URBAN AGRICULTURE IN NELSON MANDELA BAY: A CASE STUDY

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Submitted in fulfilment of the requirements for the degree Masters Technologiae in the Faculty of Business and Economic Sciences at the Nelson Mandela University

April 2018
DECLARATION

I, Bronwyn Philander, hereby declare that:

- The work in this dissertation is my own independent and original work, except where otherwise stated.

- All sources used or referred to have been documented and recognised. A complete reference list is attached.

- This dissertation has not previously been submitted in full or partial fulfilment of the requirements of an equivalent or higher qualification at any other recognised educational institution.

Students signature: B.J. Philander

Date: 5 March 2018
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ABSTRACT

Urban agriculture has gained importance due to the rise of both urban poverty and unemployment. In countries such as Malaysia, urban agriculture addresses food security by providing urban dwellers with access to nutritious, safe and cost-effective food. The rising food prices and unemployment in South Africa have put food security of the urban poor in a precarious position and whilst the benefits of urban agriculture have been researched, the main problem identified was that residents in Nelson Mandela Bay (NMB) were not practising urban agriculture. Thus, this study aims to identify the enablers and barriers of urban agriculture in NMB.

The positivism paradigm was adopted for this study. The study was an exploratory study and used Holland Park as a case study. Holland Park is situated in the centre of the city of Port Elizabeth, also known as NMB and is surrounded by Mercantile Hospital, Aspen Pharmaceutical Company, Mondelez International (previously Cadbury) and Morewag Primary School. It falls within ward seven namely the Greenacres/North End cluster of the Nelson Mandela Bay geographical area. This area consists of approximately 1189 residents and most women are housewives. This area was chosen due to the high rate of unemployment amongst women. A sample of 300 was drawn from residents in Holland Park. The selection of the respondents was based on convenience sampling. A cross sectional study was conducted and data were collected using a structured questionnaire. The measuring instrument used an existing questionnaire. The validity and reliability of the measuring instrument were confirmed using construct validity and internal reliability. Exploratory factor analysis was undertaken and six factors were extracted, namely attitude, food availability, lifestyle, awareness, perceptions and knowledge. These factors were thus identified as the enablers and barriers of urban agriculture. Data collected were subject to several statistical analyses – these included both descriptive and inferential statistics.

Pearson’s product moment correlations were conducted and findings revealed that all factors except food availability are significantly and positively correlated to the dependent variable, urban agriculture. In addition, food availability showed a negative correlation and a high positive correlation was reported between urban agriculture and knowledge. Hereafter, multiple regression analysis was performed, to
identify the strength of the effect that the independent variables, namely attitude, food availability, awareness, lifestyle, perceptions and knowledge have on the dependent variable, urban agriculture. This allowed the researcher to make conclusions as to whether the independent variables are enablers or barriers, depending on the strength of effect. Thus, the enablers identified for this study were attitude, lifestyle and perceptions. These factors were all positive and significantly related to urban agriculture. Food availability was negatively related to urban agriculture, indicating that the more residents had food available, the less they would practise or participate in urban agriculture. Thus, food availability was found to be a barrier to practising urban agriculture in NMB. Finally, awareness and knowledge (under multiple regression analysis) appeared to have not been significantly related to urban agriculture – as such it was insignificant and could not be regarded an enabler nor a barrier.

In order to establish whether relationships existed between the demographic factors (age, gender, qualification, employment status and being a breadwinner) and the independent variables (attitude, food availability, lifestyle, awareness, knowledge and perceptions) investigated in this study, an analysis of variance was undertaken. The results indicated that gender, employment status and being a breadwinner were not related to any of the factors. However, qualification had a significant relationship with attitude (p<0.000), awareness (p<0.004), knowledge (p<0.040) and perceptions (p<0.000), indicating that residents who had a post-matric qualification indicated a positive attitude towards urban agriculture and were more aware of the benefits of urban agriculture towards one’s health and the environment. Findings also revealed that having a post-matric qualification influenced residents’ knowledge with regard to growing food in a sustainable manner, such as using recyclable materials (as holding containers) when practising urban agriculture. In addition, having a post-matric qualification influenced residents’ perceptions regarding urban agriculture, these related to teaching children the importance of gardening (amongst others). In conclusion, findings indicated that residents had an interest in urban agriculture and had some knowledge with regard to growing their own fruit and vegetables.

**KEYWORDS:**

Urban agriculture, urban poverty, sustainability, food security, enablers, barriers.
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1.1 INTRODUCTION

The global population is estimated to reach over 9 billion by 2050 (Galhena, Freed and Maredia, 2013). Combined with the population growth is the conversion from primarily rural to urban living. In 2050, city dwellers are estimated to account for more than two-thirds of the world’s population with the prevailing increase taking place in the emerging countries (WEF, 2015). This increase in population requires an increase in food production, which has resulted in many studies (Deelstra and Girardet, 2000; Galhena et al., 2013; Okvat and Zautra, 2011) focusing on countries around the world, particularly emerging countries where the prevalence of hunger and food scarcity is more severe. Food systems today involve immense transportation routes and high energy requirements for storing, cooling and packaging. As a result, cities today have become too dependent on natural resources and produce too much waste. In addition, cities are confronted with an increasing number of people and, consequently an increasing number of mouths to feed. Urban agriculture therefore has a significant role in contributing to the future sustainability of cities (Deelstra and Girardet, 2000).

Okvat and Zautra (2011) state that the motivation behind urban agriculture includes safeguarding food shortages and lessening negative social impacts from factors such as unemployment. These projects thus enhance community cohesion, promote solidarity networks and build social capital. In addition, urban agriculture plays a valuable role in terms of the urban economy, urban food supply and urban development in general (Smit, Nasr and Ratta, 2001a). It also provides employment as well as an income for those involved. Urban agriculture activities are growing globally with at least 100 million individuals participating worldwide (Eigenbrod and Gruda, 2015).

In South Africa, the right to food and nutrition are entrusted within the constitution. Thus, the state and local government should essentially work together towards the realisation of such goals. However, in the case of urban agricultural projects implemented by Provincial and Local government, there has been limited monitoring
and evaluation. The number of agricultural projects, beneficiaries and inputs provided are recorded but there is no constant monitoring of agricultural outputs (Battersby, Hayson, Kroll and Tawodzera, 2015).

Nelson Mandela Bay (NMB) in the Eastern Cape, South Africa is no exception. Since 2003, R7.5 million was invested in nine agricultural projects of which 90% failed (De Kock, 2016). This creates the impression that perhaps government should rethink its funding model and support strategy.

The issues highlighted above provide the foundation for this study, which aims to address urban agriculture in NMB.

An introduction to the study has been given in the above sub-section. Through the research of literature, this chapter will address the following research questions:

- RQ1: Where does urban agriculture originate?

This research question will be addressed by satisfying the following research objective:

- RO1: To determine the origins of urban agriculture.

In delivering these outcomes, this chapter proceeds with the following chapter outline. Sub-section 1.1 has set out the introduction to this chapter. Sub-section 1.2 gives a brief background to the study by discussing the origins of urban agriculture in both the United States of America and South Africa. This sub-section further explores the importance of urban agriculture as well as the types of urban agricultural projects.

Sub-section 1.3 gives a review of related literature and explores the definition of urban agriculture as well as the advantages and disadvantages of this practise, based on previous research. Sub-section 1.4 introduces this study’s problem statement. Against this background, Sub-section 1.5 discusses the research objectives and research questions, respectively.

The research design and methodology are discussed in Sub-section 1.6 and the measuring instrument is introduced in this Sub-section. Sub-section 1.7 gives a
scope of the study and sub-section 1.8 introduces the research alignment plan (RAP). Sub-section 1.9 highlights the significance/intended contribution of this study. Sub-section 1.10 introduces and outlines the definition of key concepts. Subsections 1.11 and 1.12 introduce the structure of the research. Finally, Sub-section 1.12 concludes Chapter 1 by giving a summary and highlighting the research questions and objectives achieved in Chapter 1.

An overview of Chapter 1 is outlined in figure 1.1 below.

Figure 1.1: Overview of Chapter 1 in the context of this study
1.2 BACKGROUND TO THE STUDY

This section discusses urban agriculture in the United States as well as South Africa, the importance of this practise as well as the types of urban agricultural projects.

1.2.1 Urban agriculture in the United States of America

The idea of food production beyond our rural homelands is not new and has been significant in times of war and the Great Depression, when problems of food shortages occurred, particularly in the United States of America (USA). Research suggests the City of Detroit laid the groundwork for the long history of urban agriculture in the 1700’s, when the French used a technique called ribbon farming alongside the Detroit River (Adamo et al., 2014). This was a narrow, single-family plot that had riverfront access and stretched inland with shallow ditches – splitting its borders from its neighbours.

Greenbaum (2014) states that throughout American History, citizens often turned to gardening in response to times of financial difficulty. One such success was highlighted in 1893, when an economic depression shook Detroit. This depression increased unemployment, particularly among unskilled immigrant labourers (Adamo et al., 2014; Lawson, 2005). As a result, then Mayor, Hazen Pingree called for unoccupied lots to be used as gardens by the unemployed; as means of providing basic subsidence and occupying idle hands. The project was a success and nearly every major American City replicated Detroit’s experiment (Adamo et al., 2014; Lawson, 2005).

Similarly, during and after World Wars I and II, in the face of scarcities of food, energy and raw materials in the USA, women took the leading role in agriculture and gardening. Wartime agricultural movements such as the war gardens and liberty gardens of World War I and the victory gardens of World War II created new opportunities for women – and challenged gender norms within a male dominated society (Greenbaum, 2014). By the end of the war, nearly twenty million Americans had their own gardens and 40% of produce sold in the United States was home grown (Adamo et al., 2014; Lawson, 2005; George, 2013).

Whereas urban agricultural activities were used as coping mechanisms in the United States during the wars, most South Africans were introduced to this concept at a
young age, either through education, circumstances and or family. The next section will now explore urban agriculture in the South African context.

1.2.2 Urban agriculture in South Africa

Agriculture is observed as a vital means through which poverty and unemployment can be addressed. Prior to the founding of the democratic government in 1994, Agricultural Education and Training (AET) were administered under the Bantu Education Act No. 47 of 1953. This legislation imposed a separate curriculum for diverse racial groups in the country (DoA, 2005: 8). Most schools overseen under the Bantu Education taught agriculture as a subject combined with other non-scientific ones such as History, Biology, Geography and Biblical Studies. Thus, South Africans were fortunate enough to learn a basic skill that could sustain their livelihood.

Since the formation of the democratic South African government in 1994, unrealistic policies and programmes, strategies and agricultural education, as well as training governance structures have been implemented (Didiza, 2005: 1). The launch of the National Agricultural Education and Training Strategy was hurled in 2005, with the purpose of addressing the needs of the country’s economy and the upgrading of Agricultural production – through quality agricultural education and training. Yet not much growth has taken place in the urban areas. Where urban agricultural projects were implemented, monitoring and training was often not well facilitated – leading to high failure rates in some cities.

Urban agriculture serves an important role in the economic, social and dietary life of most cities in sub-Saharan Africa (Schmidt, 2012). According to Rogerson (2011), in the early 1980’s, 10-25% of the urban population in Africa practised urban agriculture.

Worldwide this practise is known as one of the approaches poor urban residents implement to reduce poverty and improve their food security (Rogerson, 2011). Studies have indicated that this is also the case in South Africa (Van Averbeke, 2007). Rogerson (2011) is of the opinion that the majority of urban farmers in South Africa produce food as part of their survival strategy. This is confirmed by Martin, Oudwater and Meadows (2000), who report that urban agriculture in Pretoria and Cape Town specifically, tend to be associated with the lack of formal sector
employment and aimed at the production of food for home consumption, which enabled households to save on food expenditure. Their study further reported that not only was urban agriculture important for food security in households but urban farming performed other important functions such as social, cultural, developmental, aesthetic and environmental.

1.2.3 The importance of urban agriculture

Urban agriculture is important for several reasons. It is one mechanism that plays a role in the access to and distribution of food in urban areas (Lee-Smith, 2010). This bridges the hunger gap in many instances. This practice furthermore generates an income for those involved and assists with poverty reduction. Urban agriculture also contributes significantly to food security.

In addition, urban agriculture assists with waste and nutrient recycling and water management. It has a positive effect on biodiversity (Deelstra and Girardet, 2000). Urban agriculture can help contribute to reducing the net discharge of carbon dioxide, which is one of the gasses that contribute significantly to global warming. This practice can also change the perception of people in cities regarding food. They can become more health conscious and save on their monthly budgets. This would be beneficial, considering the current financial crisis in South Africa.

1.2.4 The types of urban agricultural projects

Depending on the time, space and capacity available, those participating in urban agriculture have found rather interesting and unique ways of growing their crops. Backyard gardens are predominantly private gardens. Community gardens are either self-managed or neighbourhood groups. The latter usually provide crops to those within the vicinity. This is similar to school gardening (SF Environment, n/d: 1).

Vertical farming involves cultivating plants on vertically inclined surfaces (Despommier, 2010). This involves large scale food production and has a strong marketing orientation. In contrast, rooftop gardening can be organised for private use. These are commonly found in restaurants and cities such as Chicago, USA. Households have in the past also practiced container gardening due to space limitations. This allows them to not only save money but also cook with fresh produce without having to pay for its distribution and packaging.
Aerts, Dewaelheyns and Achten (2011) summarises the types of urban agricultural projects in the Table below.

Table 1.1 Typology of urban agriculture

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
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<tr>
<td>Private garden</td>
<td>Private food-producing gardens located in the front or backyard, rooftop, courtyard, balcony, fence, wall, window sill, or basement of a private single-family or multi-family residence, attended to by an individual or gardening business. End products are typically used for personal consumption.</td>
</tr>
<tr>
<td>Community garden</td>
<td>Small- to medium-scale production of food-producing and ornamental plants, on contiguous or discontinuous plots of land, located on public or private property in residential areas, gardened and managed collectively by a group. Gardening activities and end products are typically used for consumption or education; however, they may also be sold on- or off-site, depending on local government regulations and the goals of the garden as a collective effort.</td>
</tr>
<tr>
<td>Institutional garden</td>
<td>Small to large food-producing gardens or orchards located on private or public institutional property (school, hospital, faith-based organization, workplace) in a residential, commercial or mixed-use area, gardened by an organization or business. The process of gardening is typically used for educational, therapeutic and community service purposes — including, but not limited to, nutrition education, environmental stewardship, and community ministry. The end products are typically used for donation or consumption. Depending on local government regulations, they may also be sold on- or off-site at a stand, market, or store to financially support the garden’s specific activities.</td>
</tr>
<tr>
<td>Demonstration garden</td>
<td>Small food-producing garden located on private property (school, hospital, faith-based organization, workplace) or public property (park, school, and other civic space in a residential, commercial, or mixed-use area for public demonstration purposes only, gardened by a local government agency, community organization, or business. End products are typically donated to local organizations and food banks.</td>
</tr>
<tr>
<td>Edible landscape</td>
<td>The use of food-producing plants in the design of private and public outdoor spaces in residential, commercial, and mixed-use developments, attended to by an individual or business. End products are typically used for consumption.</td>
</tr>
<tr>
<td>Guerrilla garden</td>
<td>Unauthorized appropriation and cultivation of food-producing or ornamental plants on unmended, abandoned, or vacant private or public land by an individual or group. End products are typically used for neighborhood revitalization purposes.</td>
</tr>
</tbody>
</table>

Source: (Aerts et al., 2016: 2)

The background of this study firstly focused on a brief history of urban agriculture in both the United States of America and the South African context. Secondly, it highlighted the importance of this practise. In conclusion, it discussed the types of agricultural projects, which are mainly dependent on space and availability. The study now outlines the review of related literature.

**1.3 REVIEW OF RELATED LITERATURE**

Collis and Hussey (2009) describe the literature review as the process of exploring literature to ascertain what has been written, or published on the topic researched. In this section a brief overview is provided of the definition of urban agriculture and also the benefits, based on previous studies conducted.
1.3.1 The definition and background of urban agriculture

Urban agriculture is the practice of cultivation, processing and allocating food in or around a village, town or city. Smit, Nasr and Ratta (2001b) describe it as the practice of producing food for consumption within urban and suburban areas.

The mass monoculture production and distribution of food, introduced by the green revolution, has created a food system far removed from citizen “average” (Campbell, 2013), resulting in higher food prices and food insecurity in many households. Urban residents, particularly in inner cities need a stable salary to survive and safeguard food security for themselves and their families. According to De Swart, Puoane, Chopra and du Toit (2005), five sources of income exist in South Africa, namely: wages, grants, temporary employment, self-employment and other sources of income. Wages and social grants constitute the largest sources of income at 60% and 17%, respectively.

Due to the increase of urbanisation, most people have had to adjust their budgets and make provision for factors such as food, accommodation, transport and electricity (Van der Merwe, 2011). Figure 1.2 presents this data and indicates that high expenditure on such factors means that people have less money to spend on necessities for ensuring a healthy and sustainable livelihood (Van der Merwe, 2011). Thus, people purchase food depending on what they can afford and not necessarily, what is considered fresh and healthy.

![Figure 1.2: Average income expenditures in cities of South Africa (in ZAR).](image)

*Source: Van der Merwe (2011: 5).*
The contribution of urban agriculture to food security has been researched and documented in many countries. The advantages and disadvantages of urban agriculture are discussed in Section 1.3.2.

### 1.3.2 The advantages and disadvantages of urban agriculture

Urban agriculture initiatives buffer food shortages, mitigate negative social impact from unemployment and enhance community cohesion (Okvat and Zautra, 2011; Borowy, 2013). Crime is one negative social impact which results from unemployment. Thus, such initiatives would create employment, food security and reduce crime in communities.

Research shows a direct link between admittance to healthier food and the prospect for added income through urban agriculture (Hagey, Rice and Flournoy, 2012). Urban agriculture offers an opportunity to impact on issues such as poverty, inequality and unemployment (Crush and Frayne, 2010).

Research conducted by Gamhewage et al. (2015), suggests that urban women in Sri Lanka have reduced an average 51.42% of expenditure on vegetables. Figure 1.3 suggests that there was a reduction of expenditure on food per month, indicating the difference urban agriculture made to their monthly budget.

![Figure 1.3: Average monthly expenditure on family food consumption](source: Gamhewage et al. (2015: 201)).

The figure above displays the financial benefits of urban agriculture and its distinct contribution to food security in average households. Based on Figure 1.3, Table 1.2
shows the actual reduction on food per month via the harvest of urban agriculture. This indicates the reduction of household’s budget to necessities.

Table 1.2: Reduction of expenditure on food per month via harvest of urban agriculture

<table>
<thead>
<tr>
<th>Food item</th>
<th>Expenditure reduction per month [as a percentage]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetables</td>
<td>51.42%</td>
</tr>
<tr>
<td>Fruits</td>
<td>25.93%</td>
</tr>
<tr>
<td>Meat</td>
<td>11.74%</td>
</tr>
<tr>
<td>Milk</td>
<td>10.75%</td>
</tr>
</tbody>
</table>

Source: Gamhewage et al.(2015:201).

Although urban agriculture brings benefits, there are constraints that hamper participation. Gamhewage et al. (2015) suggest that insufficient time for agricultural activities is the main excuse. People perceive urban agriculture as an additional task to their daily lives, despite the benefits it yields. Galhena, et al. (2013) research acknowledged the access to appropriate and sufficient land to establish urban agriculture along with absence of ownership and usage rights of some form as the most significant limiting factors. The other constraints include access to capital or credit, access to water, seeds and planting materials, weak extension and advisory services, access to labour and access to markets. Adedayo and Tunde (2013) have also identified the high cost of irrigation as well as a shortage of water supply as a disadvantage for urban agriculture. This could be a major concern for households as well. In addition to seeing it as an extra task, residents could perceive gardening as an extra water expense.

Moreover, Adedayo and Tunde (2013) identified factors such as seasonal rainfall, lack of storage facilities, inadequate extension, excessive pest and diseases as additional barriers to urban agriculture. Wild (2013) suggests that it is difficult to practise urban agriculture as people have limited skills and knowledge on how to grow their own crop.

There is a stigma attached to urban agriculture or rather gardening. This may stem from childhood – such as gardening punishment or the belief that the less fortunate
only practices such initiatives. The cultural acceptance of home gardening or urban agriculture is also an important constraint (Galhena et al., 2013).

The above highlights that urban agriculture despite its disadvantages has many advantages. With the average cost of living increasing, consumers are paying high prices for daily essentials. Koen (2016) suggests that consumers are concerned with the increase in prices of vegetables and meat products. Globalisation has further alienated consumers from their food, but lately there has been a shift back towards urban agriculture, due partly to a growing ecological consciousness and partly to economic necessity.

The literature consulted mainly focused on the advantages and disadvantages of urban agriculture, based on previous studies conducted. Based on the introduction, background and overview of literature the problem statement of the study is addressed in the next section.

1.4 STATEMENT OF THE PROBLEM

Between 1991 and 2001, South Africa experienced an influx of rural to urban migration. Black people who were previously confined to living in designated rural homelands by legislation moved to urban areas (Boraine, et al. 2006). Almost 15 years later, the South Africa population is more than 60% urbanised. Whereas food poverty has historically been associated with rural communities, with sustained urbanisation, the locus of poverty has shifted from rural to the urban areas (Frayne, Battersby-Lennard, Fincham and Hayson, 2009). The recent sharp rise in food prices, together with the economic downturn, suggests that poor urban households are experiencing a widening food-gap or rather, food insecurity.

The latest South African census data indicate a simultaneous increase in urban population and levels of unemployment (Lehohla, 2009). Both factors contribute to food insecurity. Food security is the physical and economic access to sufficient and nutritious foods (Van der Merwe, 2011) – thus food insecurity is the lack thereof. Battersby, et al. (2015a) suggest that South Africa is food secure at a national level but not at a household level.

With the growth in family sizes and the current economic crisis in South Africa, many families have been struggling to make ends meet. The South African National Health
confirmed this and the Nutrition Examination Survey (SANHES) conducted in 2013, found that 28.3% of South Africans were at risk of hunger and a further 26% actually experienced hunger.

A study conducted by the Heart and Stroke foundation of South Africa in 2016, suggests that escalating food costs affect the diets and health of consumers (Govender, 2016). This study further indicates that South Africans are more likely to suffer from diseases such as diabetes, high blood pressure, heart disease and strokes. Govender (2016) concludes that consumers have less money to buy meat, dairy products and vegetables. Thus, consumers purchase food depending on what they can afford instead of what is considered healthy and nutritious.

The Food and Agricultural Organisation (FAO) of the United Nations promotes urban agriculture as being highly relevant to alleviating food insecurity in cities (Campbell, 2013; Argenti, 2000). Urban agriculture has furthermore been the focus of a few South African studies (Campbell, 2013; Richards and Taylor, 2012; Centre for Development, 2009) and research shows a direct link between access to healthier food and opportunities for additional income through urban agriculture (Campbell, 2013). Literature also suggests that studies regarding the importance, benefits and disadvantages of urban agriculture have been conducted (Smit et al. 2001a; Waliczek, Mattson and Zajicek, 1996; Bellows, Brown and Smit, 2004).

From the above literature, the researcher concludes that there is an increase of food insecurity as a result of rapid urbanisation – urban agriculture could assist in providing food security. Despite the benefits and the importance of urban agriculture, the problem identified is that residents in Nelson Mandela Bay do not practise urban agriculture. As far as can be established, little if any, research has been conducted regarding the enablers and barriers of urban agriculture in Nelson Mandela Bay (NMB). Thus, the purpose of this study is to identify the enablers and barriers to urban agriculture in NMB – in hopes to address why residents in NMB do not practise urban agriculture.
1.5 RESEARCH OBJECTIVES

1.5.1 Main research objective

The main objective (ROm) of this study is to investigate urban agriculture practices in NMB.

1.5.2 Secondary research objectives

In support of the main research objective, the secondary (sub) objectives of the study are as follows:

- RO1: To determine the origins of urban agriculture;
- RO2: To identify the advantages and disadvantaged of urban agriculture;
- RO3: To identify the barriers and enablers of urban agriculture;
- RO4: To identify and explain the research methodology used for this dissertation, enabling reproduction for the future;
- RO5: To determine the residents’ perceptions of urban agriculture;
- RO6: To provide pertinent conclusions based on findings; and
- RO7: To determine how urban agriculture practices could be promoted in NMB.

1.5.3 Main research question

The main question (RQm) of this study is: “What are the urban agriculture practices in NMB?”

1.5.4 Secondary research questions

In support of the main research question, the secondary questions of the study will be:

RQ1: Where does urban agriculture originate?
RQ2: What are the advantages and disadvantaged of urban agriculture?
RQ3: What are the barriers and enablers of urban agriculture?
RQ4: What is the appropriate research methodology to be used for this dissertation, enabling reproduction in the future?
RQ5: How do residents in NMB perceive urban agriculture?
RQ6: What are the enablers and barriers of urban agriculture in NMB?
RQ7: How can urban agricultural activities be promoted to residents in NMB?

1.6 RESEARCH DESIGN AND METHODOLOGY

As mentioned in the problem statement, this study aims to address urban agriculture in Nelson Mandela Bay (NMB). Previous studies have not been conducted in NMB. The study will be exploratory. The Holland Park area is used as a case study for this study.

Holland Park is situated in the centre of the city of Port Elizabeth, also known as NMB and is surrounded by Mercantile Hospital, Aspen Pharmaceutical Company, Mondelez International (previously Cadbury) and Morewag Primary School. It falls within ward seven, namely the Greenacres/North End cluster of the Nelson Mandela Bay geographical area as indicated in the map below.

![Map of Holland Park, NMB.](source: Google Maps (2017).

This area consists of approximately 1 189 residents (NMB Census, 2011). This area was chosen due to the high rate of unemployed women in the area and because such a project could assist in ensuring that households are more food secure. In addition, urban agriculture projects could foster community cohesion.

The research design and methodology for this study is based on Saunders, Lewis and Thornhill’s (2007) research onion. Saunders et al. (2007) use an onion metaphor, which outlines progressive layers that the researcher must investigate and select during the research process (Saunders et al., 2007). The first layer of the research onion involves the selection of a research philosophy. Thereafter, moving inwardly, each of the remaining five layers namely, the research approaches,
strategies, choices, time horizons and techniques and procedures are discussed and selected, respectively. The research onion, which is referred to throughout this chapter is illustrated in Figure 1.5.

![Research Onion Diagram](image)

**Figure 1.5: The research onion**  
*Source: Saunders et al. (2007:108)*

### 1.6.1 The research paradigm

Research paradigms offer a framework comprising of an accepted set of theories, methods and ways of defining data (Collis and Hussey, 2009). According to Saunders et al. (2007), choosing this philosophical framework is the initial step in the research process and is the first outer layer of the research onion.

The research philosophy contains important assumptions about how the researcher views the world. Although there are more than two paradigms from which a researcher can select, the two most popular philosophies include Positivism and Interpretivism (Saunders et al., 2007). The positivistic paradigm is based on the belief that reality is independent of the researcher and the goal is the discovery or validation of theories – based on empirical research. Furthermore, this approach uses quantitative methods of data analysis which provide logical or mathematical proof (Collis and Hussey, 2009). The interpretivistic paradigm, on the other hand, explores the complexity of social constructs to increase meaning (Saunders et al.,...
The research methods used under this approach are interpretive and aim to describe, translate and come to terms with meaning – thus qualitative methods of data analysis such as opinions, views and experiences are explored (Collis and Hussey, 2009).

Based on the above, the researcher uses the positivistic approach for the purpose of the study. This approach is best suited, as the researcher will be conducting a quantitative study.

1.6.2 The research approach

The two main approaches are referred to as deductive and inductive. This study will make use of the deductive approach. The deductive approach aims to test theories whereas an inductive approach is concerned with the formulation of new theory, emerging from the data (Gabriel, 2013). This study will make use of the deductive approach as there is existing theory/literature on urban agriculture.

1.6.3 The research strategy

This pertains to how data are collected for the study. This study aims to address urban agriculture in Holland Park, NMB. In other words, it will address the main research question: What are the urban agriculture practices in NMB?

In light of the above, the study will collect data by means of a survey. Saunders et al. (2007) state that surveys are popular as they allow for the collection of large amounts of data and are relatively cost effective.

1.6.4 The research choice

The research choice is determined by the number of research approaches used in the study. As this study will only use the deductive approach, it is considered a mono method.

1.6.5 The research time horizon

This outlines the time-frame. A study can either be conducted over a long period of time (longitudinal) or at a single point in time (cross-sectional). This study will adopt the cross-sectional time horizon as it will obtain information on variables in different contexts, but at the same time.
1.6.6 Research techniques, procedures and ethics

The researcher will collect data by means of a structured questionnaire. The research is quantitative. Collis and Hussey (2009), describe a questionnaire as a list of carefully structured questions, chosen after considerable testing with a view to obtain reliable responses from a chosen sample. The aim is to find out what participants do, think and feel.

Group distribution will be used as this method is appropriate when a survey is being conducted in one or a few locations. The questionnaire will be distributed by selected residents of Holland Park. The residents will be trained. Church groups, stockvels and community centres will be targeted as this is where the community will be reached. It will be emphasised that participation is voluntary and that responses will be treated as confidential, with residents remaining anonymous. Full ethics clearance was applied for through the Nelson Mandela University ethics committee. It was approved on 13 April 2017 and the ethics clearance reference number for this study is H-17-BES-MGT-006 (see Appendix C).

1.6.7 The sampling method

For this specific study the population is all members residing in the Holland Park area. The researcher will attempt to reach a sample of 300. Saunders et al. (2007) state that the larger the sample the more likely that the generalisations are an accurate reflection of the population.

Non-probability convenience sampling is used for this study. According to Kothari (2004), convenience sampling is a sampling technique where respondents are selected, because of convenient accessibility and proximity to the researcher. The advantages of this sampling method include the speed of data collection as well as the easy recruitment of respondents.

1.6.8 Validity

Validity is the extent to which the research findings accurately represent what is actually happening in the situation (Collis and Hussey, 2009). Salkind (2000) states that it is necessary to make sure that a measuring instrument is valid before it can be used in a specific study. Jackson (2011) states that there are several ways of
assessing or measuring the validity of a scale, namely criterion validity, content validity and construct validity.

Criterion validity measures the extent to which a test estimates present performance or predicts future performance (Van Zyl, 2014). Whereas the content validity of a measuring instrument refers to the extent or degree to which the content of the items provides sufficient representativeness of all relevant items or questions guiding the study (Cooper and Schindler, 2014). Finally, construct validity is established to determine whether a scale measures or correlates with the theoretical construct that it is supposed to measure (Andrew, Pedersen and McEvoy, 2011).

This study used an existing questionnaire as a guideline, the questionnaire was formulated by Dr Tornaghi in 2012 and addressed urban agriculture, social cohesion and environmental justice (Tornaghi 2012). Furthermore, construct validity was the method used to assess the validity of the measuring instrument. Factor analysis was performed to assess the construct validity of the measuring instrument in this study. According to Hair, Black, Babin and Anderson (2014), factor analysis is a technique that provides summarised information relating to original variables into a smaller set of new dimensions or factors. Hair et al. (2014) conclude that factor analysis can be used to analyse interrelationships among a large number of variables.

1.6.9 Reliability

Reliability is the consistency, dependability and duplicability of a measure (Landy and Conte, 2012). A measure is considered reliable if it provides accurate and consistent results overtime. Reliability can be measured using two techniques namely test and re-test, which repeats an event to determine if the same or similar results are recorded. One can also make use of the measures of internal consistency. This approach is mostly used in quantitative research and involves the use of a statistical technique, Cronbach’s alpha. Questions within the measuring instrument are tested statistically to determine how reliably they measure the predetermined variables (Tavakol and Dennick, 2011). A high coefficient value indicates a high internal consistency while a low coefficient indicates the opposite. Nunnally (1978) however indicates that a Cronbach alpha coefficient of 0.50 is considered acceptable for the basic exploratory research (Tavakol and Dennick, 2011).
Researchers have defined the following guidelines presented in Table 1.3 below.

Table 1.3: Levels of reliability (Cronbach alpha)

<table>
<thead>
<tr>
<th>Cronbach alpha coefficient</th>
<th>Level of reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.50</td>
<td>Poor reliability</td>
</tr>
<tr>
<td>0.60</td>
<td>Fair reliability</td>
</tr>
<tr>
<td>0.70</td>
<td>Good reliability</td>
</tr>
<tr>
<td>0.80</td>
<td>Very good reliability</td>
</tr>
</tbody>
</table>

*Source: Author’s own construction based on Zikmund et al. (2013)*

For the purpose of this study, internal consistency and Cronbach’s alpha coefficients are calculated to ensure reliability of the measuring instrument.

**1.6.10 The measuring instrument**

As was mentioned in the research design and methodology section of the study, a structured questionnaire is used to collect data. The researcher makes use of both open ended and close-ended questions.

The first section of the questionnaire (Section A) requested demographic information from respondents. The second section (Section B) asked respondents about their household structures. Section C addressed respondents’ perceptions/understanding regarding urban agriculture. Finally, Section D of the questionnaire collected data regarding respondents understanding of innovative/sustainable gardening (see Appendix B).

The researcher uses dichotomous and 5-point Likert scale questions. As previously mentioned, this study uses an existing questionnaire which, was used as a guideline in the creation of the measuring instrument used in this study. The questionnaire was also operationalised from the literature.

**1.7 SCOPE OF THE STUDY**

This section indicates the limitations of the research. The main objective of this study is to investigate urban agriculture in Nelson Mandela Bay using Holland Park as a case study. Holland Park is situated in the centre of the city of Port Elizabeth, also known as NMB and is surrounded by Mercantile Hospital, Aspen Pharmaceutical
Company, Mondelez International (previously Cadbury) and Morewag Primary School. It falls within ward seven namely the Greenacres/ North End cluster of the Nelson Mandela Bay geographical area. Thus data collection will be restricted to men and women of all races, residing in Holland Park, aged 18 and above, by means of a structured questionnaire. The research is exploratory and will be extended to other areas in the NMB in future research studies.

1.8 THE RESEARCH ALIGNMENT PLAN

This study aims to address the main and secondary research questions (RQ's) by satisfying the corresponding main and secondary research objectives (RO’s). Each research question, objective and deliverable are highlighted in Table 1.4 below namely the research alignment plan (RAP).

*Table 1.4: The research alignment plan*

<table>
<thead>
<tr>
<th>Secondary Research Questions</th>
<th>Research Objectives</th>
<th>Chapters</th>
<th>Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>RQ1 Where does urban agriculture (UA) originate?</td>
<td>To determine the origins of urban agriculture</td>
<td>Chapter 1 (Introduction)</td>
<td>History of urban agriculture</td>
</tr>
<tr>
<td>RQ2 What are the advantages and disadvantages of urban agriculture?</td>
<td>To identify the advantages and disadvantages of urban agriculture</td>
<td>Chapter 1 (Introduction)</td>
<td>The advantages and disadvantages of urban agriculture</td>
</tr>
<tr>
<td>RQ3 What are the barriers and enablers of urban agriculture?</td>
<td>To identify the barriers and enablers of urban agriculture</td>
<td>Chapter 2 (Literature review)</td>
<td>Barriers and enablers of urban agriculture</td>
</tr>
<tr>
<td>RQ4</td>
<td>What is the appropriate research methodology to be used for this dissertation enabling reproduction in the future?</td>
<td>To identify and explain the research methodology used for this dissertation, enabling reproduction for the future</td>
<td>Chapter 3 (Research methodology)</td>
</tr>
<tr>
<td>-----</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>RQ5</td>
<td>How do residents in NMB perceive urban agriculture?</td>
<td>To determine the residents’ perceptions of urban agriculture</td>
<td>Chapter 4 (Data analysis and interpretation)</td>
</tr>
<tr>
<td>RQ6</td>
<td>What are the enablers and barriers of urban agriculture in NMB?</td>
<td>To provide pertinent conclusions based on findings</td>
<td>Chapter 5 (Findings, recommendations and conclusions)</td>
</tr>
<tr>
<td>RQ7</td>
<td>How can urban agricultural activities be promoted to residents in NMB?</td>
<td>To determine how urban agriculture practices can be promoted</td>
<td>Chapter 5 (Findings, recommendations and conclusions)</td>
</tr>
</tbody>
</table>

### 1.9 SIGNIFICANCE/CONTRIBUTION OF THE STUDY

This study aims to make the following contributions firstly, the identification of enablers and barriers of urban agriculture can assist as a point of reference for new urban agriculture projects in NMB. Information gathered can assist Municipalities when budgets are allocated to agricultural projects.

Secondly, residents in and around NMB can be made aware of the benefits of such initiatives. Furthermore, in light of the current violent activities in Holland Park and surrounding areas, such an initiative could assist in re-establishing community cohesion and keep the youth busy and develop entrepreneurs according to the theory of Social Capital.

In conclusion, this study could identify a gap and present new employment opportunities in our currently over-crowded urban areas.
1.10 DEFINITION OF KEY CONCEPTS

This sub-section provides definitions of the key terms used in this study.

1.10.1 Barriers

In this study, barriers refer to circumstances and views that hinder the practice of urban agriculture in NMB.

1.10.2 Enablers

In this study, enablers refer to conditions or beliefs that foster the practise of urban agriculture in NMB.

1.10.3 Food security

For the purpose of this study, food security refers to the physical and economical access to sufficient, safe and nutritious food (FAO, 1996).

1.10.4 Sustainability

Relates to the concept of making informed decisions that balance our environment, economy and social equity (Bradshaw, 2013).

1.10.5 Urban agriculture

For the purpose of this study, urban agriculture relates to the practise of growing fruit and vegetables in or around a village, town or city.

1.10.6 Urban poor

The inability of urban residents to access nutritional food due to expenditure on other non-basic essentials (Goodfellow and Taylor, 2009).

1.11 STRUCTURE OF THE RESEARCH

This sub-section provides a brief outline of the content within each chapter of the study.

Chapter 1 provides an introductory background of the study under investigation. A brief review of related literature is explored, which introduces the problem statement of this dissertation. The research questions and objectives of the study are introduced. In addition, the scope as well as the significance/contributions are highlighted. This chapter concludes with definitions of the most important concepts used in the study and an overview of the content to follow.
Chapter 2 provides an overview on the nature of urban agriculture. This chapter aims to address RQ2, namely, “What are the barriers and enablers of urban agriculture?”

Chapter 3 explains the research design and methodology adopted for this study as well as the motivation of the chosen methodology. The research paradigm, population, sample and sampling methods are discussed before introducing the measuring instrument. The primary and secondary data collection methods and strategies are explored. In conclusion, a discussion of the statistical techniques used to analyse the data collected from the empirical study are provided.

Chapter 4 presents the empirical results of this study. The reliability and validity of the measuring instrument are confirmed in this chapter. Both descriptive and inferential statistics are presented and discussed accordingly in this chapter.

Chapter 5 is the final chapter of the study and provides an overview of the entire dissertation. Conclusions and recommendations based on both the literature review and empirical findings are made. Furthermore, the enablers and barriers to urban agriculture in NMB are discussed in accordance to the empirical results and statistical tests conducted. This study also makes recommendations on how urban agricultural practices could be promoted, in NMB. In conclusion, the contributions and possible shortcomings are provided in this chapter.

The research questions and objectives for this chapter are illustrated in Figure 1.6 below.
1.12 CHAPTER SUMMARY

This chapter set out to address RQ1 and 2, “Where does urban agriculture originate?” and “What are the advantages and disadvantages of urban agriculture?” This was achieved by satisfying RO1 and 2, namely to determine the origins of urban agriculture and to identify the advantages and disadvantages of urban agriculture. In highlight of the above, this chapter covered the following topics.

Sub-section 1.1 introduced the study and provided the foundation for this research, which aims to address urban agriculture in Nelson Mandela Bay (NMB). Sub-section 1.2 provided a background on urban agriculture. Under this sub-section, the start of urban agriculture was highlighted in both the United States of America and South Africa. Furthermore, the importance of urban agriculture as well as the types of urban agricultural practices were explored. Sub-section 1.3 gave a brief review of
related literature and discussed both the advantages and disadvantages of urban agriculture. The preceding sub-sections provided the foundation for the problem statement, which was discussed in Sub-section 1.4. The problem identified was that residents in NMB were not practicing urban agriculture. Based on this statement, this study aims to identify the enablers and barriers of urban agriculture.

Sub-section 1.5 introduced the research objectives, followed by Sub-section 1.6 which outlined the research design and methodology. Amongst other topics, this subsection discussed the proposed research paradigm, approach and strategy. In addition, the concepts of validity and reliability were discussed before the measuring instrument was explored. Sub-section 1.7 discussed the scope of the study. It was stated that this study will use Holland Park as a case study, thus primary data will only be collected from residents in Holland Park, in the Nelson Mandela Bay. The research alignment plan (RAP) was introduced in Sub-section 1.8. This RAP explained the research questions and objectives in a table format and illustrated the chapters and deliverables of each question and objective. Sub-section 1.9 explored the significance/contributions of the study. The key concepts were defined in Sub-section 1.10. Definitions were provided for key concepts such as urban agriculture, sustainability, food security, enablers and barriers. The structure of the research was discussed and in Sub-sections 1.11. Finally, sub-section 1.12 concluded with a summary of this chapter. This summary contained the main topics that were addressed in each of the chapter’s main sub-sections.

In the following chapter, Chapter 2, urban agriculture is discussed. In doing so, the relationships, specifically perceptions, innovation/sustainability, resources and food security are identified, from the literature. In doing so, Chapter 2 addresses research question 3, stating “What are the barriers and enablers of urban agriculture?” Chapter 2 addresses this research question through achieving research objective 3, namely “To identify the barriers and enablers of urban agriculture”. These research questions and objectives are therefore addressed and achieved by performing a literature review on urban agriculture and specifically the variables, namely perceptions, sustainability/innovation, resources and food security.
CHAPTER TWO  
LITERATURE REVIEW

2.1 INTRODUCTION

Chapter 1 provides an overview of the entire study. It highlights the research questions, objectives as well as the significance of this dissertation. This chapter will commence with the literature review by examining urban agriculture.

Urban agriculture is widely upheld as a solution to the food-crisis facing increasing metropolitan populations (Stewart et al., 2013). It provides the urban poor with food and a source of potential income, whilst improving the urban environment. Bringing people together, building communities and improving neighbourhoods are some of the reasons why urban agriculture empowers participants (Lazarus, 2000). Greenberg and Schneider (1996) found that social engagement through urban agriculture is positively correlated with personal attention to health care and wellness. Furthermore, urban agriculture teaches job skills and offers entrepreneurial opportunities (Halweil, 2004; Kaufman and Bailkey, 2000).

Through the research of the literature, this chapter will address the following research question:

- RQ3: What are the enablers and barriers to urban agriculture?

This research question will be addressed by satisfying the following research objective:

- RO3: To identify the barriers and enablers of urban agriculture.

In delivering these outcomes, this chapter proceeds with the following chapter outline. Sub-section 2.1 provides a brief review of what was covered in Chapter 1 and introduces the research questions and objectives that will be addressed and satisfied in Chapter 2. A brief chapter layout and topics to be covered within each proceeding sub-section are provided. Sub-section 2.2 gives an introduction into South Africa’s current phenomena on food security and government policies. Sub-section 2.3 explores the concept of urban poverty and leads to the introduction of urban agriculture, which is discussed in Sub-section 2.4. The concept of barriers and
enablers are defined and explored in Sub-section 2.5, this also introduces the proposed hypothesis. Sub-section 2.6 introduces the conceptual model for urban agriculture in NMB. Sub-section 2.7 concludes the chapter and discusses the main deductions drawn from each sub-section.

Figure 2.1 depicts the research questions and objectives that are addressed and achieved in Chapter 2.
An overview of this chapter is illustrated in Figure 2.2.
2.2 GOVERNMENT AND POLICIES: Urban agriculture and food security in South Africa

South African municipalities are faced with the policy dilemma of responding to the rapid growth of urbanisation. The influx of migrants into cities has seen the ending of decades of restrictive apartheid, which artificially held down the level of urbanisation (Gelderbloem, 2003; Todes, Kok, Wentzel, Van Zyl and Cross, 2008). This has been one of the many reasons why South Africa has been described as one of the most populous and urbanised countries in Africa (Turok, 2012); with major Metropolitan areas and some of the rapidly growing secondary cities being the main focus of migration (Edmonds, 2013). This rapid urbanisation goes hand in hand with the increase in urban poverty and urban food insecurity.

Despite the post 1994 government recognising the problems of urbanisation, it is no secret that cities have less capacity than needed to respond to these challenges (Todes et al., 2008); with South African cities confronting the limits on delivering new housing and basic services – one being access to food. Turok (2012) suggests that the policies in place have been too short-term and sector specific to bring about significant settlement restructuring.

In terms of food security, research suggests that South Africa has nearly 23% of households in food deficit and a further 5% facing severe inadequate access to food (John-Langba, 2012). This despite the policies and plans drafted by our government, regarding food security and alleviating poverty. According to Battersby et al. (2015b), five key strategies and programmes have driven the State’s role in food security, namely:

- The Integrated Food Security Strategy, which is housed in the Department of Agriculture, Forestry and Fisheries;
- The Integrated Nutrition Programme, housed in the Department of Health;
- The National School Nutrition Programme, housed in the Department of Basic Education;
- National Policy on Food and Nutrition Security (NPFNS); and
- National Development Plan (NDP).
These national strategies have informed the way in which food security is articulated by the state in its broader strategic documents. A brief summary of these five national policies follows, to highlight governments’ involvement/proposed involvement in ensuring that residents within South Africa have food to eat, which is one of their basic needs.

2.2.1 Integrated Food Security Strategy (IFSS)

The vision of the IFSS is to attain universal physical, social and economic access to sufficient, safe and nutritious food by all South Africans – at all times; in order to ensure an active and healthy lifestyle (DoA, 2005). The goal was to eradicate hunger, malnutrition and food insecurity by 2015 – with strategic goals outlined as follows:

a) Growth in household food production and trading;
b) Progress revenue generation and job creation opportunities;
c) Improve nourishment and food safety;
d) Intensification of safety needs and food emergency management systems;
e) Advance analysis and information management system;
f) Offer capacity building; and

g) Host stakeholder discussions (DoA, 2005).

2.2.2 Integrated Nutrition Programme (INP)

The mission of the INP is to improve the nutritional status of all South Africans through implementing integrated nutrition activities (DoA, 2005: 20). In line with this, it has eight strategic focus areas:

a) Involvement in household food security;
b) Disease specific nutritional treatment and counselling;
c) Growth nursing and promotion;
d) Nutritional promotion, education and advocacy;
e) Promotion, protection and support of breastfeeding;
f) Micronutrient malfunction control;
g) Food service management; and

h) Nutritional intervention programme for HIV and AIDS and TB (DoA, 2005).
This programme focuses on providing safe and nutritious foods for all South Africans, in order to build a healthy nation.

2.2.3 National School Nutrition Programme

The primary school nutrition programme was established in 1994 and though initially located within the Department of Health – it was transferred to the Department of Basic Education in 2004. Its aim is to alleviate short-term hunger within schools, seeking to enhance learning through school feeding. Furthermore, it seeks to strengthen nutrition education in schools, to promote food gardens in schools and to develop and strengthen partnerships to enhance the programme (DoA, 2002; Battersby et al., 2015b).

2.2.4 National Policy on Food and Nutrition Security (NPFNS)

The national policy on food and nutrition security was developed in 2014, with the intention of working towards a food and nutrition security act for South Africa. This policy serves as a guide to national, provincial and local government, in working towards food and nutrition security at every level (DAFF, 2013), despite it only identifying food security as a rural problem.

2.2.5 National Development Plan (NDP)

The NDP vision 2030 is a plan for South Africa to work towards eradicating poverty and reducing both unemployment and inequality in South Africa by 2030 (NPC, 2012). This plan further focuses on investments in agricultural and agro-processing sections – with the aim to increase the production of fruit and vegetables (NPC, 2012). Furthermore, it focuses on the need for interventions that reduce food costs and help create stable inflation environments (NPC, 2012), a strategy that is vital for the urban population that spend the majority of their income on food.

2.2.6 Conclusions on the current policies on food security in South Africa

The above policies show that although there are plans and Acts in place to eradicate poverty and hunger in South Africa, sometimes it remains just that – a plan and is not driven or implemented. Maxwell and Caldwell (2008) argued that food security has been neglected by city government for three reasons. Firstly, more visible projects such as housing and sanitation take precedent over food security. Secondly, food insecurity is rendered invisible by how it manifests. In rural areas it is linked to
times of famine or rather the extreme scarcity of food. Whereas, in urban areas it is linked to the failure of households being able to access food. Thirdly, Food insecurity and poverty are seen as a (overall) rural problem. Whereas, in urban areas, food insecurity is usually dealt with at household or individual levels. Thus, it does not attract policy attention.

The IFSS of 2002 was developed to achieve Section 27 of the Constitution of South Africa which highlights that everyone has the right to sufficient food. Adding, that the state must take reasonable measures within its available resources to achieve this goal. South Africa, as per the IFSS of 2002 set a deadline of 2015 to achieve this, stating that one of its (IFFS) main objective was to eradicate hunger, malnutrition and food insecurity by 2015. In addition, Food security was identified as a “key shaping force” for South Africa in the Diagnostic Overview of the National Planning Commission (NPC, 2012). In the speech delivered at the Presidency Budget Vote Debate in May 2012, Mr Trevor Manuel identified food security (amongst other factors), as one of the priority areas for the National Planning Commission for the next two years. Likewise, the ANC in their 2009 Election Manifesto listed food security as one of its five priority areas. Despite the above mentioned, South Africa has still not achieved this goal. Instead, the South African National Health and Nutrition Examination Survey (SANHES), conducted in 2013, found that 28.3% of South Africans were at risk of hunger and a further 26% actually experienced hunger. This number could increase due to rapid urbanisation and the high levels of unemployment in South Africa.

In terms of eradicating malnutrition, as set out by both the IFSS and INP, households are currently facing high levels of obesity, diabetes and hypertension (Battersby et al., 2015b). According to national studies conducted in South Africa, over 50% of women and 30% of men are overweight or obese (Puoane et al., 2012; Shisana et al., 2013). Pillay (2015) reported that South Africa is regarded as the fattest country in sub-Saharan Africa and one of the 20 fattest countries in the world. Furthermore, research suggests that diets in the country have shifted towards higher consumption of highly processed foods, rich in sugars and fats. These shifts are attributed to the country’s rise in urbanisation – and are being understood as the outcome of the changing food system and unaffordability of healthy foods (Battersby et al., 2015a). Furthermore, the SANHES found overweight and obesity to be highest in urban
formal (11.8% and 5.4% for boys; 19.4% and 8.9% for girls, respectively) and urban informal areas (20.0% and 5.2% for boys; 20.8% and 9.3% for girls, respectively) (Shisana et al., 2013).

Poverty is at the heart of South Africa’s problems and whilst the country produces more than enough food to feed all citizens, many do not have access to the right amount and types of food (Pillay, 2015). Goodfellow and Taylor (2009) state that the levels of urban poor continue to deepen, as the percentage of urban dwellers, are both “food poor” and “hard-core poor”. Food poor in this context relates to the inability of urban residents to access nutritional food due to expenditure on other non-basic essentials and “hard-core poor” as households fail to meet their minimum food requirements, regardless of their income, if any (Goodfellow and Taylor, 2009). Van Der Merwe (2011) notes the expenditure of urban residents, concluding that higher spending on food, paired with other commodities such as accommodation, transport and electricity, means that urban residents have less money to spend on other necessities, to ensure a healthy and sustainable livelihood.

Urban agriculture brings about the opportunities to improve food supply, health conditions, local economy, social integration and environmental sustainability (Orsini, Kahane, Nono-Womdim and Gianquinto, 2013). In addition, urban agriculture can contribute significantly to the development of social connections and community empowerment in urban neighbourhoods (Hynes, 1996; Johnson, 2010). Gallaher, Kerr, Njenga, Karanja and WinklerPrins (2013), state that people have been farming in African Cities since these cities were born, however colonial and post-colonial government disregarded urban agriculture as it did not fit their conception of modern cities. This resulted in very little attention to urban agriculture and little formal support.

The above section discussed government’s role in ensuring food security in South Africa, concluding, that to date little or no changes have been made. The following sub-section focuses on a household challenge for many in NMB, that of urban poverty. Though not often discussed, this a reality. Rogerson (2013) states that the poverty index for Nelson Mandela Bay, is considerably high, which points to a severe problem in the Eastern Cape metropolitan area. As such, urban poverty is discussed in the following sub-section.
2.3 URBAN POVERTY

Policy is set to be the driver of change and transformation is deeply rooted in government and its capacity to drive change. With rapid urbanisation, more than half of the estimated population of South Africa now live in urban areas (Battersby et al., 2015a), thus from both a short and long-term perspective, addressing poverty alleviation in urban areas is an important policy issue. Moser (1998) states that urban poverty is not a static condition among individuals, households or communities. It is recognised that whilst some individuals or households “are permanently poor, others become impoverished, as a result of general life-cycle changes, specific events such as the illness of main income earner, or a deterioration in external economic conditions” (Rakodi, 2002:12). Chaudhuri (2013) is of the opinion that a large number of the urban poor work in the informal sector, where entry is easy, requiring less skill and education. Secondly, they do not constitute a separate world but are linked to the rural world, in one way or another. Finally, Chaudhuri (2013) concludes that being neglected and victims of misguided policies, the urban poor have so far, also endured poor health. Rakodi (2002) states that urban poverty is not only characterised by a lack of assets but also the inability to devise an appropriate coping or management strategy.

The assets, being both tangible and intangible are characterised as follows (Moser, 1998, 1997; Moser and Holland, 1996, Rogerson, 2004).

- **Human capital**: health status, which defines the poor’s capacity for work, education and skills thus determining the return on their labour.

- **Productive assets**: housing and infrastructure are considered most significant for the underprivileged urban households.

- **Household relations**: an instrument for merging income and sharing consumption in urban poor families.

- **Social capital**: the exchange within urban poor societies and households, based on trust deriving from multifaceted social ties, networks and associations.

- **Labour**: usually known as the most significant asset of the urban poor.
Rogerson (2013) suggests that key initiatives are required to address the asset base of the poor – in terms of improving human capital, augmenting social capital and strengthening productive assets and household relations. Furthermore, Rogerson (2013) suggests that programmes that will assist the poor in terms of expanding and improving the use of their labour should be developed and encouraged – this would include the practice of urban agriculture.

Food security and the access to food for the urban poor remains a challenge, with limited access to diverse food, due to the lack of income. Van Veenhuizen and Dason (2007) state that food production is often a response to inadequate, unreliable and irregular access to food – and the lack of purchasing power among the urban poor. Urban agriculture provides the opportunity for the urban poor to increase household consumption and nutrition levels. Research conducted in Kenya found that urban poor families grow a variety of crops, to improve nutrition and reach self-reliance (Smit et al., 2001b).

In highlight of the above, this study aims to empower residents to become more independent and grow their own food. Though studies suggest that NMB has one of the highest rates of urban poverty, participating in urban agricultural activities not only assists with food security in households but could also help save money currently spent on fruit and vegetables. In highlight of this, an overview of urban agriculture is explored in the next sub-section.

2.4 URBAN AGRICULTURE

Urban agriculture has been an integral part of local food systems in developing countries around the world. Many studies provide descriptive analysis of urban agriculture in developing countries such as Asia, Africa and Latin America – these studies have also outlined the benefits to communities and families who participate in these activities such as enhancing food and nutritional security, improving family health, empowering women, promoting social justice and preserving indigenous knowledge and culture (Galhena, Freed and Maredia, 2013).

Research suggests that the experience of growing food is correlated with its consumption. Thus the more experience people have growing food, the more likely they are to eat it (Bellows, Brown and Smit, 2004). Studies also show that gardeners
and those who buy directly from local farmers identify wanting fresh produce as an important factor (Bellows, 2004; Armstrong, 2000; Hanna, 1999; Giordano et al., 1998; Lackey and Associates, 1998). This is confirmed by a study which suggests that the approximate 5 to 10 day lag between the production and consumption phase, leads to a 30 to 35% loss in some nutritional constituents (Bellows et al., 2004; Shewfelt, 1990). Pearson and Hodgkin (2010) conclude that urban agriculture allows for access to fresh local produce – that has not been exposed to storage and transport refrigeration.

Those who participate in gardening are also of the opinion that growing their own food saves them money, gives them more variety (in terms of their preference) – and suggest that their home grown produce has an ethnic or regional character that is not found when one buys from a local store (Salvidar-Tanaka and Krasny 2004; Hanna, 1999).

Urban agriculture also stimulates local economic development by creating employment opportunities (Todes et al. 2008). It provides the opportunity to transform vacant or degraded sites to productive use of land (Madaleno, 2000). Furthermore, community gardens can increase the value of neighbourhoods and property prices (Van Veenhuizen and Dason, 2007).

Studies show that the physical activity of urban agriculture increased personal well-being and human capacity development opportunities (Miles, 2007). It also has a positive effect on personal wellness, community improvements and stress reduction (Brown and Jameton, 2000). Social interaction, rebuilding a sense of community and regaining self-esteem as a result of having a sense of purpose are some of the reported benefits of urban agriculture (Van Veenhuizen and Dason, 2007). In addition, urban agriculture serves as a recreational activity and an educational function. Childhood development and an increase in the knowledge of ecological concepts, biospheres and nutrition are additional benefits of urban agriculture (Hamm and Baron, 1999).

Research conducted by Zhang, Brereton and Roe (2013) suggests that the following are motivations and benefits of participating in urban agriculture:

- Tradition – as farming is key development in the rise of human civilisation – thus urban agriculture is part of our heritage as South Africans.
• Recreation and well-being – gardening is a way of interacting with nature. It makes people more relaxed and calm. It can also help one (temporarily) forget about the stress from work or life.

• Food varieties and quality – not only is home grown produce organic it is also more flavourful and desirable than store bought produce.

• Knowledge and education – growing food not only improves our knowledge on farming/gardening but also our dietary knowledge. It is also a good exercise to encourage children to be more active and involved. Furthermore, by growing our own food the appreciation of green and sustainability issues at home, for example collecting rain water for the garden and recycling kitchen waste as fertilizers are encouraged.

Urban agriculture is undoubtedly a good practise that has many benefits from both a personal and community perspective. The problem identified in this study was that residents in NMB were not practising urban agriculture. In light of this statement, this study aims to seek the possible barriers and enablers of practising urban agriculture in NMB. As such, the following subsection explores possible barriers and enablers of urban agriculture.

2.5 BARRIERS AND ENABLERS OF URBAN AGRICULTURE

2.5.1 Defining barriers and enablers

Barriers can be defined as something that prevents or blocks movement or a law, rule or problem that makes something difficult or impossible (Merriam-Webster, 2016). For the purpose of this study, barriers are described as laws, rules or circumstances – that hinder the success of practising urban agriculture. Enablers on the other hand, can be defined as a person or thing that makes something possible (Merriam-Webster, 2016). For the purpose of this study, enablers are defined as conditions or factors – that foster the practise of urban agriculture.

2.5.2 Perceptions

Perception refers to the interpretation of what is taken in through our senses. Griffin and Moorhead (2013) states that perception is a set of processes by which an individual regards, understands or interprets information about the environment.
Thus, the way the environment is perceived, is what differentiates others (Heffner, Newman and Idsardi 2017). Ones perception about urban agriculture can either be a barrier or enabler to participating in gardening activities. The following sub-section discusses various factors that influence the perception of urban agriculture, in either a positive or a negative manner.

2.5.2.1 Social stigma

There seems to be a social stigma attached to urban agriculture, which may consider gardening as “desperate” means to access food (Campbell, 2013). Although this may be seen as individual’s perceptions, the high levels of food insecurity in South Africa’s cities and towns, seems to be framed as predominantly rural in nature by government as well (Battersby et al., 2015b). This has led to policies and programmes failing to acknowledge urban food insecurity. As a result, urban agriculture is merely seen as the “default” response to food insecurity in urban areas (Battersby et al., 2015b).

People look down on urban agriculture and it is perceived as only for the low social class, a dirty job – and that it is a man’s job. Marais (2016) reports that there is a growing tendency of younger generations moving away from family farms – in order to focus on other business interests, failing to see the potential of agriculture.

Despite these perceptions, research shows that agriculture contributes 4% to the Gross Domestic Product (GDP) and accounts for 10% of reported employment (OECD, 2006). Furthermore, research conducted by Paroda (2000), shows that women play a major role in food production, food access and food utilisation.

2.5.2.2 Financial rewards

There is substantial research indicating that urban agriculture saves participant’s money on food expenditure (Golden, 2013). Community gardeners who participated in research studies frequently discussed the cost savings of growing food (Suarez-Balcazar, 2006). Other studies found that farmer’s markets in food insecure areas offered more affordable and quality produce (Suarez-Balcazar, 2006) than neighbourhood stores and supermarkets – and in some cases provided enough competition to lower supermarkets prices on produce (Larsen and Gilliland, 2009).
The idea that urban agriculture can save municipal agencies money by maintaining vacant lots was often listed in agency reports as a positive impact (Cohen and Reynolds and Sanghvi 2012; Hodgson, 2012). According to SPUR (2012), community management of vacant lots transformed into urban agricultural sites not only saved the Department of Public Works money but also prevented vandalism, dumping and labour-intensive upkeeps of vacant lands. This can be achieved through projects such as community gardens within residential areas of NMB or at Schools.

2.5.2.3 Time for gardening

In a study conducted by Gamhewage et al. (2015) found that one of the constraints to participating in urban agricultural activities – was time. Research shows that gardening is a preferred form of exercise across age, gender and ethnicity (Wood, 2004). Research suggests that older persons do more gardening compared to younger generations (Wood, 2004). The perception regarding gardening however changes when it comes to gender as men see it as an exercise and women as a gendered household food-related chore (Armstrong, 2000).

2.5.2.4 Children and schools participation

Gardening in schools can have an impact when it comes to giving young children the skills they need to reach their full potential in life. In South Africa particularly, schools governed under the Bantu Education taught agriculture as a subject (DoA, 2005), however, this is no longer the case, especially in urban settings where the perception has changed.

With the increase in urbanisation, the distance between growing food and the fork is becoming greater. With the rapid changes in technology, students are becoming less connected to their actual food source and more distant from agricultural roots (Leising, and Pense, 2004). Bahaman et al. (2010) suggest that one way to get the younger generation more involved in urban agriculture, is through the use of media and technology, as improved knowledge in young adults could help the future of sustainable cities.
Research conducted by Pugh (2013) found that gardening improved children’s readiness to learn. It could also improve their self-esteem, confidence and motivation. In addition, children participating in gardening activities would be encouraged to eat healthy thus promoting responsible behaviour.

2.5.2.5 Job creation

The United Nations Development Programme (UNDP) (1996) identified several potential advantages of urban agriculture. For the poor, it provides good access to food. For the stable poor, a source of income and good quality food at a relatively low cost. For the middle-income families, it offers the possibility of savings and a return on their investment in urban poverty. For small and large entrepreneurs, it offers a profitable business (Hampwaye, Nel and Rogerson, 2007; Van der Merwe, 2011).

Kobayashi, Tyson and Abi-nader (2010) found that many urban agriculture projects provide skills training and jobs. Community food projects funded by the USDA provided an estimated 2 300 jobs and incubated over 3 600 micro-businesses (Kobayashi et al., 2010). Urban agricultural projects located in neighbourhoods where unemployment is high, served as viable employment and catalyst for entrepreneurial endeavours (Bradley and Galt, 2013; White, 2010). One particular study from the UK found that participants of City farming projects felt that job related skills developed were the most significant outcome of their experience (Holland, 2004).

In addition to economic benefits – community and school gardens provide opportunities for community involvement, social interaction amongst ethnically and age-diverse communities as well as health and environmental stewardship education (Hodgson, 2012). Urban agriculture can foster community building and engagement as well as mutual trust, feelings of safety and comfort and friendships that can translate into a collective investment in the common good of any community (Hodgson, 2012) – thus encouraging social capital.

Social capital encompasses the social resources on which people rely when pursuing their livelihoods. This includes social networks, membership in groups, relationships of trust and access to wider institutions of society (Rakodi, 2002).
Gallaher et al. (2013) state that social capital can enable households to become urban farmers and help them gain access to needed supplies, allowing them to work together for increased efficiency and food security. Sumner, Mair and Nelson (2010) conclude that social capital can have other effects on food security, independent of urban agriculture – for example, by having people to turn to in times of need or building relationships, or contacts through whom to gain employment.

2.5.2.6 Formulation of hypothesis

As a result of the above literature on perceptions of urban agriculture, this study hypothesises that perceptions is significantly related with urban agriculture and thus proposes the following hypothesis:

- H1: Perceptions are significantly related to urban agriculture.

2.5.3 Innovation/sustainability

Innovation is the application of new ideas that leads to increased value (Bradshaw, 2013). Sustainability on the other hand is driven by a belief that our individual actions, government and policies have a tangible impact on the world today and our future generations. Furthermore, sustainability is the concept of making informed decisions that balance our environment, economy and social equity (Bradshaw, 2013). In terms of urban agriculture, many new concepts have developed regarding the way we garden and the materials used. This sub-section discusses both the concepts of innovation and sustainability in urban agriculture.

2.5.3.1 Space

Land security remains a challenge for urban agricultural activities. Jansen van Vuuren (2016) states that one of the leading challenges with regard to assigning urban surface for food production, is that it is a contradiction to urban development planning. However, with backyard or household gardening one can grow plants in almost anything that holds some soil and has holes in the bottom for drainage. Innovation and sustainability in terms of urban agriculture are bound by our imagination. Over the years, land and limited spaces have been one of the main barriers to urban agriculture. However, space limitations in Hong Kong have created opportunities for rooftop gardens. Saldivar-Tanaka and Krasny (2004) advise that
one can grow organic vegetables and fruits by using a couple of pots or a window box as a container.

One of the new trends have been making plants grow up a wall, which is considered vertical gardening. This method of growing plants can be used both indoors and outdoors. In comparison to traditional land-based agriculture, indoor and vertical have more benefits such as more efficient use of land and resources, protection from severe weather conditions, limited (or zero) use of pesticides and fertilizers as well as water saving of approximately 70-90%, when compared to traditional gardening. Space limitations in Kibera have introduced an innovative method of growing kale and Swiss chard in sacks filled with soil, called sack gardening (Pascal and Mwende, 2009)

2.5.3.2 Sustainable environments

Productive urban landscapes correlate with environmental sustainability and in order to realise sustainable spaces it requires “new arrangements – institutions, technology, financial mechanism, innovation and flexible urban planning processes” (UN-Habitat, 2013: 93).

Cities use too many natural resources and as a result – they produce too much waste. Thus, the ecological footprints of cities are stamping out the habitat of many species. Deelstra and Girardet (2000) are of the opinion that the environmental contribution that urban agriculture brings to urban spaces includes the greening of space. Emphasising that green spaces increase humidity, lower temperature and introduce more pleasant odours to the city, capture dust and gases from polluted air through disposition and capture by the foliage of plants and trees, and soils. Deelstra and Girardet (2000) states that urban agriculture decreases the urban heat island and improves air quality. Furthermore, urban agriculture contributes to local natural resource management, which ultimately leads to an increase in biodiversity on a local level (Goddard, Dougil and Benton, 2010).

As cities are confronted with an increasing number of people, households have more mouths to feed. Given the dire situation, South Africans now has to act positively to reduce their carbon footprint – minimising the impacts on this changing climate. One way to make this happen is to take control of their own food supply. This can be
done by supporting local farmers or learning to garden. Thus, urban agriculture has an important role in contributing to the future sustainability of cities (Deelstra and Girardet, 2000). Urban agriculture can further contribute to environmental management and the productive re-use of contaminated land. Furthermore, as a result of increased plant foliage, urban agriculture can reduce storm water runoff and air pollution, increase urban biodiversity and species preservation (Kaufman and Bailkey, 2000).

2.5.3.3 Health

Urban agriculture benefits both individuals and neighbourhoods – thus contributing to overall community health (Bellows, 2004). If used well, gardening can also be a key element in successful health intervention programmes as it simultaneously addresses the physical, mental, spiritual and social health of individuals and their communities (Armstrong, 2000). Gardening can also be seen as an exercise, ranging from fine motor involvement when cutting grass, to aerobic gross motor tasks such as turning compost piles (Brown and Jameton, 2000). Gardeners have also reported that gardening activities increased their self-esteem, pride, confidence, personal satisfaction and efficacy (Bellows et al., 2004; Hanna and Oh, 2000; Waliczek, Mattson and Zajicek, 1996). Moreover many studies have found that the presence of urban agriculture in communities develops physical hobbies by reducing stress and improving mental health (Teig et al., 2009; Saldivar-Tanaka and Krasny, 2004; Twiss et al., 2003).

2.5.3.4 Summary on innovation/sustainability

The above literature on sustainability/innovation has highlighted the different methods and benefits of practising urban agriculture. Fletcher (2008: 233) contributes to sustainable development by identifying 10 Rs of sustainability, which contributes to achieving a sustainable urban space. These are listed below; and apply specifically to urban agriculture:

1. **Reduce** dependence on exterior food sources that increase urban weakness and food security;
2. **Reuse** space and resources accessible in urban spaces;
3. **Recycle** resources such as water and plastic;
4. **Recognise** prospects of urban agriculture and possible markets;
5. **Refuse** developments that does not include sustainable development;
6. **Replace** unproductive urban spaces to generate productive ones;
7. **Re-engineer** the urban atmosphere to include urban agriculture;
8. **Retrain** policy makers on the possibilities of urban agriculture and how to apply an all-inclusive resolution to urban challenges;
9. **Reward** associations and companies that contribute to the sustainable development reality; and
10. **Re-educate** inhabitants and local government on urban agriculture and actual urban design.

### 2.5.3.5 Formulation of hypothesis

As a result of the above literature on innovation/sustainability, this study hypothesises that innovation/sustainability is significantly related to urban agriculture and thus proposes the following hypothesis:

- **H2**: Innovation/Sustainability is significantly related to urban agriculture.

### 2.5.4 Food security

Food Security is a concept that’s definition and operationalisation varies – depending on the research being conducted. However, the most commonly used definition of food security stems from the 1996 World Food Summit is “Food security, at an individual, household, national, regional and global level (is achieved) when all people, at all times, have physical and economic access to sufficient, safe and nutritious food; to meet their dietary needs and food preferences, for an active and healthy life” (FAO, 1996; Jones, Ngure, Pelto and Young, 2013: 482). Thus, food insecurity is the absence of one or more of these conditions. Gallaher et al. (2013) state that food insecurity historically, was viewed as a result of inadequate agricultural production and supply at a regional or national level. However, (Jones et al., 2013; Sen, 1981) argues that households’ food security status depends on its ability to access food with its own assets. WHO (2012) states that one component of food security is the availability of food on a consistent basis.
Food insecurity means more than just missing a meal here and there; it has lasting
effects on the health of people in our communities. The South African Integrated
Food Security Strategy (IFSS) describes the components of food security as follows

- *Food accessibility*: unceasing supply of food at both a national and
  household level;

- *Effective demand of food*: capacity of a nation and its households to
  attain adequate food on a sustainable basis;

- *Dependability of food*: use of safe and nourishing food; and

- *Food distribution*: reasonable delivery of food to address points of
  demand at the right time and place.

Rapid urbanisation in sub-Saharan Africa has led to serious concerns over
household food security in urban areas (Schmidt, 2012). Food availability in urban
areas predominantly determined by food supply to cities. Thus, the access to food
goes hand-in-hand with income availability (Van der Merwe, 2011). As such, the
urban poor often pay more for food, as they are forced to buy in small quantities, due
to their limited income; which in turn impacts food security amongst the urban poor.

According to Ruel and Garret (2004:39), food prices depend on five factors, namely:

1. The competence of the food marketing system in urban areas;
2. Buying patterns of homes;
3. Families capability to harvest its own food, i.e. urban agriculture;
4. Domestic access to food aid or subsidies; and
5. Macroeconomic policies of government, which includes food policies.

Cohen and Garret (2010) argue that food security depends on food availability, and
household’s obtainability to food depends on their disposable income and food
prices. Cohen and Garret (2010) conclude that intra-household distribution
influences individual food security, as depicted in Figure 2.3, indicating that the
ability of household food depends on both the household income as well as food
prices. Furthermore, Figure 2.3 shows that individual food security rests on the
distribution of food within the household.
Urban agriculture is one of the main alternatives for ensuring urban food security (Van der Merwe, 2011). Urban agriculture has been a successful strategy for improving food access to food insecure areas (Armstrong, 2000; Corrigan, 2011). Despite the fact that studies have highlighted this practise cannot provide all the nourishing needs of communities, it can be an effective technique to take direct action and can catalyse more complete food-access strategies (SPUR, 2012). Urban agriculture also provides opportunities for public health programming, to improve nutrition knowledge, attitudes and dietary intake (Bellows et al., 2004).

In addition to urban agriculture being an important source of fresh produce, meat and dairy products for consumers; it also plays a vital economic role as a source of income for both producers and distributors, it increases food security and prevents malnutrition (Maxwell, Levin and Csete, 1998). This has been evident in the City of Havana, which become one of the largest producers of vegetables in Cuba, demonstrating the enormous potential of urban agriculture (Novo and Murphy, 2000). Urban agriculture has further increased local self-sufficiency and has made food

Figure 2.3: Determinants of food, nutrition and health security

Source: Cohen and Garret (2010:469)
cheaper and more easily accessible. To date, some neighbourhoods in Havana produce up to 30% of their food supply (Novo and Murphy, 2000).

Urban agriculture can be viewed as an important part of an urban livelihood strategy – furthermore, studies have indicated that it can have (some) impact on household food security (Gallaher et al., 2013). Maxwell et al. (1998) state that urban agriculture can provide an additional source of income, increase dietary diversity, or help protect households against seasonal unavailability in food supply.

Various studies have confirmed that urban agriculture can be an effective way to secure and access food (Balmer et al. and Wall, 2005; Corrigan, 2011) and also suggested that there is a close connected between urban agriculture and food and water security (Zezza and Tasciotti, 2011; Barthel, Sörlin and Ljungkvis, 2010). In addition to securing food, urban agriculture can make fresh fruit and vegetables more accessible to urban residents (Park et al., 2011), as well as increase the consumption of fresh produce (Corrigan, 2011).

2.5.4.1 Formulation of hypothesis

As a result of the above literature on food security, this study hypothesises that food urban agriculture is significantly related to food security and thus the following hypothesis:

- H3: Food security is significantly related to urban agriculture.

2.5.5 Knowledge and interest

Knowledge refers to information, understanding and skills one gains through education or experience whereas interest relates to the feeling of wanting to know or learn something (Merriam-Webster, 2017). An old Chinese proverb suggests that if one gives a man a fish, you feed him for a day however if you teach a man to fish, you can feed him for a lifetime. Against this background, this study aims to identify the enablers and barriers of practising urban agriculture in NMB, in order to establish how urban agricultural practices can be promoted to residents in NMB.
Kwadwo, Kristin and Dejene (2008) state that knowledge can be referred to as organised or processed information, which is crucial in any innovation process. Carreon, Rene, Niels and Rob (2011) report that knowledge is a possible impingement aspect for sustainability. Furthermore Akram et al., (2015), conclude that attitude, knowledge and support are the three elements that drive the acceptance of sustainable agriculture.

Mougeot (2006) states that there are approximately 800 million people around the globe who are actively engaged in urban agriculture – of which 200 million produce goods for market sale products. A study conducted to investigate the knowledge, perception or attitude and practices of vegetable growers towards organic farming in Pakistan, found that knowledge with regard to the use of herbicides and fertilizers were limited (Akram et al., 2015). It furthermore concluded that there were negative attitudes towards urban agricultural activities.

Shamsudin, Rezai and Kit-Teng (2014) suggest that because the development of urban agriculture is in its beginning stages, it is crucial to find the relationship between the respondents’ prior knowledge and their attitude toward participation. Prior knowledge for this particular study related to information stored in the individual’s memory – based on experience and familiarity (Flynn and Goldsmith, 1999; Chen and Li, 2009). Shamsudin et al. (2014) suggest that knowledge for this study was divided in to objective and subjective knowledge. With objective knowledge relating to accurate information regarding urban agriculture and subjective knowledge to an individual’s perceptions and feelings towards urban agriculture. The model is depicted in Figure 2.4 below.

![Figure 2.4: Determinants attitudes towards urban agriculture](source: Shamsudin et al., (2014: 469))
The results indicated that underlying and assigned values, along with prior knowledge were major factors that influenced one’s attitude towards urban agriculture. Secondly, it highlighted that the attitude towards urban agriculture does seem to be associated with food safety and security (Shamsudin et al., 2014). This reflects that both subjective and objective knowledge may underpin a positive attitude – hence closely related to urban agricultural activities (White, 2010; Shamsudin et al., 2014).

This study aims to determine if having an education or being taught how to garden is an important factor when it comes to participating in urban agriculture. As previous research indicate, individuals with a higher level of education are more involved in urban agricultural activities and younger individuals tend to be more driven by environmental activities (Bradley and Galt, 2013; McClintock, 2014). On the other hand, this study also aims to research whether or not members within the community had an interest in participating in urban agriculture.

2.5.6 Resources

The term resources is used in many ways in different disciplines. For the purpose of this study, resources will relate to the materials (and skills) needed to grow fruit and vegetables. One possible constraint to practising urban agriculture could be related to the available resources at a resident’s disposal. As the size and type of urban agricultural practises are influenced by the needs, financial capital as well as the availability of resources in urban areas.

Alexander (2016) suggests that growing fruit and vegetables is quite simple – one only requires soil, water, sun, care and time. However, with less disposable income, residents might regard purchasing resources such as seeds and fertilisers as an additional household expense.

The lack of resources for urban agriculture could be related to urban poverty. For decades, poverty and food insecurity have been considered to be a rural problem. Apartheid planning could be the reason for geographical displacement of poverty. Under apartheid, social engineering, the poor were shifted to the margins, of both the urban areas and the margins of the country as a whole – thus focusing the core of South Africa’s poverty in the rural areas (Rogerson, 2004). The depth and severity of
urban poverty is undoubtedly highest in South Africa’s small towns, followed by secondary cities and the country’s four metropoles, with NMB being one of these (Rogerson, 2004). Woolard and Leibbrandt (2006) argues that the poverty rate for all urban households is 24.4 percent, for metropolitan areas, secondary cities and small towns respectively, the rates are 15.4, 26.7 and 35.1%. Van der Merwe (2011) suggests that the expenditure of urban residents who live in cities is relatively high – leaving less money for the necessities that could ensure a healthy and sustainable livelihood.

The access to sufficient land is also one of the biggest constraints of practising urban agriculture (Van der Merwe, 2011; Mosha, 2015). Water is also a key factor in urban agriculture and Sub-Saharan Africa suffers from a serious lack of water, with NMB on the verge of a water crisis, with consumption levels equating to roughly 12 months of usable water (Sain, 2017). As such, the access to sufficient water also poses as a barrier for the practise of urban agriculture. Furthermore, Van der Merwe (2011) suggests that another constraint to practising urban agriculture includes the lack of commitment, the culture of dependency as well as skill deficiencies.

2.5.6.1 Formulation of hypothesis

As a result of the above literature on resources, this study proposes that the availability of resources is significantly related to urban agriculture and thus the following hypothesis is formulated:

- H4: The availability of resources is significantly related to urban agriculture.

2.6 A hypothesised model of urban agriculture in Nelson Mandela Bay

This sub-section proposes a hypothesised model on urban agriculture in Nelson Mandela Bay, based upon the reviewed literature and the hypotheses that have been formulated in this regard. According to Collis and Hussey (2014), quantitative research establishes relationships based on numeric data between independent and dependent variables – and allows for hypothesis testing. These variables can be measured using instruments that can be analysed using statistical measurements.

The hypotheses identify the independent and dependent variable from the literature (Collis and Hussey, 2009). The dependent variable for this study is urban agriculture
and the literature review identified Perceptions, Innovation/Sustainability, Food security and Resources as possible enablers and barriers to urban agriculture, as a result the following hypotheses were formulated:

- H1: Perceptions are significantly related to urban agriculture.
- H2: Innovation/Sustainability is significantly related to urban agriculture.
- H3: Food security is significantly related to urban agriculture.
- H4: The availability of resources is significantly related to urban agriculture.

As a result of these formulated hypotheses the following hypothesised model for urban agriculture has been developed.

![Proposed Hypothesised Model for Urban Agriculture in NMB](image)

Figure 2.5: Proposed hypothesised model for urban agriculture in NMB

### 2.7 CHAPTER SUMMARY

Through a review of literature, this chapter addressed RQ3, namely “What are the barriers and enablers of urban agriculture?” This was addressed by satisfying RO3, namely “To identify the barriers and enablers of urban agriculture”.

These outcomes were achieved by addressing topics within sub-sections outlined in this chapter. Sub-section 2.1 introduced the study and highlighted the research question and objective to be achieved in this chapter. Sub-section 2.2 discussed the current phenomena on urban agriculture and food security policies in South Africa. In this sub-section the integrated food security strategy, integrated nutrition programme, national school nutrition programme, national policy on food and
nutrition security and the national development plan, with regard to urban agriculture were discussed. The conclusions made were that policies set-out to alleviate poverty and ensure food security for South Africa were not achieved. Concluding that policies were well written but not executed.

Sub-section 2.3 discussed the reality of urban poverty. This states that residents within urban cities spend more money on basic necessities such as accommodation and transport and had less money on food, thus purchasing food that is cheap and not necessarily healthy. Sub-section 2.4 explored the concept as well as the benefits associated with urban agriculture. The definition of barriers and enablers, in the context of this study were introduced in Sub-section 2.5. Urban agriculture has been developed quite recently, in the South African context. To date, most research focuses on the benefits and government’s lack of involvement in this sustainable practise. The literature with regard to agriculture is well documented and reported however very limited when it comes to “urban” agriculture. This study aimed to identify possible barriers and enablers to urban agriculture and proposed the following variables: perceptions, innovation/sustainability, food security, resources as well as knowledge and interest as possible enablers or barriers to this practise. Each variable and its relation to urban agriculture were explored before the necessary hypotheses were formulated. The proposed hypothesis model was depicted in Sub-section 2.6. It was shown that this model resulted from the hypotheses that were formulated in the literature review namely:

- **H1:** Perceptions are significantly related to urban agriculture;
- **H2:** Innovation/Sustainability is significantly related to urban agriculture;
- **H3:** Food security is significantly related to urban agriculture; and
- **H4:** The availability of resources is significantly related to urban agriculture.

Chapter 3 discusses RQ4, namely “What is the appropriate research methodology to be used for this dissertation enabling reproduction in the future?” In doing so, Chapter 3 will satisfy RO4, namely “To identify and explain the research methodology used for this dissertation enabling reproduction for the future”. This will be done by firstly defining the concept of research and elaborating on the types of research. Secondly, the sample design is discussed before the data collection and analysis explored.
CHAPTER THREE  RESEARCH METHODOLOGY

3.1 INTRODUCTION

In Chapter 2, a literature review on urban agriculture was conducted. As a result RQ3: “What are the barriers and enablers of urban agriculture?” – were addressed. Furthermore, RO3, namely “To identify the barriers and enablers of urban agriculture” - was achieved.

This chapter will assist in addressing RQ4, namely “What is the appropriate research methodology to be used for this dissertation enabling reproduction in the future?” This research question is addressed by satisfying RO4, namely “To identify and explain the research methodology used for this dissertation enabling reproduction for the future”.

In delivering the above outcomes, each sub-section covers the following topics. Sub-section 3.1 provides a brief overview of what was covered in Chapter 3 and introduces the research questions and objectives that are addressed in chapter three. A brief chapter layout and topics to be covered (within each proceeding sub-section) are provided. Sub-section 3.2 provides a brief definition of research. Thereafter, the context of the research problem is explained - which sets the basis for this dissertation. Sub-section 3.3 provides an explanation of the types of research. This section outlines and explains the research methodology, and research paradigms. The types of research is explored – including concepts such as qualitative and quantitative research, inductive and deductive approaches. Cross-sectional and longitudinal research as well as mono-methods, mixed-methods and multi-method research are discussed. Sub-section 3.4 discusses the sample design and covers topics such as what is sampling, types of sampling methods and sampling frames. Thereafter, the sampling methods and frame chosen for this study are addressed and motivated.

Sub-section 3.5 provides an overview of the data collection process. Under this sub-section the concept of data collection and the measuring instrument used for this study are addressed. Sub-section 3.6 continues to explore research procedures and techniques, specifically referring to data analysis. This sub-section firstly defines the concept of data analysis and methods used in this study. In addition, the concepts of
validity and reliability of the measuring instrument are addressed. Sub-section 3.9 provides a summary of the chapter, highlighting the most important deductions that can be drawn.

Figure 3.1 depicts the research questions and research objectives that will be addressed and achieved in Chapter 3.

Figure 3.1: Chapter 3 RQ's and RO's in the context of this study
An overview of the chapter is presented in Figure 3.2.

Figure 3.2: Overview of Chapter 3 in the context of this study
3.2 DEFINING RESEARCH

This sub-section provides a definition of research. Thereafter, the context of the research problem is briefly explained, which highlights the purpose of this dissertation.

3.2.1 The concept of research

Research is a process of enquiry and investigation. It is systematic and methodical and it increases knowledge, hence it being a vital requirement for any business or industry (Collis and Hussey, 2009). The research process involves identifying a research topic, defining the research problem, determining how to conduct, collect, analyse and interpret research data (Collis and Hussey, 2009).

Saunders et al. (2007) use an onion metaphor, which outlines progressive layers that the researcher must investigate and select during the research process (Saunders et al., 2007). The first layer of the research onion involves the selection of a research philosophy. Thereafter, moving inwardly, each of the remaining five layers, namely the research approaches, strategies, choices, time horizons, techniques and procedures are discussed and selected. This approach is adopted for this study. The research onion, which is referred to throughout this chapter, is illustrated in Figure 3.3 below.

![Figure 3.3: The research onion](source: Saunders et al. (2007: 108))
3.2.2 Research in the context of this study

This study focuses on urban agriculture, which is defined as the practise of nurturing, processing and distributing food in and around a village, town or city. The problem identified is that residents in Nelson Mandela Bay (NMB) do not practise urban agriculture. As a result, this research aims to investigate urban agricultural practises in NMB by using Holland Park as a case study. Furthermore the study aims to identify the enablers and barriers of urban agriculture in Holland Park.

3.3 TYPES OF RESEARCH

This sub-section provides an explanation of the types of research. It focuses on concepts such as research methodology and the research paradigms, whilst further elaborating on the concept of the research onion (Saunders et al., 2007). Concepts such as quantitative and qualitative research are explored, inductive and deductive research, exploratory and explanatory research, basic and applied research, cross-sectional and longitudinal research and mixed method, multi-method and mono-method research. This section concludes with an explanation of the specific philosophy, approach, strategy, choices, time horizons and reasoning (techniques and procedures) used in this specific study.

3.3.1 Research methodology

The research methodology is the systematic, theoretical analysis of the methods applied to a field of study (Collis and Hussey, 2014). Before choosing the appropriate methodology, the research paradigm needs to be selected – this is discussed in the following sub-section.

3.3.2 Research paradigms

Research paradigms offer a framework comprised of an accepted set of theories, methods and ways of defining data (Collis and Hussey, 2014). According to Saunders et al., (2007), choosing this philosophical framework is the initial step in the research process and is the first (outer) layer of the research onion.
The research philosophy contains important assumptions about how the researcher views the world. More than two paradigms exist however, the two most popular philosophies include the positivism paradigm, which relates to quantitative research and the interpretivism paradigm that relates to qualitative research (Saunders et al., 2007; Zikmund et al., 2013).

Positivism is based on the belief that reality is independent of us and the goal is the discovery of theories, based on empirical research; thus with this approach it is possible to provide logical or mathematical proof for every rationally justifiable assertion (Collis and Hussey, 2014). Under this paradigm, theories provide the basis of explanation, permit the anticipation of phenomena, predict their occurrences and therefore allow them to be controlled (Collis and Hussey, 2014).

Interpretivism on the other hand holds the view that the social world cannot be understood by applying research principles adopted from the natural sciences and suggests that social sciences require a different research philosophy; this paradigm further suggests that simple fundamental laws are insufficient to understand the whole complexity of social phenomena (Blumberg, Cooper and Schindler, 2005). Thus, where positivism seems to focus on theories and the testing of relationships between two or more variables, interpretivism focuses more on giving meaning to certain observations.

Several methods of conducting research exist under the interpretivism paradigm, which include, amongst others, ethnography studies, case studies, content analyses, grounded theory and phenomenological studies (Williams, 2007). Instrumental research and surveys are used under the positivism paradigm. These and other methods are explored in the third layer of the onion, namely strategies (Saunders et al., 2007).

3.3.3 Classification of the types of research

The second (outward) layer of the research onion is the research approach. This refers to the chosen research principles that achieve the purpose and objectives of the research (Saunders et al., 2007). The research approach can be classified
according to the type of reasoning that will be applied by the researcher namely, inductive or deductive (Collis and Hussey, 2009).

The deductive approach begins with the formulation of hypotheses and testing their validity through data collection and analyses techniques, whilst the inductive approach begins with the results of data analysis and thereafter attempts to explain the findings through theories and explanations (Trochim, 2006). As such, inductive approaches are usually associated with qualitative research whereas deductive approaches are more commonly associated with quantitative research.

Before moving on to the third layer of the research onion, namely strategies, one needs to address or define the types of studies, namely exploratory, descriptive and explanatory.

Exploratory studies discover general information about a topic that is not clearly understood by the researcher (Saunders et al., 2007). Saunders et al. (2007) suggest that the most usual way of conducting exploratory research includes, searching academic literature, interviewing experts in the subject and conducting interviews. Descriptive studies analyse and explain the literature and answer the question “why?” In addition, this aim to portray an accurate profile of persons, events or situations (Saunders and Lewis, 2014). They furthermore use techniques such as statistical and numerical analyses (Sreejesh, Mohapatra and Anusree, 2013) by collecting measurable and quantifiable data by using methods such as questionnaire surveys, sampling, interviews and the re-analysis of secondary data (Saunders and Lewis, 2014).

Explanatory studies are formed on the basis of descriptive research by discovering casual relationships between key variables (Saunders and Lewis, 2014) – in other words, they give more meaning. The methods used in explanatory research are case studies, observations, historical analysis, attitude surveys and statistical surveys (Saunders and Lewis, 2014). These can be either quantitative or qualitative, depending on the focus of research. From the above the researcher concludes that exploratory studies discover new information (qualitative) and descriptive explains the new information or literature by collecting measurable and quantifiable data (quantitative) and explanatory studies gives meaning to the descriptive information (this can use qualitative or quantitative approach).
Having explained the different studies one can now move on to the third layer of the research onion which outlines the strategies one can use to collect data. Saunders and Lewis (2014) emphasise that the research strategy is guided by the study’s research questions and objectives. Saunders and Lewis (2014) summarise the strategies as follows:

- **Experiment** – studies casual relationships between variables to establish whether a change in one independent variable produces a change in another dependent variable. Collis and Hussey (2014) state that under this strategy the independent variable is deliberately manipulated to observe the effect on the dependent variable.

- **Survey** – involves the structured collection of data from a sizeable population by making use of questionnaires, structured observations and structured interviews. Collis and Hussey (2014) furthermore state that this strategy collects primary or secondary data, with a view to generalise the results to a population.

- **Case study** – explores a single phenomenon (the case) in a natural setting, using a variety of methods to obtain in-depth knowledge (Collis and Hussey, 2014). Saunders and Lewis (2014) say that with a case study the likelihood is that you are “on the outside looking in” (although you may be part of the organisation).

- **Action research** – conducts experiments and acting upon them by making changes and observing the results. Collis and Hussey (2014: 343), define action research as “a methodology used in applied research to find an effective way of bringing about a conscious change in a partly controlled environment”.

- **Grounded theory** – theory is developed from data generated by a series of interviews or observations.

- **Ethnography** – aims to understand another way of life from the perspective of those pursuing that way of life. Collis and Hussey (2014) further state that in this strategy the researcher uses socially acquired and shared knowledge to understand the observed patterns of human activity.

- **Archival research** – uses administrative records and documents or publically available information as the principal source of data.
The fourth layer of the onion outlines the research choices. These can be defined as mono-method, mixed methods or multi-methods. The mono-method uses a single data collection technique and corresponding analysis procedures. For example, one will combine a single quantitative data collection technique, such as questionnaires, with quantitative data analyses procedures (Saunders et al., 2007). Multi-methods refer to combinations where more than one data collection technique is used, with associated analysis techniques – however, this is restricted within either a quantitative or qualitative “world view” (Tashakkori and Teddlie, 2003). A mixed method research approach involves the researcher mixing qualitative and quantitative data, data collection methods and methodologies – in a single research study (Saunders et al., 2007).

The fifth layer of the onion outlines the time horizons; which can be classified as cross-sectional or longitudinal. Cross-sectional collects data from participants at only one period in time whereas, longitudinal studies a particular topic over an extended period of time (Saunders and Lewis, 2014). Bryman (2012) states that the results of cross-sectional research are often used to draw conclusions on the association or relationships between variables of the whole population under study. In contrast to cross-sectional, longitudinal studies collect information that allows comparisons over time, among the same individuals or population (Salkind, 2000).

Quantitative research follows a positivistic approach and is a deductive process, which aims to provide explanatory theories – in order to understand social phenomena (Collis and Hussey, 2014). Quantitative research also aims to address questions about relationships between variables that are measured numerically, with the purpose of explaining and predicting phenomena (Collis and Hussey, 2009). This type of research attempts to establish statistical relationships between variables by determining the amount of variation contained (Mitchell and Jolley, 2010).

In quantitative data, correlation analysis is often used to analyse the relationship between variables. Collis and Hussey (2014) define correlation as a measure of strength and association between two quantitative variables. The strength of such correlations is expressed statistically by the correlation coefficient (Salkind, 2000). This is referred to as a measure of the linear dependence of one numerical random variable on another (Upton and Cook, 2006; Collis and Hussey, 2014). The
The correlation coefficient \( r \) is measured within the range \(-1\) to \(+1\) and has the following interpretations as outlined by Collis and Hussey (2014: 270):

- \( 1 \) represents a perfect linear association;
- \( 0 \) represents no linear association; and
- \(-1\) represents a perfect negative linear association.

As such, values in between can be graded roughly as indicated in Table 3.1.

\[ \text{Table 3.1: Strengths of correlation} \]

<table>
<thead>
<tr>
<th>Correlation Coefficient</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.90 to 0.99</td>
<td>Very high positive correlation</td>
</tr>
<tr>
<td>0.70 to 0.89</td>
<td>High positive correlation</td>
</tr>
<tr>
<td>0.40 to 0.69</td>
<td>Medium positive correlation</td>
</tr>
<tr>
<td>0 to 0.39</td>
<td>Low positive correlation</td>
</tr>
<tr>
<td>0 to -0.39</td>
<td>Low negative correlation</td>
</tr>
<tr>
<td>-0.40 to -0.69</td>
<td>Medium negative correlation</td>
</tr>
<tr>
<td>-0.70 to -0.89</td>
<td>High negative correlation</td>
</tr>
<tr>
<td>-0.90 to -0.99</td>
<td>Very high negative correlation</td>
</tr>
</tbody>
</table>

*Source: Collis and Hussey (2014: 230).*

Qualitative research, on the other hand, is primarily exploratory research which aims to gain an understanding of underlying reasons, opinions and motivations. Furthermore, it is used to uncover trends in thoughts and opinions and dive deeper into the problem (Wyse, 2011).

### 3.3.4 Research methodology applied to this study

This subsection discusses the research methodology to be applied in this study, along with providing motivation for the selected choices made in this regard. Guided
by the nature of the research aims and objectives, the choices will be discussed below, in accordance with the research onion.

The positivistic paradigm has been selected for this study, as this approach uses quantitative methods of data analysis, which provide logical or mathematical proof. The deductive approach is used as there is existing theory regarding urban agriculture. As such, the study makes use of the mono-method research approach which is cross-sectional.

Data are collected by means of a structured questionnaire – designed specifically for the objectives and research questions of the study. The measuring instrument and data analysis are discussed in the next section of the study but first the sample design will be addressed.

3.4 SAMPLE DESIGN

This sub-section provides an explanation of sample design with reference to the process of sampling, the concept of a sample frame and the types of available sampling methods. As done in the previous section, the researcher gives a broad explanation of key concepts regarding sampling and narrows it down to the sampling methods and frame chosen for this study.

3.4.1 Sampling

Sampling is the process of selecting and studying part of a group. A sample is defined as a finite part of a statistical population, whose properties are studied to gain information about the whole (Collis and Hussey, 2009). Thus sampling is the technique of selecting a suitable sample, or rather a representative part of a population – for the purpose of determining parameters or characteristics of the whole population (Mugo, 2002).

3.4.2 The types of sampling methods

Sampling methods can be classified under two main categories, namely probability (random) and non-probability (non-random). Probability sampling is based on the concept of random selection – a controlled procedure that assures that each population element is given a known non-zero chance of selection. This procedure is
never haphazard and provides estimates of precision (Cooper and Schindler, 2014). According to Bryman and Bell (2007), non-probability sampling does not make use of a random selection method. Essentially, this implies that some units in the population are more likely to be selected than others.

Random sampling includes techniques such as simple random sampling, systematic sampling, cluster sampling, stratified and multistage sampling. Simple random sampling occurs when a group of people are selected at random from a complete list of a given population (Bryman and Bell, 2007). Systematic sampling relies on arranging the population according to the same order – thereafter selection occurs at regular intervals through that ordered list (Chaturved, n/d). Under stratified sampling the population is divided into several sub-populations that are individually more homogeneous than the total population. Items are then selected from each stratum to constitute a sample (Kothari, 2004). Multistage sampling is essentially the process of taking random samples of preceding random samples (Chaturved, n/d).

Non-random sampling includes techniques such as quota, snowball, convenience and judgemental sampling methods. With quota sampling, researchers are given quotas of different types of people to question (Collis and Hussey, 2009). Convenience sampling is a technique where respondents are selected because of their accessibility and proximity to the researcher (Kothari, 2004) and snowball sampling is done when existing sample members recruit future members from among their acquaintances (Kumar, 2011). Finally, judgemental sampling is when a sample is chosen based on the researcher’s opinion of who would be appropriate (respondent) for a given study (Chaturved, n/d).

3.4.3 The sampling frame

The sample size has an effect on how the sample findings accurately represent the population (Burns and Bush, 2014). The larger the sample the more likely that, the generalisations are an accurate reflection of the population (Saunders et al., 2007). According to Hair et al. (2014) small or very large samples have a negative impact on statistical tests, either the sample is too large to allow for generalisation or the sample is not big enough to reach any conclusions.
3.4.4 The sampling methods and sampling frame chosen for this study

The sampling method proposed for this study falls under the non-probability category and convenience sampling is used. This approach was used as samples were easy to recruit and it is less time consuming. Furthermore, it allowed the researcher to use whatever individuals were available rather than selecting from the entire population. All respondents in this regard, had an equal opportunity of being selected for the study.

The sample frame constitutes of residents in Holland Park, the case study area in NMB and the study had a sample frame of 300. Hair et al. (1998) suggest that a sample of 100 and more is needed for factor analysis.

3.5 DATA COLLECTION

This subsection provides an explanation of data collection. The specific data collection methods and measuring instrument used in this study are discussed. This section is aligned to the sixth layer of the research onion, referred to as techniques and procedures. Broad analyses of data collection topics are explored, before being narrowed down to methods used in this study.

3.5.1 The concept of data collection

Two main sources of data exist, namely primary and secondary data. The original data are known as primary data. This is data collected at source; examples include survey data, which is obtained in an uncontrollable situation by asking questions or making observations (Collis and Hussey, 2013). Secondary data are data which already exist and were collected for some purpose other than the one at hand (Zikmund et al., 2013). The specific choice of which of the outlined sources will be used to obtain data comprise the third layer of the research onion, namely research strategies.

The approach selected determines the data collection techniques (Goddard and Mellville, 2001). Techniques chosen should be in line with the research and take factors such as data quality, costs, responses, errors and collection parameters into consideration (Hox and Boeije, 2005).
3.5.2 Gathering data by means of a questionnaire

Questionnaires are designed questions used to gather information from a sample of a general population (Collis and Hussey, 2014). This technique of data collection gives researchers one chance to collect data from respondents – thus questions need to be defined precisely, prior to data collection (Saunders, et al., 2007). Dillman (2007) suggests that opinions, behaviours and attributes, also referred to as data variables, can be collected through questionnaires.

3.5.3 Data collection and measuring instrument used in this study

3.5.3.1 Data collection

The main objective (ROm) of this study is to investigate urban agriculture practices in the Nelson Mandela Bay. Primary data will be collected for this purpose – as no previous (primary) data exists. The researcher makes use of non-probability sampling in the form of convenience sampling. This method was chosen because data are much easier to collect.

Primary data are collected by means of a questionnaire, which has been designed in alignment with research questions, objectives and literature review for this given study. Methods of data collection that could have been used are interviewing and questionnaires – since these get to the primary source. However, the researcher proposes to use the questionnaire for the following reasons:

- Respondents are in close proximity to the researcher, allowing the researcher to distribute questionnaires to a group of respondents at a given time;
- Some questions were sensitive for the respondents to answer in the presence of another person;
- It is important for respondents to remain anonymous; and
- It is important to get responses from the primary source to find out how each one perceived urban agriculture and whether they were interested in practising it.
According to Wiersma and Jurs, 2009 questionnaire has to meet the following requirements:

- It should be in a format that is straightforward and attractive to respondents;
- It should meet the objectives of the given study;
- It should reflect accurate information about the given research study; and
- It should be executable within the time and resources available.

Questionnaires were distributed manually. Ten fieldworkers were selected based on their availability, trainability and knowledge of the community. All fieldworkers were 18 years and older, worked voluntarily and were trained by both the Primary Responsible Person (PRP) and Primary Investigator (PI) prior to data collection.

3.5.3.2 The measuring instrument

According to Goddard and Melville (2001), any device used for data collection is called an instrument. Both literature and an existing questionnaire were consulted in developing the measuring instrument for this study. The literature review for this study formed the bases for the measuring instrument. In addition, an existing questionnaire formulated by Dr Tornaghi in 2012 addressing urban agriculture, social cohesion and environmental justice was consulted for this dissertation. The measuring instrument developed for this study consisted of a cover page and four sections.

The cover page gave written consent to all participants and explained the purpose of this study. Participants were also informed that their participation was voluntary and that all responses will be treated as confidential. The first section of the questionnaire (Section A) requested demographic information from respondents. The second section (Section B) asked respondents about their household structures. Section C addressed respondents’ knowledge, interest, perceptions and factors that influence their desire to grow food. Section D of the questionnaire collected data regarding respondents understanding of innovative/sustainable gardening, resources and household food security. (see Appendix B).
Both open and closed ended questions were used in the questionnaire. Five-point Likert scale questions with rankings from most negative perception (strongly disagree represented on the scale by 1) to the most positive perception (strongly agree represented on the scale by 5) were included.

3.5.3.3 Ethical considerations

Several ethical considerations were taken into account in the administration of the measuring instrument. Ethics refers to the standard of behaviour that directs the moral adoptions we make, which administers our behaviour and our relationships with others (Saunders et al., 2007). The main purpose of obtaining ethical clearance is to ensure that the research process used adheres to certain acceptable standards (Cooper and Schindler, 2014). These standards relate to (but are not limited) the issues of rights and welfare of research subjects around issues such as informed consent, confidentiality of data and limitation of possible risks to respondents (Collis and Hussey, 2009). This study was subjected to the research ethics approval procedures at the Nelson Mandela University and was approved in April 2017 (see Annexure C). The ethics clearance reference number for this study is H-17-BES-MGT-006.

3.6 DATA ANALYSIS

This section outlines the concept of data analysis, validity and reliability of the measuring instrument. In addition, the methods and tools used in this study are explored.

3.6.1 The concept of data analysis

Once primary data are collected, data analysis is initiated to better summarise the data. Data analysis is the reduction of data to simple elements. This entails reducing the amount of data collected to ensure that the necessary statements pertaining to the data are made (Hardy and Bryman, 2009). Collis and Hussey (2009) describe analysis as the skill to break down information into various parts.

The data analysis in this study involves assessing the validity and reliability of the measuring instrument. Thereafter, both descriptive and inferential statistics are conducted.
3.6.2 Validity of the measuring instrument

This study aims to investigate the enablers and barriers to urban gardening in the Nelson Mandela Bay area. As such the validity of the measuring instrument had to be confirmed. “Validity is the extent to which the research findings accurately represent what is really happening in the situation” (Collis and Hussey 2009: 58). In other words, it answers whether the measuring instrument tests that which it is supposed to. Salkind (2000) states that it is necessary to make sure that the measuring instrument is valid before it can be used in a specific way. There are several ways of assessing or measuring the validity of a scale, namely criterion validity, construct validity and content validity. This was discussed in Chapter 1 of the dissertation.

In this study, construct validity was the method used to assess the validity of the measuring instrument. Factor analysis was performed to assess the construct validity of the measuring instrument in this study. According to Hair et al. (2014), factor analysis is a technique that provides summarised information relating to original variables into a smaller set of new dimensions or factors. Hair et al., (2014) concludes that factor analysis can be used to analyse interrelationships among a large number of variables.

Exploratory factor analysis was undertaken to assess the validity of the variables in the study. A varimax rotation of the original factor matrix was used – and the Principal Component analysis was used as the technique for factor extraction. Collis and Hussey (2014) state that varimax raw minimises the tendency of each variable to load on one factor only. Zikmund et al. (2013) state that exploratory factor analysis is performed when the researcher is uncertain about how many factors may exist among a set of variables (Zikmund et al., 2013).

Percentage variances and factor loadings were considered when assessing the validity of the measuring instrument. Factor loadings of greater than 0.5 were considered significant for this study. According to Hair et al. (2014), factor loadings of greater than 0.4 can be considered significant for a sample size of greater than 200.
3.6.3 Reliability of the measuring instrument

Reliability is the consistency, dependability and duplicability of a measure (Landy and Conte, 2012). A measure is considered to be reliable when it provides accurate and consistent results over time. Collis and Hussey (2009) are of the opinion that there are three common ways of estimating reliability of the responses to questions in questionnaires or interviews, namely the test re-test method, split haves method and the internal consistency method.

This study uses the internal consistency method. Internal reliability measures the degree to which an instrument’s items are similar and reflect the same fundamental construct (Cooper and Schindler, 2014). According to Bryman and Bell (2007), reliability can be tested through the calculation and interpretation of Cronbach’s alpha coefficients. For the purpose of this study Cronbach’s alpha coefficients are calculated to ensure the reliability of the measuring instrument. Cronbach’s alpha coefficients of greater than 0.7 are considered significant (Bryman, 2012). However, Nunnally (1978) considers a Cronbach alpha of 0.5 as acceptable for basic exploratory research (Nunnally, 1978; Tavakol and Dennick, 2011).

3.6.4 Descriptive and inferential statistics

Descriptive statistics signify to a group of statistical techniques used to summarise, define or display quantitative data used in exploratory data analysis (Collis and Hussey, 2009). Descriptive statistics are generally divided into two sections, namely measures of central tendency and measures of dispersion. Measures of central tendency include the calculation of percentages, means, modes and medians, whereas measures of dispersion are associated with the calculation of variances and standard deviations (Keller and Warrack, 2004). Both measures of central tendency and dispersion were calculated for this study.

In addition to descriptive statistics, inferential statistics such as Pearson’s product moment correlation, multiple regression analyses and analyses of variance are undertaken. Trochim (2006) states that inferential statistics try to conclude from the sample data collected – what the population might think. Thus, inferential statistics refer to a group of statistical techniques and procedures used in confirmatory data
analysis, to draw conclusions about the population from the primary data collected from the sample (Collis and Hussey, 2009).

Firstly, Pearson’s product moment correlation is calculated to determine whether associations exist between the various factors under investigation as well as the strengths of associations (Jackson, 2011). Furthermore, multiple regression analyses are undertaken to identify the strength of the effect that the independent variables has on the dependent variable, urban agriculture. This enables conclusions as to whether the independent variables are enablers or barriers, depending on the strength of effect.

Pearson’s product moment correlation is a technique that is used for examining relationships between variables. The correlation coefficient (r) ranges between -1.00 and +1.00 (Mendenhall and Sincich, 2012). Bryman (2012) suggests that the closer to 1, the stronger the relationship and the closer to 0, the weaker the relationship. The coefficient is either positive or negative, indicating the direction of the relationship between the variables (Bryman, 2012). Collis and Hussey (2009) state that a positive correlation occurs when an increase in the value of one variable is associated with the increase in the value of the other. Whereas a negative correlation occurs when an increase in the value of one variable is associated with a decrease in the value of the other. Andrew et al. (2011) states that while correlation coefficients reveal the associations of relationships, they do not indicate causality between variables.

According to Babbie (2013), multiple regression analysis provides a means of analysing the influence of the independent variable/s to the dependent variable/s. As such it predicts the changes of the independent variables in response to changes in the dependent variable (Hair et al., 2014). The type and strength of the relationship between the variables is determined by the beta coefficients (b) (Hair et al., 2014). Rubin and Babbie (2011) state that the higher the beta coefficient, the greater the influence. Furthermore, the multiple coefficient of determination (R2) is a sample statistic that determines the proportion of the variance of the variable accounted for, by another value of another variable (Zikmund et al., 2013). This is calculated to determine how well the independent variables explain the variance in the dependent variable (Mendenhall and Sincich, 2012).
In addition to the Pearson’s product moment correlation and multiple regression analysis an analysis of variance (ANOVA) is undertaken to determine the influence of the demographic factors on the independent variables. For the purpose of this analysis, the independent variables, namely perceptions, food security, innovation/sustainability and resources served as dependent variables. Aron et al. (2011) describe ANOVA as a technique in which two or more independent population means are compared to determine whether they are equal. Quinlan (2011) states that this tests the differences among the means of several groups at once.

3.6.5 Data analysis methods used in this study

The purpose of this study is to identify the enablers and barriers to urban agriculture in Nelson Mandela Bay, by using Holland Park as a case study. In order to achieve this, the primary data collected (manually) was captured on QuestionPro, which is an online survey software tool. Thereafter, the data was sorted, categorised and cleaned using Microsoft Excel. The raw data were submitted and further discussed with a statistician; who performed quantitative statistical analysis, using the STATISTICA version 13 computer software package.

Data derived from the QuestionPro site was used to analyse descriptive statistics such as the mean, median and mode. In addition, cross tabulation and frequency tables were generated from the site. Data sorted on STATISTICA version 13 were used to measure both descriptive and inferential statistics such as the association of variables. This was done by using the Pearson’s product moment correlation coefficient, which gives a measure of the strength of association between two variables, multiple regression and the analysis of variance (ANOVA).

3.7 CHAPTER SUMMARY

This Chapter addressed RQ4, namely “What is the appropriate research methodology to be used for this dissertation, enabling reproduction in the future?” This was achieved by satisfying RO4 namely, “To identify and explain the research methodology used for this dissertation, enabling reproduction for the future”. In doing so this chapter covered the following sub-sections:
Sub-section 3.1 outlined what was covered in Chapter 2 and thereby confirmed that a literature review on urban agriculture was conducted. As a result of this review it further confirmed that RQ1 and RQ2, namely “Where does urban agriculture originate?”, “What are the advantages and disadvantages of urban agriculture?” Furthermore RO1 and RO2, namely “To determine the origins of urban agriculture” and “To identify the advantages and disadvantages of urban agriculture” – were achieved, respectively. The start of urban agriculture was highlighted in both the United States of America and South Africa. Literature revealed that the start of urban agricultural activities were introduced as coping mechanisms in the United States during the wars, whereas most South Africans were introduced to this concept at a young age, either through education, circumstances and or family.

Sub-section 3.2 described and defined research as a multistage process which not only requires one to understand the concept of research but to also find suitable methods and processes for a given study – in order to achieve its objectives. This section furthermore characterised the research process, referred to as a research onion, as consisting of various layers – resembling that of an onion. This sub-section highlighted that principles of research are applied in this study to determine how urban agriculture is perceived by residents.

Sub-section 3.3 explained the types of research. It focused on concepts such as research methodology and the two predominant research paradigms, namely positivism and interpretivism. It further elaborated on the concept of the research onion. The sub-section explained further the research process by clarifying upon the second, third, fourth and fifth layers of the illustrated research onion. As a result it was concluded that research can be classified according to its purpose, methods, logic and outcomes as being qualitative or quantitative, inductive or deductive, exploratory, descriptive, or explanatory, basic or applied and cross-sectional or longitudinal. Guided by the research aims and objectives the following research design was established for this given study in Table 3.2
Table 3.2: Research design for the study in the context of this study

<table>
<thead>
<tr>
<th>Philosophy</th>
<th>Positivistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approach</td>
<td>Deductive</td>
</tr>
<tr>
<td>Strategy</td>
<td>Survey</td>
</tr>
<tr>
<td>Choice</td>
<td>Mono-method (quantitative)</td>
</tr>
<tr>
<td>Time horizon</td>
<td>Cross-sectional</td>
</tr>
</tbody>
</table>

*Source: Researchers own formulation based on Chapter 3.*

Furthermore, Sub-section 3.3 concluded with the outline of the research methodology applied to this study, as discussed above. Sub-section 3.4 discussed the sampling design by addressing what sampling is, types of sampling methods and sampling frames. This study has chosen to adopt a non-probability sampling approach by proposing to use convenience sampling. As explained in this sub-section this method allows the researcher to collect data from respondents because of their accessibility and proximity to the researcher. The sampling frame was further discussed and the sub-section concluded that 300 respondents will be targeted for this study.

Sub-section 3.5 provided an overview of the data collection process. The sub-section discussed that two main sources of data exist, namely primary and secondary data. The questionnaire was selected as a data collected tool. The sub-section concluded with a detailed summary of the designed measuring instrument/questionnaire that will be used for this study.

Sub-section 3.6 introduced the concept of data analysis as the reduction of data to simple elements. It also confirmed that the researcher will make use of QuestionPro to capture all primary data collected and do descriptive statistics. In addition, the researcher with the help of a statistician will make use of STATISTICA version to sort all data and do inferential statistics. The concepts of validity and reliability were also discussed. In this study, construct validity was the method used to assess the validity of the measuring instrument. Factor analysis was performed to assess the construct validity of the measuring instrument in this study. Furthermore, this sub-section
indicated that exploratory factor analysis was undertaken to assess the validity of the variables in the study. As such a varimax rotation of the original factor matrix was used – and the Principal Component analysis was used as the technique for factor extraction. In addition, this study used the internal consistency method, through the calculation and interpretation of Cronbach’s alpha coefficients to confirm reliability of the measuring instrument. It was concluded that study will follow Nunnally (1978) who considers a Cronbach alpha of 0.50 as acceptable for basic exploratory research.

Sub-section 3.7 concluded Chapter 3 and gave a summary of the sub-sections discussed. Chapter 4 reviews the statistical analysis undertaken on the primary data to be collected for the purpose of this study. In doing so Chapter 4 addresses RQ5 “How do residents in NMB perceive urban agriculture?” Chapter 4 addresses the research question through achieving RO5, namely “To determine the residents’ perceptions of urban agriculture”.
4.1 INTRODUCTION

Chapter 3 provided an overview and discussion on the research methodology applied in this dissertation. This was achieved by outlining the concept of research, research methodology, research paradigms, sample design, measuring instruments and ethics. Thereafter the chapter set out the chosen method, specifically for this study. In doing this, Chapter 3 addressed RQ4, namely “What is the appropriate research methodology to be used for this dissertation enabling reproduction in the future?” This was achieved by satisfying RO4, namely “To identify and explain the research methodology used for this dissertation, enabling reproduction for the future”.

This chapter is comprised of the analysis and interpretation of the primary data collected. The study presents and discusses all descriptive data and then progresses on to inferential statistics. In doing so this chapter will address RQ5, namely “How do residents in NMB perceive urban agriculture?” This will be achieved by satisfying RO5, namely “To determine residents’ perceptions of urban agriculture”. As such, this chapter presents the findings of the statistical analyses. The proposed hypothesised model was depicted in Chapter 2 (figure 2.5). This model resulted from the hypotheses that were formulated from the literature review, namely:

- H1: Perceptions are significantly related to urban agriculture;
- H2: Innovation/Sustainability is significantly related to urban agriculture;
- H3: Food security is significantly related to urban agriculture; and
- H4: The availability of resources is significantly related to urban agriculture.

Thus, this chapter tests these relations through statistical analyses. In delivering the above outcomes each sub-section covers the following topics. Sub-section 4.1 provides a brief review of what was covered in Chapter 3 and introduces the research questions and objectives that will be addressed in chapter 4. Sub-section 4.2 provides a brief explanation of the data analysis and interpretation methods used in this chapter. Furthermore, it provides more information on the survey structure within the main study questionnaire (see Annexure B) and the specific techniques
used to analyse the data. Sub-section 4.3 provides the descriptive statistics. This comprises respondents’ demographics (Section A) and Household structures (Section B). The descriptive statistics furthermore present the respondents’ knowledge on urban agriculture as well as their interest in urban agricultural activities. This sub-section concludes with a brief summary on the main findings.

Sub-section 4.4 provides information on the inferential statistics that were conducted on the variables in this study. This includes the results of the validity and reliability. In order to assess the validity of the measuring instrument, a factor analyses was undertaken and the reliability of the measuring instrument was assessed by means of calculating Cronbach’s alpha coefficients. Based on the results derived, the hypothesised model was revised and the hypotheses reformulated this is presented in Sub-section 4.5. The analysis of data also included the results of Pearson’s product moment correlations and then presented the relationships between the variables discussed in this study. Furthermore, the results of the multiple regression analyses, showing the influence of the dependent variable on independent variables was presented and explored. Thereafter, an analysis of variance was undertaken to establish whether relationships exist between selected demographic factors and the independent variables investigated in this study, this is discussed and analysed in sub-section 4.6. Finally, Sub-section 4.7 provides a chapter summary highlighting the most important deductions that can be drawn therefrom.

An overview of the RQ’s and RO’s can be seen in Figure 4.1 while Figure 4.2 presents the overview of Chapter 4 in the context of this study.
Figure 4.1: Chapter 4 RQ's and RO's in the context of the study
An overview of the chapter is presented in Figure 4.2

4.2 DATA ANALYSIS AND INTERPRETATION METHODS

This sub-section provides a brief review of the questions in the questionnaire (Annexure A). Both the variables and sections of the questionnaire are discussed. Lastly, this sub-section provides a brief review of the data analysis and interpretation methods used.
The respondents who formed part of this study included all residents in Holland Park. The area consists of approximately 1 189 residents and was chosen due to the high rate of unemployment amongst residents, especially women. A representative sample of 303 was selected from the population. The responses were statistically analysed to address the research questions and satisfy the research objectives set out in Sub-section 4.1.

Primary data were collected from the sample by means of a survey (structured) questionnaire (see Annexure A), which was manually distributed by selected and trained fieldworkers, on a voluntary basis. The questionnaire was divided into 4 sections, consisting of 79 questions in total. The four sections were outlined and collected data as follows:

- Section A: Demographics;
- Section B: Household structure;
- Section C: Knowledge, Interest, Perceptions and factors that influence individuals desire to grow food; and
- Section D: Innovation/Sustainability, Resources and Food security.

Data collected from respondents were analysed using two statistical analysis techniques, namely univariate and multi-variate analysis. Under univariate analysis descriptive statistics are used to analyse individual variables without investigating their relationships to other variables. This data is usually presented by means of frequency tables and figures. Under multi-variate analysis on the other hand, inferential statistics are used to analyse and interpret the existence of relationships between two or more variables.

**4.3 DESCRIPTIVE STATISTICS ON DEMOGRAPHICS AND HOUSEHOLD STRUCTURE**

This sub-section presents the descriptive statistics and provides the analysis for Section A and B (of the questionnaire), namely demographics and household structures.
4.3.1 Questionnaire Section A: Demographics

Section A of the questionnaire asked respondents about their gender, age, race, home language, employment status and highest qualifications. The results were analysed and are reported under the different headings in this sub-section.

4.3.1.1 Gender

Data on the respondents’ gender were collected. Respondents had to choose one from two alternatives, namely male and female. The results (n=303) are illustrated in Figure 4.3 below.

![Gender of respondents](image)

Figure 4.3: Data on respondents’ gender

Results indicated that more than half of the respondents (n=303), 58% (n=176) were female and the remaining 42% (n=127) were male.

4.3.1.2 Age

From the data collected the results show that 23% (n=69) respondents were between the ages of 18 and 25 whereas 18% (n=54) were between the ages of 26 and 35. An additional 20% (n=61) were between the ages of 36 and 45; 22% (n=67) were between the ages of 46 and 55; 17% (n=50) were between the ages of 56 and 65 and finally, 0.7% (n=2) were older than 66 years of age.
These results indicate that the average age of respondents for this study was between the ages of 18 and 25 (n=69). This is therefore the most common age group, which is also referred to as the youth within the community.

The data collected (n=303) is illustrated in Figure 4.4 below.

![Figure 4.4: Data on respondents' age](chart)

**4.3.1.3 Race**

Data on the respondents’ race were collected, by the respondent selecting from one of the alternatives provided, namely Asian, Black, Coloured, Indian, White and Other. The results collected (n=303) are illustrated in Figure 4.5.

![Figure 4.5: Data on respondents' age](chart)

The results revealed that 1% (n=2) of respondents were Asian, 7% (n=22) were Black, 24% (n=206) were White, 0% (n=0) were Indian and 68% (n=73) were Coloured.
4.3.1.4 Home language

Respondents had to select one option from the list of alternatives provided namely, Afrikaans, English, isiXhosa, Zulu and Other. The results (n=303) are illustrated in Figure 4.6 below.

![RESPONDENTS HOME LANGUAGE](chart)

*Figure 4.6: Data on respondents’ home language*

From the data collected most respondents, 73% (n=220) selected Afrikaans as their home language. This was followed by English, 21% (n=63) and finally isiXhosa, 6% (n=20). Furthermore, it is noted that no respondents selected Zulu or Other as a home language.

4.3.1.5 Employment status

Data on the respondents’ employment status were collected. Respondents had to choose one from the list of alternatives, namely full-time employed, part-time employed, self-employed, unemployed, retired and full-time student. The results from (n=298) respondents are illustrated in Figure 4.7 below.

![Respondents’ employment status](chart)

*Figure 4.7: Data on respondents’ employment status*
The results show that 3% (n=9) are full time students, 10% (n=28) are retired, 39% (n=117) are unemployed, 6% (n=19) are self-employed, 13% (n=40) were part-time employed and 29% (n=85) were full-time employed.

The results for “unemployed” in this question were further analysed through cross-tabulation between the different age groups. The results obtained from (n=117) unemployed respondents is illustrated in Table 4.1.

*Table 4.1: Cross tabulation of unemployment and age*

<table>
<thead>
<tr>
<th>Age group</th>
<th>No. of respondents unemployed</th>
<th>% of respondents unemployed</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-25</td>
<td>36</td>
<td>31%</td>
</tr>
<tr>
<td>26-35</td>
<td>26</td>
<td>22%</td>
</tr>
<tr>
<td>36-45</td>
<td>21</td>
<td>18%</td>
</tr>
<tr>
<td>46-55</td>
<td>22</td>
<td>19%</td>
</tr>
<tr>
<td>56-65</td>
<td>12</td>
<td>10%</td>
</tr>
<tr>
<td>66+</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

(n=117)

Results obtained from the cross-tabulation indicates that 39% (n=117) of residents were unemployed. Furthermore, 31% (n=36) of the unemployed residents were between the ages of 18 and 25.

**4.3.1.6 Highest qualification**

In order to obtain additional background on the respondents, they were asked about their highest qualification. Respondents had to select one from the alternatives, namely no formal qualification, less than matric, matric, diploma, degree and post graduate degree. Data collected from the (n=278) respondents are illustrated in Figure 4.8.
The results show that 0.7% (n=2) had completed a Post graduate qualification, 2% (n=6) had a Degree, 6% (n=18) had completed a Diploma, 51% (n=141) had completed their Matric, 33% (n=91) had less than Matric and 7% (n=20) had no formal education.

4.3.1.7 Summary on respondents’ demographics

A synthesis of the biographical data collected indicated that out of the 301 respondents 58% (n=176) were female, 23% (n=69) were aged between 18 and 25, 68% (n=206) were coloured. In addition, the data showed that 73% (n=220) selected Afrikaans as their home language, most respondents 39% (n=117) were unemployed and 51% (n=141) had completed their Matric.

4.3.2 Questionnaire Section B – Household structures

Section B of the questionnaire asked respondents about their household structures, disposable income and expenses. The data provided are illustrated and explained under the headings as collected in the questionnaire (see Annexure B).

4.3.2.1 Ownership of property

Respondents were asked to select the (one) option that best described the property they are living in from the alternatives, namely owned by you, rented, owned by family, squat or other. The data collected are illustrated in Figure 4.9.
Figure 4.9: Data on respondents’ household ownership

Data collected from the (n=300) respondents indicated that 48% (n=145) of the houses were owned by respondents, 9% (n=28) lived in rented houses or buildings, 41% (n=123) lived in houses or structures owned by their family, 0.6% (n=2) squat and 0.6% (n=2) selected other.

4.3.2.2 Type of (household) structure

Respondents were asked to select the (one) option that best described their type of (household) structure they live in. The options provided were flat, free-standing house, housing complex, informal settlement and other. The data collected from (n=291) respondents are illustrated in Figure 4.10 below.

Figure 4.10: Data on respondents’ household structures

Data collected from the (n=291) respondents that answered this question indicated that 7% (n=20) lived in a flat (or outbuilding), 83% (n=257) lived in free-standing (including semi-detached) houses, 3% (n=10) lived in a complex, 0.7% (n=2) lived in informal settlements and 0.7% (n=2) selected other. Residents who selected other indicated that they lived in a caravan and the other in a wendy-house.
4.3.2.3 Number of people in the household

As to acquire more information on respondents’ household structures they were also asked to indicate the number of people they live with. The options provided were 1, between 2 and 5 residents and more than 5 residents in a household. The data collected from (n=301) respondents are illustrated in Figure 4.11 below.

![Number of residents in a household](chart)

*Figure 4.11: Data on respondents’ number of residents in a household*

Data collected from the residents showed that 2% (n=5) of residents lived alone, 63% (n=190) had between 2 and 5 members in a household and 35% (n=106) had more than 5 members in a household.

4.3.2.4 Number of people employed in the household

Respondents had to specify (from the options provided) how many people were employed in their households. The alternatives provided were 1, 2, 3 and 4 more than 4 and all unemployed.

Data collected from (n=301) respondents indicated that 25% (n=75) had only one person employed in a household, 48% (n=145) had two people employed, 19% (n=57) had three people employed, 4% (n=13) had 4 people employed, 0.7% (n=2) had more than 4 people employed and 3% (n=9) had all residents (in a given household) as unemployed. This data are illustrated in Figure 4.12.
4.3.2.5 Monthly household income

Data on respondents’ monthly household income were collected. Respondents had to select one from the alternatives, namely less than R1 000, R1 001 to R2 000, R2 001 to R5 000, R5 001 to R10 000, R10 001 to R20 000, R20 000 – R40 000 and more than R40 000.

Data collected from the (n=227) respondents that answered the question indicated that 9% (n=20) households earned less than R1 000 per month, 6% (n=14) earned between R1 001 to R2 000, 26% (n=60) earned between R2 001 to R5 000 per month, 20% (n=45) earned between R5 001 to R10 000, 26% (n=60) earned between R10 001 to R20 000 per month, 11% (n=24) earned between R20 001 and R40 000 and 2% (n=4) had a household income of more than R40 000. This data is illustrated in Figure 4.13.
4.3.2.6 Recipients of government grant

Data on respondents’ dependability on government grants were collected. Respondents had to indicate whether they were dependent on any government grant. The alternatives provided were yes and no. Data collected from (n=302) respondents is illustrated in Figure 4.14 below.

Figure 4.14: Data on respondents’ dependability on government grant

From the data collected 14% (n= 41) indicated that they were dependent on government grants and the remaining 86% (n=261) were not dependent on any government grants.

4.3.2.7 Breadwinner in the household

Respondents were asked to indicate (either yes or no) whether they were the breadwinner in their household. Data collected from (n=302) is illustrated in Figure 4.15 below.

Figure 4.15: Data on household breadwinners
From the data collected 39% (n=117) indicated that they were the breadwinners in their households and the remaining 61% (n=185) were not breadwinners. This data were further analysed through cross tabulation. The results obtained from the 117 respondents that indicated that they were the breadwinners in their household are illustrated in Table 4.2 below.

**Table 4.2: Data on respondents who are breadwinners**

<table>
<thead>
<tr>
<th>Gender</th>
<th>No. of breadwinners</th>
<th>% of breadwinners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>64</td>
<td>55%</td>
</tr>
<tr>
<td>Male</td>
<td>53</td>
<td>45%</td>
</tr>
</tbody>
</table>

(n=117)

The results collected indicate that from a total of 117 breadwinners in Holland Park, 55% (n=64) were female. Indicating that more than half of the households in Holland Park were female-headed.

### 4.3.2.8 Where do you buy fruit and vegetables?

Respondents were asked to indicate from the alternatives provided where they bought their fruit and vegetables. Respondents could select more than one of the alternatives, namely I grow my own fruit, I grow my own vegetables, from a spaza shop, from supermarkets/wholesalers, food markets and other.

Data collected from (n=301) respondents showed that 12% (n=64) grew their own fruit, 16% (n=80) grew their own vegetables, 24% (n=124) bought from spaza shop’s, 30% (n=153) bought their fruit and vegetables from supermarkets and/or wholesalers and 18% (n=92) bought from food markets. None of the respondents selected the “other” option. Data collected from respondents are presented in Figure 4.16.
Where do you get your fruit and vegetables? n=301

<table>
<thead>
<tr>
<th>Source</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food market</td>
<td>92</td>
</tr>
<tr>
<td>From super markets/wholesalers</td>
<td>153</td>
</tr>
<tr>
<td>From a spaza shop</td>
<td>124</td>
</tr>
<tr>
<td>I grow my own vegetables</td>
<td>80</td>
</tr>
<tr>
<td>I grow my own fruit</td>
<td>64</td>
</tr>
</tbody>
</table>

Figure 4.16: Data on respondents’ household structure (HS) Question 8

4.3.2.9 Average spending on food per month

Respondents were asked to indicate their average spending on food per month by selecting one of the alternatives provided namely, I do not contribute towards this expense, R100 to R400, R401 to R1 000, R1 001 to R2 000, R2 001 to R4 000 and more than R4 000. Data collected from (n=267) respondents is illustrated in Figure 4.17 below.

Figure 4.17: Data on respondents’ average spend on food (per month)

Data collected indicated that 33% (n=88) did not contribute to buying food, 5% (n=13) spent between R100 and R400 on food per month, 17% (n=44) spent between R401 and R1000 on food, 22% (n=60) spent between R1 001 and R2 000 on food per month, 19% (n=51) spent between R2 001 and R5 000 on food per month and 4% (n=11) spent more than R5 000 on food per month.
4.3.2.10 Average spending on rent/bond per month

Residents were asked about their average spend on their rent/bond per month. They had to select one from the list of alternatives provided namely, I do not contribute towards this expense, less than R1 000 per month, R1 001 to R3 000, R3 001 to R5 000, R5 001 to R8 000 and more than R8 000 per month. The data collected from (n=294) respondents are illustrated in Figure 4.18 below.

![Figure 4.18: Data on respondents’ average spend on rent/bond (per month)](image)

Data collected indicated that 67% (n=197) did not contribute towards rent or bonds per month, 9% (n=28) spent less than R1 000 per month, 18% (n=52) spent between R1 001 and R3 000 per month, 4% (n=12) spent between R3 001 and R5 000 per month, 1% (n=3) spent between R5 001 and R8 000 per month and 1% (n=2) spent more than R8 000 per month on their rent/bond.

4.3.2.11 Average spend on transport per month

Residents were asked to indicate approximately how much they spent on transport per month. They had to select from the list of alternatives namely, I do not contribute towards this expense, less than R300 per month, R301 to R500, R501 to R800, R801 to R1 000 and more than R1 000 per month.

Data collected indicated that 56% (n=168) did not contribute towards this expense, 9% (n=27) spent less than R300 on transport per month, 16% (n=50) spent between R301 and R500 on transport per month, 8% (n=24) spent between R501 and R800 per month, a further 8% (n=23) spent between R801 and R1 000 per month and 3% (n=9) spent more than R1 000 on transport per month. This data collected from (n=301) respondents is illustrated in Figure 4.19 below.
4.3.2.12 Summary on respondents’ household structures

A synthesis of the respondents’ household structures data indicates that 48% (n=145) of the houses were owned by respondents, 83% (n=257) lived in free-standing houses (this included semi-detached houses). Most households, 63% (n=190) had between 2 and 5 residents, 48% (n=145) had two people employed. The average monthly household income was bi-modal as 26% (n=60) earned between R2 001 and R5 000 and a further 26% (n=60) earned between R10 001 to R20 000 per month. Only 4% (n=41) of the residents were dependent on government grants and 39% (n=117) were breadwinners.

Most residents 30% (n=153) bought their fruit and vegetables from supermarkets/wholesalers, 33% (n=88) did not contribute towards food, 67% (n=197) did not contribute towards rent/bond and 56% (n=168) did not contribute towards transport per month.

4.3.3 Questionnaire Section C – Knowledge and interest

The first part of “Section C” of the questionnaire asked respondents about their knowledge about urban agriculture. For all questions respondents could select between two alternatives, namely yes and no. The data provided are illustrated and explained under the headings as collected in the questionnaire (See Annexure B).
4.3.3.1 Knowledge (Q1): My parents grew their own fruit and vegetables

Data collected from (n=256) respondents indicated that 76% (n=195) grew up in households were their parents grew their own fruit and vegetables (Figure 4.20). Furthermore 24% (n=64) indicated that their parents did not grow their own fruit and vegetables.

4.3.3.2 Knowledge (Q2): My parents taught me how to grow my own fruit and vegetables

Data collected from (n=267) respondents indicated that 76% (n=203) were taught how to grow their own fruit and vegetables and 24% (n=64) were not taught to grow their own fruit and vegetables.
4.3.3.3 Knowledge (Q3): My parents taught me the importance of growing my own fruit and vegetables

Figure 4.22: Data on respondents’ knowledge (Q3)

Data collected from (n=301) respondents indicated that 88% (n=266) were taught the importance of growing their own fruit and vegetables and 12% (n=35) were not taught the importance of growing their own fruit and vegetables. This is illustrated in Figure 4.22, indicating that more respondents were taught about the importance of growing their own fruit and vegetables.

4.3.3.4 Knowledge (Q4): I know how to grow my own fruit and vegetables

Data collected from (n=303) indicated that 78% (n=236) of respondents had some knowledge about how to grow their own fruit and vegetables whereas 22% (n=67) indicated that they did not know how to grow their own fruit and vegetables. This is illustrated in Figure 4.23.
4.3.3.5 Knowledge (Q5): My children know how to grow fruit and vegetables

![Pie chart showing 64% (n=236) had children who knew how to garden and 36% (n=104) did not.](image)

Data collected from (n=288) respondents indicated that 64% (n=236) had children who knew how to garden. In addition, 36% (n=104) had children who did not know how to garden. This is indicated in Figure 4.24.

4.3.3.6 Knowledge (Q6): My children are taught how to grow their own fruit and vegetables

![Pie chart showing 75% (n=194) had children taught and 25% (n=95) not taught.](image)

As illustrated in Figure 4.25, data collected from (n=259) respondents indicated that 75% (n=194) had children who were taught how to grow their own fruit and vegetables and 25% (n=95) indicated that their children (if applicable) were not taught how to grow their own fruit and vegetables.


4.3.3.7 Knowledge (Q7) Do you have children?

The last question relating to knowledge asked respondents if they had children. The researcher realises that this should have been a screening question instead. However, the data will be illustrated and discussed.

Data collected from (n=300) respondents indicated that 82% (n=246) of respondents had children and 18% (n=54) indicated that they did not have children. This is illustrated in Figure 4.26.

![Figure 4.26: Data on respondents' knowledge (Q7)](image)

4.3.3.8 Summary of respondents knowledge regarding urban agriculture

From the data collected the following conclusions are drawn. Most respondents 76% (n=256) grew up in a household where their parents grew their own fruit and vegetables. Secondly more respondents indicated that they were taught how to garden as well as the importance of gardening. A further 78% (n=236) indicated that they knew how to grow their own fruit and vegetables.

Furthermore, 82% (n=246) of the respondents indicated that they had children. Sixty four percent (n=236) indicated that their children knew how to garden. Finally 75% (n=194) indicated that their children were taught how to grow their own fruit and vegetables.

The second part of “Section C” of the questionnaire asked respondents about their interest in urban agriculture. For all questions respondents could select between two
alternatives namely, yes and no. The data provided will be illustrated and explained under the headings as collected in the questionnaire (see Annexure B).

4.3.3.9 Interest (Q1): I enjoy gardening

![Graph showing I enjoy gardening](image)

Figure 4.27: Data on respondents’ interest (Q1)

As illustrated in Figure 4.27, data collected from (n=300) indicated that 77% (n=231) of the respondent enjoyed gardening and a further 23% (n=69) indicated that they did not enjoy gardening, concluding that more respondents enjoyed gardening in Holland Park.

4.3.3.10 Interest (Q2): I would grow my own fruit

![Graph showing I would grow my own fruit](image)

Figure 4.28: Data on respondents’ interest (Q2)
As indicated in Figure 4.28, from the data collected (n=302) 87% (n=236) of respondents indicated that they would grow their own fruit and 13% (n=39) indicated that they would not grow their own fruit.

4.3.3.11 Interest (Q3): I would grow my own vegetables

Figure 4.29: Data on respondents’ interest (Q3)

As illustrated in Figure 4.29, from the data collected (n=301) 88% (n=266) of respondents indicated that they would grow their own vegetables and 12% (n=35) indicated that they would not grow their own vegetables.

4.3.3.12 Interest (Q4): I would share my produce

Figure 4.30: Data on respondents’ interest (Q4)

Data collected from respondents (n=302) indicated that 87% (n=265) indicated that they would share their produce. In addition, 13% (n=37) indicated that they would not share their produce, as presented in Figure 4.30. This could either be translated as they would not share their produce or would not grow their own fruit or vegetables.
4.3.3.13 Interest (Q5): I am interested in participating in gardening activities

Figure 4.31: Data on respondents’ interest (Q5)

As illustrated in Figure 4.31, data collected from (n=302) indicated that 84% (n=253) of respondents indicated that they were interested in participating in urban agricultural/gardening activities. Furthermore, 16% (n=49) indicated that they would not participate in urban agricultural/gardening activities.

4.3.3.14 Interest (Q6): I would like to learn more about urban gardening

Figure 4.32: Data on respondents’ interest (Q6)

Data collected from (n=294) indicated that 87% (n=255) of respondents were interested in learning more about gardening and 13% (n=39) were not. This is portrayed in Figure 4.32.
4.3.3.15 Interest (Q7): I am interested in participating in community gardening activities

As indicated in Figure 4.34, data collected from respondents (n=302) showed that 81% (n=245) indicated that they were interested in participating in community gardening activities and 19% (n=57) indicated that they were not interested in participating in community gardening activities.

4.3.3.16 Summary of respondents interest in urban agriculture

From the data collected, it is concluded that all answers were affirmative, indicating that respondents had some interest in urban agricultural activities. As such, 77% (n=231) indicated that they enjoyed gardening. Eighty seven percent (n=236) and 88% (n=266) indicated that they would grow their own fruit and vegetables, respectively. Furthermore, 87% (n=265) indicated that they would share their produce. Eighty four percent (n=253) of respondents indicated their interest in participating in gardening activities and a further 87% (n=255) indicated that they were interested in learning more about urban gardening/agriculture. Finally, 81% (n=245) indicated that they were interested in participating in community gardening activities.

4.3.3.17 Analysis of descriptive data on urban agriculture

The analysis of the descriptive data of urban agriculture revealed that most respondents grew up in households where they were exposed to gardening and or urban agriculture (76%; n=195). A further 78% (n=236) indicated that they had some
knowledge regarding growing their own fruit and vegetables. Data collected indicated that children knew how to garden. The second sub-section which analysed the descriptive data for interest indicated that 77% (n=231) enjoyed gardening. Furthermore, data collected revealed that most respondents would grow their own fruit and vegetables. Eighty four percent (n=253) indicated that they were interested in learning more about urban agriculture. Finally, 81% (n=245) indicated that they were interested in participating in community gardening activities.

The data collected revealed that most residents had some knowledge about urban agriculture and that they were interested in participating in urban agricultural activities/practices, concluding that urban agriculture was perceived as an important practise - of which residents were interested in. Having concluded that there was an interest for practicing urban agriculture in Holland Park, this study now aims to identify possible barriers and enablers to urban agriculture in Holland Park to find the underlying reasons as to why residents were not practising urban agriculture.

4.4 MULTIVARIATE ANALYSIS AND INFERENTIAL STATISTICS

This sub-section provides information on the multivariate analysis and inferential statistics conducted on the variables in this study. In doing so, this sub-section discusses the results of the validity and reliability analysis. As such, an exploratory factor analyses was undertaken on both the dependent and independent variables. Furthermore, Pearson’s product moment correlation analysis is conducted to determine the correlation between the dependent and independent variables. Multiple regression analysis is also conducted to test the strength and relationship (if any) between the dependent and independent variables. In conclusion, ANOVA tests are conducted to determine the influence of selected demographic factors on the independent variables.

4.4.1 Results of the validity and reliability analysis

Exploratory factor analyses was undertaken to assess the validity of the scales that measured both the independent as well as dependent variables for this study. An exploratory factor analysis; was undertaken on the independent variables and tests for uni-dimensionality (using factor analysis) were undertaken on the dependent
variable, namely urban agriculture. This sub-section firstly presents the findings of the dependent variable before proceeding to the independent variables.

4.4.2 Dependent variable

The results of the tests for uni-dimensionality undertaken on the dependent variable, urban agriculture, are explored in this sub-section. The dependent variable was labelled “factors that influence your desire to grow food” in the questionnaire (See Annexure B). This factor was based on an existing questionnaire developed by Tornaghi (2012) – which addressed urban agriculture, social cohesion and environmental justice.

The nine items intended to measure urban agriculture all loaded as expected (F7, F3, F9, F5, F4, F6, F2, F8 and F1) and explained 57.1% of variance in the data. Factor loadings of between 0.688 and 0.819 were reported for this factor, which ranged between 0.6 (fair reliability) and 0.80 (very good reliability) (Zikmund et al., 2013). Thus, efficient evidence of validity for the scale measuring urban agriculture is provided. Urban agriculture furthermore returned a Cronbach’s alpha coefficient of 0.901 which if above 0.80 indicating very good reliability and suggesting that the scale measuring urban agriculture was reliable. Table 4.3 summarises the exploratory factor loading and reliability of the dependent variable, urban agriculture.

Table 4.3: Exploratory factor loading and reliability of dependent variable, urban agriculture

<table>
<thead>
<tr>
<th>ITEM</th>
<th>I would participate in urban agricultural activities because of the...</th>
<th>% OF VARIANCE 57.09</th>
<th>CRONBACH'S ALPHA: 0.901</th>
</tr>
</thead>
<tbody>
<tr>
<td>F7</td>
<td>Fun (you enjoy gardening as an activity in itself)</td>
<td>-0.819</td>
<td>0.750</td>
</tr>
<tr>
<td>F3</td>
<td>Need to socialise/meet new people</td>
<td>-0.803</td>
<td>0.737</td>
</tr>
<tr>
<td>F9</td>
<td>Personal Health (you feel it is good for your mental or physical health)</td>
<td>-0.800</td>
<td>0.724</td>
</tr>
<tr>
<td>F6</td>
<td>Popularity on TV and media (i.e. Pasella)</td>
<td>-0.770</td>
<td>0.699</td>
</tr>
<tr>
<td>F4</td>
<td>Taste/food quality (i.e. enjoy the quality and taste of your own grown food)</td>
<td>-0.754</td>
<td>0.668</td>
</tr>
<tr>
<td>F1</td>
<td>Education: learn a useful skill yourself or teach your children</td>
<td>-0.751</td>
<td>0.668</td>
</tr>
<tr>
<td>F2</td>
<td>Environmental concerns (i.e. reduce food miles, live more sustainably)</td>
<td>-0.706</td>
<td>0.640</td>
</tr>
<tr>
<td>F8</td>
<td>Friends/Partner influence (i.e. they are doing it or someone has convinced you to do it with them)</td>
<td>-0.696</td>
<td>0.623</td>
</tr>
<tr>
<td>F1</td>
<td>Income/need to provide affordable fresh food to you and your family</td>
<td>-0.688</td>
<td>0.598</td>
</tr>
</tbody>
</table>
### 4.4.3 Independent variables

The results of the exploratory factor analyses undertaken on the independent variables, namely Perceptions (P), Food security (FS), Innovation/Sustainability (IS) and Resources (RS) are presented below. In the questionnaire (see Annexure B) Perceptions was measured using 12 items (P 1-12), food security had 9 items (FS 1-9), Innovation/Sustainability had 7 items (SI 1-7) items and Resources had 5 items (R 1-5). In determining the factors to extract, both the percentage of variance explained and the factor loadings were considered. Six factors were extracted, explaining 55.81% of the variance in the data. The resulting factor structure is presented in the Table 4.4, this shows how each item from the questionnaire loaded.

**Table 4.4: Factor structure for the independent variables**

<table>
<thead>
<tr>
<th>ITEMS</th>
<th>Attitude</th>
<th>Food availability</th>
<th>Awareness</th>
<th>Lifestyle</th>
<th>Perceptions</th>
<th>Knowledge</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
<th>Factor 5</th>
<th>Factor 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 - Gardening is for the poor</td>
<td>-0.232</td>
<td>0.261</td>
<td>0.06</td>
<td>0.038</td>
<td>-0.182</td>
<td>0.256</td>
<td>-0.195</td>
<td>0.168</td>
<td>0.511</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P2 - Gardening is a hobby</td>
<td>0.763</td>
<td>-0.195</td>
<td>-0.09</td>
<td>0.139</td>
<td>0.094</td>
<td>0.085</td>
<td>-0.065</td>
<td>0.223</td>
<td>0.053</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 - Gardening is a lifestyle</td>
<td>0.562</td>
<td>0.006</td>
<td>0.659</td>
<td>0.092</td>
<td>0.227</td>
<td>-0.051</td>
<td>0.041</td>
<td>0.361</td>
<td>0.02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P4 - Growing fruit and vegetables should only take place in rural areas</td>
<td>-0.039</td>
<td>0.041</td>
<td>-0.05</td>
<td>-0.056</td>
<td>0.095</td>
<td>-0.001</td>
<td>0.74</td>
<td>0.032</td>
<td>0.027</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P5 - Growing fruit and vegetables can have financial rewards</td>
<td>0.127</td>
<td>-0.05</td>
<td>0.257</td>
<td>-0.132</td>
<td>0.259</td>
<td>0.202</td>
<td>0.033</td>
<td>-0.129</td>
<td>0.581</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P6 - It is too expensive to garden</td>
<td>-0.139</td>
<td>-0.259</td>
<td>0.12</td>
<td>-0.071</td>
<td>0.147</td>
<td>0.075</td>
<td>0.258</td>
<td>0.471</td>
<td>-0.278</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P7 - Gardening is time consuming</td>
<td>0.423</td>
<td>-0.057</td>
<td>-0.108</td>
<td>0.185</td>
<td>0.1</td>
<td>0.246</td>
<td>0.489</td>
<td>0.101</td>
<td>-0.039</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P8 - Gardening is a good practice</td>
<td>0.052</td>
<td>-0.035</td>
<td>0.033</td>
<td>0.068</td>
<td>0.538</td>
<td>0.084</td>
<td>0.388</td>
<td>0.18</td>
<td>0.238</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P9 - I would buy my fruit and vegetables from a street vendor (who grow it at home)</td>
<td>0.227</td>
<td>0.095</td>
<td>0.025</td>
<td>0.102</td>
<td>0.211</td>
<td>0.415</td>
<td>0.429</td>
<td>0.099</td>
<td>-0.24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P10 - Parents should teach their children about gardening</td>
<td>0.15</td>
<td>-0.048</td>
<td>0.061</td>
<td>0.096</td>
<td>0.739</td>
<td>0.05</td>
<td>-0.111</td>
<td>0.029</td>
<td>-0.103</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P11 - Schools should teach children about gardening</td>
<td>0.054</td>
<td>-0.017</td>
<td>0.055</td>
<td>0.179</td>
<td>0.834</td>
<td>0.051</td>
<td>0.008</td>
<td>-0.008</td>
<td>0.031</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P12 - Gardening is not important</td>
<td>0.072</td>
<td>-0.221</td>
<td>0.247</td>
<td>-0.102</td>
<td>0.254</td>
<td>0.152</td>
<td>-0.249</td>
<td>0.239</td>
<td>-0.274</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FS1 - I cook with fresh vegetables</td>
<td>0.129</td>
<td>0.13</td>
<td>0.07</td>
<td>0.78</td>
<td>0.091</td>
<td>0.081</td>
<td>0.111</td>
<td>0.141</td>
<td>0.13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FS2 - There is always food to cook/eat in my household</td>
<td>0.029</td>
<td>0.158</td>
<td>0.071</td>
<td>0.682</td>
<td>0.043</td>
<td>0.244</td>
<td>0.011</td>
<td>0.086</td>
<td>0.414</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FS3 - I eat fresh fruits</td>
<td>0.151</td>
<td>0.025</td>
<td>0.071</td>
<td>0.787</td>
<td>0.21</td>
<td>0.117</td>
<td>-0.045</td>
<td>-0.006</td>
<td>0.041</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FS4 - I live a healthy lifestyle</td>
<td>0.204</td>
<td>0.26</td>
<td>0.014</td>
<td>0.83</td>
<td>-0.006</td>
<td>0.001</td>
<td>0.038</td>
<td>0.019</td>
<td>-0.161</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FS5 - My family lives a healthy lifestyle</td>
<td>0.218</td>
<td>0.295</td>
<td>0.041</td>
<td>0.787</td>
<td>0.029</td>
<td>0.021</td>
<td>0.05</td>
<td>0.011</td>
<td>-0.173</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FS6 - I have missed a meal in the last month</td>
<td>0.052</td>
<td>0.912</td>
<td>0.008</td>
<td>0.191</td>
<td>-0.016</td>
<td>0.02</td>
<td>0.06</td>
<td>0.103</td>
<td>0.058</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FS7 - My family has missed a meal in the last month</td>
<td>-0.016</td>
<td>0.928</td>
<td>0.063</td>
<td>0.142</td>
<td>-0.04</td>
<td>0.074</td>
<td>0.014</td>
<td>0.009</td>
<td>0.115</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FS8 - I have missed a meal in the last week</td>
<td>0.029</td>
<td>0.911</td>
<td>-0.002</td>
<td>0.102</td>
<td>-0.01</td>
<td>-0.029</td>
<td>-0.038</td>
<td>0.005</td>
<td>-0.079</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FS9 - My family has missed a meal in the last week</td>
<td>-0.032</td>
<td>0.93</td>
<td>-0.001</td>
<td>0.085</td>
<td>0.033</td>
<td>-0.024</td>
<td>-0.041</td>
<td>-0.008</td>
<td>-0.022</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VS1 - Fruit and vegetables can only be grown outdoors</td>
<td>-0.244</td>
<td>0.068</td>
<td>-0.08</td>
<td>-0.121</td>
<td>0.079</td>
<td>0.516</td>
<td>-0.36</td>
<td>0.202</td>
<td>-0.076</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VS2 - Fruit and vegetables can be grown indoors</td>
<td>-0.044</td>
<td>-0.304</td>
<td>-0.102</td>
<td>-0.134</td>
<td>0.043</td>
<td>0.168</td>
<td>-0.061</td>
<td>0.659</td>
<td>0.045</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
For the purpose of this study, only factor loadings of 0.5 and above will be reported on, as a Cronbach alpha of 0.5 is considered acceptable for basic exploratory research (Nunnally, 1978; Tavakol and Dennick, 2011). In addition, only factors that have three or more variables will be reported on. Tabachnick and Findell (2007), states that for something to be labelled a factor, it needs to have at least three variables. Finally, factors that load on to more than one variable will not be interpreted for this study. Yong and Pearce (2013), state that a cross loading can be dropped when results cannot be easily interpreted.

### 4.4.3.1 Attitude

Of the seven usable items loading onto factor one, four items were originally intended to measure resources (RS4, RS2, RS5, and RS1) and three originally intended to measure perceptions (P2, P3 and P7). The items focused on resources and perceptions of gardening. Given the nature of the items, factor one was named...
attitude. *Attitude* explains 12.165 of the variance in the data and factor loadings of between 0.836 and 0.562 were reported, which were all above 0.4 and considered acceptable (Hair et al., 2014). The validity of the scale measuring *attitude* is thus confirmed.

The Cronbach’s alpha coefficient for attitude is 0.835 which is above 0.7 (Bryman, 2012), stating that the scale measuring attitude is reliable. Table 4.5 below summarises this data.

Table 4.5: Validity and reliability of attitude

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUESTION</th>
<th>FACTOR LOADING</th>
<th>ITEM-TOTAL CORREL.</th>
<th>CA AFTER DELETION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS4</td>
<td>I do have a garden</td>
<td>0.836</td>
<td>0.785</td>
<td>0.775</td>
</tr>
<tr>
<td>RS2</td>
<td>I have the time to grow my own fruit and vegetables</td>
<td>0.765</td>
<td>0.687</td>
<td>0.796</td>
</tr>
<tr>
<td>P2</td>
<td>Gardening is a hobby</td>
<td>0.763</td>
<td>0.654</td>
<td>0.804</td>
</tr>
<tr>
<td>RS5</td>
<td>I do have a yard.space for growing my own fruit and vegetables</td>
<td>0.744</td>
<td>0.595</td>
<td>0.811</td>
</tr>
<tr>
<td>RS1</td>
<td>I can afford to grow my own fruit and vegetables (e.g. buying seeds, fertilizer etc.)</td>
<td>0.678</td>
<td>0.550</td>
<td>0.818</td>
</tr>
<tr>
<td>P3</td>
<td>Gardening is a lifestyle</td>
<td>0.562</td>
<td>0.436</td>
<td>0.833</td>
</tr>
</tbody>
</table>

Hogg and Vaughan (2005: 150) define attitude as “a relatively enduring organisation of beliefs, feelings and behavioural tendencies towards socially significant objects, groups, events or symbols”. McLeod (2009) states that the structure of attitudes can be described in terms of three components, namely affective component – which relates to the persons feelings. Behavioural component, which influences how people behave and the cognitive component, which relates to a person’s knowledge or belief about an object. For the purpose of this study, *attitude* refers to resident’s beliefs and knowledge about urban agriculture.

### 4.4.3.2 Food availability

The nine items intended to measure food security loaded onto two different factors. FS9, FS7, FS6 and FS8 loaded onto one factor, similar wording such as “missed a meal” provides a possible explanation as to why these factors loaded together on to one factor. Given the nature of these items, factor two was renamed *food availability*. *Food availability* explains 12.12% of the variance in data. Furthermore, factor
loadings of between 0.930 and 0.911 were reported. The Cronbach’s alpha coefficient food availability is 0.792, which is above 0.70 (Andrew et al., 2011). Therefore, sufficient evidence of validity and reliability for the scale measuring food availability is confirmed. Table 4.6 summarises the results of the validity and reliability for this factor.

Table 4.6: Validity and reliability of food availability

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUESTION</th>
<th>FACTOR LOADING</th>
<th>ITEM-TOTAL CORREL.</th>
<th>CA AFTER DELETION</th>
</tr>
</thead>
<tbody>
<tr>
<td>FS9</td>
<td>My family has missed a meal in the last week</td>
<td>0.930</td>
<td>0.562</td>
<td>0.727</td>
</tr>
<tr>
<td>FS7</td>
<td>My family has missed a meal in the last month</td>
<td>0.928</td>
<td>0.704</td>
<td>0.636</td>
</tr>
<tr>
<td>FS6</td>
<td>I have missed a meal in the last month</td>
<td>0.912</td>
<td>0.561</td>
<td>0.763</td>
</tr>
<tr>
<td>FS8</td>
<td>I have missed a meal in the last week</td>
<td>0.911</td>
<td>0.558</td>
<td>0.787</td>
</tr>
</tbody>
</table>

For the purpose of this study food availability refers to residents’ access to food.

4.4.3.3 Lifestyle

The remaining five items intended to measure food security loaded onto factor four. Similar wording such as “lifestyle” and “fresh” provide a possible explanation as to why these factors loaded together. Given the nature of these items, factor four was named lifestyle. This factor explains 10.52% of the variance of data and factor loadings of between 0.830 and 0.682 were reported. The Cronbach’s alpha coefficient is 0.888 which is above 0.70 (Andrew et al., 2011), thus sufficient evidence of validity and reliability for the scale of measuring lifestyle is confirmed.

Table 4.7: Validity and reliability of lifestyle

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUESTION</th>
<th>FACTOR LOADING</th>
<th>ITEM-TOTAL CORREL.</th>
<th>CA AFTER DELETION</th>
</tr>
</thead>
<tbody>
<tr>
<td>FS4</td>
<td>I live a healthy lifestyle</td>
<td>0.830</td>
<td>0.787</td>
<td>0.850</td>
</tr>
<tr>
<td>FS3</td>
<td>I eat fresh fruits</td>
<td>0.787</td>
<td>0.755</td>
<td>0.862</td>
</tr>
<tr>
<td>FS5</td>
<td>My family lives a healthy lifestyle</td>
<td>0.787</td>
<td>0.736</td>
<td>0.863</td>
</tr>
<tr>
<td>FS1</td>
<td>I cook with fresh vegetables</td>
<td>0.780</td>
<td>0.741</td>
<td>0.861</td>
</tr>
<tr>
<td>FS2</td>
<td>There is always food to cook/eat in my household</td>
<td>0.682</td>
<td>0.652</td>
<td>0.882</td>
</tr>
</tbody>
</table>
For the purpose of this study lifestyle refers to resident’s access to safe and healthy food.

### 4.4.3.4 Awareness

Seven items were intended to measure innovation/sustainability. The items were centred on respondents' knowledge of using recyclable materials, such as containers when growing food – and how gardening could contribute towards one’s health and our environment. Three of the items loaded onto one factor – these three factors suggested that urban agriculture has a positive impact on our health and environment. Given the nature of the items, factor three was named awareness. This factor explains 7.72% of the variance in the data and factor loadings of between 0.951 and 0.616 were reported, which were all above 0.4 (Hair et al., 2014). The Cronbach’s alpha coefficient is 0.861 which is above 0.70 (Andrew et al., 2011). As such, the validity and reliability of the scale measuring awareness is confirmed.

**Table 4.8: Validity and reliability of awareness**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUESTION</th>
<th>FACTOR LOADING</th>
<th>ITEM TOTAL CORREL.</th>
<th>CA AFTER DELETION</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/55</td>
<td>Growing your own food contributes positively to your health</td>
<td>0.951</td>
<td>0.852</td>
<td>0.708</td>
</tr>
<tr>
<td>I/57</td>
<td>Growing your own food contributes positively to your family's health</td>
<td>0.940</td>
<td>0.803</td>
<td>0.745</td>
</tr>
<tr>
<td>I/55</td>
<td>Growing your own food contributes positively to the environment (e.g. reduce food miles, increases freshness)</td>
<td>0.616</td>
<td>0.591</td>
<td>0.960</td>
</tr>
</tbody>
</table>

For the purpose of this study awareness refers to respondents’ knowledge of how urban agriculture can have a positive impact on one’s health and environment.

### 4.4.3.5 Knowledge

The three remaining items intended to measure innovation/sustainability loaded onto factor six. The wording “can be grown” could provide a possible explanation as to why these factors loaded together. Given the nature of the items the factor was named knowledge. Knowledge explains 6.79% of variance in the data and factor loadings were above 0.4, ranging between 0.814 and 0.516. The Cronbach’s alpha coefficient is 0.617 (Zikmund et al., 2013) suggests that a Cronbach’s alpha of 0.60
indicates fair reliability. Thus the validity and reliability of the scale measuring knowledge is confirmed and is outlined in Table 4.9 below.

Table 4.9: Validity and reliability of knowledge

<table>
<thead>
<tr>
<th>% OF VARIANCE 6.79</th>
<th>CRONBACH'S ALPHA: 0.617</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITEM</td>
<td>QUESTION</td>
</tr>
<tr>
<td>I/S4</td>
<td>Fruit and vegetables can be grown on rooftops</td>
</tr>
<tr>
<td>I/S3</td>
<td>Fruit and vegetables can be grown using recyclable materials (e.g. plastic, tyres, wooden boxes, bricks)</td>
</tr>
<tr>
<td>I/S1</td>
<td>Fruit and vegetables can only be grown outdoors</td>
</tr>
</tbody>
</table>

For the purpose of this study knowledge refers to respondents’ understanding of the sustainable methods/resources one can use when growing food.

4.4.3. Perceptions

Twelve items were intended to measure perception however one of these items loaded on to more than one factor and five were problematic. Costello and Osborne (2005) suggest that the researcher can decide whether to drop cross loading or problematic items from analysis – provided that there are adequate items left. Of the four usable items that loaded on to factor five – three were intended to measure perception (P11, P10 and P8) and one was supposed to measure resources (RS3). The factor loadings ranged between 0.834 and 0.441 and 6.50% variance of data is explained by this factor. The Cronbach’s alpha coefficient is 0.569, which Nunnally (1978) considers acceptable for basic exploratory research (Tavakol and Dennick, 2011).

Table 4.10: Validity and reliability of perceptions

<table>
<thead>
<tr>
<th>% OF VARIANCE 6.79</th>
<th>CRONBACH'S ALPHA: 0.617</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITEM</td>
<td>QUESTION</td>
</tr>
<tr>
<td>P11</td>
<td>Schools should teach children how to garden</td>
</tr>
<tr>
<td>P10</td>
<td>Parents should teach their children how to garden</td>
</tr>
<tr>
<td>P8</td>
<td>Gardening is a good practise</td>
</tr>
</tbody>
</table>
As a result of exploratory factor analyses, the factor named *perception* was retained but the operationalisation thereof was slightly adapted because of the items that loaded onto this factor. Thus for the purpose of this study, *perception* refers to the respondents understanding and interpretations the importance of urban agriculture.

### 4.4.3.7 Summary of the exploratory factor analysis of the independent variables

Yong and Pearce (2013: 79) state that the purpose of factor analysis is to summarise data, so that relationships can be easily interpreted. Furthermore, it is used to regroup variables into a cluster, based on shared variances – hence it helps to isolate constructs and concepts. The literature of this study identified four factors as possible barriers and enablers of practising urban agriculture. However, after conducting exploratory factor analysis from the data collected from 303 respondents – six factors were extracted, explaining 55.81% of variance in the data.

Figure 4.34 illustrates how each of the four factors contributed towards the loading of the six factors extracted by conducting exploratory factor analysis.

![Diagram of factor analyses](image)

*Figure 4.34: Result of factor analyses*

### 4.5 Revised hypothesised model and hypotheses

As a result of factor analyses, the operationalisation of the independent variable was reformulated. Table 4.11 presents the reformulated operational definition.
Table 4.11: Reformulated operational definitions

<table>
<thead>
<tr>
<th>Factor</th>
<th>Operationalisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td>Refers to resident’s beliefs and knowledge about urban agriculture.</td>
</tr>
<tr>
<td>Food availability</td>
<td>Refers to resident’s access to food.</td>
</tr>
<tr>
<td>Lifestyle</td>
<td>Refers to resident’s access to safe and healthy foods.</td>
</tr>
<tr>
<td>Awareness</td>
<td>Respondents’ knowledge of how urban agriculture can have a positive impact on one’s health and environment.</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Refers to respondents understanding of the sustainable methods/resources one can utilise when growing food.</td>
</tr>
<tr>
<td>Perception</td>
<td>Refers to the respondents understanding and interpretations about the importance of urban agriculture.</td>
</tr>
</tbody>
</table>

In addition, the hypothesised model was revised based on the results of exploratory factor analyses. The relationships illustrated in the revised hypothesised model and the formulated hypotheses are presented below and are subjected to further empirical testing in the study.

In addition, the hypothesised model was revised based on the results of exploratory factor analyses. The relationships illustrated in the revised hypothesised model and the formulated hypotheses are presented below and are subjected to further empirical testing in the study.

Figure 4.35: Reformulated hypothesised model
The reformulated hypotheses for this study are as follows:

H1: Attitude is significantly related to urban agriculture
H2: Food availability is significantly related to urban agriculture
H3: Lifestyles are significantly related to urban agriculture
H4: Awareness is significantly related to urban agriculture
H5: Knowledge is significantly related to urban agriculture
H6: Perceptions are significantly related to urban agriculture

4.6 EMPIRICAL RESULTS

STATISTICA 13 statistical package was used to undertake the statistical analyses of the study. The results of both the descriptive and inferential statistics are explored in this sub-section. Descriptive statistics included the mean and standard deviation. Inferential statistics included calculating Pearson’s product moment correlations and undertaking multiple regression analysis as well as ANOVA tests.

Responses for all independent variables were categorised on the 5-point Likert scale as indicated in Table 4.12 below.

Table 4.12: Calculated index and scale range for independent variables

<table>
<thead>
<tr>
<th>Calculated index</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-point Likert scale range</td>
<td>Strongly disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly agree</td>
</tr>
</tbody>
</table>

Table 4.13: Descriptive statistics for independent variables

<table>
<thead>
<tr>
<th>Factor</th>
<th>Responses (out of 301)</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td>282</td>
<td>3,65</td>
<td>0,792</td>
</tr>
<tr>
<td>Food availability</td>
<td>301</td>
<td>1,81</td>
<td>0,859</td>
</tr>
<tr>
<td>Lifestyle</td>
<td>298</td>
<td>4,07</td>
<td>0,736</td>
</tr>
</tbody>
</table>
Of the six independent variables *awareness* returned the highest mean score ($\bar{x} = 4.20$) indicating that respondents typically agreed with the statements measuring awareness. As such they agreed that growing their own food can contribute positively towards their health, their family’s health and the environment.

*Perceptions* returned the second highest mean score ($\bar{x} = 4.18$) indicating that respondents typically agreed with the statements measuring perceptions. As such they agreed that gardening was a good practise that it could save money (spent on fruit and vegetables) and that schools and parents should teach children about the importance of growing their own food.

*Lifestyle* reported a mean score of ($\bar{x} = 4.07$) that interpreted the typical agreement amongst respondents regarding the statements measuring lifestyle. This indicated that respondents always had food to cook, cooked with fresh foods and that both they and their families lives healthy lifestyles.

*Attitude* was the fourth highest mean ($\bar{x} = 3.65$) indicating that neutral responses were typically recorded for the statements measuring attitude. Thus respondents neither agreed nor disagreed that gardening was a hobby, lifestyle or time consuming. In addition, neutral responses were typically recorded regarding statements that respondents had the time, space and money to buy resources for gardening.

*Knowledge* also recorded a typical neutral response with a mean of ($\bar{x} = 3.51$). Thus respondents neither agreed nor disagreed with the statements that fruit and vegetables can be grown on rooftops, recyclable materials can be used as containers and fruit and vegetables can only be grown outdoors.

*Food availability* recorded the lowest mean ($\bar{x}=1.81$), which indicates a typical disagree response. Thus respondents typically disagreed that they or their families had missed meals in the past week or month (of the survey being conducted). This was also the only factor that all responses (n=303) were recorded.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Count</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness</td>
<td>300</td>
<td>4.20</td>
<td>0.676</td>
</tr>
<tr>
<td>Knowledge</td>
<td>285</td>
<td>3.51</td>
<td>0.966</td>
</tr>
<tr>
<td>Perception</td>
<td>298</td>
<td>4.18</td>
<td>0.455</td>
</tr>
</tbody>
</table>
4.6.1 Descriptive statistics on dependent variable

The dependent variable (when compared to the independent variables) made use of a different 5-point Lickert scale. Respondents had to give a rating between 0 (being not at all) and 4 (being a lot) regarding their opinions about the item/question. The responses are recorded in Tables 4.14 and 4.15.

Table 4.14: Calculated index and scale range for dependent variables

<table>
<thead>
<tr>
<th>Calculated index</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-point Likert scale range</td>
<td>Not important at all</td>
<td>Low importance</td>
<td>Slightly important</td>
<td>Moderately important</td>
<td>Very important</td>
</tr>
</tbody>
</table>

Table 4.15: Descriptive statistics for independent variables

<table>
<thead>
<tr>
<th>Factor</th>
<th>Responses (out of 303)</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Urban agriculture)</td>
<td>303</td>
<td>3.31</td>
<td>0.809</td>
</tr>
</tbody>
</table>

The dependent variable had an average of 301 respondents. The mean was 3.31, indicating that respondents typically regarded the items as “moderately important”. Concluding that the factors were very important and affected their desire to participate in urban agriculture.

4.6.2 Pearson’s product moment correlations

Table 4.16: Pearson’s correlation coefficient

<table>
<thead>
<tr>
<th>Factor</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Attitude</td>
<td>1,000</td>
<td>-0,045</td>
<td>0,179</td>
<td>0,420</td>
<td>0,335</td>
<td>0,235</td>
<td>0,288</td>
</tr>
<tr>
<td>(2) Food availability</td>
<td>-0,045</td>
<td>1,000</td>
<td>-0,010</td>
<td>-0,312</td>
<td>-0,003</td>
<td>-0,062</td>
<td>-0,273</td>
</tr>
<tr>
<td>(3) Awareness</td>
<td>0,179</td>
<td>-0,010</td>
<td>1,000</td>
<td>0,216</td>
<td>0,245</td>
<td>0,335</td>
<td>0,177</td>
</tr>
</tbody>
</table>
From the above table it can be seen that all independent variables except food availability are significantly (p<0.05) and positively correlated with the dependent variable, urban agriculture. Food availability however shows a negative correlation. R-values of between 0.350 and 0.177 were reported for the associations between urban agriculture and four dependent variables, namely lifestyle, attitude, perceptions and awareness. According to Statsoft (2014), these values reflect weak positive associations.

A very high positive correlation was reported between urban agriculture and knowledge (r= 0.094), this was close to +1, which signifies a high positive relationship (Collis and Hussey, 2009). This indicates that urban agriculture and knowledge move in the same direction. Thus the more people were to practice urban agriculture, the more knowledgeable they become about it.

A negative correlation on the other hand indicates that both variables move in the opposite direction – thus if one increases, the other decreases (Collis and Hussey, 2009). This study reported a negative correlation between urban agriculture and food availability (r= -0.273). Indicating that the more food availability (in households) the less residents would practise urban agriculture.

4.6.3 Multiple regression analysis

The previous sub-section was based on correlation analysis, which focuses on the strength of the relationship between variables. This sub-section will explore regression analysis, which assumes a dependence or causal relationship between the dependent and independent variables.

As this study aims to identify the enablers and barriers to urban agriculture, the regression analysis allows one to identify the strength of the effect that the independent variables, namely attitude, food availability, awareness, lifestyle,
perceptions and knowledge have on the dependent variable, urban agriculture. This will allow conclusions to be made as to whether the independent variables are enablers or barriers, depending on the strength of effect.

Table 4.17: Influence on the independent variables on urban agriculture

<table>
<thead>
<tr>
<th>Dependent variable: Urban agriculture</th>
<th>R-Square: 0.2064</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent variables</td>
<td>Beta</td>
</tr>
<tr>
<td>Intercept</td>
<td>2,1522</td>
</tr>
<tr>
<td>Lifestyle</td>
<td>0,1840</td>
</tr>
<tr>
<td>Attitude</td>
<td>0,1584</td>
</tr>
<tr>
<td>Perceptions</td>
<td>0,1203</td>
</tr>
<tr>
<td>Food availability</td>
<td>-0,2111</td>
</tr>
<tr>
<td>Awareness</td>
<td>0,1003</td>
</tr>
<tr>
<td>Knowledge</td>
<td>-0,0668</td>
</tr>
</tbody>
</table>

(*p<0.05)

A significant positive linear relationship (beta = 0.1840; p <0.0064) was reported between lifestyle and urban agriculture. As such, the more people had access to fresh foods and lived a healthy lifestyle, the more they would practice urban agriculture. Thus at a 95% confidence interval, it is further noted that the p value is smaller than 0.05, indicating a significant relationship between lifestyle and urban agriculture. This result indicates an acceptance of the formulated hypothesis H3: Lifestyle is significantly related to urban agriculture. As a result, of these findings the researcher concludes that lifestyle was an enabler of urban agriculture amongst residents in Holland Park.

Another positive linear relationship (beta=0.154; p <0.0145) was reported between attitude and urban agriculture. Indicating that, the more people had (access to) time, space and money to garden and the more they viewed gardening as a lifestyle/hobby – the more they would practise urban agriculture. Thus at a 95%
confidence interval, it is noted that that the p value is below 0.05, indicating a significant relationship between attitude and urban agriculture. This result indicates that the formulated hypothesis \( H1: \text{attitude is significantly related to urban agriculture} \) – is accepted. As a result, of these findings it is concluded that attitude is an enabler of urban agriculture amongst residents in Holland Park.

At a 94.95% confidence level, with a p value of just above 0.05, indicating a (almost) significant relationship (beta = 0.1203; \( p<0.0505 \)) between perceptions and urban agriculture. Indicating that the more gardening is viewed as a good practise which should essentially be taught to younger generations, the more people would practise urban agriculture. As a result, the formulated hypothesis \( H6: \text{Perceptions are significantly related to urban agriculture} \) – is accepted. Concluding that perceptions are an enabler to practising urban agriculture amongst residents in Holland Park.

Food availability is negatively related to urban agriculture (beta = -0.2111; \( p<0.0004 \)), indicating that the more residents had food available, the less they would practise or participate in urban agriculture. As such, the formulated hypothesis: \( H2: \text{Food availability is significantly related to urban agriculture} \) – is accepted. However, food availability is identified as a barrier to the practise of urban agriculture. As the more residents feel that they had food available (regardless of it being nutritional and healthy) the less they would participate in urban agricultural activities.

Awareness and knowledge showed no significant relationship with urban agriculture. Thus indicating that knowing about growing food indoors or outdoors or using recyclable material (knowledge), or how urban agriculture can contribute towards one’s health and environment (awareness), does not automatically result in practising or participating in urban agricultural activities. As a result, the hypothesis \( H4: \text{Awareness is significantly related to urban agriculture} \) and \( H5: \text{Knowledge is significantly related to urban agriculture} \), are rejected.

### 4.6.3.1 Food availability: A distractor

Food availability was identified as a barrier to urban agriculture. As such, it was removed. Table 4.18 below indicates the result thereof.
Table 4.18: Influence of food security on R-square

<table>
<thead>
<tr>
<th>Dependent variable: Urban agriculture</th>
<th>R-Square: 0.1635</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent variables</td>
<td>Beta</td>
</tr>
<tr>
<td>Intercept</td>
<td></td>
</tr>
<tr>
<td>Attitude</td>
<td>0.1343</td>
</tr>
<tr>
<td>Awareness</td>
<td>0.0881</td>
</tr>
<tr>
<td>Lifestyle</td>
<td>0.2644</td>
</tr>
<tr>
<td>Perceptions</td>
<td>0.1052</td>
</tr>
<tr>
<td>Knowledge</td>
<td>-0.0614</td>
</tr>
</tbody>
</table>

Statistical tests (regression analysis) concluded that food availability is a very important determinant of urban agriculture. As a result, leaving out food availability as an independent variable reduces the R-squared by 5%. Indicating that food availability is an important distractor and thus a barrier to practising urban agriculture in NMB.

4.6.3.2 Summarising the data obtained from multiple regression

Table 4.19: Summary of multiple regression analyses

<table>
<thead>
<tr>
<th>FACTOR</th>
<th>HYPOTHESIS</th>
<th>RELATIONSHIP</th>
<th>OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td>Is significantly related to urban agriculture – <strong>Accepted</strong></td>
<td>Positive</td>
<td>Enabler</td>
</tr>
<tr>
<td>Food availability</td>
<td>Is significantly related to urban agriculture - <strong>Accepted</strong></td>
<td>Negative</td>
<td>Barrier</td>
</tr>
<tr>
<td>Awareness</td>
<td>Is significantly related to urban agriculture – <strong>Rejected</strong></td>
<td>None</td>
<td>Not significant</td>
</tr>
<tr>
<td>Lifestyle</td>
<td>Is significantly related to urban agriculture – <strong>Accepted</strong></td>
<td>Positive</td>
<td>Enabler</td>
</tr>
<tr>
<td>Perceptions</td>
<td>Are significantly related to urban agriculture</td>
<td>Positive</td>
<td>Enabler</td>
</tr>
</tbody>
</table>
Data derived from multiple regression, resulted in the proposed model for this study. This is presented in Figure 4.36 below.

![Figure 4.36: Revised hypothesised model](image)

**4.6.4 The influence of demographic variables on the independent variables**

In Section A of the measuring instrument, demographic information relating to respondents Gender and Age was requested. In addition, information regarding respondents Qualifications and Employment status was also obtained. Furthermore, respondents were asked to indicate if they were the breadwinners in their households. For the purpose of this study, these factors (gender, age, qualifications employment status and being a breadwinner) are referred to as “demographic factors” in this sub-section. In order to establish whether relationships exist between the demographic factors and the dependent variables (attitude, food availability, lifestyle, awareness, knowledge and perceptions) investigated in this study, an analysis of variance was undertaken. As such, the independent variables were used as dependent variables to calculate ANOVA. The results of these analyses are illustrated and discussed in Table 4.21 below.
Table 4.20: The influence of demographic variables on the independent variables.

<table>
<thead>
<tr>
<th>Demographic factors</th>
<th>Attitude</th>
<th>Food availability</th>
<th>Lifestyle</th>
<th>Awareness</th>
<th>Knowledge</th>
<th>Perceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>0.586</td>
<td>0.586</td>
<td>0.959</td>
<td>0.742</td>
<td>0.374</td>
<td>0.883</td>
</tr>
<tr>
<td>Age</td>
<td>0.005**</td>
<td>0.993</td>
<td>0.134</td>
<td>0.347</td>
<td>0.030**</td>
<td>0.112</td>
</tr>
<tr>
<td>Qualification</td>
<td>0.000**</td>
<td>0.540</td>
<td>0.125</td>
<td>0.004**</td>
<td>0.040**</td>
<td>0.000**</td>
</tr>
<tr>
<td>Employment status</td>
<td>0.111</td>
<td>0.268</td>
<td>0.749</td>
<td>0.178</td>
<td>0.790</td>
<td>0.196</td>
</tr>
<tr>
<td>Breadwinner</td>
<td>0.880</td>
<td>0.176</td>
<td>0.863</td>
<td>0.229</td>
<td>0.653</td>
<td>0.157</td>
</tr>
</tbody>
</table>

(**p< 0.05)

The above table indicates that gender was not significantly related to any of the dependent variables. The second demographic factor that proved no significant relationship with the dependent variables was the employment status. Thus regardless of resident’s employment status, it did not influence the dependent variables. The third demographic factor that proved to have no significance on the dependent variables was being a breadwinner. Concluding that being a breadwinner did not influence any of the dependent variables.

Qualification had a significant relationship with attitude (p<0.000), awareness (p<0.004), knowledge (p<0.040) and perceptions (p<0.000). This indicates that residents who had a post-matric qualification indicated a positive attitude towards urban agriculture. Secondly, they were more aware of the benefits of urban agriculture towards one’s health and the environment. Thirdly, having a post-matric qualification influenced resident’s knowledge with regard to growing food in a sustainable manner, such as using recyclable materials when practising urban agriculture. Finally, having a post-matric qualification influenced resident’s perceptions regarding urban agriculture, these related to teaching children the importance of gardening (amongst others).
Age also had a significant relationship with attitude (p< 0.005) and knowledge (p< 0.03). Concluding that certain age groups would have a different attitude towards urban agriculture and knowledge would vary, depending on the age group.

4.7 CHAPTER SUMMARY

Chapter 4 discussed the data analyses and interpretations of the primary data collected. This chapter addressed RQ5 namely, “How do residents in NMB perceive urban agriculture?” in doing so it had to satisfy RO5 namely, “To determine the residents’ perceptions of urban agriculture.” In doing so this chapter covered the following sub-sections:

Sub-section 4.1 provided a brief review of what was covered in Chapter 3 and introduced the research questions and objectives that are addressed in Chapter 4, as indicated above. Sub-section 4.2 provided a brief explanation of the data analysis and interpretation methods used in this chapter. Furthermore, it provided more information on the survey structure within the main study questionnaire (see Annexure B) and the specific techniques that were to analyse the data. Sub-section 4.3 provides the descriptive statistics. This comprises respondents’ demographics (Section A) and Household structures (section B). The descriptive statistics furthermore presented the respondents’ knowledge on urban agriculture as well as their interest in urban agricultural activities. The data collected revealed that most residents had some knowledge about urban agriculture and that they were interested in participating in urban agricultural activities/practices. It was concluded that urban agriculture was perceived as an important practise which residents were interested in.

Sub-section 4.4 conducted multivariate analysis and inferential statistics. As such, an exploratory factor analyses was undertaken on both the dependent and independent variables. Furthermore, Pearson’s product moment correlation analysis was conducted to determine the correlation between the dependent and independent variables. Multiple regression analysis was also conducted to test the strength and relationship (if any) between the dependent and independent variables. Furthermore, ANOVA tests were conducted to determine the influence of selected demographic factors on the independent variables.
Sub-section 4.4 provides information on the inferential statistics that were conducted on the variables in this study. This included the results of the validity and reliability. In order to assess the validity of the measuring instrument, a factor analyses was undertaken and the reliability of the measuring instrument was assessed by means of calculating Cronbach’s alpha coefficients. Based on the results derived, the hypothesised model was revised and the hypotheses reformulated, this was presented in Sub-section 4.5. Sub-section 4.6 introduced and discussed the analysis of data which included the results of Pearson’s product moment correlations and then presented the relationships between the variables discussed in this study. Furthermore, the results of the multiple regression analyses, showing the influence of the dependent variable on independent variables was presented and explored. Thereafter, an analysis of variance was undertaken to establish whether relationships exist between selected demographic factors and the independent variables investigated in this study. Finally, sub-section 4.7 provides a chapter summary highlighting the most important deductions that can be drawn.
CHAPTER FIVE     FINDINGS, RECOMMENDATIONS AND CONCLUSIONS

5.1 INTRODUCTION

The overall summary of this study was presented in Chapter 1. Chapter 2 reviewed literature pertaining to urban agriculture; government and policies on urban agriculture, food security in South Africa and urban poverty. The possible barriers and enablers to the practise were identified and a hypothesised model of urban agriculture in NMB proposed. Chapter 3 discussed the research methodologies used in the study whilst Chapter 4 presented the data analysis and interpretations. In Chapter 5, a summary of each Research Objective and Question is given in addition to findings, recommendations and conclusions based on the empirical study presented. Figure 5.1 presents the overview of the research questions and objectives of Chapter 5.

Figure 5.1: Chapter 5 RQ’s and RO’s in the context of the study
Chapter 5 addresses Research questions six and seven, namely “What are the enablers and barriers of urban agriculture in NMB?” and “How can urban agricultural activities be promoted to residents in NMB?” respectively. Subsequently this will achieve Research objectives six, “To provide pertinent conclusions based on findings” and seven “To determine how urban agriculture practises could be promoted in NMB”. A proposed model for urban agriculture in NMB is presented based on the identified enablers and barriers. Recommendations based on the findings of the empirical study are suggested, contributions of the study highlighted. Limitations and recommendations for further use as well as a summary concludes this chapter.

5.2 RESEARCH QUESTIONS AND OBJECTIVES SUMMARY

The main research question “What are the urban agricultural practices in NMB?” is achieved through the main research objective (ROm) of this study, namely “To investigate urban agricultural practices in NMB”. In order to address the main research question and objectives, secondary questions and objectives were developed and a summary is presented below in addition to how they (RQ and RO) were achieved.

Table 5.1: Summary of research objectives and questions

<table>
<thead>
<tr>
<th>Research questions</th>
<th>Research objectives</th>
<th>Chapter in which objectives were achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>RQ1 Where does urban agriculture (UA) originate?</td>
<td>RO1 To determine the origins of urban agriculture</td>
<td>Chapter 1 (Introduction)</td>
</tr>
<tr>
<td>RQ2 What are the advantages and disadvantages of urban agriculture?</td>
<td>RO2 To identify the advantages and disadvantages of urban agriculture</td>
<td>Chapter 1 (Introduction)</td>
</tr>
<tr>
<td>RQ3 What are the barriers and enablers of urban agriculture?</td>
<td>RO3 To identify the barriers and enablers of urban agriculture</td>
<td>Chapter 2 (Literature review)</td>
</tr>
<tr>
<td>RQ4 What is the appropriate research methodology to be</td>
<td>RO4 To identify and explain the research methodology used for this dissertation enabling</td>
<td>Chapter 3</td>
</tr>
</tbody>
</table>
5.2.1 Research question one (RQ1) and research objective one (RO1)

The first research question was developed to determine the origins of urban agriculture. This was discussed in the context of the United States of America and South African history. Chapter 1 highlighted that throughout American History, citizens often turned to gardening in response to times of financial difficulty (Greenbaum, 2014). In contrast to the USA, most South Africans were introduced to this concept at a young age, either through education, circumstances and/or family. As such, schools governed under the Bantu Education taught agriculture as a subject (DoA, 2005). Thus South Africans were fortunate enough to learn a basic skill that could sustain their livelihood.

5.2.2 Research question two (RQ2) and research objective two (RO2)

The second research question aimed to address the advantages and disadvantages of urban agriculture. Okvat and Zautra (2011) found that urban agriculture initiatives buffer food shortages mitigate negative social impacts such as unemployment and
violence, concluding that it enhances community cohesion. Hagey et al. (2012) also suggested that there was a direct link between the access to healthier food and the opportunity for additional income. Factors such as seasonal rainfall, excessive pests and diseases were identified as disadvantages to practising urban agriculture (Adedayo and Tunde, 2013).

5.2.3 Research question three (RQ3) and research objective three (RO3)

The third research question focused on identifying enablers and barriers to urban agriculture. Reviewed literature highlighted government and policies regarding food security in South Africa. According to literature policies exist, well documented although not executed (Battersby et al., 2015a). The reality of urban poverty was also discussed and it was noted that residents within urban cities spend more money on necessities such as accommodation and transport and therefore had less money for food. The lack of disposable income therefore leads to purchasing food that is cheap and not necessarily healthy (Van der Merwe, 2011).

The definition of barriers and enablers, in the context of this study were introduced. The limitation identified in the literature was that urban agriculture is a new development within the South African context. To date, most research focuses on the benefits of urban agriculture and the government’s lack of involvement in the sustainability of the practise (Battersby, 2012; Battersby et al., 2015a: Rogerson, 2004). Even though literature of agriculture specifically exists and reported, that of urban agriculture is limited. Thus, this study aimed to identify possible barriers and enablers to urban agriculture and proposed the following variables: perceptions, innovation/sustainability, food security and resources as possible enablers or barriers to this practise.

Each variable and its relation to urban agriculture was explored before the necessary hypotheses were formulated. The proposed hypotheses were formulated based on the literature and are as follows:

- **H1:** Perceptions are significantly related to urban agriculture;
- **H2:** Innovation/Sustainability is significantly related to urban agriculture;
- **H3:** Food security is significantly related to urban agriculture; and
- **H4:** The availability of resources is significantly related to urban agriculture.
Hypothesis 1 (H1) suggests that residents’ perceptions regarding the financial rewards associated with urban agriculture, the importance of children and school participation as well as job creation through this practise had an impact on participating in urban agriculture. Hypothesis 2 (H2) suggests that residents’ understanding of sustainable gardening and the environmental as well as health benefits of urban agriculture had an impact on their participation in urban agriculture. Hypothesis 3 (H3) suggests that residents food security, for example having food available in the household had an impact on their participation in urban agriculture. Finally, hypothesis 4 (H4) suggests that the availability of resources such as space, time and money related to urban agriculture had an impact on their participation in the practise. The initial proposed model based on the above hypotheses is reflected in Figure 5.2.

Figure 5.2: Initial proposed hypothesised model for urban agriculture in NMB

5.2.4 Research objective four (RO4) and research question four (RQ4)

The fourth research question addressed the research methodology used for this dissertation, enabling reproduction for the future. A quantitative research paradigm was adopted; the population, sample and sampling techniques explored. For this study a sample was drawn from residents in Holland Park, (who were 18 years and older), comprising of 303 respondents. The selection of respondents was done using convenience sampling (chosen based on their availability and proximity to the fieldworkers). A structured questionnaire was utilised to collect data and the
measuring instrument constructed from literature in addition to a guide from Tornaghi (2012), is available as Appendix (B).

In this study, construct validity was used to assess the legitimacy of the measuring instrument where factor analysis was performed to assess the construct validity. Exploratory Factor Analysis (EFA) was undertaken to assess the validity of both the dependent and independent variables in the study. A varimax rotation of the original factor matrix was used – and the Principal Component Analysis (PCA) utilised as the technique for factor extraction. In addition, this study used the internal consistency method, through the calculation and interpretation of Cronbach’s alpha coefficients to confirm reliability of the measuring instrument. It was concluded that this study will follow Nunnally (1978) who considers a Cronbach alpha of 0.50 as acceptable for basic exploratory research.

Both descriptive and inferential statistics analysed data collected in this study. Pearson’s product moment correlation was utilised to determine whether associations exist between the various factors under investigation as well as the strengths of any existing associations (Jackson, 2011). Furthermore, multiple regression analyses identified the strength of the effect that the independent variables have on the dependent variable, urban agriculture. Thereafter, inferences derived as to whether the independent variables are enablers or barriers, depending on the strength of effect.

5.2.5 Research objective five (RO5) and research question five (RQ5)

The fifth research question stated, “How do residents in NMB perceive urban agriculture?” The empirical study in Chapter 4 addressed this question and the research objective – “To determine the residents’ perceptions of urban agriculture”. Data were collected from Section C of the questionnaire with items 3 and 4, which asked respondents about their knowledge relating to urban agriculture as well as interests in participating in urban agricultural activities. Therefore, perceptions of the practise were measured based on respondents’ knowledge and interest in urban agriculture (see Annexure B).
Descriptive statistics were conducted and conclusions made accordingly. Data collected regarding *knowledge*, indicated that 76% (n=256) of respondents grew up in households where their parents grew their own fruit and vegetables. Respondents also indicated that they were taught how to garden and understood the importance of gardening. Furthermore, 78% (n=236) indicated that they knew how to grow their fruit and vegetables. Eighty two percent (n=236) indicated that they had children and 64% (n=236) of those with children said that their children knew how to garden. Finally 75% (n=194) of respondents stated that they taught their children how to grow their own fruit and vegetables.

Data collected regarding the respondents *interest* in urban agriculture made it possible for the researcher to draw the following conclusions. Answers in this section were in the affirmative, indicating that respondents had an interest in urban agricultural activities. Of the respondents, 77% (n=231) indicated that they enjoyed gardening, 87% (n=236) would grow their own fruit whilst 88% (n=266) would grow their own vegetables. Furthermore, 87% (n=265) said that they would share their produce with other residents in the community, 84% (n=253) said they would participate in gardening activities and a further 87% (n=294) were interested in learning more about urban agriculture. Finally, 81% (n=245) indicated that they were interested in participating in community gardening activities. The findings regarding knowledge supports (Azman et al., 2013) who state that knowledge is an element that drives the acceptance of urban agriculture, as well as (Shamsudin et al., 2014) who found that, knowledge and interest influenced ones attitude towards urban agriculture.

5.2.6 Research objective six (RO6) and research question six (RQ6)

The sixth research question was “What are the enablers and barriers to urban agriculture?” Inferential statistics conducted addressed the question and the research objective – “To provide pertinent conclusions based on findings.” Exploratory factor analyses were loaded on the independent variables, namely Perceptions, Food security, Innovation/Sustainability and Resources. From the analyses, six factors were extracted which explained a 55.81% variance in data. Only one factor (perceptions) was retained from the proposed model and the other
five factors developed were labelled *attitude, awareness, knowledge, food availability and lifestyle*.

The dependent variable was labelled “factors that influence your desire to grow food” in the questionnaire (see Annexure B). This factor was based on an existing questionnaire developed by Dr Tornaghi (2012) which addressed urban agriculture, social cohesion and environmental justice. The nine items intended to measure urban agriculture all loaded as expected. As such, a revised hypothesised model was proposed for this study, this is presented in Figure 5.3.

![Revised hypothesised model for urban agriculture in NMB](image)

*Figure 5.3: Revised hypothesised model for urban agriculture in NMB*

Pearson’s moment correlation analysis was further conducted in order to determine whether a correlation between the dependent variable (urban agriculture) and the independent variables (attitude, food availability, awareness, lifestyle, perceptions and knowledge) exists. It was noted that all independent variables except food availability were significantly and positively correlated with urban agriculture. Food availability however reported a negative correlation, indicating that the more food availability (in households) the less residents would practise urban agriculture.

Multiple regression analysis tested the strengths and relationships (if any) between the dependent and independent variables. The analysis revealed that four of the independent variables (attitude, food availability, lifestyle and perceptions) had a significant influence on urban agriculture, concluding that two factors (awareness and knowledge) had no influence on urban agriculture. Of the identified relationships attitude, lifestyle and perceptions were enablers. Indicating that these factors foster the practise of urban agriculture. Whereas food availability was identified as a barrier
and hindered the residents from practising urban agriculture. Awareness and knowledge are not significantly related to urban agriculture, inferring that whether or not residents knew about the positive associations (health and environment) of urban agriculture and the fact that they could garden sustainably (on rooftops and in recyclable materials) there is no impact on their participation.

The factors (independent variables), hypotheses developed for the study and identified relationships and outcomes (enabler or barrier) are summarised in Table 5.2.

Table 5.2: Summary of multiple regression analyses

<table>
<thead>
<tr>
<th>FACTOR</th>
<th>HYPOTHESIS</th>
<th>RELATIONSHIP</th>
<th>OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td>Is significantly related to urban agriculture – Accepted</td>
<td>Positive</td>
<td>Enabler</td>
</tr>
<tr>
<td>Food availability</td>
<td>Is significantly related to urban agriculture - Accepted</td>
<td>Negative</td>
<td>Barrier</td>
</tr>
<tr>
<td>Awareness</td>
<td>Is significantly related to urban agriculture – Rejected</td>
<td>None</td>
<td>Not significant</td>
</tr>
<tr>
<td>Lifestyle</td>
<td>Is significantly related to urban agriculture - Accepted</td>
<td>Positive</td>
<td>Enabler</td>
</tr>
<tr>
<td>Perceptions</td>
<td>Is significantly related to urban agriculture - Accepted</td>
<td>Positive</td>
<td>Enabler</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Is significantly related to urban agriculture - Rejected</td>
<td>None</td>
<td>Not significant</td>
</tr>
</tbody>
</table>

In order to establish whether any relationships existed between selected demographic variables (gender, age, qualification, employment status and being a breadwinner) and the independent variables (attitude, food availability, awareness, lifestyle, perceptions and knowledge), an ANOVA test was conducted. The findings indicated that gender, employment status and being a breadwinner (demographic factors) had no significant relationship with any of the independent variables.
However, age had a significant relationship with the attitude towards and knowledge of urban agriculture. Finally, the test revealed that academic qualifications (post matric) had a significant relationship with attitude, awareness, knowledge and perceptions towards the practise. The findings are consistent with those of Bradley and Galt, (2013) and McClintock (2014) who separately contend that individuals with a higher level of education are likely to be involved in urban agricultural activities.

5.2.7 Research objective seven (RO7) and research question seven (RQ7)

Research question seven aimed to address, “How can urban agricultural activities be promoted to residents in NMB?” Therefore, the research objective is “To determine how urban agriculture practices could be promoted.” Based on this question and objective the recommendations for this study are proposed.

- Parents/guardians should educate their children about the importance of gardening as improved knowledge in young kids could help the future of sustainable cities.
- Training initiatives should be introduced, from government or the private sector, to show residents how to grow their own fruit and/or vegetables, in a sustainable manner.
- Gardening amongst younger children and the unemployed youth should be promoted as a sustainable “survival tool”. The youth need to understand that they can contribute towards their household food structures, through gardening.
- Schoolchildren should be taught about the importance of gardening – this could be done as an “after care” programme at one of the community centres.
- Residents should be made aware of how one can garden sustainably – i.e. using recyclable material as containers, or seeds from the fruit and vegetables consumed in the household.
- Vacant plots such as school grounds or idle land in the community can be used to foster urban agricultural activities.
- Most residents indicated that they would share their produce, thus urban agriculture could foster social cohesion amongst residents in NMB, which will build social capital. This is in line with Okvat and Zautra (2011), who indicates
that the effort to develop and sustain urban agriculture builds social capital – trust, civic engagement, the development of community leaders and the sharing of produce.

5.3 CONTRIBUTIONS OF THE STUDY

- The enablers and barriers of urban agriculture can assist as a point of reference for new urban agriculture projects in the NMB. Information gathered can assist Municipalities when budgets are allocated for agricultural projects.
- The findings of this study portrayed how vulnerable residents in Holland Park are, in terms of urban poverty. Projects can be implemented to assist households in starting up their own food gardens.
- This study highlighted how urban agriculture could foster community cohesion amongst residents in NMB, which promotes social capital.
- The study concluded that initiating such projects could assist with employment opportunities amongst the unemployed youth in NMB.

5.4 LIMITATIONS OF THE STUDY AND RECOMMENDATIONS FOR FURTHER RESEARCH

While this study attempted to make important contributions with regard to identifying the enablers and barriers to urban agriculture, several limitations were noted:

- The present study was limited to residents in Holland Park and the use of non-probability sampling techniques (convenience sampling) prevented the researcher from generalising or extending the research findings to that of the Nelson Mandela Bay population. Hence, the results are not a representation of the NMB residents and further research should look at selecting a more representative sampling, by using probability sampling.
- The study only focused on four possible factors. There is a possibility that other enablers or barriers to urban agriculture exist and therefore this leaves a possibility for further investigation.
- Specific literature on urban agriculture lacks, but government policies and its lack of involvement are well researched and documented. This study therefore opens up a platform for further studies on the barriers and enablers of urban agriculture.
Despite the above limitations, the present study contributes to the body of knowledge by providing insights to the enablers and barriers of urban agriculture in Holland Park.

5.5 CONCLUSIONS OF STUDY

The primary objective of this study was to investigate urban agriculture practices in NMB. Literature reviewed examined the origin of the practice, both in the United States of America and South Africa. Perceptions, food security, innovation/sustainability and resources were identified in the literature as the possible barriers and enablers to the practise. A hypothesised model was proposed, based on developed hypotheses based on literature. The study then discussed the research methodology adopted for this study, enabling reproduction for the future. Data was analysed in Chapter 4 while the last chapter discussed the findings of the study.

Findings of the study indicated that only some factors affected the practise of urban agriculture. These were attitude, food availability, lifestyle and perceptions. For the purposes of this study, attitude refers to the belief and knowledge of residents about urban agriculture, food availability is the access to food, and lifestyle is the access to safe and healthy food. Awareness and knowledge were, however, not significant to the practise of urban agriculture. Awareness in the study referred to the respondents’ knowledge of how urban agriculture can have a positive impact on one’s health and environment while knowledge refers to respondents’ understanding of the sustainable methods/resources one can use when growing food.

The findings indicated that attitude was significantly related to urban agriculture and as such, residents who had a garden, felt that they had the time to garden and perceived gardening as a hobby. Furthermore, if these residents had space for gardening and could afford to buy the necessary resources to garden, they would participate in urban agricultural activities. Residents in Holland Park indicated that they had an interest in and knowledge about gardening. These results contradict the views of Van der Merwe (2014), who suggests that the lack of commitment, culture
of dependency as well as skill deficiencies are constraints to practising urban agriculture.

Lifestyle had a positive and significant influence on urban agriculture. Results of the study indicated that residents who wanted to live a healthy life, cook and eat fresh fruit and vegetables in their households would participate in urban agricultural activities. These findings concur with a study conducted by Bellows et al. (2004), who revealed that growing food and consuming it had a positive correlation. As a lifestyle, the use of recyclable material such as wooden, paper boxes and plastic bottles (as holding containers) can be encouraged and embraced when growing food. Such an activity would develop creative and fun ways of gardening, which would enable children to appreciate gardening at a young age and maintain the culture throughout adulthood.

The results of the study therefore indicate that if residents of NMB were to engage in urban agriculture, they need to have a positive attitude towards the importance of gardening. Additionally, the results indicated that the residents and their families are willing to live a healthy lifestyle by cooking and eating fresh fruit and vegetables. The residents also perceived urban agriculture as a good practise to teach at schools and encouraged in households. Interestingly, the only barrier to urban agriculture was food availability whereby residents felt that because they did not miss any meals, it was not necessary to engage in urban agriculture. These observations explain the lack of urban agriculture in NMB.
REFERENCE LIST


Centre for Development support (COS). 2009. The role of urban agriculture in addressing household poverty and food security: The Case of South Africa. CDS Research Report, LED and SMME Development, Bloemfontein.


Hamm, M.W. and Baron, M. 1999. Developing an intergrated, sustainable urban food system: The case of New Jersey, United States.


Dear Participant,

I am a Masters student (MTech) at the Nelson Mandela Metropolitan University (NMMU) conducting research on urban agriculture in Nelson Mandela Bay. The purpose of the research is to investigate urban agriculture practices in Holland Park.

The enclosed questionnaire has been designed to collect information on how urban agriculture is perceived by residents in Holland Park as well as the enablers and barriers to this practise.

Your participation in this survey is completely voluntary and you may decline altogether, or leave blank any questions you do not feel comfortable answering. Kindly note that responses will remain confidential and anonymous.

If you agree to participate in this project, please answer the questions as best you can; it should take approximately 10 minutes to complete the questionnaire.

Should you have any questions about this project, please feel free to contact Miss Bronwyn Philander (Primary investigator) on Bronwyn.Philander2@mnmu.ac.za or 078 774 8464. You can also contact the Primary Responsible Person/Study Supervisor, Prof M Cullen on Margaret.Cullen@mnmu.ac.za or 041 504 3771.

Before proceeding with the questionnaire please answer the following screening question by making an "x" in the appropriate box.

Are you currently residing in Holland Park?

Yes  No

If no, thank you for your willingness to engage in the study however it is only applicable to residents of Holland Park. Thus you DO NOT have to complete the attached questionnaire.

Sincerely yours,
Bronwyn Philander
(Primary investigator/ Researcher)
Appendix B: Questionnaire

Dear Participant,

Thank you for choosing to complete the questionnaire. Your accurate responses will be highly appreciated. Again you are reminded that all information will be treated as confidential and that no information that could reveal your identity will be requested.

Please complete the below, relating to your demographics by making an “x” in the appropriate box.

**SECTION A**

1. **DEMOGRAPHICS**

**GENDER**

<table>
<thead>
<tr>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
</table>

**AGE**

<table>
<thead>
<tr>
<th>18 - 25</th>
<th>26 - 35</th>
<th>36 - 45</th>
<th>46 - 55</th>
<th>56 - 65</th>
<th>66+</th>
</tr>
</thead>
</table>

**WHAT IS YOUR HOME LANGUAGE?**

<table>
<thead>
<tr>
<th>Afrikaans</th>
<th>English</th>
<th>Xhosa</th>
<th>Zulu</th>
<th>Other, please specify (in the box below)</th>
</tr>
</thead>
</table>

**WHICH ETHNIC GROUP DO YOU BELONG TO?**

<table>
<thead>
<tr>
<th>Asian</th>
<th>Black</th>
<th>Coloured</th>
<th>Indian</th>
<th>White</th>
<th>Other, please specify (in the box below)</th>
</tr>
</thead>
</table>

**WHAT IS YOUR EMPLOYMENT STATUS?**

<table>
<thead>
<tr>
<th>Full time employed</th>
<th>Part-time employed</th>
<th>Self-employed</th>
<th>Unemployed</th>
<th>Retired</th>
<th>Full time student</th>
</tr>
</thead>
</table>

**WHAT IS YOUR HIGHEST QUALIFICATION?**

<table>
<thead>
<tr>
<th>No formal education</th>
<th>Less than Matric</th>
<th>Matric</th>
<th>Diploma</th>
<th>Degree</th>
<th>Post-graduate Degree</th>
</tr>
</thead>
</table>
2. HOUSEHOLD STRUCTURE

From the below alternatives provided, please select the answers which best describes your current household structure by making an “x” in the appropriate box.

THE PROPERTY YOU ARE LIVING IN IS:

<table>
<thead>
<tr>
<th>Owned by you</th>
<th>Rented</th>
<th>Owned by my family</th>
<th>Squat</th>
<th>Other, please specify (in the box below)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

WHICH BEST DESCRIBES THE TYPE OF STRUCTURE YOU LIVE IN?

<table>
<thead>
<tr>
<th>Flat</th>
<th>Free-standing house</th>
<th>Housing complex</th>
<th>An informal settlement</th>
<th>Other, please specify (in the box below)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PLEASE INDICATE THE NUMBER OF PEOPLE IN YOUR HOUSEHOLD

<table>
<thead>
<tr>
<th>1</th>
<th>2 - 5</th>
<th>5+</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

HOW MANY PEOPLE ARE EMPLOYED IN YOUR HOUSEHOLD?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>4+</th>
<th>all unemployed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

HOW MUCH IS YOUR MONTHLY HOUSEHOLD INCOME?

<table>
<thead>
<tr>
<th>Less than R1000</th>
<th>R1000 - R2000</th>
<th>R2001 - R5000</th>
<th>R5001 - R10 000</th>
<th>R10 001 - R20 000</th>
<th>R20 001 - R40 000</th>
<th>R40 000+</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ARE YOU DEPENDENT ON ANY GOVERNMENT GRANT?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ARE YOU THE BREADWINNER IN THE HOUSEHOLD?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

WHERE DO YOU BUY YOUR FRUIT AND VEGETABLES? (You can select more than one option)

<table>
<thead>
<tr>
<th>I grow my own fruit</th>
<th>I grow my own vegetables</th>
<th>From a spaza shop</th>
<th>From super markets/wholesalers</th>
<th>Food market</th>
<th>Other, please specify (in the box below)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

159
ON AVERAGE, HOW MUCH DO YOU (AS A HOUSEHOLD) SPEND ON FOOD PER MONTH? (I.E. GROCERIES, FRUIT AND VEGETABLES)

<table>
<thead>
<tr>
<th>I do not contribute towards this expense</th>
<th>R100 – R400 per month</th>
<th>R401 – R1000 per month</th>
<th>R1001 – R2000 per month</th>
<th>R2001 – R4000 per month</th>
<th>More than R4000 per month</th>
</tr>
</thead>
</table>

ON AVERAGE, HOW MUCH DO YOU SPEND ON YOUR RENT/BOND PER MONTH?

<table>
<thead>
<tr>
<th>I do not contribute towards this expense</th>
<th>Less than R1000 per month</th>
<th>R1001 – R3000 per month</th>
<th>R3001 – R5000 per month</th>
<th>R5001 – R8000 per month</th>
<th>More than R8000 per month</th>
</tr>
</thead>
</table>

ON AVERAGE, HOW MUCH DO YOU SPEND ON TRANSPORT PER MONTH?

<table>
<thead>
<tr>
<th>I do not contribute towards this expense</th>
<th>Less than R300 per month</th>
<th>R300 – R500 per month</th>
<th>R501 – R800 per month</th>
<th>R801 – R1000 per month</th>
<th>More than R1000 per month</th>
</tr>
</thead>
</table>

SECTION C

3. KNOWLEDGE

Please answer the following questions, relating to your knowledge about urban agriculture by making an “x” in the appropriate box.

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>My parents grew their own fruit and vegetables</td>
<td></td>
</tr>
<tr>
<td>My parents taught me how to grow my own fruit and vegetables</td>
<td></td>
</tr>
<tr>
<td>My parents taught me the importance of growing my own fruit and vegetables</td>
<td></td>
</tr>
<tr>
<td>I know how to grow my own fruit and vegetables</td>
<td></td>
</tr>
<tr>
<td>My children know how to grow fruit and vegetables</td>
<td></td>
</tr>
<tr>
<td>My children are taught how to grow their own fruit and vegetables</td>
<td></td>
</tr>
<tr>
<td>Do you have children?</td>
<td></td>
</tr>
</tbody>
</table>

4. INTEREST

Please answer the following questions, relating to your interest in urban agriculture by making an “x” in the appropriate box.

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>I enjoy gardening</td>
<td></td>
</tr>
<tr>
<td>I would grow my own fruits</td>
<td></td>
</tr>
<tr>
<td>I would grow my own vegetables</td>
<td></td>
</tr>
</tbody>
</table>
I would share my produce
I am interested in participating in gardening activities
I would like to learn more about urban gardening
I am interested in participating in community gardening activities

5. PERCEPTION

Please answer the following questions, relating to your perception of urban agriculture by making an “x” in the appropriate box.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gardening is for the poor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gardening is a hobby</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gardening is a lifestyle</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growing fruit and vegetables should only take place in rural areas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growing fruit and vegetables can have financial rewards</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It is too expensive to garden</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gardening is time consuming</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gardening is a good practise</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would buy my fruit and vegetables from a street vendor (who grew it at home)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parents should teach their children about gardening</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schools should teach children about gardening</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gardening is not important</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. FACTORS THAT INFLUENCE DESIRE TO GROW FOOD.

Between zero and 4 – zero being not at all, 4 being a lot, how much do the following factors influence your desire to grow food? (Please make an “x” in the appropriate box).

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income/need to provide affordable fresh food to you and your family.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental concerns (i.e. reduce food miles, live more sustainably).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Need to socialise/meet new people.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taste/food quality (i.e. enjoy the quality and taste of your own grown food).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perception</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Popularity on TV and media (i.e. Pasella)  
Interest/Perception  

Education: learn a useful skill yourself or teach your children.  
Knowledge  

Fun (you enjoy gardening as an activity in itself)  
Interest  

Friends/Partner influence (i.e. they are doing it or someone has convinced you to do it with them)  
Interest and Knowledge  

Personal Health (you feel it is good for your mental or physical health).  
Food security/sustainability

| SECTION D |
|-----------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 7. INNOVATION/SUSTAINABILITY |
| Please answer the following questions, relating to your understanding of innovation around urban agriculture by making an “x” in the appropriate box. |

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit and vegetables can only be grown outdoors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit and vegetables can be grown indoors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit and vegetables can be grown using recyclable materials (e.g. plastic, tyres, wooden boxes, bricks) as containers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit and vegetables can be grown on rooftops</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growing your own food contributes positively to the environment (e.g. reduce food miles, increases freshness)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growing your own food contributes positively to your health</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growing your own food contributes positively to your family's health</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 8. RESOURCES |
| Please answer the following, relating to your resources available for urban agricultural activities by making an “x” in the appropriate box. |

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can afford to grow my own fruit and vegetables (e.g. buying seeds, fertilizer etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have the time to grow my own fruit and vegetables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growing my own fruit and vegetables can save me money</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I do have a garden</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I do have a yard/space for growing my own fruit and</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
9. **FOOD SECURITY**

Please answer the following questions, relating to your household food security by making an “x” in the appropriate box.

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I cook with fresh vegetables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>There is always food to cook/eat in my household</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I eat fresh fruits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I live a healthy lifestyle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My family lives a healthy lifestyle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have missed a meal in the last month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My family has missed a meal in the last month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have missed a meal in the last week</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My family has missed a meal in the last week</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix C: Ethical clearance

Ref: H-17-BES-MGT-006 [Approved]

Chairperson: Faculty RTI Committee
Faculty of Business and Economics Sciences
Tel. +27 (0)41 604 2906

13 April 2017

Prof M Cullen
NMMU
Business School
Second Avenue Campus

Dear Prof Cullen,

PROJECT PROPOSAL: URBAN AGRICULTURE IN NELSON MANDELA: A CASE STUDY (MASTERS)

PBP: Prof M Cullen
PI: Ms B Philander

Your above-entitled application for ethics approval served at Fac RTI.

We take pleasure in informing you that the application was approved by the Committee. However, please note that the approval is on condition that permission to conduct the study is also obtained from the other relevant individuals, parties, organisations and/or role players to which the study pertains.

The ethics clearance reference number is H-17-BES-MGT-006, and is valid for three years. Please inform the Faculty RTI Committee, via the faculty representative, if any changes (particularly in the methodology) occur during this time.

Please inform your co-investigators of the outcome.

Yours sincerely

[Signature]

Dr M van Eyk
Faculty of Business and Economic Sciences
Appendix D: Turnitin Report

Turnitin Originality Report
Submission 3 by Bronwyn Philander
From MBA Treatise - Part 1 (Moodle 32663503) (T711TR0: Treatise (Moodle 9623824))
- Processed on 01-Dec-2017 10:30 SAST
- ID: 795855574
- Word Count: 33181

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