

**An assessment of the contribution of peri-urban agriculture on household food security in  
Tongaat, eThekweni Municipality**

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## **DEDICATION**

This dissertation is dedicated to Miss Phumzile Princess Dlamini. My love for you is forever.

## ORIGINALITY DECLARATION

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I acknowledge that I have read and understood the University's policies and rules applicable to postgraduate research, and I certify that I have, to the best of my knowledge and belief, complied with their requirements.

In particular, I confirm that I obtained an ethical clearance certificate for my research (Certificate Number UZREC 171110-030 PGM 2017/442) and that I have complied with the conditions set out in that certificate.

I further certify that this research thesis is original and that the material has not been published elsewhere, or submitted, either in whole or part, for a degree at this or any other university.

I declare that this research is, save for the supervisory guidance received is the product of my work and effort. I have, to the best of my knowledge and belief, complied with the University's Plagiarism Policy and acknowledged all sources of information in line with normal academic conventions.

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**Date:** \_\_\_\_\_

As the research supervisor, I agree to the submission of this thesis for examination.

**Signed:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Name:** Dr M. Sibanda

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Had it not been God who has always been on my side, the enemy would have swallowed me. My strength is in the name of the Lord. Through His strength, I could persevere through what has been a difficult journey. He has assisted me to endure with his sufficient grace.

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## **PUBLICATION/S IN PREPARATION**

The researcher anticipates to produce at least two articles emanating from this study to be submitted to accredited journal/s for publication. The anticipated manuscript titles are:

- (i) An assessment of the contribution of peri urban agriculture on household food security in Tongaat.
- (ii) Factors influencing the practice of peri-urban agriculture by households in Tongaat.

## ABSTRACT

Despite South Africa's economic growth having been accelerated considerably in the country, poverty levels have not decreased as one would have expected. Urban and peri-urban agriculture have been introduced as a livelihood strategy to alleviate poverty and ensure household food security. Food insecurity is conventionally theorized as a rural development problem and the current theoretical tools to comprehend the challenge and frame the responses are inadequate to address food insecurity in urban areas. The aim of this study was to assess the contribution of peri-urban agriculture on household food security in the Tongaat peri-urban area of eThekweni Municipality. A quantitative approach, employing a cross-sectional design was used to gather data. Stratified random sampling was employed, and a total of 208 households (109 farming and 99 non-farming households) were sampled. Data analysis was done through descriptive statistics and inferential statistics (econometric modelling using a probit regression model). On average, respondents were about 46 years old. There was a high rate of unemployment with the majority (51%) of the total sample indicated that they were not formally employed. The results revealed that labour for gardening activities was predominantly supplied by female household members. A greater proportion (about 46%) of the interviewed farming households in Tongaat were involved with field crops (which included cabbages, spinach, sweet potato and avocado) followed by livestock rearing which accounted for about 40 percent of the sample, poultry (about 35%), fruits (about 4%) and flowers (about 3%). The majority (50% and 62%) of crop and livestock farmers respectively reported that limited land availability and drought were the major farming challenges for each category of farming. The results from the HDDS tool, showed that a greater proportion (54%) of the farming households consumed >6 food groups (deemed to be food secure) as compared to their counterparts, the non-farming households (40%) percent that were consuming >6 food groups. On the other hand, a greater proportion (12 and 47.5%) of the non-farming households were consuming <3 and 4 to 5 food groups respectively (deemed to be food insecure and moderately food secure in that manner). The finding is further supplemented by the HFIAS measure which revealed that a greater proportion (about 72%) of the farming households indicated that they never or rarely worried about food shortages (deemed to be food secure) as compared to their counterparts – the non-farming households (about 61%) that never or rarely worried about food shortages. Again, a lesser proportion (about 4%) of the farming households indicated that they often had to cut down on meal size or on the number of meals (deemed to be severely food insecure) as compared to their counterparts – the non-farming households (about 10%) that indicated that they often had to cut down on their meal size or on the number of meals. Overall farming households were better off or more food secure than their non-farming counterparts. Overall the total sampled households showed mixed perceptions regarding the practice of peri-urban agriculture in Tongaat. Overall, there were mixed feelings

(perceptions) ranging from neutral, positive and negative with respect to societal recognition; attitude; social value; economic; health and knowledge impacts. However, farming households showed an affirmative perception towards the practice of peri-urban agriculture than the non-farming households. Results from the probit regression model showed that the variables land size and land tenure were important predictors with regard to the practise of peri-urban agriculture. The study recommends that peri-urban agriculture should be promoted as a tool to achieve household food security and that land issues regarding to land sizes and land tenure be attended to if peri-urban agriculture is to contribute more positively in ensuring household food security within the peri-urban spheres.

**Key words:** HDDS, HFIAS, household food security, peri-urban agriculture, Tongaat.

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## LIST OF ACCRONYMS

ANC	African National Congress
BFAP	Bureau for food and agricultural policy
CSIR	Council for Scientific and Industrial Research
CSG	Child Support Grants
DAFF	Republic of South Africa Department of Agriculture, Forestry and Fisheries
DG	Disability Grants
ESRC	Economic and Social Research Council
FANTA	Food and Nutrition Technical Assistance
FAO	Food and Agriculture Organisation
HDDS	Household dietary diversity score
HFIAS	Household food insecurity access scale
HIV/AIDS	Human Immunodeficiency Virus, Acquired Immunodeficiency Syndrome
IDP	Integrated Development Planning
IFPRI	International Food Policy Research Institute
IFSS	Integrated Food Security Strategy
MDG	Millennium Development Goals
OAP	Old Pension Grants
SANHANES	South African National Health and Nutrition Examination Survey
SDG	Sustainable Development Goals
SLA	Sustainable Livelihood Approach
SPSS	Statistical Package for the Social Science
SSA	Sub-Saharan Africa
STATSSA	Statistics South Africa
UA	Urban agriculture
UN	United Nations
UPA	Urban and peri-urban agriculture
UNDP	United Nations Development Programme
WFS	World Food Summit
WHO	World Health Organisation



## CHAPTER ONE – INTRODUCTION

### 1.1 Background

The United Nations (UN), Food and Agriculture Organisation of the United Nation (FAO) and the World Bank set the eradication of hunger and poverty as their highest priority to be dealt with internationally. The target date to achieve this goal and others was the year 2015 (Molelu, 2015). Various goals have been set out for countries highly affected by hunger, food insecurity and food shortages, matters relating to economic growth, equality in general and poverty. The major movement being the Millennium Development Goals (MDGs), developed in 2000 at the United Nations Millennium Summit. South Africa in line with the international community has taken a stand in reducing poverty as well as fulfilling the other seven goals set out by the UN, by being part of the UN and making sure that the MDGs were achieved by 2015 (Molelu, 2015). The Sustainable Developmental Goals (SDG) were developed in 2012 which seek to carry on the momentum generated by the MDGs and were launched in 2015 when the MDGs expired. South Africa has its own instruments to achieve food security. These include agriculture and land reform policy, food trade policy, income security and diversification policy, social and welfare services policy, disaster mitigation policy and, food and nutrition policy.

Numerous underprivileged South Africans are confronted with the increasing unemployment rate therefore they struggle to combat poverty eradication and food insecurity (Machethe, 2004; Abdu-Raheem & Worth, 2011). Though urban and peri-urban agriculture (UPA) are recognised as an essential livelihood strategy to curbing the presence of food insecurity in the urban areas, more research needs to be done to investigate the dynamics at play in the lives of those practicing peri-urban agriculture (Jansen van Vuuren, 2016). Urban and peri-urban agriculture accounts for a substantial segment in the food supply of numerous capitals in Sub-Saharan Africa (SSA). By practicing UPA locals are able to produce fresh milk, poultry products, and perishable vegetables. Urban and peri-urban agriculture is considerably contributing to employment, livelihoods, poverty alleviation and to a greater assortment of foods in the city market places (Cofie *et al.*, 2003; De Bon *et al.*, 2010).

Urbanisation has proved to be one of the major difficulties facing mankind (Briassoulis, 2009). According to UN forecasts, approximately half of the population in Africa and Asia will live in peri-urban and urban areas by the year 2020 (Cofie *et al.*, 2003; De Bon *et al.*, 2010). According to FAO. (2011)FAO (2011), there has been rapid economic growth which is associated with rapid rates of urbanization which is evident in sub-Saharan Africa, including South Africa. Increasing urbanisation coupled with increased poverty becomes a challenge because populations are growing, but employment prospects for these

populations remain low. In addition to the identified poverty state, food insecurity is currently moving from rural areas to urban centres (Maxwell *et al.*, 2000; Hovorka *et al.*, 2009).

Furthermore, in order to fully address the problem of food security globally, much consideration has to be given to access and availability of basic services such as clean water, acceptable health care for the poor and sanitation (De Wet *et al.*, 2008; Frayne *et al.*, 2014). Underprivileged inhabitants in the urban centres of developing countries are confronted with challenges of securing livelihoods. This in turn disturbs the food security of the household and especially those of vulnerable groups. This group consists of the disabled, children, the elderly and women (Maxwell *et al.*, 2000; Guo, 2012). Males generally participate in the more skilled and physical labour meanwhile women are exposed to unskilled labour (Maxwell *et al.*, 2000; Hovorka *et al.*, 2009; Bhawra *et al.*, 2017). Due to the skewed distribution of employment opportunities by gender, both female and male headed households face different difficulties in acquiring basic needs and food. Male headed households are characterised with greater incomes compared to female headed households (Statistics South Africa, 2011). Females are able to discover more inventive methods to earn incomes and to find food to sustain themselves and maintain their families. An established method that these women use is urban agriculture (UA) (Kiguli & Kiguli, 2004; Ngome & Foeken, 2012).

Urban agriculture comprises of agricultural activities that take place in developed peri-urban fringes and intra-urban areas of metropolises and cities (Thornton, 2008; Orsini *et al.*, 2013). These activities range from production, processing, distribution and marketing of agricultural products (Mougeot, 2000a; Specht *et al.*, 2014). Returns from these activities are either food crops or livestock (Thornton *et al.*, 2010; Frayne, 2010; Giannini *et al.*, 2017). Urban agriculture occupies vacant land usually situated along river banks, roadsides and streams and in wetlands (Thornton *et al.*, 2010; Nzunda *et al.*, 2013). Currently, urban agriculture is on the increase in sub-Saharan African cities regardless of some of the challenges of access to basic services and land tenure. According to Statistics South Africa (2011), South Africa's urban population has increased. Gauteng Province having the highest population of 12.2 million people in 2011 then followed by Kwa-Zulu Natal with 10.3 million people (Statistics South Africa, 2011). This is an outcome of the labour movement to the larger metropolises from the rural South Africa (De Wet *et al.*, 2008; Maziya *et al.*, 2017).

Urban agriculture has been found to be increasing within small sections in cities, either in vacant plots of land being used to grow food near informal settlements, yards and nearby rivers (Stewart *et al.*, 2013). These various different plots are maintained and sustained either by individuals or small groups. The

main purpose is to feed their families and perhaps make additional money to provide for their families and households to be able to sustain their growing potential.

Regardless of the use of cutting-edge technology for agricultural production, the current food system has failed to ensure food security for the rapidly growing global population (Foley *et al.*, 2011). Conventional agriculture does not guarantee endless food security for the growing population and based on the negative effects that conventional agriculture has on the ecosystem, alternative methods of food production should be further explored (Viljoen *et al.*, 2005; Ward *et al.*, 2014) Urban food security needs to undergo policy intervention in order to improve implementation of food security strategies within urban areas (Jansen van Vuuren, 2016). The practice of urban and peri-urban agriculture presents an opportunity to achieve household food security however it is underutilised given its potential.

## **1.2 Problem statement**

Food insecurity is conventionally theorised as a rural development problem and the current theoretical tools to comprehend the challenge and frame the responses are inadequate to address food insecurity in urban areas. Such tools mainly concentrate on issues of accessibility rather than finding solutions on improving food production through peri-urban and urban agriculture. Though urban agriculture is recognised as an essential approach to curbing the presence of food insecurity in the urban areas, further research needs to be done to discover more of the dynamics at play in the lives of those practicing peri-urban agriculture (Jansen van Vuuren, 2016). The study aims to bridge the gap on the understanding of the practice of peri-urban agriculture and to determine the factors influencing the practice of peri-urban agriculture. In order to thoroughly comprehend the household food security status of a particular country, it is important to examine how the mechanisms of food supply systems and the resources owned by individual households determines its accessibility to food (Muzah, 2015). There has been relatively few studies such as Molelu (2015), Magidimisha *et al.* (2016) and Olivier and Heinecken (2017), conducted on ascertaining the contribution of peri-urban agriculture on household food security (Zeza & Tasciotti, 2010). Additionally, there is a lack of empirical studies on the factors influencing the practice of peri-urban agriculture (Philander, 2015). Hence this study attempts to fill this research vacuum and provide current information on the status of peri-urban agriculture and its contribution on household food security in the study area. The study attempts to quantify the contribution of peri-urban agriculture on household food security.

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

The aim of this study is an assessment of the contribution of peri-urban agriculture on household food security in Tongaat area of eThekweni Municipality, in KwaZulu-Natal Province.

The specific objectives were:

- I. To describe the status of peri-urban agriculture by households in Tongaat peri-urban area.
- II. To distinguish analytically the food security status for farming and non-farming households in Tongaat peri-urban area.
- III. To investigate the perceptions of Tongaat peri-urban households towards the practice of peri-urban agriculture.
- IV. To determine the factors influencing the practice of peri-urban agriculture by households in Tongaat peri-urban area.

### **1.4 Hypothesis**

The following hypotheses were formulated:

- I. Tongaat households are practicing small-scale urban agriculture in open land/spaces near their homes.
- II. Tongaat households practising any form of peri-urban agriculture are comparatively better off (food secure) than those households not practising any form of peri-urban agriculture.
- III. Tongaat households have a positive perception towards the practice of peri-urban agriculture.
- IV. Biophysical and socio-economic factors influenced the practise of peri-urban agriculture by households in Tongaat peri-urban area.

### **1.5 Motivation of the study**

Urban and peri-urban agriculture has previously been identified as a livelihood strategy that urban communities can use in order to combat household food insecurity however the contribution aspect is unknown. Given that there is limited information or lack of studies on the impact of peri-urban agriculture to food security and the factors influencing the practice of peri-urban agriculture in South Africa, the study aims to explore these areas (Philander, 2015). There is a need for research that will understand the contribution of urban agriculture to food security and to assess the factors influencing the practice of peri-urban agriculture in the study area. Through this study, the researcher intends to create a better understanding of the contribution of peri-urban agriculture on household food security status as well as understanding the drivers or factors influencing the practice of peri-urban agriculture. Such an understanding can be crucial in formulating policies and strategies to promote urban agriculture and thus

improve food security status among households within the peri-urban spheres. In addition, the study will contribute to literature on the contribution of peri-urban agriculture on household food security as well as the factors that influence the practice of peri-urban agriculture. The study will be beneficial to the community of Tongaat as the practice of peri-urban agriculture presents them with a strategy to ensure household food security and generate surplus income.

## **1.6 Organisation of the dissertation**

Chapter 2 discusses the literature review. The chapter dissects urban agriculture by presenting its concepts and definitions. It explores the significance of peri-urban agriculture on household food security. Chapter 3 presents and discusses the theoretical framework aspects concerning urban agriculture and food security.

Chapter 4 describes the important methodological viewpoints and discusses the research design used to achieve the aim and objectives of this study. The research method and data collection process are presented in this chapter.

Chapter 5 presents and discusses the descriptive results of the study. Demographic characteristics of respondents, the status of peri-urban agriculture in Tongaat, a comparative estimation of household food security status between farming and non-farming households and perceptions of households towards the practice of peri-urban agriculture are presented herein this chapter.

Chapter 6 presents and discusses the empirical results of the study on the factors influencing the practise of peri-urban agriculture by households in Tongaat.

Chapter 7 presents the summary of the key findings, conclusions and provides recommendations and suggests areas for further research.

## 2 CHAPTER TWO – LITERATURE REVIEW

### 2.1 INTRODUCTION

The aim of this chapter is to provide a brief overview of literature on the context of peri-urban agriculture and urban agriculture in South Africa. The chapter continues to explore the significance of peri-urban agriculture on household food security and the factors influencing peri-urban and urban land use in agriculture in South Africa. This encompasses knowledge claims and research evidence for the role of urban agriculture in contributing to food security and poverty reduction. Further, the state of food security and poverty in South Africa is incorporated to provide the context within which urban agriculture is taking place. Though urban agriculture has been recognised as a livelihood strategy used to generate revenue in order to curb the presence of food insecurity in the urban areas, additional research is required in order to uncover more of the dynamics at play.

### 2.2 Defining urban agriculture and its concepts

Urban agriculture entails of numerous conceptions. Therefore, it is imperative that one explores all of the concepts of UA in order to be able to understand UA in its entirety. Food and Agriculture Organization has written extensively about the motivations behind the diverse classification of UA. Food and Agriculture Organization states that a definition only highlights parts of what UA consists of. There is a “lack of clarity and differences between regions or cities” of what UA is characterised of (Arku *et al.*, 2012). However there are numerous useful definitions of peri-urban and urban agriculture available (Mougeot, 2000b; Hovorka, 2005; Specht *et al.*, 2014). Urban and peri-urban agriculture in the broadest of terms is defined as any type of agricultural practice taking place in peri-urban peripheries of cities and intra-urban city centres/areas. The notion of ‘peri-urban’ is commonly understood as the physical boundary where multifaceted rural–urban collaborations occur (Lynch, 2004; McGregor *et al.*, 2006).

Peri-urban agriculture is practiced by those who are socially excluded and by underprivileged households (Mbiba & Huchzermeyer, 2002; Mabin *et al.*, 2013). However, based on evidence gathered from case studies, poor households are predominately involved in urban agriculture, though the poorest may not be involved in agriculture because of insufficient land and not having the necessary resources to acquire suitable land (Ruel *et al.*, 1998; Zezza & Tasciotti, 2010). Peri-urban agriculture is situated on the peripheries of occupied urban regions and its locality sets it apart from urban agriculture (Obosu-Mensah, 1999; Tornaghi, 2014). Foeken and Owuor (2000) and Lee-Smith (2010) supplemented the existing interpretation and stated that agriculture practiced by these inhabitants is not identical with UA. Many researchers have also suggested that there are challenges in providing a three-dimensional dissimilarity

amongst urban and peri-urban areas. It is possible that urban inhabitants could practice agriculture in the homelands that they were raised in (Foeken & Mwangi, 2000; Foeken & Owuor, 2000; Lee-Smith, 2010).

It is therefore imperative to dissect UA into smaller fragments which enables for the identification of key concepts in order to scrutinize urban agriculture's multi-dimensions. This procedure is crucial to comprehend UA and recognise the advantages it can provide for urban places. Urban agriculture has evidently advanced over time. UA has evolved from being practiced in ancient cities and has progressed through to the 21<sup>st</sup> century and literature which documents this change is available.

Studies conducted on food insecurity within developing countries illuminate our understanding of UA. The study conducted by Mwangi (1995) on UA post 1994 in Kenya highlighted the role of UA on household food security among low income urban households indicated that farming households were relatively food secure as those who were non-farming. Altieri *et al.* (1999) documented that the study conducted in Cuba regarding urban agriculture showed that urban agriculture became a significant source of food production for suburban and urban populations during the food crisis in Cuba. The study emphasises the significance of the practice of urban and peri-urban for the subsistence of urban dwellers. The study also continues to define UA "as all agriculture and animal production that occurs within cities or peripheries that receive direct influence from cities, so that the productive process is intimately linked to the urban population" (Altieri *et al.*, 1999). Although there have been numerous studies that have explored the relationship between food security and urban agriculture, the number of quantitative works that have been published is surprisingly limited (Zezza & Tasciotti, 2010). There has been a drastic shift from focusing on rural to urban food security in the sub-Saharan African region. Developmental practitioners, experts and researchers now working on urban food security have had previous experience working in rural areas.

Garrett and Ruel (1999) advised administrators and policy makers that they should not just transfer food security programmes from rural to urban areas especially when there was a new buzz about urban areas. It is imperative to note that the food security interventions and programmes that were executed in these urban areas were unique to their situation. However, the practitioners and researchers have not fully understood the fundamental causes and solutions regarding food security in urban areas therefore, the solutions are heavily influenced by rural experiences. Research conducted in urban areas disregards any other urban food issues but is focused on promoting urban agriculture to achieve urban food security (Garrett & Ruel, 1999; Battersby, 2013). Investigating the factors that contribute to food insecurity in urban households will create a better understanding on the instruments that should be used to ensure urban household food security.

The World Food Conference of 1975 emphasized that food security was a crucial developmental challenge therefore, that is when research on urban agriculture gained momentum (Maxwell, 1995). The popular research trends were focused on urban agriculture as a strategy to address urban poverty and enhance food security (Mwangi, 1995; Cofie *et al.*, 2003; Lee-Smith, 2010; De Zeeuw *et al.*, 2011). According to Crush *et al.* (2010), research regarding urban agriculture has an advocacy approach therefore, the work tends to be optimistic and promote urban agriculture and can be identified with its titles such as 'self-reliant cities', 'agropolis', 'hunger-proof cities' and 'growing greener cities'. This type of work tends to be ahistorical and apolitical.

Urban agriculture in the past has been considered an illegal activity (Mubvami *et al.*, 2006). Research conducted by Bowyer-Bower (1997), Mlozi (1996), Simatele and Binns (2008) and Mkwambisi *et al.* (2011) drew attention to the resistance of urban agriculture from both local and national governments. There was resistance based on public health concerns (Brown & Jameton, 2000; Afrane *et al.*, 2004; Wolch *et al.*, 2014). Urban agriculture did not fit into the idealistic image of a modern city that authorities were pursuing to achieve thereby seen as an activity that has the potential to tarnish their plans (Smith, 1998; Simatele & Binns, 2008). Practice of urban agriculture gives international spectators and local elites the impression that a city is still uncivilised, unmodern, underdeveloped and uncontrolled (Burger *et al.*, 2009). This is particularly evident in a study conducted by Simatele and Binns (2008) whereby the Local Government and urban authorities in the city of Lusaka viewed urban agriculture as a rural activity. The cities authorities felt that the practice of urban agriculture was unsuitable because it undermines the idealistic image of a modern city. Therefore, a new research approach developed which was to work against policy constraints that hindered the progress of urban agriculture (Battersby, 2013). Several scholars have argued that resistance to urban agriculture in the early days was fuelled by the idea agricultural planners had that extensive urban agriculture could decrease the demand for food produced in rural areas for urban areas (Maxwell, 1999).

### **2.3 The context of urban agriculture in South Africa**

Agriculture had in the past constantly been linked to the idealist image of a rural surroundings. This image has been like this because of the activities that are related to past experiences of the role of agriculture and where it is practised. Urban populations think that they should be fed by produce from rural areas (Molelu, 2015). This conception has turned rather erroneous for numerous metropolises in the developing nations (Molelu, 2015). It is primarily attributed to the low purchasing power of the impoverished population and scarce food resources (Drescher, 2002).



South Africa is a country with a young democracy. Therefore it is faced with various economic, environment, political and social problems which have been aggravated by the increasing rate of urbanisation and the globalisation of the food system (Nel, 2012). South Africa as a country is still undergoing some key social challenges. The citizens of South Africa are still faced with high rates of poverty and unemployment. The country has low levels of human capital development and extremely high rates of crime has therefore led to social unrest linked to service delivery protests. According to Roux (2005), numerous countries found in southern and central Africa are still unable to produce food to feed their own citizens, therefore, they are obligated to import food from other countries. There are more than one billion people worldwide who are chronically hungry and undernourished (World Food Programme, 2009). In 2007, greater than 50 percent of the total global population lived in cities with Africa at 41 percent and Europe at 74 percent (Mawois *et al.*, 2011). It is estimated by the year 2030 the figure for Africa is set to increase to 54 percent and Europe will increase to 80 percent (Mawois *et al.*, 2011). According to Nel (2012), the estimated current growth rate for sub-Saharan African cities is nearly twice the global average and the growth of urban populations will increase rapidly over the millennium, thus putting more pressure on food demand.

South Africa as a country is positioned amongst the nations with a high rate of income inequality worldwide (Chopra *et al.*, 2009). It has exceedingly high levels of absolute poverty when compared to other middle income countries. During the period between 2004 and 2014, the South African government's main objective was to decrease poverty by 50 percent (Burger *et al.*, 2009). In order to attain that objective, the country had to achieve household food security first which is a critical component. The connection between income, poverty and household food security is ambiguous. There are a great number of households in the country that are still food insecure even though South Africa as a country may be deemed to be food secure (Burger *et al.*, 2009).

It is therefore obligatory to examine the mechanisms of the food distribution system and household food security and its drivers in order to fully understand household food security status in South Africa. Rather poverty and food insecurity would be addressed by increasing employment opportunities thus improving household incomes (Altman *et al.*, 2009). There is also evidence showing that social grants have played a vital role in improving household food security (Aliber, 2009).

However, the high rates of unemployment and poverty will promote a continued dependence on social grants if not a possible growth especially with the economic recession (Aliber, 2009). South Africa is

amongst countries that have high rates of both unemployment and inequality globally (Burger *et al.*, 2009). Due to these factors, underprivileged households are vulnerable to politics and national policy changes. With the three potential contributors to food security namely expanding employment, social grants and small-scale agricultural production, there has been evidence of progress especially linked directly to small-scale agricultural production with regard to improving food security (Altman *et al.*, 2009).

However, the practice of urban agriculture in South Africa and Africa as a whole still does not receive the necessary acknowledgement when paralleled to the developed world despite its contribution and long standing history on the continent (Nel, 2012). Urban agriculture is a feasible and sustainable livelihood strategy for the urban poor however because of its lack of political recognition and informal nature needs to be addressed.

Urban agriculture in South Africa is under the umbrella of the Integrated Development Planning (IDP). The essential feature of the South African democratic government is that both seek to ensure that the individuals of the country have nutritious and safe enough food to meet their needs and have access to economic opportunities. According to (Austin & Visser, 2002), the finding of the Council for Scientific and Industrial Research (CSIR), agriculture is not considered as an urban land use activity when planning in urban areas and urban agriculture is relegated in order to prioritise industrial and residential land use activities. Urban agriculture is unregulated in a sense because it used unauthorised rain-fed water and the utilization of high agricultural potential land has been given little attention in urban land use planning (Austin & Visser, 2002). Evidently, in a study conducted in KwaMashu, it showed that urban agriculture was practiced on designated land such as along railways, roadsides, vacant open spaces, river valleys and residential plots (Magidimisha *et al.*, 2016). There are still a number of issues that need to be addressed for urban agriculture to be effective however some places such as Cape Town, Stellenbosch, Johannesburg and Soweto have begun to incorporate urban agriculture in their urban land use planning.

In South Africa, particularly in Kwa-Zulu Natal, urbanisation was delayed due to influx control laws which were in place during South Africa's apartheid past (Nel, 2012). Today, rural-urban migration is one of the main factors in the rising levels of slum sprawl in areas. Poverty for several years has been linked to rural communities and labelled as a rural phenomenon therefore it has been the key driving force of people migrating to urban areas in hopes to pursue better opportunities. Therefore, it has become a major challenge to ensure food provision for poor urban citizens. Urban and peri-urban agriculture should be regarded as a potential resolution to the challenge of urban food security for the urban poor as these poor urbanised citizens are open to practising agriculture due to their rural backgrounds. In other words,

feeding a growing urban population living in poverty will be one of the major humanitarian and political challenges of the next century (Nel, 2012). Therefore, this suggests that there will be increased pressure that will be put on urban and peri-urban agriculture. This is specifically apparent in developing countries whereby there are challenges in food supply created by poor infrastructure and transportation between cities and rural areas (Eriksen-Hamel & Danso, 2010). It is imperative that the various stakeholders address the limitations which hinder the growth and advancement of urban agriculture. Consequently, urban agriculture can become a main constituent of sustainable cities as it can both feed urban citizens and contribute to the attractiveness of cities.

Even though the primary practitioners and recipients of UPA are generally categorized as underprivileged urban households, the impact and occurrence of UPA in underprivileged urban households in Sub-Saharan Africa and most especially South Africa seem to be inadequate. This is extremely important especially those households experiencing high levels of poverty (Crush *et al.*, 2010). Burger *et al.* (2009) stated that areas that had the highest poverty rate in South Africa were urban areas. According to Heerden and Rossouw (2014) between 40 and 50 percent of South Africa's population is considered to be living in poverty while 25 percent of the population can be considered as to be living in absolute poverty. Although South Africa is said to be independent in food production, approximately 43 percent of the South African households are affected by food poverty and 14 million people are susceptible to food insecurity (Statistics South Africa, 2010). Burger *et al.* (2009) attempted to determine who the practitioners of urban agriculture were and their socio-economic status in South Africa. The report found that the Eastern Cape and Kwa-Zulu Natal Provinces had the highest UA practitioners and could also be attributed to the good soils and high summer rainfall found in those areas. According to a study by Burger *et al.* (2009) black South Africans were predominantly involved in UA and approximately 7.5 percent of urban agriculture practitioners cited urban agriculture as their main source of income. Practitioners of urban agriculture face a number of diverse challenges and limitations that they do not have the capacity to address on their own (Magidimisha *et al.*, 2016). This is because urban agriculture has increased the competition for resources such as energy, finance, labour, land and water.

An analysis conducted by Badami and Ramankutty (2015) between high-income and low-income countries showed that urban agriculture is feasible in terms of available land availability to grow produce for the urban poor. However, high-income countries did not need urban agriculture from the view point of urban food security because food is widely available, highly affordable and inexpensive (Badami & Ramankutty, 2015). This is not to disrepute the numerous benefits derived from urban agriculture in high-income countries such as the productive use of land, greening of cities, provision of nutritious food to the

destitute and social benefits (Badami & Ramankutty, 2015). It is critical that urban agriculture is not kept in a political vacuum. There is a need for structured alignment through the various government departments and different ministries. This is required in order to prevent situations whereby urban farmers are supported by one department but persecuted by another (Nel, 2012).

## **2.4 Food security**

The 1996 World Food Summit (WFS) which was held in Rome focused on malnutrition and in which (Frayne, 2010) indicated that the United Nations Development Programme projected has it that over 800 million people engaging in the practice of urban agriculture globally (Mougeot, 2000a). This figure is traced back to the source which is the United Nations Development Programme (UNDP). The UNDP report estimated that 800 million people are engaged in urban agriculture, 200 million of those people produced goods for market sale and 150 million estimated jobs in production and processing. The figures represented on the data are established on the authors' experiences and observations. However, the authors of the tool did caution that their intention was to have an idea and rather that a more systematic estimation is required (Zezza & Tasciotti, 2010). However, many scholars and readers have quoted the figures as hard evidence and ignored the caution. This is because literature on urban agriculture is biased and is being widely promoted. Therefore, there are authors that still question the equation of increased household food security through increased urban food production (Ellis & Sumberg, 1998; Foeken & Owuor, 2006; Crush *et al.*, 2010; Tawodzera, 2011). Subsequently, The State of Food Insecurity in the World 2015 report conducted by FAO categorised 795 million people as malnourished in the world (FAO., 2015) . Food security still remains a sustainable development challenge even though the number of malnourished population has been reduced faintly.

The WFS defines food security as: "when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preference for an active and healthy life" (FAO., 1996). There are four components in which food security is established on. Firstly, the accessibility of food, precisely guaranteeing that there are adequate amounts of food on a regular basis. Secondly, availability to food by ensuring that there are adequate resources to acquire food for a healthy diet. Lastly, food security entails the understanding of both health and nourishment (World Health Organization (WHO), 2016). Food security as a concept has evolved over the decades. Primarily food security was focused on food production and the availability of food. With time constituents such as accessibility of food, utilization and stability were incorporated. There have been several endeavours to

link the concepts of food security and sustainability. Over time the concept of sustainability was progressively applied by organisations examining food security internationally (Berry *et al.*, 2015)

The South African Integrated Food Security Strategy (IFSS) explanation regarding food security constituents are as follows (Republic of South Africa, 2002):

- Food access: this is the capability of a country and the households to attain adequate food on a maintainable basis. Food access also addresses concerns regarding consumption behaviour and buying power.
- Food availability: the supply of food either active or uninterrupted supply local and national level. The availability of food is affected by the competences to produce in the farming division and the various related market conditions.
- Consistency of food: consumption and deployment of healthy and safe food.
- Food distribution: Unbiased delivery of food in order to be able to tackle issues concerning demand at the correct place and time. This place and time feature of food security communicates the fact that a nation can be regarded as being food secure at a national level however there could be other areas in the country that are still food insecure.

Food security is a multifaceted sustainable development issue. International environmental challenges contributing to hunger includes: political conflicts, unemployment and economic recession, increased energy and food prices, natural disasters, political instability and extreme weather events (FAO., 2015). The economic recession that occurred throughout 2007 to 2008 led to a substantial escalation in food prices which is interrelated with an increase in food insecurity and level of malnourished people predominantly those living in urban areas (Frayne, 2010). African nations and other developing countries are still recuperating from the 2007 to 2008 economic and food crisis.

#### **2.4.1 Food security status in a global context**

The concept of food insecurity was not formally recognised but the concept of being hungry was (Philander, 2015). Hunger described by Campbell (1991) as a condition which creates an uncomfortable sensation that is triggered by a strong want or desire for food. Later on the International Food Policy Research Institute (IFPRI) (2017) went on to describe hunger as a feeling of distress and physical feeling of emptiness and pain due to lack of food. According to a study performed by Teka Tsegay *et al.* (2014), the participants of the study described hunger as a phenomena “genocide of the mind” that aggravates feelings of hopelessness, despair, worthlessness and humiliation. According to FAO (2009b) 1 billion

people experienced chronic hunger in the year 2009. There are many people globally who are still going hungry and are being deprived of their basic human needs and that is therefore immoral and unethical. The greatest challenge regarding food security is to be able to feed the current global population which is 6.9 billion and to increase the efforts of production to feed the estimated populace of 9.2 billion by the year 2050 (Godfray *et al.*, 2010). Ironically, the food that is being produced is enough to feed the growing population however organizational changes within the agricultural sector have had an injurious impact on food security (FAO, 2009b).

A number of scholarly studies have highlighted that issues such as urbanization, food prices, climate change, nutrition and poverty influence food security (Cohen & Garrett, 2010; Grote, 2014). Many academic debates have been centred on the phenomena of food security and examined through various viewpoints (such as food production; hunger; nutrition; poverty alleviation and sustainability). These debates have also gingered several initiatives and policy deliberations. It is therefore imperative that practical and sustainable solutions are found to improve and ensure food security in order to reduce hunger, malnutrition, mortality and starvation. The Global Hunger Index (GHI) conducted by International Food Policy Research Institute (IFPRI) (2017), is used to track hunger globally. The Global Hunger Index is used to measure the development and failure in the combat against global food security. From the 2000 to 2016 spanning over 16 years, overall 22 countries have made significant progress whereby they have been able to reduce their scores by 50 percent (Von Grebmer *et al.*, 2016). Only seventy countries were able to make notable progress with their scores dropping about 25 percent and 49.9 percent. In spite of this progress, distressing levels of hunger are still present in 50 countries (Von Grebmer *et al.*, 2016). Countries such as Cambodia, Myanmar and Rwanda were able to reduce their scores by 50 percent since the year 2000 (Von Grebmer *et al.*, 2016). This improvement is a reflection of increased stability as each of these countries have experienced political instability and civil wars.

Despite these improvements, there are still 7 countries that suffer from distressing levels of hunger. The majority of these countries are from Africa namely Zambia, Sierra Leone, Madagascar, Central African Republic and Chad. With Haiti and the Republic of Yemen being exceptions. Both Chad and Central African Republic are suffering civil wars which has worsened their food security status coupled with an influx of refugees has therefore affected their food production. The aforementioned countries highlight that regardless of the substantial progress that is made in order to reduce and eradicate hunger globally, issues such as climate change, conflict, poor governance and violence still guarantee that the hunger plague will continue to threaten the world. Nutrient deficiency has terrible and sometimes permanent effects child deaths, maternal deaths, physical disabilities, compromised intellectual abilities and

weakened immune system (Teka Tsegay *et al.*, 2014). Child malnutrition in 2001 contributed 54 percent of deaths in children in developing countries (Bain *et al.*, 2013). One can therefore conclude from the discussion above that more should be undertaken to eradicate hunger and improve the food security status of people globally so that these people can lead productive, healthy and active lifestyles. This is extremely important for urban populations as they are growing rapidly and the demand for food is increasingly outstripping the supply.

#### **2.4.2 Food security status in sub-Saharan Africa**

Food security is a challenge for both developed and developing countries and this can be seen in the Global Hunger Index. Sub-Saharan Africa has been experiencing extreme climate disturbances which are of a result of the El Nino and La Nina weather phenomena. Coupled with these extreme weather patterns, prevailing drought and floods have made the situation worse. Therefore, millions of poor households' livelihoods have been affected as a result. Other factors such as socio-economic shocks, conflicts and animal and plant diseases have demoralised the efforts of African governments to strive to achieve food security. Africa's development agenda is centred on food security and nutrition by eradicating hunger and malnutrition.

The Sustainable Development Goals (SDGs) are a set of goals that countries accepted in the year 2015 in order to preserve the earth and ensure sustainable development. Millennium Development Goals (MDGs) were before the SDGs and were adopted in the year 2000 and concluded in 2015. The SDGs entail of 17 goals. Both the SDG1 and SDG2 are related to eradicating hunger and poverty. In 2014, the African Union (AU) adopted their first 10-year implementation plan spanning from 2015 to 2025 which is a part of the AU's Agenda 2063. The plan is aligned with the vision of the SDG's which will be focusing on improved nutrition, increasing production and reducing waste.

Globally it is estimated that 7.5 percent of the total world population from the age of 15 years and above constitute 406 million people who are extremely food insecure between the years 2014 to 2015 (Von Grebmer *et al.*, 2016). Sub-Saharan Africa accounts for 26 percent of the age group and represents 153 million people (Von Grebmer *et al.*, 2016). This region mentioned accounts for the highest prevalence of severe food insecurity rate in the world (FAO., 2017). Regions that are in the sub-Saharan African region with the lowest prevalence were southern Africa and western Africa with 20 and 23 percent respectively (FAO., 2017). Eastern and Middle Africa accounted for 28 and 31 percent respectively which was higher than the regional average (FAO., 2017). The necessary efforts to improve hunger and nutrition have been delayed by the climatic conditions, civil wars and political instability. Climate and weather changes in the

form of drought, elevated temperatures and floods have proven to be devastating to the agricultural sector and countries such as Cameroon, Central African Republic, Niger and Nigeria (FAO., 2017). The food availability index still remains lower for sub-Saharan Africa as equalled to the world average (FAO., 2017). Between 2003 and 2004, 35 countries around the world experienced food crises. However, 24 of these countries were located within sub-Saharan Africa (FAO., 2004). The main cause of the food crisis dating from 1992 to 2004 was attributed to drought (FAO., 2004). According to Crush *et al.* (2011), it is estimated that more than 50 percent of the sub-Saharan African population will be living in urban areas by the year 2030. This has been amongst the highest estimation globally (Battersby, 2012). Food security has shifted from being a rural to an urban problem. Subsequently, food security in urban areas has become a developmental challenge in sub-Saharan Africa. It has been a long-lasting challenge dating from 1900 which is usually experienced by the poor (Arku *et al.*, 2012; Battersby, 2012).

African countries have over the years since 1980 increasingly become net importers. Their import reached a high in 2008 when the world was under the global economic recession. African countries remain vulnerable to high and rising food import bills that reduce any funds that could be utilised to mobilise food security interventions and strategies (Rakotoarisoa *et al.*, 2012). Middle Africa has the highest import dependency at a sub-regional level varying from 28.4 to 34.5 percent during the period of 1980 to 2010 (Rakotoarisoa *et al.*, 2012). However, in the southern African region, there has been a substantial decrease in reliance on cereal imports. This, therefore, suggests that there may be an effective substitution to imports with local production.

Most importantly solutions regarding food security and nutrition should lead to lesser dependence on foreign food aid and more dependency on solution coming from within the sub-Saharan Africa (Bain *et al.*, 2013). To achieve these goals, there is a need for properly functioning economic and political structures that will work within the sub-Saharan African governments to ensure food security for all and also in turn improve the quality of life of their citizens.

#### **2.4.3 Food security status in South Africa**

National food security in South Africa before the democratic transformation was associated to large-scale commercial farmers and the sector was dominated by white South Africans (Hendriks, 2014). Due to the international sanctions placed on South Africa during the 1980's, the agricultural policy of the country concentrated mainly on commercial production in order to achieve self-sufficiency (Van Zyl & Kirsten, 1992). After the abolishment of the apartheid regime, African National Congress (ANC) in the year 1994 developed the Reconstruction and Development Programme which acknowledged food security as a



basic human need. In alignment with this, national programmes and strategies have focused on food security and have made it a priority. Government set out to improve food security for historically disadvantaged people and has implemented various social programmes to achieve this. Some of these programmes included agricultural programmes, free health services for children and mothers, school feeding schemes, public works programmes and social grants (such as child support, disability and pension) (National Department of Agriculture, 2002). South Africa at a national level is food secure meaning it is able to produce sufficient calories to adequately feed each of its 53 million citizens. South Africa has made some progress post-apartheid however the efforts are not enough. South Africa at a household level still remains food insecure in some of its regions.

Historically, agriculture's main aim was to provide food for low income households. However it is evident that household food security in South Africa mainly depends less on household food production and considerably more on the total income (Shisanya & Hendriks, 2011). There has been a considerable decline in commercial farming units whereby there were 60 000 commercial farming units in 1996 to 40 000 by 2007 (Vink & Van Rooyen, 2009). About 80 percent of the total food production is a contribution from 20 percent of the country's commercial farmers. The decline in commercial production is a result of land reform, political instability and uncertainty. The South African government bought numerous farms for the redistribution and restitution to black farmers and these farms have become inefficient and unproductive (Van der Merwe, 2011). According to a report by Bureau for Food and Agricultural Policy (2013), there has been a steady increase in rice imports between 2009 and 2013 therefore resulting in an increased demand for rice while demand for maize remained stationary since 2008. It is during these years that South Africa shifted from a net exporter to a net importer ((Bureau for Food and Agricultural Policy, 2013). As a result, it has put national food security at risk. About 23 percent of the total population which accounts for 2.9 million households participate in any type of agriculture, therefore it indicates that household engagement is relatively low (Statistics South Africa, 2012a).

More than half of the South African population live under conditions that make them vulnerable to hunger and 1 in 4 people currently suffer from hunger South on a regular basis (Teka Tsegay *et al.*, 2014). A study conducted in 2013 by the South African National Health and Nutrition Examination Survey (SANHANES) revealed that 26 percent of the population were confronted with hunger and 28 percent were at risk (Shisana *et al.*, 2014). Hunger and malnutrition in South Africa are a major challenge the country faces with regards to food security whereby 70 percent of women are overweight and 26.5 percent of children have stunted growth (Shisana *et al.*, 2014). Eastern Cape is a province with high rates of inequality whereby 30 percent in the province experience hunger (Statistics South Africa, 2012b).

## 2.5 The contribution of urban agriculture on food security

Currently, the world is experiencing multi-faceted problems which have adversarial effects on the livelihoods of people at individual, household, regional, national, and global levels (Mthethwa, 2012). The significant amounts of food produced through urban food production is commonly undervalued. Urban and peri urban agriculture is commonly related with the means to achieve food security and has therefore been the sole reason why urban dwellers are practicing it. Initiatives of UPA enables urban dwellers to become self-sufficient and receive a more nutritious diet. Poor urban households have greater access to more nutritious food and have these foods in larger quantities. This results in the households being able to decrease the amount of money they allocate to buy food therefore making them more food secure.

Kutiwa *et al.* (2010), supported the fact that urban households can practice UPA as a possible strategy to break down the poverty cycle as well as eliminate food security to develop a theoretical framework which could be able to unpack the four components of food security. Urban and peri-urban agriculture is advantageous to households because they are able to produce their own food which is fresh and nutritious for consumption. Households are able to have a greater access to dietary diversity because the household can buy additional food products with the supplementary money saved from producing their own food (Guo, 2012). Products that are produced through urban agriculture are usually perishable products such as eggs fruits, milk and vegetables (Mougeot, 2000a; Specht *et al.*, 2014).

A substantial number of studies have examined the relationship between food security and UA in cities in Sub-Saharan Africa. These studies have indicated that UA significantly contributes to improving the household per capita dietary energy requirement, child nutritional status, food quality, food access and reduced food prices (Armar-Klemesu, 2000; Crush & Frayne, 2010; Kutiwa *et al.*, 2010; Zezza & Tasciotti, 2010). The origin of UPA dates back to Asian countries who have been confronted with limited arable land, increasing populations and have been practicing UPA for a very long time. A majority of cities in China are self-sufficient in non-grain foods through the continued practicing of UPA (Guo, 2012). At a national level, Singapore is 100 percent self-reliant in meat and is 25 percent self-reliant in vegetables (Guo, 2012). It was during the late 1980s where Cuba experienced the failure of communist alliance which contributed 85 percent towards Cuba's trade. Due to this devastating economic slump, the Cuban agricultural sector faced challenges to provide food that would be locally available (Altieri *et al.*, 1999).

Another example is that of urban households who practiced urban agriculture in Harare (Zimbabwe) who were able to provide for their families for about four months' worth of staple food in order to meet their households needs (Mbiba & Huchzermeyer, 2002; Mabin *et al.*, 2013). Kampala inhabitants that dwelled

within a 5 km range to the town's hub produced approximately 20 percent of the staple food (Maxwell, 1994). Studies have been conducted in order to fully quantify the contribution of UA on household food security. This was done in order to justify the theory that claims that urban agriculture actually increases household food security status of susceptible homes (Mwangi, 1995). Mwangi (1995), conducted a comparative study on low-income neighbourhoods in Nairobi by comparing those households who were farming and the non-farming households. Their findings revealed that households that were involved in farming were significantly food secure as compared to the non-farming households. It is imperative to first understand the implications of food security implications and nature of UPA which is stalled by the absence of reliable quantitative data. With the bulk of studies based on a number of major cities, a considerable amount of evidence is still qualitative if not subjective (Zezza & Tasciotti, 2010).

### **2.5.1 Connection between urban agriculture and food nutrition**

In times where food resources become scarce, households are not concerned with the hygiene or nutrient content of their diets but are focused on providing a meal for their families (Mwangi, 1995). Households overlook food nutrition and safety. By reducing poverty and food insecurity, underprivileged communities will have better access to a diverse range of foods that will meet their nutritious diet requirements and also ensure overall food security. Malnutrition can result in households contracting communicable diseases (Maxwell *et al.*, 1998). Scarcity of food resources makes households vulnerable and an easy target for sexual abuse (Armar-Klimesu, 2000). Malnutrition in children causes childhood development delays and this is a result of mineral deficiencies and non-nutritious diets (Armar-Klimesu, 2000; Zezza & Tasciotti, 2010). Populations living with HIV/AIDS are extremely vulnerable as their diets need to be nutritious enough to maintain a healthy immune system (Gallaher *et al.*, 2013).

There is a connection between the availability of diverse food choices and food security were it has been connected to a substantial improvement in the nutrition status of poverty stricken households (Armar-Klimesu, 2000; Zezza & Tasciotti, 2010). There have been limited research that has been done to determine the relationship between nutrition and urban agriculture especially in Southern Africa. Maxwell *et al.* (1998), conducted a study in Kampala which confirmed the theory in that there is definitely a correlation between nutrition and urban agriculture. Furthermore, the study also revealed that children coming from non-farming households had a lower nutritional status than those children from households practising farming.

### **2.5.2 Improved health status of households**

Literature supports the claim that urban agriculture improves the consumption of both fruits and vegetables among urban agriculture practitioners (Brown & Jameton, 2000; McCormack *et al.*, 2010). Households are able to choose among healthier food options to consume. Urban agriculture that is practiced in the form of community gardens provides an area whereby occupants can engage in physical activity and a place to recreate. According to Bellows *et al.* (2003), food production benefits exceed emotional, mental and physical health of an individual or household but rather have an everlasting impact on those around and on the physical and social space. Practicing agriculture either farming or gardening is a lifetime activity. The health benefits derived from it have been advantageous to generations of farmers and gardeners. Agriculture is related to mental and physical relaxation, satisfying labour, socializing and an ability to produce food and beauty (Bellows *et al.*, 2003).

Farming and gardening is a good exercise however health professionals often underestimate the health benefits derived from this exercise. Gardening has been associated with the ability to decrease the possibilities of coronary heart disease, occupational injuries, obesity in children and adults and diabetes (Bellows *et al.*, 2003). Working in an outdoor environment with plants improves an individual's mental health and mental outlook (Clatworthy *et al.*, 2013). Over the years, health professionals have been using gardening materials and plants to help patients of different ages suffering from mental illnesses to improve their self-esteem and social skills. Horticulture therapy has been used to encourage relaxation, reduce fear, anger, muscle tension and pressure by promoting plant-human relationships (Grabbe *et al.*, 2013).

### **2.5.3 Urban agriculture and income generation**

Households are able to achieve their own basic needs or sell surplus products in the market through producing food in spaces around their homes or on proper farmlands (Guo, 2012). A significant "real" income is generated through peri-urban agriculture (Baumgartner & Belevi, 2001). Firstly, a household is capable of producing their own food for their household consumption thereby cutting down of expenses on food can be able to use the extra income which was previously allocated for food to for other household needs (Guo, 2012). Various researches have shown how most African countries saved money or income that could have been invested in household capital or used to acquire basic needs (Drescher, 2002; Rogerson, 2003; Crush *et al.*, 2010). Urban agriculture therefore plays an important role in alleviating poverty.

Secondly, in the case whereby a household has produced in excess, the households may sell excesses in the market, this is a complementary source of household income which the household can enjoy for themselves (Guo, 2012). Urban agriculture becomes another source of income generation therefore increasing disposable income which increases food security. Wei (2008) conducted a study in China which explored the relationship between peasants' income and urban agriculture. The study further revealed that there is indeed a relationship between increasing peasants' income and urban agriculture, and rivalry relationship between sustainable development of ecosystems and expansion of temporary income. Urban agricultural production and urban labour markets have a strong relationship. It is commonly seen that in developed cities, there has been an increasing number of urban unemployed labour migrants who are unsuccessful at finding adequate employment. They have a tendency to seek employment in city farms as a livelihood strategy. However, in the developing world, urban agriculture is commonly practiced however its level in quantitative terms remains uncertain. It is common in developing countries to have agriculture as the largest employment sector in the country but agriculture is usually not the single source for households' income (Gallaher *et al.*, 2013). Employment opportunities in production, processing and marketing are as a result of urban and peri-urban agriculture. Females are the dominant gender in the source of employment (Poulsen *et al.*, 2015).

#### **2.5.4 Urban agriculture and social inclusion of ostracized groups**

According to Bailkey *et al.* (2007), UPA contributes to the social inclusion of ostracized groups (comprising of the disabled, the elderly and women) by allowing them an opportunity to nourish their relatives and increase their household income and also improving their self-confidence. Various researchers have indicated that urban agriculture plays a great part in teaching urban inhabitants on indigenous knowledge, agricultural methods and preserving local cultural diversity. Chinese scholars think urban agriculture offers a convenient space for social interaction and that it is the appropriate way to promote urban-rural integration (Qiu *et al.*, 2005b).

Esim and Cindoglu (1999) survey in Turkey discovered that females who were employed in non-market sectors and in traditional sectors earned considerably lower wages than men in the same situations. The largest percentage of women practicing urban agriculture are from Africa with the exception of Accra and Dakar (Esim & Cindoglu, 1999; Stivachtis & Georgakis, 2011). These places are predominately of Islamic faith and women are expected to be at home (Esim & Cindoglu, 1999; Stivachtis & Georgakis, 2011). Women are influenced by their cultural and traditional behaviour to take up their responsibilities within the family (De Zeeuw *et al.*, 2011). Women predominately dominate the urban agricultural sector in cities where urban agriculture is not fully recognised (De Zeeuw *et al.*, 2011). Women find it their role and

responsibility to prepare and provide food for their households. This has been reported in Dar-Es-Salaam, whereby subsistence farms belong to women and marketable undertakings are dominated by men (De Zeeuw *et al.*, 2011).

### **2.5.5 Factors influencing the practise of urban agriculture**

Humans depend heavily on land for their survival and have used land to meet their various needs (Briassoulis, 2009). Humans have changed the surface of the earth to suit their lifestyles and meet their needs. However, the changing of the land cover has come at a cost. Over time land has been degraded due to exploitation of the land resources and to excessive changes in land cover (Nzunda *et al.*, 2013). There are various factors that may influence land use in agricultural practices in urban areas. The rapid growth in population has been noted to influence land use. Population growth is usually associated with areas that have free available land in which people can move into and where migrants can develop their own households (Briassoulis, 2009). According to an investigation conducted by Nzunda *et al.* (2013), stated that the availability of arable land remained the main influence of migration. People leave their past households with the aim to find better land for farming and residence. The influx created by these populations creates a planning problem as they demand more resources to support their lifestyles (Nzunda *et al.*, 2013). The challenge that arises from rapid population growth is that more land is required that could be used for agricultural purposes. Instead the land is used for building residential sites and urbanisation (Nzunda *et al.*, 2013).

Climate, relief and soils influence the decisions made by individuals and land planners. It is important for society to move towards land that is favourable for their intended lifestyles. Therefore, arable land, stable warm climatic conditions, relatively flat land and fertile soils are favoured (Briassoulis, 2009). Land tenure and land rights also influences land use. Fenced plots or land owned by the household are more likely to be prosperous in their agricultural endeavours (Nzunda *et al.*, 2013). This is due to the fact that the households are able to access funding for expansion and preserve the land that they work in. Land that is not established or measured is usually abandoned by the households and heavily degraded. There is no incentive to rehabilitate land after vigorous agricultural practices have stripped the land of its fertility. There has been an increase in demand for farms and expansion of farm sizes over time (Briassoulis, 2009). Natural land cover has shifted from natural vegetation to agriculture. This is a direct response due to a global increase in demand for agricultural products.

## **2.6 Chapter summary**

The literature validates the potential of urban and peri-urban agriculture in achieving household food security. The various concepts of urban and food security were analysed in order to determine whether there is a relationship between the two. As supported by literature, the practice of urban and peri-urban agriculture has the ability to increase household food security. One important conclusion that can be drawn out is that food security was conventionally theorised as rural developmental problem however it has become an urban problem as well. The current tools available to address food security are suited for a rural setting rather an urban setting. Therefore, this is where urban agriculture has been proposed as a potential strategy to alleviate poverty and achieve household food security. Urban agriculture in a South African context is still unregulated and perceived as an illegal activity. There still remains a gap between policy-making and urban agriculture that needs to be attended to rather than being isolated.

With increased rates of urbanisation and urban influx the households living conditions have worsened over the years. The literature explored the various contributions of urban agriculture such as improved health status of households, income generation and inclusion of socially ostracized groups. Nevertheless, there is still ongoing academic arguments regarding the validity and reliability of the contribution of urban agriculture towards household food security because some studies have an advocacy approach. There is still a gap for reliable qualitative data to be available. The following chapter presents the theoretical framework for the study.

## **3 CHAPTER THREE – THEORETICAL FRAMEWORK**

### **3.1 INTRODUCTION**

This chapter presents the theoretical framework for the study. A theoretical framework is model that underpins a study and useful in designing research questions as well as organisation and interpreting the findings of a study. It is theorised that peri-urban agriculture as a livelihood strategy can contribute to household food security. The success of agriculture is highly dependent on a number of various factors which include natural, social, human, physical and financial. Natural factors include aspects such as climate, fauna, flora and land; social factors include gender, empowerment and household size; the human factors that are considered include human capacity, abilities and education and physical factors such as infrastructure and property. Additionally, a household's ability to adapt to change is directly linked to the capital that they have available at their disposal. There are various development and social approaches namely capital, feminism, sustainable resource management, sustainable economic development. These approaches attempt to provide different paradigms to be able to understand urban agriculture better. According to Rutherford *et al.* (2002) the sustainable livelihood framework incorporates and makes sense of the complexity and diversity of urban agriculture. For this study, the sustainable livelihood framework was found to be beneficial. The core elements (five capitals) regarding the sustainable livelihood framework are discussed in this chapter

### **3.2 The Sustainable Livelihoods Approach**

The study employs the Sustainable Livelihood Approach (SLA) which is centred around activities, assets and capabilities to understand the intricacies of peri-urban agriculture. Livelihood resources constitute of assets which determine the possibilities that a household can employ to achieve a sustainable livelihood.

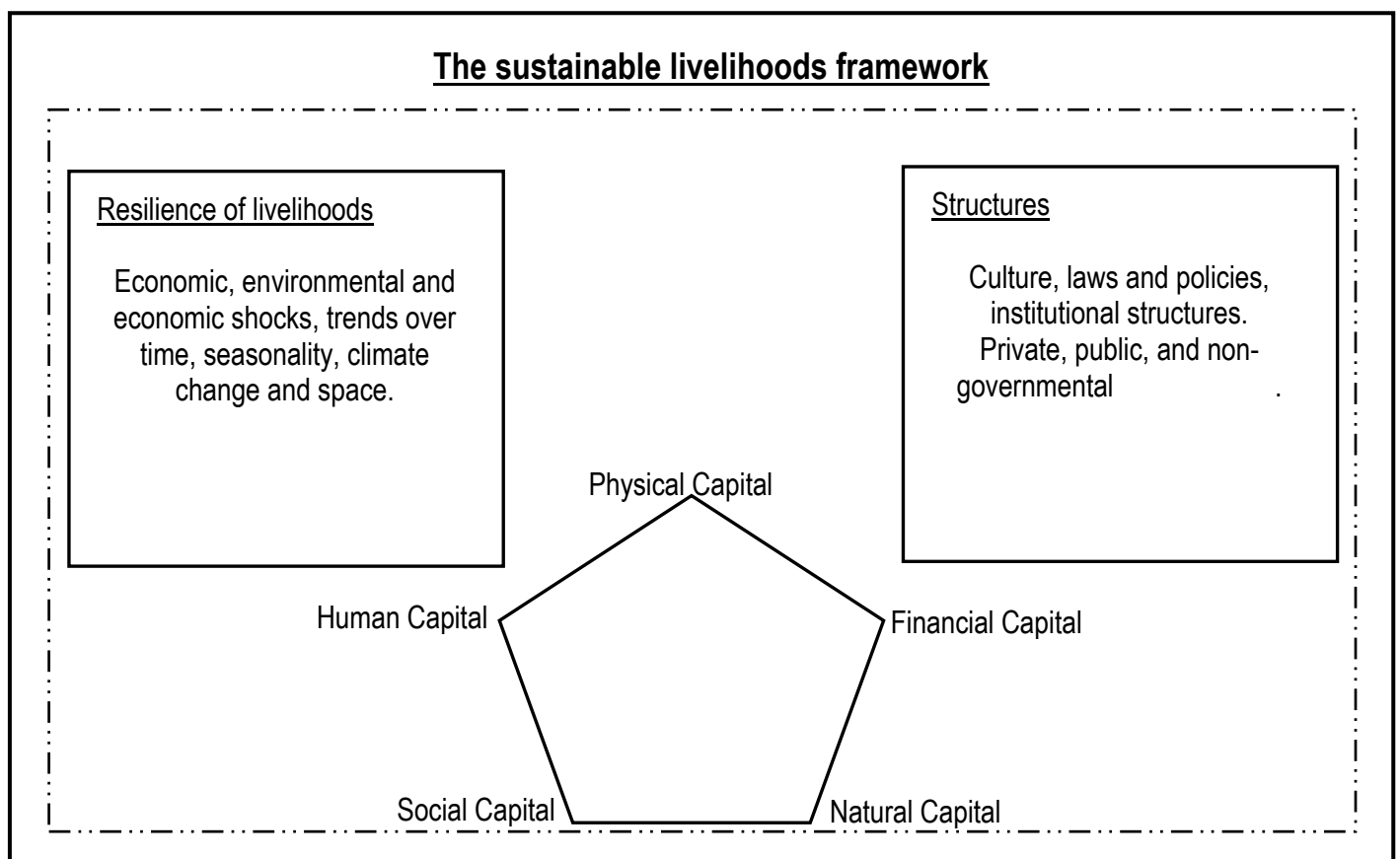
#### **3.2.1 Defining the sustainable livelihoods framework**

Key concepts and elements regarding the sustainable livelihood framework can be misinterpreted without proper clarification. There are three basic questions that provides some clarity so that a basic understanding is created. The questions asked are what is a livelihood, what is sustainable and how "sustainable livelihoods" are utilised.

According to Serrat (2017), a livelihood does not comprise of employment only. This is because early concepts concerning poverty accepted definitions that concerned income alone. However, it was established that poverty stricken individuals need to diversify their activities rather than rely on initiative as they are extremely vulnerable to environmental influences. The concept of livelihood is extensive



whereby capabilities and social capitals are included rather than just it being economic equations (Biggs *et al.*, 2015). The most widely accepted definition of livelihoods is that a livelihood encompasses assets, activities and capabilities mandatory for a means of living (Serrat, 2017). Livelihoods are not created through addressing poverty but rather sustaining them. Through alleviating poverty, livelihoods become sustained over long periods of time. There have been many questions raised regarding the addition of the word sustainable to livelihoods. This is because there is no clarity as to what exactly is being sustained and at what cost does it occur. Sustainability comprised of social, economic and environmental dimensions that may not be well-matched. Therefore, the sustainable livelihoods framework endeavours to balance social and environmental sustainability by adapting to change. There are positive and negative dimensions to livelihoods. A positive dimension is characterised by creating and enhancing capabilities to change in a livelihood. In contrast, a negative dimension is the ability to cope with change. A sustainable livelihood integrates positive and negative dimensions of livelihoods flexibility. It does so by not deserting ecological and social sustainability. Gee and Mansur (2015) define a sustainable livelihood as one that can cope and recuperate from stresses and shocks. The sustainable livelihood framework is illustrated in Figure 3.1.



*Figure 3.1: The sustainable livelihoods framework*  
 Source: Adapted from Morse and McNamara (2013)

### **3.3 The five capitals of the sustainable livelihoods framework**

There are five capitals entailed in the sustainable framework. Namely these capitals are physical, natural, social, financial and human capital (Speranza *et al.*, 2014). It should be noted that the use of the word capital is not used in an economic but rather to describe the components of livelihoods. These capitals may either be personal capabilities or private property of an individual. However, social networks and public resources may determine exactly which capital/s the individual has access. The capitals of sustainable livelihoods are not only economically rewarding but are the fundamental aspects that contribute towards the resilience of livelihoods.

Livelihoods constitute of a number of capitals. This is evident in underprivileged people whereby they lack financial resources however may be exposed to land resources. These individuals then have the opportunity to use the public land to make up for the financial capital that they do not have (Atela *et al.*, 2015). In the context of peri-urban agriculture, such individuals are then able to obtain food from the land than relying on buying food from retailers through a financial transaction. It is evident that it is not always feasible to substitute capitals. This is evident in a situation whereby there is a shortage of financial capital. Financial capital is reliant on human capital. Therefore, an increase in human capital such as education increases the opportunities of acquiring financial capitals through a job (Farrington *et al.*, 2002). Many households that have low income levels usually have limited access to capitals which include private land, education and finances. Due to the fact that some capitals cannot be substituted, households then need to have multiple business activities so that they are able to substitute their need for money. The households do so by acquiring money from temporary labour and social grants.

Peri-urban agriculture is one of the substitute methods. Practicing peri-urban agriculture benefits households in a sense that they are able to save money from producing their own food and households are able to save the money they receive for essentials. Households can also sell surplus produce to generate surplus income (Guo, 2012). Households can benefit from peri-urban agriculture from an economic aspect. It was Serrat (2017) who recommended that livelihood resilience can be ensured through supporting productive assets, implementing programmes and by improving human and social capitals. The small-scale farming community in South Africa utilised this recommendation through development initiatives. Small-scale agriculture can be used to promote community development. This is only possible if there are existing physical and natural capitals and in addition enough human and social capital (Nel, 2012). Therefore, it is imperative that peri-urban agriculture adopts all the capitals in the sustainable livelihood framework. It is also important to note how the issues discussed in the previous chapter on urban agriculture arise from this activity.

### **3.3.1 Physical capital**

Physical capitals comprise of public infrastructure and private property. These are important as they assist people and households in becoming more productive. Equipment, tools and housing that households own or rent make up private poverty resources. Sustainable livelihoods require infrastructure such as access to information, affordable transport, water and sanitation and affordable energy (Farrington *et al.*, 2002; Atela *et al.*, 2015). Poor urban households need public infrastructure such as water, housing and energy. Public infrastructure can be a motivation for rural households to migrate to urban areas. Improving infrastructure for the urban poor which is beneficial to them as it will enable them to practice agriculture. It provides an additional opportunity for them to generate income through informal businesses, rent and urban agriculture (Farrington *et al.*, 2002; Atela *et al.*, 2015). It was noted by Satterthwaite and Tacoli (2002) that small-scale farmers who had adequate access to physical capital were successful in their farming operations and business. The availability of physical capital increases the economic viability of urban agriculture.

### **3.3.2 Natural capital**

Natural capital consists of goods and services. These services can be renewable or non-renewable. Non-renewable resources are resources such as fossil fuels which are depleted through use and cannot be replenished (Pearson *et al.*, 2010). Renewable resources are those that can replenish themselves provided that they are used in a sustainable manner (Mok *et al.*, 2014). Goods and services are freely available such as air and nutrient cycling. The sustainable livelihood framework is concerned with the conservation of the natural environment. This is because the environment provides resources which are essential to human beings. Unsustainable use of the environment and continued exploitation provides short-term benefits. This puts the livelihoods of future generations to come at a vulnerable position. Therefore, that is why the sustainable livelihood framework stresses the importance of preservation and sustainable use of natural capitals (Morse & McNamara, 2013). Natural capital enables households to be able to substitute the cost of food by practicing peri-urban agriculture. Land is extremely important towards the practice of urban agriculture. This was evident in a study conducted by Arene and Anyaeji (2010) in Nigeria where by households made use of vacant land to produce food because they lacked financial capital to purchase food. Land in urban areas is expensive and extremely difficult to access. Therefore, automatically poor households are excluded. Access to land does not indicate ownership of land but rather usage of land. This could either be vacant land, land set for development or usage of public land.

### **3.3.3 Financial capital**

Financial capital regards the accessibility of commodities or cash that may be exchanged (Giannini *et al.*, 2017). Financial capital consists of two types which are inflows of cash and stock. Inflows regard of social grants and salaries. While stocks constitute of liquid assets and savings. In order to access resources in urban areas, there has to be some sort of financial transaction that takes place therefore financial capitals are essential (Farrington *et al.*, 2002; Atela *et al.*, 2015). Low-income households are dependent on salaried employment in order to access financial capital (Akter & Basher, 2014). These households cannot rely on employment as their only source of income because human capital is not valued enough in the labour market (Kutiwa *et al.*, 2010; Akter & Basher, 2014). This results in the urban poor turning to informal markets. These households are active in selling produce generated from urban agriculture. They could either be street vendors or hawkers (Tornaghi, 2014). Households make use of this market however income generated from the informal sector is irregular and limited. These households benefit from urban agriculture as they save money which would be previously allocated for food. Low-income household spend majority of their income purchasing food (Ngome & Foeken, 2012). The main aim of social grants is poverty alleviation and to ensure food security. Social grants namely Child Support Grants (CSG), Disability Grants (DG), and Old Age Pensions (OAP) ensure that households have a stable income coming in every month (Grobler, 2013).

### **3.3.4 Human capital**

Development is directly influenced by the availability of human capital. Financial capitals can be limited by lack of education and ill health by decreasing the opportunity to earn a salary (Stewart *et al.*, 2013). It is experience that increases human capital. Human capital require sustainable development and could be done so through extension services, training and internships (Poulsen *et al.*, 2015). Taking peri-urban agriculture into consideration, extension services are a great assistance to farmers in their farming initiatives. Urban agricultural experts are available to help farmers use the small land they have around their houses and use it as efficiently as possible (Nesengani *et al.*, 2016). Success of urban agriculture lies in adequate investment in human capital. One-home One-garden and community gardens are initiatives that provide farming households with valuable knowledge of agriculture and choosing among crops and livestock that are suitable for that particular area (Nesengani *et al.*, 2016). Therefore, human capitals are an important component for the sustainability of urban agriculture and they determine financial capital.

### **3.3.5 Social capital**

Social capital is characterized by social organisation. Social cohesion increases social capital. Low-income households rely on social networks to reduce their vulnerability and mitigate risks. Individuals that have greater social capital have the ability to increase access to other types of capitals and increased competencies (Jansen van Vuuren, 2016). Social capital is important for communities to thrive for development. It is important that communities feel completely satisfied about their lives. A study conducted by Gallaher *et al.* (2013) in Kenya found that communities that relied on each other developed a deeper sense of trust and were happier overall. This was evident when farming households would share their produce and assist other farmers in turn increasing social interaction (Gallaher *et al.*, 2013). Farming households reported positive social interaction and higher levels of household food security (Gallaher *et al.*, 2013). Sustainable development emphasises community development whereby it's the community that formulates their own goals instead of external organisations who do not know anything about them. Unfortunately, social capital is threatened by social inequalities that undermine the sustainable livelihood. It was Farrington *et al.* (2002) who recognised the inadequacy of the sustainable livelihood framework to address social capital and hence introduced a sixth capital being political capital.

## **3.4 The sustainable livelihoods framework in the context of urban agriculture**

The sustainable livelihoods framework requires for all the capitals to be available so that community development occurs. Institutional context refers to private, public, and non-governmental organisations that assist communities with the practice of urban agriculture. They are able to guide farmers and expose them to new opportunities that the households themselves could not have accessed. The resilience of livelihoods context is dependent on capability. This is the extent in which households can recuperate from shocks and endure stresses (Giannini *et al.*, 2017). These are discussed in the following subsections in detail.

### **3.4.1 Resilience of livelihoods**

Resilience of livelihoods is determined by the livelihoods ability to create or endure change. Vulnerability has two dimensions namely internal and external forces. Internal forces relate to how individuals' ability to endure influences regarding their livelihood. External forces are those out of the control of an individual (Grochowska, 2017). Diversity of livelihoods make them more resilient. This is why the urban poor decide to have multiple sources of income rather than relying on one source. According to Morse and McNamara (2013) stresses are predictable however individuals still find it difficult to mitigate the risks and an example would be an economic slump. Shocks are however unforeseen and have the power to reduce capitals

completely in one incident. Shocks could be drought, floods or theft. It is imperative that households have suitable risk management strategies in place to mitigate the adverse effects.

### **3.4.2 Institutional structures**

Institutional structures consist of formal or informal organisations. Municipal structures could either limit or assist resilience of livelihoods. Structures or institutions play a vital role in production of households as they have power over access to capital. Their power or influence could either be negative or positive towards farming. It is important for organisations to expose communities to new types of capital (Morse & McNamara, 2013). However, the way in which organisations approach these communities may not be acceptable. The institutions may create dependency by using a top-down approach and are at risk of being rejected by communities as well. As the communities that they are assisting will not relate to the various aid strategies they are being given (Grochowska, 2017). Livelihoods are influenced by institutional structures through service delivery, policy implementation, legislation and trade. It is institutions that ensure that the environment is used sustainably in order to sustain livelihoods. The South African government has created a number initiatives that support and promote urban agriculture as means to ensure household food security (D'Haese *et al.*, 2013).

### **3.5 Authors conceptual framework on peri-urban agriculture as an instrument to improve household food security**

Based on the sustainable livelihoods approach already discussed as well as the reviewed literature, the author adapted the following conceptual framework from Kutiwa *et al.* (2010) on the practice of urban and peri-urban agriculture as an instrument to alleviate poverty and improve household food security (Figure 3.2). It is through practicing UPA that households are able to provide nutritious food on a daily basis. The inventiveness of UPA is to aid in the availability and access of food as well as to try decrease a household's expenditure on food items. This all results in households becoming more food secure. Urban and peri-urban agriculture is a strategy formulated to terminate the vicious cycle of poverty and food insecurity in an environment that is extremely cash intensive (Kutiwa *et al.*, 2010). Farming households are able to produce food for their own consumption and save money. Money that is saved by the households enables them to purchase a diverse diet of foods.

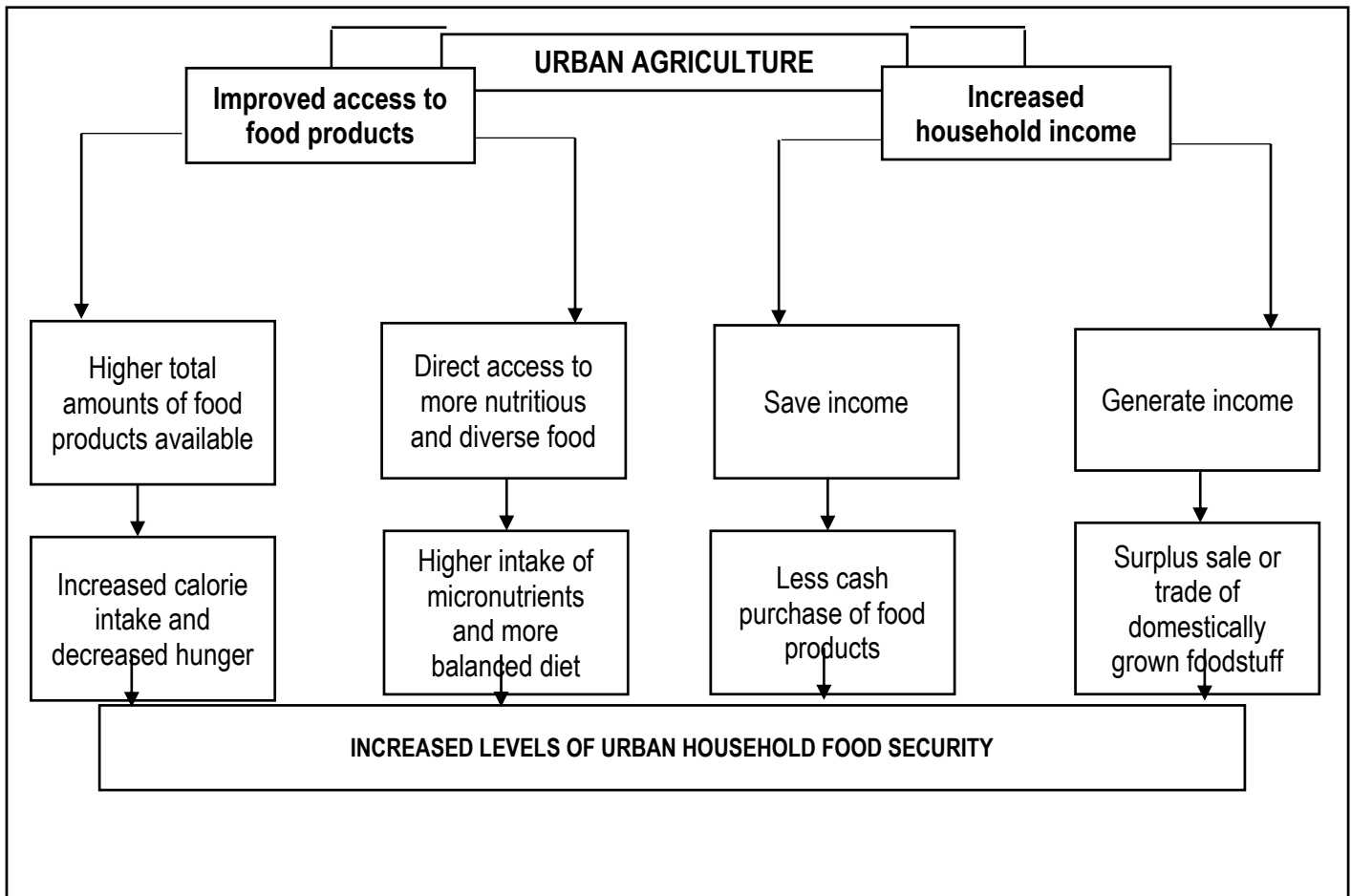


Figure 3.2: Urban agriculture as an instrument to acquire for household food security

Source: adapted from Kutiwa *et al.* (2010)

### 3.6 Chapter summary

The chapter presented and discussed the theoretical framework in which this study is underpinned. A better understanding on how urban and peri-urban agriculture can contribute to household food security is explained through the use of the sustainable livelihoods framework. The chapter demonstrated how the framework is suitable for the study in the context of achieving household food security through urban and peri-urban agriculture as a livelihood strategy. In the aim of acquiring a better understanding of the practice of peri-urban agriculture, the sustainable livelihood approach provides more insight on the benefits of urban and peri-urban agriculture as an instrument to achieve household food security. Based on the prior discussion, it is evident that the sustainable livelihoods framework has influence over the feasibility of urban agriculture. Five capitals of the sustainable livelihoods framework are discussed and linked to the practice of urban agriculture in ensuring household food security. The next chapter presents and describes the research methodology applied to the study.

## **4 CHAPTER FOUR – RESEARCH METHODOLOGY**

### **4.1 INTRODUCTION**

This chapter provides a detailed description of the research methodology that was employed in conducting the study. In brief, the study is an assessment of the contribution of peri-urban agriculture on household food security in Tongaat in eThekweni Municipality. The chapter starts by describing the study area and expands more on the geophysical aspects and socio-economic characteristics of Tongaat (the study area). The chapter also provides detailed explanations on the research design which includes the conceptual framework, study population and sample size. The research instrument used in this study is also described in detail. The chapter then subsequently provides an overview of the data collection process, explaining how data were collected, captured and analysed. The variables that were considered in the analytical framework are supported by extensive scholarly literature. The latter portion of the chapter is dedicated to explaining the ethical considerations that were upheld during the duration of the study. The limitations of the study are also described herein this chapter.

### **4.2 Selection and description of the study area**

The study was carried out in Tongaat which is a peri-urban area which falls within the eThekweni Municipality. Tongaat area has been purposively selected because of its productive and potential peri-urban farming. Tongaat is located about 37km northbound of Durban (South Africa.Com, 2017). The name Tongaat is synonymous with sugar because this is where Tongaat Hullet Group (an agriculture and agro-processing business of sugarcane and maize) has its headquarters and their largest mill. Tongaat is one of the largest sugar producing regions in the world. Tongaat is found between the development corridor that exists between Richards Bay and Durban (eThekweni Municipality, 2008). This area is known for its increasing and potential development prospects. Tongaat is accessible to the populations living in the surrounding rural areas as it provides a convenient transportation. Tongaat makes use of both rail and road to connect the rural communities to the Durban city centre (eThekweni Municipality, 2008). Figure 4.1 is a map showing the location of the study area (Tongaat) which lies within the eThekweni Municipality.



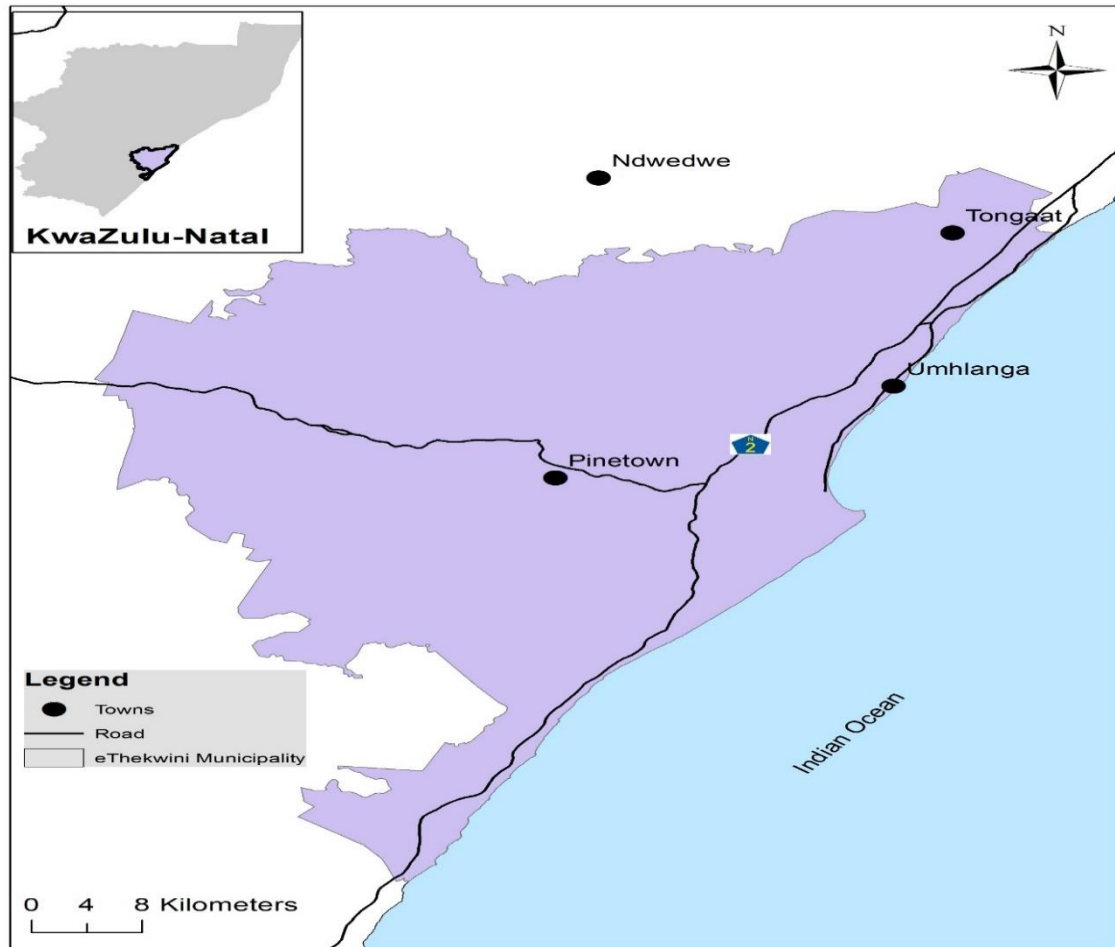


Figure 4.1: Map showing the location of Tongaat  
Source: Unizulu Geography Department (2017 )

#### 4.2.1 Geophysical aspects

Tongaat consists of an area of 11.72 km<sup>2</sup> (SA Explorer, 2014). Geographically Tongaat is surrounded by the following areas: Ballito, Verulam and the Indian Ocean (eThekweni Municipality, 2008). In natural situations, the vegetation type is defined by various types of subtropical coastal forests intermixed with grassland. The average midday temperatures range from 22.2°C in July to 27.5°C in February. The region is the coldest during July when the temperature drops to 9.5°C on average during the night (South African Explorer, 2014). Tongaat normally receives about 772mm of rain per year, with most of the rain occurring midsummer and the lowest rainfall of 12mm in June and highest rainfall of 109mm in January (SA Explorer, 2014). The slope of the area is moderately sloping at approximately 8 - 12 percent, which allows water drainage and the soils are characterized by clay to loam soils (SA Explorer, 2014). Tongaat has 2 rivers that supply the area with water namely the Tongaat and the Wewe rivers.

#### **4.2.2 Socio-economic characteristics**

This section describes the population, educational levels, employment levels and agricultural activities in the study area.

##### **4.2.2.1 Population and population densities**

The population of Tongaat is 42 554 with a population density of 3 600/km<sup>2</sup> (Statistics South Africa, 2011). Indians make up the majority of the race group in Tongaat. This is due to the fact that Indians were introduced to the area of Tongaat in the 1860's to work as labourers in the sugarcane plantations (Govender, 2012). The Indian population accounts for the majority (56.7%) of the population followed by black population with accounts for 41.07 percent (Statistics South Africa, 2011). Coloureds and whites represent 1.79 and 0.44 percent of the total population respectively (Statistics South Africa, 2011). Majority of the Indian households are located in the south while the black population is located in the north (eThekweni Municipality, 2008). Females make 51.7 percent of the total population and males make up 48.3 percent (Statistics South Africa, 2011).

##### **4.2.2.2 Educational levels**

Approximately 27 percent of the population received formal basic education and possess a matriculation certificate (eThekweni Municipality, 2008). Around 17.3 percent of the population was estimated to have received education of up to grade 10 and 11 levels in 2007 (eThekweni Municipality, 2008). The majority (82.7%) of the population is illiterate. The food security status of households may be worsened by the fact that the majority lack formal qualifications and skills that the population need for a livelihood. The population relies heavily on unskilled labour which does not pay a decent wage to successfully sustain households. Therefore, households may be inclined to practice agriculture as a source of livelihood.

##### **4.2.2.3 Employment levels**

The unemployment level of Tongaat is 45.9 percent (eThekweni Municipality, 2008). Due to black people being previously disadvantaged during the apartheid era, the unemployment level is high among the black population. Due to lack of employment, the population may be unable to sustain itself therefore making it vulnerable to food insecurity. Most of the people have not been exposed to opportunities to acquire a formal education and learn a skill. About only 32 percent of the total population contribute to the economy and was involved in some sort of economic activities in the town such as business and employment (eThekweni Municipality, 2008).

#### **4.2.2.4. Economic activities**

Tongaat is an area that heavily relies on industrial activities in order for the town to be able to create employment for the citizens. The area is involved in footwear, textiles, luggage and clothing sectors (eThekweni Municipality, 2008). However, the economy of Tongaat is crippled by the cheap imports such as electronic devices, textiles, transport equipment coming from China (eThekweni Municipality, 2008). Local producers are not able to lower the prices to match their competitors because it is economically unviable for the local producers. The dominant employment of Tongaat include manufacturing, education and training and the automotive and transport sector (eThekweni Municipality, 2008).

#### **4.2.2.5. Agricultural activities**

The name Tongaat is synonymous with sugar production. The area is predominately a sugar farming region. Aside from sugar farming, there are numerous farms that are producing other crops and livestock rearing. The production of sugar is a contributor to the Gross Domestic Product of South Africa (eThekweni Municipality, 2017). The industry provides employment opportunities for the locals of Tongaat.

### **4.3 Research approach and design**

The study adopts a quantitative research approach. Quantitative research is an empirical investigation using scientific methods. It involves the collection of numerical data that can be statistically analysed and conclusions made. Quantitative research is important because deductive reasoning moves from general to specific. A descriptive cross-sectional study was used in this study to collect data on relevant variables required from the sample size. A cross-sectional study makes it possible to capture information at a specific point in time based on required data. This design was suited for this study because it is an inexpensive method and does not require too much time.

#### **4.3.1 Study population and units of analysis**

A study population is a collection of individuals or objects that have a common binding characteristic or trait. The study population of interest composed of peri-urban dwellers (both households involved in any form of peri-urban agriculture and those not) in Tongaat area under the eThekweni Municipality. The actual study respondents from the selected households were the individuals that were involved in preparing the food for the household (*see section 4.4.1*).

### **4.3.2 Sampling procedure and sample size**

Sampling is a statistical method used to obtain representative data or observations from a group. There are two sampling approaches which are probability and non-probability sampling. This study made use of probability sampling. Probability sampling was employed because the targeted sample group was stratified into farming and non-farming households. A sample is “a smaller (representative) collection of units from a population used to determine truths about that population” (Field, 2005). A sample of 208 respondents (that is 109 households practising any form of urban agriculture and 99 households that are not practising any form of urban agriculture) were selected using a stratified random sampling technique. A sample size of 208 respondents was deemed to be large enough to generate a meaningful statistical analysis, yet, at the same time small enough to be manageable. By making use of the stratified random sampling technique, the researcher intended to highlight differences between specific sub-groups whilst ensuring greater precision (Crossman, 2017). One advantage of using the stratified random sampling technique is that it allows for improved representation of particular groups within the population and ensures that certain groups are not over-represented (Crossman, 2017).

### **4.3.3 Data collection**

The researcher made use of questionnaires in order to collect data. Questionnaires were administered to individuals who were involved in preparing the food for the households to answer. As already indicated, the respondents were selected from households practising any form of peri-urban agriculture and those households not practising any form of peri-urban agriculture to allow comparative analysis on the contribution of peri-urban agriculture on household food security. Data were collected in December 2017 to January 2018. A questionnaire that consisted of both close and open ended questions was used as a tool for data collection. A questionnaire is used in the generalization of findings so as to understand the phenomenon in its natural context (Bless *et al.*, 2006). The questionnaire was translated to the local language which is isiZulu. A pilot test was conducted before the actual survey. The test was able to determine the viability of the study before continuing with the major research. The questionnaire was administered to respondents through face-to-face interviews. The benefits of an interviewer-administered questionnaire is that respondents are able to seek clarity from the researcher and reduces confusion for the respondent (Bless *et al.*, 2006).

## **4.4 Data analysis**

After the completion of data collection, raw data was captured and programmed on Microsoft Excel in the form of spreadsheets and later imported to Statistical Package for the Social Science (SPSS) version 25

and STATA 14 software for analysis. For the first objective (i), to describe the status of peri-urban agriculture in Tongaat, descriptive statistics was applied; here, means, frequencies and percentages were used by comparing the similarities and differences in responses given by the respondents. A Household Dietary Diversity Score (HDDS) and Household Food Insecurity Access Scale (HFIAS) were used to estimate the food security status of the households to achieve the second objective (ii). A Likert scale measure was used to achieve objective three (iii), which was to investigate the perceptions of Tongaat peri-urban households towards the practice of peri-urban agriculture. A probit regression model was employed to achieve the fourth objective (iv), which was to determine the factors influencing the practice of peri-urban agriculture by households in Tongaat peri-urban area. Results are presented in the form of tables and figures (graphs).

#### **4.4.1 Household Dietary Diversity Score**

It has proven to be very expensive and time consuming for researchers to find accurate information regarding household food access and individual dietary intake (Swindale & Bilinsky, 2006). This process involves a particular expertise which is not readily available (Rodriguez, 2007). The HDDS is determined by the variety of foods that the household consumes over a particular period in time. The questions asked are directed either to the individual or the household at large. This makes it possible to be able to study food security within a household. Dietary diversity involves the household's access and consumption of food that is diverse from each other and also used to assess whether individuals are acquiring the necessary nutrients in their diets (FAO, 2012). The questionnaire to determine dietary diversity is constructed in a way that makes it comprehensible, convenient, cost and time effective in collecting the necessary data (Grobler, 2013). An HDDS tool adopted from Swindale and Bilinsky (2006) was used to access the household dietary diversity score for this study. The indicators of household food insecurity in this study were: dietary diversity, food frequency and food sources. The independent variables for household dietary diversity were the number of meals in a 24-hour recall period. In this study the information concerning the type of foods consumed among the households in a 24-hour recall was collected to help in determining the household dietary diversity. This information was collected from a person who is responsible for household food preparation. Thereafter, food items were grouped into food groups.

The HDDS is used to determine the socio-economic status of a household and this is done by examining 12 food groups and analysing its score (Swindale & Bilinsky, 2006). Improved household access is identified by an increase in the normal quantity of food that a household consumes (Swindale & Bilinsky, 2006). An improvement in a household's score reveals that there has been a substantial enhancement

in the household's diet and this will be obtained by asking questions on food groups consumed at household level. For each household, the HDDS has to be calculated. Tabulation of HDDS was constructed by using a computer (spreadsheet). The HDDS was then determined by adding the quantity of food groups consumed either by an individual or household over a period of 24-hour recall. According to Rajendran (2012), HDDS does not have a restrictions regarding the quantity of food groups to indicate adequate or inadequate dietary diversity. Consequently, it is therefore recommended that a researcher should use the distribution or average of scores in order to be able to analyse data as accurate as possible. The following represents how the average HDDS was calculated (equation 1):

$$\text{Average HDDS} = \frac{\text{Sum (HDDS)}}{\text{Total number of households}} \quad (1)$$

The dietary diversity score is not concerned about the quantity of food consumed either by the household or the individual but focuses on the quality of the food consumed. Consumption patterns vary due to the changes in seasons. Some foods may be easily accessible, relatively cheaper for a short while and could be consumed in large numbers. Dietary diversity from households differ tremendously between rural and urban populations. Urban and peri-urban populations are more likely to have a much diverse diet due to their greater accessibility to food markets. An increased food diversity indicates that a household is able to improve its accessibility to a range of diverse foods as already indicated. Therefore, households which fall above the target HDDS (average HDDS for this study) level were treated as food secure and those that fall below the target HDDS level were treated as food insecure.

#### **4.4.2 Household Food Insecurity Access Scale**

The Household Food Insecurity Access Scale was used to thoroughly understand the access element of household food security. A collection of 9 universal questions were established (Coates *et al.*, 2007). The HFIAS tool produces a total score ranging from 0 to 27. The mission of this score is to indicate a statistical measurement of food security. The technique is based on understanding cases of food security that produces anticipated replies. Therefore, these replies are analysed and later summarized in a scale. The HFIAS relied on the information and knowledge that respondents provided in a recollection of 4 weeks. The respondents replied with regard to their experiences on food access with answers such as "often, sometimes or rarely". These responses were calculated and developed into a score. According to researchers such as Wehler *et al.* (1992) and Hamilton *et al.* (1997), households experience food insecurity in the following instances:

- Having mixed emotions and apprehension over food.
- Observing that the available food is insufficient for both grown-ups and youngsters.
- Observing that food does not contain the dietary diversity that is required.
- There has been a substantial decrease in the consumption of food.
- Stated concerns of decreased food consumption of both adults and children.
- Thinking of malicious or improper methods to require food for consumption.

Food and Nutrition Technical Assistance (FANTA) formulated a collection of questions that have proved to be successful in investigating food insecure and secure households among many nations and their respective ethnic groups (Coates *et al.*, 2007). The questions were able to fully express a wide range of food insecurity experiences. The questions were structured in such a way to categorize the total population from those who are food secure and to those who are food insecure (Coates *et al.*, 2007).

The household food insecurity access scale component was able to provide necessary knowledge regarding food insecurity. There are indicators that are used to aid in understanding the features and variations of food insecurity. According to Coates *et al.* (2007), indicators of household food security are as follows:

- Access Scale Score
- Access-related Conditions
- Access Prevalence
- Access-related Domains

The information gathered from the questionnaire was encoded on a Microsoft spreadsheet and later exported to SPSS software. This study, in addition to the HDDS analysis, employed the Household Food Insecurity Access Scale Score to supplement the results of the HDDS tool. The HFIAS tool was adopted from Coates *et al.* (2007). The HFIAS score represented the degree in which a household found themselves food secure and/or insecure for the preceding four weeks. A household's HFIAS score was determined by adding the frequency of occurrence codes for each question for each household by adding the codes for each frequency-of-occurrence question. The HFIAS score ranged from 0 to 27 for each household. A household that had a higher than the average score indicated that it is food insecure. Therefore, a household that had a lower than the average score indicated that it is food secure. The following depicts how the HFIAS was calculated (equation 2):

$$\begin{aligned} \text{HFIAS Score} = & \text{Sum frequency of occurrence question response codes (Q1a + Q2a} \\ & + \text{Q3a + Q4a + Q5a + Q6a + Q7a + Q8a + Q9a)} \end{aligned} \quad (2)$$

The average HFIAS was then computed as follows (equation 3):

$$\text{Average HFIAS score} = \frac{\text{Sum of HFIAS in the sample}}{\text{Total number of HFIAS scores in the sample}} \quad (3)$$

#### 4.4.3 Likert scale measure

The Likert scale was developed by Rensis Likert (1932), a sociologist with the aim to successfully quantify psychological approaches in a scientific way (Uebersax, 2006). Likert therefore developed a technique whereby attitudes could be interpreted on a metric scale (Bertram, 2006). This scale is usually used in questionnaires in order to acquire a participant's preferences. This was assessed by the degree of agreement or disagreement with the set of statements in the questionnaire. The scale only measures a single trait and is a non-comparative scaling technique. Participants, therefore, were able to specify their level of agreement with a particular statement in an ordinal scale (Sullivan & Artino, 2013). There are many variations of the likert scale. There is a 5-point, 7-point and 9-point scale. This study employed a 5 point Likert scale. Every option or level on the Likert scale is allocated a numeric number (code). The number usually begins at 1 and increases by 1 for each level or option. The 5-point scale for this study included the following options: strongly disagree (1), disagree (2), neutral (3), agree (4) and strongly agree (5). Each specific question was analysed independently.

As already indicated, a Likert scale measure was used to indicate the perceptions of Tongaat peri-urban households towards the practice of peri-urban agriculture. The questions on the Likert scale measure was subjected to a reliability testing (Cronbach alpha) to ensure internal consistency in answering the questions. A Cronbach alpha value of more than 0.70 and close to 1 was deemed to be a reliable score (acceptable) as in most social science studies.

#### 4.4.4 Probit regression model

The probit regression model is a statistical probability model with two possible outcomes in the dependent variable. The probit regression analysis is based on the cumulative normal probability distribution that takes on the values of zero (0) and one (1). A probit regression model was used to determine the factors influencing the practise of peri-urban agriculture by households in the study area. A probit regression



model is a commonly used model in social science research and is used to analyse data where the dependent variable is dichotomous. The purpose of the model is to estimate the probability that an observation with particular characteristics will fall into a specific one of the categories; moreover, classifying observations based on their predicted probabilities is a type of binary classification mode. For this study, the dependent variable of interest was whether a household is practicing any form of peri-urban agriculture and/or otherwise. The outcome of the dependent variable has the probability of belonging to one of the two conditions, which can take on any value between 0 and 1. Households who were practicing any form of peri-urban agriculture were assigned a numeric code of one (1) and zero (0) for households not practicing any form of peri-urban agriculture. Modelling the (conditional) probability of a "successful" outcome, that is,  $Y_i = 1$ , can be expressed as follows (equation 4):

$$P [Y_i = 1 \mid X_{1i}, \dots, X_{ki}; \beta_0, \dots, \beta_k] = \Phi \left( \beta_0 + \sum_{k=1}^K \beta_k X_{ki} \right) \quad (4)$$

Where  $\Phi$  is the cumulative distribution function of the standard normal distribution. This means that, conditional on the regressors, the probability that the outcome variable,  $Y_i = 1$ , is a certain function of a linear combination of the regressors. The linear regression being expressed as follows (equation 5):

$$E (Y_i \mid X_{1i}, \dots, X_{ki}; \beta_0, \dots, \beta_k) = \beta_0 + \sum_{k=1}^K \beta_k X_{ki} \quad (5)$$

Other than in the linear regression model, coefficients rarely have any direct interpretation. In the probit regression model, the relationship between a specific explanatory variable and the outcome of the probability was interpreted by means of the marginal effects. The marginal effect associated with the explanatory variables accounts for the partial change in the probability *ceteris paribus* (holding the other variables constant), that is, the effects of changes in the regressors affecting the features of the outcome variable. The marginal effect associated with continuous explanatory variables  $X_k$  on the probability  $P(Y_i = 1 \mid X)$  can be derived as follows (equation 6):

$$\frac{\partial P [Y_i = 1 \mid X_{1i}, \dots, X_{ki}; \beta_0, \dots, \beta_K]}{\partial X_{ki}} = \beta_k \Phi \left( \beta_0 + \sum_{k=1}^K \beta_k X_{ki} \right) \quad (6)$$

The marginal effect on dummy variables were computed differently from continuous variables. Discrete changes in the predicted probabilities constitute an alternative to the marginal effect when interpreting the influence of a dummy variable. In the case of discrete regressors, the discrete change in a regressor  $X_{ki}$  takes the values and is derived as follows (equation 7):

$$\begin{aligned} \Delta X_{ki} P [Y_i = 1 | X_{1i}, \dots, X_{ki}; \beta_0, \dots, \beta_K] \\ = \beta_k \Phi(\beta_0 + \sum_{l=1}^{k-1} \beta_l X_{li}) + \beta_k + \sum_{l=k+1}^{k-1} \beta_l X_{li} - \beta_k \Phi(\beta_0 + \sum_{l=1}^{k-1} \beta_l X_{li} + \sum_{l=k+1}^{k-1} \beta_l X_{li}) \end{aligned} \quad (7)$$

Scientific literature especially in the field of econometrics, illustrate the probit model as follows (equation 8):

$$\Pr(Y = 1|X) = \beta_0 + \beta_n X + \varepsilon \quad (8)$$

Prior to the probit model regression was run, a bivariate model was employed. In statistics, a bivariate model is used to analyse two variables simultaneously in order to explore whether a practical relationship exists between the variables or not (Gujarati & Porter, 2009). The nature of the relationship in terms of how the independent variables relate to the dependent variable is analysed (Gujarati & Porter, 2009). The type of relationship that exists between the variables (if any), the statistical significance of the relationship between the variables as well as the strength of the relationship is also taken into consideration (Gujarati & Porter, 2009). There are different types of bivariate analysis such as the scatterplot, regression analysis and the correlation coefficients (depending on whether the variables are numerical, categorical or both) in order to identify the significant variables. The researcher made use of the correlation coefficients. The correlation coefficients indicate whether the variables in question are related. A zero (0) coefficient suggest that the variables are not correlated (that is not related in some way), while a coefficient of one (1) (either positive (+) or negative (-)) means that the variables are perfectly correlated (that is they are perfectly in sync with each other). Only those variables that were significant from the bivariate analysis were then incorporated into the final probit model.

#### **4.4.4.1 Independent explanatory variables and their expected outcome**

The selection of the independent variables that were likely to influence a household to practice any form of peri-urban agriculture relies on literature studies. Table 4.1 is a brief description of the independent variables and their hypothesised effect on the dependent variable.

Table 4.1: Explanatory variables, description and the expected outcome

Independent/explanatory variable	Variable description	Measurement type	Expected outcome (+/-)
Age	Actual age of the respondent (in this study, the person that prepares food for the household (years))	Continuous	+/-
Gender	Gender of the respondent (1 = Male; 0 = Female)	Dummy	+/-
Family size	Household family size (actual number of household members)	Continuous	+
Educational level	Actual number of schooling years	Continuous	-
Employment status	Employment status of respondent (1 = employed, 0 = unemployed)	Dummy	+/-
Access to farming inputs/implements	Whether household has access to farming inputs/implements (1 = Yes; 0 = No)	Dummy	+
Receiving social grants	Whether the household is receiving government social grants (1 = Yes; 0 = No)	Dummy	-
Land sizes	Arable land available for practicing UPA (Ha)	Categorical	+
Land tenure	The ownership of land by the household (1 = own land; 2 = renting land; 3 = share cropping; 4 = unspecified).	Categorical	+
Perceptions on societal recognition towards the practice of peri-urban agriculture	<i>"Most of the people who are important to me, believe that peri-urban agriculture is essential."</i> (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree).	Categorical	+
	<i>"The society will see me as a better person, if I practice peri-urban agriculture."</i> (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree).	Categorical	+
	<i>"People who are important to me think that I should get involved in peri-urban agriculture."</i> (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree).	Categorical	+
Attitude towards the practice of peri-urban agriculture	<i>"I believe in practicing peri-urban agriculture as a hobby."</i> (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree).	Categorical	+
	<i>"To me, peri-urban agriculture is easy to practice."</i> (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree).	Categorical	+

Perceptions on social values towards the practice of peri-urban agriculture	"Peri-urban agriculture is an effective way to access food." (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree).	Categorical	+
	"Peri-urban agriculture contributes to urban poverty reduction." (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree).	Categorical	+
Perceptions on the economic impact towards the practice of peri-urban agriculture	"Peri-urban agriculture can reduce cost of importing fresh food." (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree).	Categorical	+
	"Peri-urban agriculture can build an innovation driven economy." (1= strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree).	Categorical	+
Perceptions on the health impact towards the practice of peri-urban agriculture	"Home-based product consumption is healthier." (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree).	Categorical	+
	"Peri-urban agriculture can enhance healthy eating." (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree).	Categorical	+
Perceptions on knowledge impact towards the practice of peri-urban agriculture	"Though I have not practiced peri-urban agriculture, I am an expert regarding this activity." (1= strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree).	Categorical	+
	"I think I am comparatively well-informed about urban agriculture." (1 = strongly disagree; 2= disagree; 3= neutral; 4= agree; 5= strongly agree).	Categorical	+

(+/-) indicates positive or negative relation with the dependent variable

Source: Author (2017)

#### 4.4.4.1.1 Age of the respondent

Age was measured as a continuous variable and represented the actual age of the farmer (to the last birthday) in years when the survey was conducted. The variable of age was used to ascertain the age distribution of respondents. A person's age has a huge influence on their attitude, perception, experience and skills (Asif *et al.*, 2005; Agbadi *et al.*, 2017). It is hypothesised that age will positively influence the practice of peri-urban agriculture by the households.

#### 4.4.4.1.2 Gender of respondent

Gender of the respondents was measured as a dummy variable whereby females were assigned a numerical value (code) of one (1) male and females zero (0). Gender is a vital in determining to some extent the type and nature of work to be carried out at a given time and in a given society. According to

FAO. (2012) women are main practitioners of agriculture. It was therefore, hypothesised that being female would positively be correlated with the practise of peri-urban agriculture.

#### **4.4.4.1.3 Family size**

Family size was measured as a continuous variable and represented the actual number of the family members within the household. It was hypothesised that a large family size would have a positive influence towards the practice of peri-urban agriculture. Large households are able to farm on bigger land because they can rely extensively on family labour availability. The family size was determined by family members that lived permanently in the family residence.

#### **4.4.4.1.4 Educational level of the respondents**

The variable was measured as a continuous variable and represented the actual number of schooling years by the respondents starting from primary, high school and right through to university (higher education institutions). It was hypothesised that a higher level of education would have a negative influence on the practice of peri-urban agriculture. A high level of education may have a negative influence on the practice of agriculture as households may seek employment in the formal sector and not have any time to practice agriculture. It would be those households that have a low level of education that would resort to practicing peri-urban agriculture as a livelihood strategy.

#### **4.4.4.1.5 Employment status**

The employment status was measured as a categorical variable whereby being employed was assigned a numeric value of one (1) and being unemployed assigned a code of zero (0). It was hypothesised that the employment status of a respondent would have a negative influence on the practice of peri-urban agriculture. Household heads would find it difficult to manage their farming activities and also go to work at the same time as their time for getting involved in farming activities would be extremely limited. Therefore, it would be those household heads that are unemployed that would practice peri-urban agriculture because it could be their only means of income generation.

#### **4.4.4.1.6 Access to farming inputs/implements**

The variable "access to farming inputs/implements" was measured as a dummy variable. Respondents were asked to indicate whether they had access to farming inputs/implements and coded with one (1) if respondent answered in the affirmative (yes) and with zero (0) if answered in the negative (no). It was hypothesised that households that had access to farming inputs/implements would be more inclined to practice any form of urban agriculture than those households without access.

#### **4.4.4.1.7 Receiving social grants**

The variable “receiving social grants” was measured as a dummy variable and coded with one (1) if respondent answered in the affirmative (yes) and zero (0) if negative (no). These social grants included child, disability and pension grants. Households who have money at their disposal (through receiving social grants) may be discouraged to grow their own food but rather buy food. Therefore, it was hypothesised that this variable would have a negative influence on the practice of peri-urban agriculture by households.

#### **4.4.4.1.8 Land sizes**

The variable “land size” was measured as a continuous variable and represented the actual size of arable land in hectares. The practice of peri-urban agriculture is largely restricted by the availability of land. It was hypothesised that an increase in the size of arable land would have a positive influence on the practice of peri-urban agriculture by households.

#### **4.4.4.1.9 Land tenure**

The variable “land tenure” was measured as a categorical variable. If the household owned the land (own land), this construct was assigned a numeric value of one (1), if the household rented the land; coded with two (2), if the household practised share cropping; coded with three (3), and lastly if ownership of the land was unspecified; coded with four (4). The type of ownership of land in which the households have is important for the survival of their farming businesses. It was hypothesised that ownership of land would be positively correlated with the practice of peri-urban agriculture by households.

#### **4.4.4.1.10 Perceptions towards the practice of peri-urban agriculture**

The various ways in which households perceive peri-urban agriculture may also influence its practice. The perceptions were measured on a five (5) point Likert scale (see section 4.4.3). Perceptions included in the analysis included societal recognition, attitude, social values, economic impact, health impact and knowledge impact.

#### **Societal recognition**

The variable “societal recognition” was one of the households’ perceptions investigated for its influence towards the practice of peri-urban agriculture. The households were asked to rank their level of agreement or disagreement to the three statements regarding the social recognition of practicing peri-urban agriculture. These statements included “*Most of the people who are important to me, believe that peri-urban agriculture is essential*”; “*The society will see me as a better person if I practice peri-urban*

agriculture” and “People who are important to me think that I should get involved in peri-urban agriculture.” The perceptions (level of agreement/disagreement) towards the statement were coded with 1 if respondent strongly disagreed; 2 if disagreed; 3 if neutral (indifferent), 4 if agreed and lastly 5 if strongly agreed. Households are most likely to practice peri-urban agriculture if the society they live in finds it acceptable. Guo (2012), revealed that urban and peri-urban agriculture promotes the social inclusion of ostracized groups namely children, women and the disabled. It was therefore hypothesised that a positive societal recognition perception towards peri-urban agriculture would be positively correlated with its practice.

### **Attitude**

The variable “attitude” was one of the household perception investigated for its influence towards the practice of peri-urban agriculture. The households were asked to rank their level of agreement or disagreement to the two statements regarding the social recognition of practicing peri-urban agriculture. These statements included “*I believe in practicing peri-urban agriculture as a hobby*” and “*To me, peri-urban agriculture is easy to practice.*” The perceptions (level of agreement/disagreement) towards the statement were coded with 1 if respondent strongly disagreed; 2 if disagreed; 3 if neutral (indifferent), 4 if agreed and lastly 5 if strongly agreed. It is the households’ attitude that determines whether they practice urban agriculture or not. Since an individual’s attitude is engrained by one’s own beliefs and has a great influence on an individual’s decision making process. It was therefore hypothesised that a positive attitude towards peri-urban agriculture would be positively correlated with its practice.

### **Social Values**

The variable “social value” was one of the household perception investigated for its influence towards the practice of peri-urban agriculture. The households were asked to rank their level of agreement or disagreement to the two statements regarding the social values of practicing peri-urban agriculture. These statements included “*Peri-urban agriculture is an effective way to access food*” and “*Peri-urban agriculture contributes to urban poverty reduction.*” The perceptions (level of agreement/disagreement) towards the statement were coded with 1 if respondent strongly disagreed; 2 if disagreed; 3 if neutral (indifferent), 4 if agreed and lastly 5 if strongly agreed. These are related to social values where households believe that urban agriculture is an effective way of accessing food and is easy to practice. Battersby and Marshak (2013) revealed that communities that relied on one another developed a deeper sense of trust and were happier overall and this was evident when farming households would share their produce and assist other farmers in turn increasing social interaction. It was therefore hypothesised that

a positive social value perception towards peri-urban agriculture would be positively correlated with its practice.

### ***Economic impact***

The variable “economic impact” was one of the household perception investigated for its influence towards the practice of peri-urban agriculture. The households were asked to rank their level of agreement or disagreement to the two statements regarding the economic impact of practicing peri-urban agriculture. These statements included “*Peri-urban agriculture can reduce cost of importing fresh food*” and “*Peri-urban agriculture can build an innovation driven economy.*” The perceptions (level of agreement/disagreement) towards the statement were coded with 1 if respondent strongly disagreed; 2 if disagreed; 3 if neutral (indifferent), 4 if agreed and lastly 5 if strongly agreed. Households that believe that peri-urban agriculture can reduce importing costs and has the ability to build the economy have a positive perception towards the practice of peri-urban agriculture. These households benefit from urban agriculture as they save money which would be previously allocated for food. Low-income household use most of their income purchasing food (Ngome & Foeken, 2012). It was therefore hypothesised that a positive economic impact perception towards peri-urban agriculture would be positively correlated with its practice.

### ***Health impact***

The variable “health impact” was one of the household perception investigated for its influence towards the practice of peri-urban agriculture. The households were asked to rank their level of agreement or disagreement to the two statements regarding the health impact of practicing peri-urban agriculture. These statements included “*Home-based product consumption is healthier*” and “*Peri-urban agriculture can enhance healthy eating.*” The perceptions (level of agreement/disagreement) towards the statement were coded with 1 if respondent strongly disagreed; 2 if disagreed; 3 if neutral (indifferent), 4 if agreed and lastly 5 if strongly agreed. These are related to health impact of peri-urban agriculture whereby households are concerned with consuming healthier foods and the availability of fresh food would be promoting a healthy diet. Working in an outdoor environment with plants improves an individual’s mental health and mental outlook (Clatworthy *et al.*, 2013). It was therefore hypothesised that a positive health impact perception towards peri-urban agriculture would be positively correlated with its practice.

### ***Knowledge impact***

The variable “knowledge impact” was one of the household perception investigated for its influence towards the practice of peri-urban agriculture. The households were asked to rank their level of



agreement or disagreement to the two statements regarding the social recognition of practicing peri-urban agriculture. These statements included “*Though I have not practiced peri-urban agriculture, I am an expert regarding this activity*” and “*I think I am comparatively well-informed about peri-urban agriculture.*” The perceptions towards the statement were coded with 1 if respondent strongly disagreed; 2 if disagreed; 3 if neutral (indifferent), 4 if agreed and lastly 5 if strongly agreed. The knowledge impact is with regards as to how informed households were about this agricultural practice. It was therefore hypothesised that a positive knowledge impact perception towards peri-urban agriculture would be positively correlated with its practice.

#### **4.5 Limitations of the study**

It should be noted that the study did not focus on a particular peri-urban agricultural activity but rather focused on all peri-urban agricultural activities (any form of peri-urban agriculture). As such, the study’s aim and objectives might have been too broad for an effective research focus. Another challenge was getting a complete sampling frame for peri-urban households practising farming. Therefore, this created a limitation in determining an appropriate sample size that may be deemed to be representative of the study area. This has implications on generalising the findings of the study. Geographically, this study is limited only to the area of Tongaat, under the eThekweni Municipality. Furthermore, the study only estimated the food security status of the peri urban households and did not analyse the determinants or factors influencing the food security status of peri-urban households. This was because the scope of the study would be too big to handle all this in one study.

#### **4.6 Ethical considerations**

The study followed the specified standards in terms of conducting research and safety as stipulated in the University of Zululand’s Policies and Procedures on Research Ethics document. The respect of dignity of participants in any research is critical. Respect of dignity which focused on the right to privacy, self-esteem, personal liberty and basic human rights. Since the study involved the participation of humans, the following ethical obligations such as informed consent, anonymity, respect for opinions and decisions, language and cultural considerations, honesty, carefulness and objectivity were considered.

##### **4.6.1 Informed consent and voluntary participation**

The informed consent is valuable because it is important that the research respondents be allowed to voluntarily agree or refuse to be part of the research (Cahana & Hurst, 2008). Respondents were not coerced into participating in the research, but were asked to voluntarily consent to participate. Voluntary

participation is closely related to informed consent. The research respondents were informed the procedures involved in the research. Respondents were given an informed consent form to sign prior to their participating in the study.

#### **4.6.2 Anonymity and confidentiality**

The researcher considered the principle of anonymity to guarantee the privacy of the respondents in the study (Economic and Social Research Council (ESRC), 2008). The researcher ensured that each and every respondent remained anonymous throughout the study by simple assigning a number or codes to their data. The researcher informed the respondents that they were free to decide what information they wished to share with the researcher. The respondents were assured that the information they provided would remain confidential.

#### **4.6.3 Respecting respondents' opinions and decisions**

The researcher respected the opinions and decisions of respondents by allowing them room to express their sincere opinions freely regarding the study without limiting or judging any of the responses (Cahana & Hurst, 2008). This was particularly an important ethical obligation for this study because it can affect the credibility and validity of the data collected.

#### **4.6.4 Language and cultural considerations**

Researchers should be considerate of the different cultures, languages, beliefs, perceptions and customs of persons who participate in a study (Canagarajah & Stanley, 2015). These elements are particularly important because any conflict or failure to comply with cultural norms and procedures followed in the area may result in the inability of the researcher to obtain relevant information for the study. The researcher used isiZulu language as a medium of communication during the survey, since isiZulu is a native and predominant language in the study area.

#### **4.6.5 Honesty**

A researcher should strive for honesty and not change data and observations (Resnik, 2011). An honest research has integrity and enhances the quality of the study. Therefore, the researcher did by all means avoid fabrication, falsification, or misrepresentation of data. The researcher ensured that the study does not breach the ethical guidelines.

#### **4.6.6 Carefulness**

A researcher should avoid careless errors and negligence and keep good records of research activities (Economic and Social Research Council (ESRC), 2008). Therefore, the researcher strived for diligence during the study. Data were carefully stored safely by keeping completed questionnaires in a locked cabinet and having backup information such as data stored in a computer.

#### **4.6.7 Objectivity**

Objectivity is major goal of research ethics. Objectivity in research assumes that a reality or truth exists outside of any investigation or observation (Ratner, 2002). Therefore, the researcher did discover this truth and so in a manner that didn't influence it in anyway. The researcher strived to avoid bias in the process of data collection, data analysis, data interpretation and other aspects of research where objectivity was required. In this study, the researcher ensured that the research does not contain false or misleading data.

#### **4.6.8 Recognition of authorities**

This was concerned with the respect of local authorities in the study area. The researcher recognized the authority of these institutions on the study area and the study subjects. Authorities in the study area are also the main consumers of the findings of the research and hence it is important to acknowledge their presence before the start of the research. The research recognized the existence of regulatory authorities in the study area and hence sought audience and paid courtesy calls to the authorities such as the local municipality.

#### **4.6.9 Disseminating research results to communities**

Very often, researchers tend to focus dissemination of research findings on policy makers, donors and fellow researchers. Some cited reasons include that it may sometimes be difficult to trace all research participants after the study is completed especially over a long time period, where some respondents might have relocated to other places. Additionally, some results may not be of immediate benefit to research respondents. However, despite the cited challenges, research respondents have a right to know the results after completion of a study. The researcher, therefore, planned to organize the dissemination of the findings of this study through community meetings/forums to provide feedback on the results of the research to the participating community members.

#### **4.7 Chapter summary**

The chapter provided a description and selection of the study area. The chapter also described the study area according to its geophysical and social-economic characteristics. The chapter offered an explanation of how the research was conducted. The research design explained the study population, data collection and data analysis processes. The main data collection tool used in the study was a questionnaire that was administered through a survey method. Data was analysed by means of both descriptive (frequencies and percentages (including Likert scales) and inferential (bivariate and probit regression models) statistics. Variables that were considered for empirical analysis were also described and explained in detailed in this chapter. The chapter concludes by presenting the limitations of the study as well as the ethical considerations undertaken to uphold integrity of this study. The following chapter presents and discusses the descriptive results of the study.

## 5 CHAPTER FIVE – DESCRIPTIVE RESULTS AND DISCUSSION

### 5.1 INTRODUCTION

This chapter presents and discusses the descriptive results of the study. The results are stratified between interviewed farming (practising any form of peri-urban agriculture) and non-farming (not practising any form of peri-urban agriculture) households of Tongaat. The data under analysis were collected from a total of 208 respondents which constituted of 109 farming households and 99 non-farming households. The aim of the chapter is to give a descriptive analysis of the demographic information and households' characteristics such as age, gender, marital status, household size, education levels, employment status, income and income sources. The chapter subsequently describes the peri-urban agriculture activities in the study area and provides a comparative analysis on the household food security status between farming and non-farming households by using the HDDS and HFIAS tools. The HDDS and HFIAS estimates were used as proxies for the food security status of households. Descriptive results with regard to perceptions of households towards the practise of urban agriculture are also presented and discussed herein this chapter.

### 5.2 Demographic characteristics of respondents

The demographic characteristics of the respondents in the study area presented in this section include gender, age, marital status, highest education level, household sizes, employment status and income levels.

#### 5.2.1 Gender of respondents

Gender is an important aspect as it may determine the type of farming activities that can be carried out by a specific gender. Table 5.1 shows the gender distribution of the respondents in Tongaat.

Table 5.1: Gender distribution of respondents in Tongaat

Gender	Farming households		Non-farming households		All households (combined analysis)	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
Male	48	44.0	46	46.55	3	45.2
Female	61	56.0	53	53.5	30	54.8
<b>Total</b>	<b>109</b>	<b>100</b>	<b>99</b>	<b>100</b>	<b>208</b>	<b>100</b>

Source: Survey data (2017/18)

In this study, there were more (about 54%) female respondents (that is 56 and 54 percent for farming and non-farming households respectively) than males who only accounted for (about 45%) (that is 44 and about 47 percent for farming and non-farming households respectively). Although overall results showed that women dominated the total sample, a comparison between the two groups (that is between farming and non-farming households) showed that women constituted a higher proportion among the farming households. Indeed, women tended to be the majority in the farming sector (Ngome & Foeken, 2012). The finding showed that men tended to have a lesser participation in agricultural activities. The results suggest that women dominate peri-urban agriculture in the study area. This gender distribution structure could be attributed to the fact that males migrate into more urban areas (city centres) in search of better opportunities and employment (Hamilton *et al.*, 2014). Men usually leave their female counterparts at home to look after the family. Again, given the existing gender distribution, most African communities rely on women for labour in the agriculture sector (Lubwama, 1999; Grabbe *et al.*, 2013).

Studies of Gallaher *et al.* (2013) and Poulsen *et al.* (2015) revealed that women are the main practitioners of urban and peri-urban agriculture. Females are the dominant gender in the source of employment. Therefore, women sought employment opportunities in production, processing and marketing areas of urban and peri-urban agriculture. The findings above are in harmony with the finding by FAO. (2012) which further showed that women played a vital role in agriculture as opposed to men. As women are predominantly the ones who are in charge of food preparation in homes and women are the main practitioners of urban agriculture. Therefore, households that were headed by women are more likely to practice peri-urban agriculture and to be food secure. Studies conducted by Ngome and Foeken (2012) and Hammer *et al.* (2015) indicated that there was a positive relationship between the gender attribute (being female) and the practice of urban agriculture.

### **5.2.2 Marital status of respondents**

An individual's attitudes and beliefs may depend heavily on their marital status (Girei & Giroh, 2012). The marital status of households in this study was considered to have an influence on the practice of peri-urban agriculture as well as the household's food security status. Table 5.2 shows the marital status of the respondents.

Single respondents accounted for a higher (about 40%) proportion for the farming households and about 35 percent for non-farming households. Overall, those respondents who were single accounted for about 38% of the total sample (both farming and non-farming households). Married respondents constituted about 29 percent of the total sample (that is about 31 percent and 26 percent of the farming and non-

farming households respectively). The minority (about 14%) of the total sample was made up of the household heads that were divorced (that is about 12 and 17 percent of the farming and non-farming households respectively). These results generally showed that married respondents were fewer than single respondents.

Table 5.2: Marital status of respondents in Tongaat

Marital Status	Farming households		Non-farming households		All households (combined analysis)	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
Single	43	39.5	35	35.4	78	37.6
Married	34	31.2	26	26.3	60	28.8
Divorced	13	11.9	17	17.2	30	14.4
Widowed	19	17.4	21	21.2	40	19.2
<b>Total</b>	<b>109</b>	<b>100.0</b>	<b>99</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Source: Survey data (2017/18)

According to Luscombe (2014) individuals may be single or divorced because they are financially unstable to settle down. Marriage is no longer viewed as an achievement for South African women especially with the country becoming more economically active. According to Erasmus (2016), in South Africa for the year 2014, divorces increased by 3.2 percent and a greater proportion (about 37%) of the divorcees were black African woman. As women are becoming more empowered and playing a more significant role in their community they are less likely to settle for marriage but rather head their families as single parents. Finances and child rearing barriers are the most cited causes of conflicts between couples. However, a closer comparison between the farming and non-farming households show that a greater proportion of the married couples were among the farming households. According to a study conducted by Mwendera and Chilonda (2013), revealed that farming households that are married rely heavily on their immediate family for labour in their agricultural practices. Therefore the marital status may have a positive influence on the practice of peri-urban agriculture as evident in a study by Gallaher *et al.* (2013) in Kenya where the respondents were more successful in their farming operations if they were married. These households are at a better position to make better decisions than the other categories.

### 5.2.3 Age distribution of respondents

Age can influence a household's food security status and their ability to grow and harvest their own food (Agbadi *et al.*, 2017). Table 5.3 shows the age distribution of the respondents in Tongaat. The minimum age for the total sample was 21 years of age (that is 21 and 22 years of age for the farming and non-

farming households respectively). The maximum age for the total sample was 73 years of age (that is 73 and 70 years of age for the farming and non-farming households respectively). On average, respondents were about 46 years old (about 45 and about 47 years old for the farming and non-farming households respectively). The results showed that the average age of the non-farming households was slightly older than that of farming households. A study conducted by Arene and Anyaeji (2010) revealed that households that are headed by older members are more likely to be food secure than those headed by younger members. The results of this study suggested that the respondents were at their economically active years and had the ability to partake in agricultural activities and as well earn an income. The ability for a household head is imperative as it will determine the dynamics of the household situation. An age of above 65 years is regarded as being too old. This is because people at that age do not have the physical capability to perform agricultural activities with efficiency like their younger counterparts. Although the results suggested that the respondents were within the economically active group, younger household members tend to move away from their homes and go to city centres in search of more lucrative employment opportunities other than agriculture. This becomes a problem for agricultural productivity. The study conducted by Vos (2014), revealed that as farmers grow older in age their productivity becomes less. Therefore, an increase in a farmer's age has negative influence on the practice of peri-urban agriculture thereby making them vulnerable to household food insecurity.

*Table 5.3: Age distribution of respondents in Tongaat*

<b>Age</b>	<b>Farming households</b>	<b>Non-farming Households</b>	<b>All households (combined analysis)</b>
Mean	44.68	46.84	45.71
Std. Deviation	16.053	14.981	15.552
Minimum	21	22	21
Maximum	73	70	73
Mode	28	28	28
<b>Number of observations</b>	<b>109</b>	<b>99</b>	<b>208</b>

Source: Survey data (2017/18)

#### **5.2.4 Educational level of respondents**

The educational level of respondents was measured by the number of formal schooling years. A household's standard of living is largely affected by the exposure of a household head to education (Girei & Giroh, 2012). This is because education is essential for the development of skills. Table 5.4 represents that educational level of the respondents in Tongaat.



Overall, the results show that the maximum number schooling years was 19 years. Farming households however appear to have a greater (19 years) maximum number of schooling years than their counterparts (non-farming households – 15 years). The minimum number of schooling years for all households was 2 years with a mode 12 years for all households. The overall average number of schooling years was 9.165 years for all households; 9.17 years for farming households and 9.16 for non-farming households. Generally, these results would suggest that the respondents (who may have happened to be household heads in this instance) for both groups had some form of formal education. The average number of schooling years between farming and non-farming households suggests that the education levels between the two groups was more or less the same. The results of the study imply that households of Tongaat have a great potential in developing their peri-urban agriculture as asserted by Dlova *et al.* (2004) that farming households with higher levels of education were more successful in their practices. The results of the study also suggest that the households of Tongaat may be able to seek other forms of livelihood/employment and also practice peri-urban agriculture as a supplementary source of income. Individuals that have formal education are able to further their studies therefore increase their chances of securing a livelihood. This therefore could contribute in improving the household food security status.

Table 5.4: Educational level of respondents in Tongaat

<b>Education (number of schooling years)</b>	<b>Farming households</b>	<b>Non-farming households</b>	<b>All households (combined analysis)</b>
Mean	9.17	9.16	9.165
Std. Deviation	3.441	3.288	3.372
Minimum	2	2	2
Maximum	19	15	19
Mode	12	12	12
<b>Number of observations</b>	<b>109</b>	<b>99</b>	<b>208</b>

Source: Survey data (2017/18)

#### **5.2.4.1 Highest level of education for other household members apart from the respondents**

A study conducted by Grote (2014) revealed that the education status of a household can influence the household food security status as a household with educated members are more likely to diversify their livelihoods and thus be food secure than uneducated households. A household with educated members is exposed to a number of opportunities and equips them with necessary skills to become successful. Table 5.5 shows the educational level of other household members apart from the respondents in Tongaat. Overall, the results show that the maximum number schooling years was 18 years for all households. The minimum number of schooling years for all households was 7 years with a mode 12 years. The overall average number of schooling years was 12.16 years for all households; 12.02 years

for farming households and 12.32 years for non-farming households. Generally, these results again suggest that the other household members apart from the respondents were fairly educated for both farming and non-farming households.

Table 5.5: Highest educational level of other household members apart from the respondents in Tongaat

Education (number of schooling years)	Farming households	Non-farming households	All households (combined analysis)
Mean	12.02	12.32	12.16
Std. Deviation	2.966	2.602	2.796
Minimum	7	7	7
Maximum	18	18	18
Mode	12	12	12
<b>Number of observations</b>	<b>109</b>	<b>99</b>	<b>208</b>

Source: Survey data (2017/18)

A study conducted by Bhawra *et al.* (2017) revealed that households with higher levels of education among its members are able to expand their farming business and become successful. Household members are able to contribute to the household both in terms of income (in the form of remittances) and in practising agricultural activities. Therefore, educated household member have the ability to improve the household's food security status.

### 5.2.5 Household size

The size of a household has an influence on the food security status of a household (Frayne *et al.*, 2014). A household member in this study was defined as an individual who resided at the household full-time and included school/college students. Table 5.6 shows the household size of the interviewed households in Tongaat.

Table 5.6: Household size of respondents in Tongaat

Household size (number of household members)	Farming households	Non-farming households	All households (combined analysis)
Mean	9.68	8.63	9.16
Std. Deviation	5.366	3.760	4.690
Minimum	2	2	2
Maximum	26	22	26
Mode	7	7	7
<b>Number of observations</b>	<b>109</b>	<b>99</b>	<b>208</b>

Source: Survey data (2017/18)

The minimum household size for the total sample was 2 household members. The maximum household size for the total sample was 26 household members (that is 26 and 22 members for farming and non-farming households respectively). On average, respondents had a household size of about 9 members per household (all households - combined analysis) and about 10 and 9 members per household for the farming and non-farming households respectively. The results showed that all the households had bigger family sizes although farming households had some slightly larger household members than their counterparts. Households with a higher number of household members have a higher demand for food therefore making such households more vulnerable to household food insecurity. On a different note, larger household size could imply family labour availability suggesting that such households could be more inclined to practice peri-urban agriculture to supplement their food supplies. It is therefore more likely that households with more members rely on farm produce to keep members' food secure, therefore constant food availability motivates them to participate in peri-urban agriculture. Altman *et al.* (2009) agreed that an increased household size and the associated demand for more food encourages engagement in subsistence production as a way of feeding a larger group of dependents.

### 5.2.6 Employment status of respondents

Employment is defined as a state of having paid work (Heathsfield, 2017). Employment status was considered important because it is a factor that can influence a household's food security status and the practice of peri-urban agriculture (Mkwambisi *et al.*, 2011). Table 5.7 shows the employment status of respondents in Tongaat.

Table 5.7: Employment status of respondents in Tongaat

Employment status	Farming households		Non-farming households		All households (combined analysis)	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
<b>Unemployed</b>	71	65.1	34	34.3	105	50.5
<b>Employed</b>	38	34.9	65	65.7	103	49.5
<b>Total</b>	<b>109</b>	<b>100.0</b>	<b>99</b>	<b>100.0</b>	<b>208</b>	<b>100.0</b>

Source: Survey data (2017/18)

The results revealed that there is a high rate of unemployment with the majority (51%) of the total sample indicated that they were not employed (that is about 65 and 34 percent for the farming and non-farming households). High unemployment rate can make households to be extremely vulnerable to poverty and food insecurity. These results suggest that the households of Tongaat peri-urban area could benefit from

the practice of peri-urban agriculture as it can be used as a livelihood strategy and as means to generate income for households. Peri-urban agriculture can also be implemented as a poverty alleviation strategy to improve employment levels. This would be beneficial for the households to be able to generate income in order for them to maintain their household food security status. According to Statistics South Africa (2012b), the majority of the South African households are extremely vulnerable to food insecurity because most households have limited opportunity to generate income thus limiting their purchasing power for food. Regardless of this being the case, urban households would rather seek employment in formal sectors and industries rather than agriculture. Agriculture is still viewed as a traditional and rural activity. Peri-urban agriculture has a potential to provide employment opportunities in the production, processing and marketing sector of urban and peri-urban agriculture.

### 5.2.6.1 Main occupation of respondents

The type of occupation of the employed households can have an influence on the household food security status of households and their ability to practice peri-urban agriculture (Agbadi *et al.*, 2017). Table 5.8 shows the main occupation of respondents in Tongaat.

Table 5.8: Main occupation of respondents in Tongaat

Main occupation of respondents	Farming households		Non-farming households		All households (combined analysis)	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
Professionals	3	7.9	23	35.5	26	25.2
Non-professionals	33	92.1	42	64.6	75	74.8

Source: Survey data (2017/18)

The main occupations of the employed respondents were grouped into professionals and non-professionals. Non-professionals included technical jobs that demanded manual labour (artisans, welders, mechanics, plumbers, carpenters, electricians, bricklayers, farmers, construction worker, factory worker and landscaping) accounted for the majority (about 92.1%) proportion for the farming households and about 65 percent for non-farming households. Professionals (which included nurses, teachers, law enforcement, bank tellers and social workers) constituted about 25 percent of the total sample (that is about 8 and 36 percent of the farming and non-farming households respectively). These results generally show that professionals were fewer than non-professionals. According to Agbadi *et al.* (2017) the main occupation of household may influence the food security status of a household. This is because income generated from the informal sector is irregular and limited (Ngome & Foeken, 2012). This, therefore,

makes the household vulnerable to household food insecurity when there is no stable income that's entering the household. Therefore, households can be inclined to practice peri-urban agriculture in order to grow their own food. The type of occupation also influences the practice of peri-urban agriculture as some occupation types have strict working hours. Household heads that are working in a job that has laborious long hours may be too tired to perform any agricultural activities and would rather buy their own food because they priorities their formal job. The type of occupation also determines the remuneration that respondents may receive. The formal sector is stable and more regulated than the informal sector and the salaries earned are usually higher than those earned in the informal sector (Tornaghi, 2014). Therefore, individuals that were employed in occupations under the formal sector are more likely to be food secure than those employed in the informal sector.

#### **5.2.6.2 Other adult household members employed in the household apart from the respondents**

The number of adults employed in a household influences the household food security status because of the available disposable income the household may have. The number of adults employed also influences the practice of peri-urban agriculture as it determines how many adults are available to do farming. Table 5.9 shows the other adult household members in the household that were employed apart from the respondents in Tongaat.

The results showed that some households had other adult household members apart from the respondents that were not formally employed (that is a minimum of 0 employed adults apart from the respondent for all households). The maximum number of other employed adult household members apart from the respondents was 6 for all households (that is 6 and 5 employed adults apart from the respondent for the farming and non-farming households respectively). On average, the results show that apart from the respondents, other adult household members that were employed was about 1 adult per household (that is about 2 and 1 employed adult household member for the farming and non-farming households respectively). The results show that the average number of employed adults apart from the respondents for the farming households was slightly higher than that of non-farming households. Overall, the results generally suggest that households had a lesser number of other adult household members apart from the respondents that were formally employed. With a higher number of unemployed adults in a household, there is a great demand for food therefore household members can take advantage and practice peri-urban agriculture. Peri-urban agriculture can provide household with the opportunity to grow their own food therefore making households food secure. Households can grow their own food and sell the surplus to generate an income (Guo, 2012).

Table 5.9: Other adult household members employed in the household apart from the respondents in Tongaat

Other employed adults (number of household member)	Farming households	Non-farming households	All households (combined analysis)
Mean	1.53	1.26	1.40
Std. Deviation	1.411	1.157	1.300
Minimum	0	0	0
Maximum	6	5	6
Mode	0	0	0
<b>Number of observations</b>	<b>109</b>	<b>99</b>	<b>208</b>

Source: Survey data (2017/18)

### 5.2.6.3 Sources of income

Table 5.10 shows the sources of income for the interviewed households in Tongaat. The majority (about 86%) of the total sample indicated that they were recipients of the government social grant (that is about 85 and 86 percent for the farming and non-farming households respectively). Paid jobs were reported as a source of income by about 38 percent of the total sample (that is about 38 and 40 percent of the farming and non-farming households respectively). The minority (about 32%) of the total sample was made up of the respondents that were self-employed (that is about 26 and 38 percent of the farming and non-farming households respectively). These respondents were self-employed in child care workers, hairdressing, housekeeping and carpenters

Table 5.10: Sources of income by respondents in Tongaat

Sources of income	Farming households		Non-farming households		All households (combined analysis)	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
Paid job	41	37.6	39	39.4	80	38.4
Social grant	93	85.3	85	85.6	178	85.6
Self-employment	28	25.7	38	38.4	66	31.7

Source: Survey data (2017/18)

Many households that have low income levels usually have limited access to resources which include private land, education and finances. Due to the fact that some resources cannot be substituted, households then need to have multiple business activities so that they are able to substitute their need for money. The households do so by acquiring money from temporary labour, being self-employed and government social grants. Again, urban agriculture is one of the substitute methods (Golnaz *et al.*, 2016).

Practicing peri-urban agriculture benefits households in a sense that they are able to save money from producing their own food and households are able to save the money they receive for essentials. Households can also sell surplus produce to generate extra income. The households are more likely to be food secure if they have more than one source of income.

### 5.2.7 Types of government grants received by households in Tongaat

Table 5.11 shows the proportions of households receiving various types of government social grants in the study area which include Child Support Grants (CSG), Disability Grants (DG), and Old Age Pensions (OAP).

Table 5.11: Types of government social grants received by households in Tongaat

Type of social grant received by households	Farming households		Non-farming households		All households (combined analysis)	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
Child only	55	50.5	44	44.4	99	47.6
Disability only	3	2.8	6	6.1	9	4.3
Pension only	17	15.6	15	15.2	32	15.4
Child and Pension	18	16.5	20	20.2	38	18.3
No grant received	16	14.7	14	14.1	30	14.4
<b>Total</b>	<b>109</b>	<b>100.0</b>	<b>99</b>	<b>100.0</b>	<b>208</b>	<b>100.0</b>

Source: Survey data (2017/18)

Households that received the child support grant accounted for a higher (about 51%) proportion for the farming households and about 44 percent for non-farming households. Overall, those households that were receiving pension accounted for about 15 percent of the total sample (both farming and non-farming households). The minority (about 4%) of the total sample was made up of the household that were receiving disability grant (that is about 3 and 6 percent of the farming and non-farming households respectively). Households that did not receive any form of government social grant constituted about 14 percent of the total sample (that is about 15 and 14 percent of the farming and non-farming households respectively). Overall the results show that a significant proportion of the interviewed households relied on some sort of government social grant.

The finding of this study aligned with those of the report conducted by Statistics South Africa (2002) which stated that about 19% of households rely on social grants as their primary source of income. The finding also correlates with those of Rogerson (2003) which reported that a majority of urban agriculture practitioners are dependent on social welfare. Social grants in South Africa were introduced with the aim to alleviate poverty and increase household food security (Aliber, 2009). Social grants therefore are important for the households of Tongaat as they provide money for destitute households to buy food because these households may not have savings and they spend whatever amount they receive. It is ostracized group namely the children, women and the elderly in black African communities that are vulnerable to poverty and food security. Historically black Africans were limited to low income jobs and it affected those mostly who were landless and unemployed. Accessibility to household income increases the disposable income which is available for a household to improve the quality of life that they lead. However, as important as social grant maybe towards poverty alleviation and improving household food security, some scholars for example De Cock *et al.* (2013) and Grobler (2013) are of the view the government social grants in South Africa have had a detrimental effect. Households received social grants become too dependent on them in such a way that they have become discouraged to produce their own food and ultimately resulting in rendering such households vulnerable to food insecurities. Based on the results, it is evident that there are more children in this community based on the child grant. There is a need to ensure or improve food security so that malnutrition is avoided in children.

### **5.2.8 Average household income**

The income that is available to a household determines what they can afford and the quantity in which they can afford to buy (Akter & Basher, 2014). A higher income level is advantageous to households as they can afford more and have a greater variety to choose from. Table 4.6 shows the average household income for the interviewed households in Tongaat computed from the total income received by households from various sources.

About 46 percent of the all the households (for both farming and non-farming households (combined analysis) indicated an average monthly income of greater than ZAR2 500 (whereby the farming and non-farming households accounted for 45 and about 48 percent respectively for this income level). The minority (3.8%) of the interviewed households (combined analysis) received an average income of between ZAR500 - ZAR999 per month (that is 3.7 and 4 percent for the farming and non-farming households respectively). The minimum stipulated wage in South Africa is ZAR3 500 for 40 hours and ZAR3 900 for 45 hours (Von Finel, 2017) . The results from this study indicated that the majority (about



54%) of the interviewed households were earning less than (<ZAR2 500) which is below the South African minimum wage rate.

Table 5.12: Average household income for interviewed households in Tongaat

Average monthly Income (ZAR)	Farming households		Non-farming households		All households (combined analysis)	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
0 – 499	7	6.4	3	3.0	10	4.8
500 – 999	4	3.7	4	4.0	8	3.8
1 000 – 1 499	17	15.6	15	15.2	32	15.4
1 500 – 1 999	17	15.6	11	11.1	28	13.5
2 000 – 2 500	15	13.8	19	19.2	34	16.3
>2 500	49	45.0	47	47.5	96	46.2
<b>Total</b>	<b>109</b>	<b>100.0</b>	<b>99</b>	<b>100.0</b>	<b>208</b>	<b>100.0</b>

Source: Survey data (2017/18)

ZAR – South African Rand

With the majority of interviewed households in Tongaat receiving less than the minimum wage, suggest that households may be vulnerable to household food insecurity as their disposable income may not be enough to earn a decent living. However, through the practice of peri-urban agriculture, households can be able to save some of their disposable income by producing their own food to consume as a family and also generate surplus income by selling produce that they do not consume. Peri-urban agriculture therefore becomes another important source of income generation thereby increasing disposable income which has the potential to improve the food security status of a household. It is common in developing countries to have agriculture as the largest employment sector in the country but agriculture is usually not the single source for households' income (Gallaher *et al.*, 2013).

### 5.3 The status of peri-urban agriculture in Tongaat

This section presents results with regard to the status of peri-urban agriculture in Tongaat. Here the type of crops grown, livestock reared, land sizes, land tenure and challenges faced by households in practicing peri-urban agriculture is discussed.

#### 5.3.1 Type of agricultural practices by households in Tongaat peri-urban

Table 5.13 shows the various types of agricultural practices performed by interviewed households in Tongaat peri-urban areas. A greater proportion (about 46%) of the interviewed farming households in Tongaat were involved with field crops (which included cabbages, spinach, sweet potato and avocado)

followed by livestock rearing which accounted for about 40 percent of the sample, poultry (about 35%), fruits (about 4%) and flowers (about 3%). Livestock (both small and large stock) is often preferred to poultry farming because it generates larger income and is kept also for a social status (see section 5.3.2 for a further discussion on livestock reared by farming households in Tongaat). The name Tongaat is synonymous with sugar production. The area is predominately a sugar farming region. Aside from sugar farming, there are numerous farms that are into crop and livestock production. Field crops were predominantly practiced by the farming households because they provide households with staple food items for their diets.

Table 5.13: Types of agricultural practices by farming households in Tongaat

Type of agricultural practice	Farming households	
	Frequency	Percentage (%)
Field crops	50	45.9
Poultry	38	34.9
Flowers	3	2.9
Fruits	4	3.7
Livestock (both small and large stock)	44	40.4

Source: Survey data (2017/18)

#### 5.3.1.1 Family members providing labour in the garden

Respondents were asked to indicate who in the household worked in the garden in order to assess the labour availability for farming activities by households. Table 5.14 shows the various family members that provided labour in the garden for the farming households in Tongaat.

Respondents who worked in the garden themselves constituted about 19 percent of the farming households. The minority (about 1%) of the total sample was made up of the households where labour for gardening activities was done by their fathers. Households who had their grandmothers alone working in the garden constituted for 20 percent and those respondents that had their mothers work in the garden accounted for 17 percent of the farming households. The results revealed that labour for gardening activities was predominantly supplied by female household members. The finding of this study is in line with the results revealed by Hamilton *et al.* (2014) and Hammer *et al.* (2015) whereby they found that women were the ones who dominated the urban agricultural sector as they are predominately the ones who are household heads and in charge of food preparations in the household.

Table 5.14: Family members providing labour in the garden by farming households in Tongaat

Family members providing labour in the garden	Farming households	
	Frequency	Percentage (%)
Myself (respondent)	21	19.3
Mother	19	17.4
Grandmother	22	20.2
Cousin	2	1.8
Father	1	.9
Myself (respondent) and mother	3	2.8
Myself (respondent) and grandmother	2	1.8
Mother and grandmother	5	4.6

Source: Survey data (2017/18)

The household farming outcome of households is negatively influenced because household heads who are predominantly female especially grandmothers may be too old and not have enough energy to work in the garden. Therefore, it is likely that the productivity of the garden declines because of the main workers age. It is therefore advantageous that household members (both male and female especially the young members who are still active and innovative) assist each other when working in the garden. The collective effort of the household members can be substantial. If more family members especially from both sexes and youngsters are to be involved in practicing peri-urban agriculture, then that may improve the productivity of the household thus be able to produce more food hence improve household food security. Through working with other family members (all sexes and ages), labour is shared within the household making farming in the garden an easier task therefore encouraging the practice of peri-urban agriculture.

#### 5.3.1.1 *The frequency in which households ate food produced from their own gardens in Tongaat*

Respondents were asked to indicate how often they ate food produced from their own gardens. Table 5.15 shows the frequency in which the households ate the food that they have produced from their gardens and this would indicate how often households relied on food from their own gardens.

Farming household that indicated that they ate once a week from the garden accounted for a higher (about 49%) proportion. Households that indicated that they did not eat food from the garden constituted for about 31 percent of the farming households. The minority (about 2%) of the farming households was made up of the households that indicated that they ate food from the garden once a month. About 10 percent of the farming households indicated that they ate food from the garden only once in a fortnight

(in 2 weeks). Households that indicated that they ate food from the garden daily accounted for 9 percent of the farming households. It is evident from the results that the majority of the farming households are able to supplement their diets with food that they have produced from their own gardens thereby in a better position of improving their household food security status.

Table 5.15: The frequency in which households ate food that produced from their own gardens

The frequency in which households ate food that produced from their own gardens	Farming households	
	Frequency	Percentage (%)
None (they do not eat from the garden)	34	31.2
Daily	9	8.3
Once a week	53	48.6
Once in 2 weeks	11	10.1
Once a month	2	1.8
<b>Total</b>	<b>109</b>	<b>100.0</b>

Source: Survey data (2017/18)

This means that households having food from their own gardens on a frequent basis are able to save money which would have been allocated for purchasing food and rather utilise it for other household needs (Magidimisha *et al.*, 2016). The households can also generate a supplementary income through selling the surplus food that they produce from their gardens (Nesengani *et al.*, 2016). Hence households are more likely to practice peri-urban agriculture as a source of livelihood.

### 5.3.2 Type of livestock reared by farming households in Tongaat

Interviewed farming households were asked to indicate the different types of livestock they reared. Table 5.16 shows the different types of livestock they reared by farming households in Tongaat. Chicken rearing came at top as the most kept by about 39 percent of the interviewed farming households in Tongaat. This was to be expected because rearing chicken is cost effective and chicken meat is in high demand and is the most consumed meat type in the world. Cattle rearing was practised by about 16 percent of the farming households and these households indicated that they kept cattle for social status rather than for consumption and selling. The rearing of goats was practised by about 18 percent of the farming households which was the second most popular livestock option among the farming households. This is attributed to the fact that goats are small animals and survive well on low quality grazing land which is the situation in the peri-urban area of Tongaat. Sheep farming accounted for 11 percent of the total livestock reared in Tongaat by interviewed farming households. The rearing of pigs was the least popular

(8.2%) out of the 5 livestock types reared by interviewed farming households in Tongaat. Rearing pigs is very costly and requires more land than is available to Tongaat's farming households.

Table 5.16: Type of livestock reared by farming households in Tongaat

Type of livestock reared	Farming households	
	Frequency	Percentage (%)
Cattle	17	15.7
Chicken	42	38.8
Goats	19	17.6
Pigs	9	8.2
Sheep	12	11

Source: Survey data (2017/18)

Cattle farming is important to the households of Tongaat peri-urban area because it can provide households with draught power, by products (such as manure, meat and milk) and can be an easy source of income for households during times when a household suffers food shortages (Giannini *et al.*, 2017). The households can consume the animals they raise or either sell them to generate an income that they can use to purchase food items for the household during times when the household suffers food shortages. This has the potential to improve the food security status of the households. Households are therefore more likely to practice peri-urban agriculture (livestock rearing) in order to enjoy the benefits derived from it.

### 5.3.3 Reasons for keeping livestock by households in Tongaat

Respondents were asked to indicate reasons why they reared or kept livestock. Table 5.17 shows the reasons as to why the peri-urban households of Tongaat kept livestock.

The results showed that households were motivated by various reasons to keep the different types of livestock. Households that indicated that they kept livestock for household consumption (meat and milk) accounted for about 68 and 33 percent respectively. About 52 percent of the interviewed farming households indicated that they kept livestock for sales. Household that indicated that they kept livestock for a social status as cattle in the Zulu culture is seen as a symbol of wealth and intermediary between people and the spirit world. Cattle ownership constituted about 23 percent of the farming households. About 12 percent of the farming households indicated that they kept livestock (especially cattle) for paying *lobola* (traditional bride price). The minority (about 2%) was made up of the household that indicated that they kept livestock for manure.

Table 5.17: Reason for keeping/rearing livestock by households in Tongaat

Reason for keeping/rearing livestock by households	Farming households	
	Frequency	Percentage (%)
Household consumption (meat)	67.9	67.9
Social status	25	22.9
<i>Lobola</i> (traditional bride price)	13	11.9
Selling	57	52.3
Household consumption (milk)	36	33.1
Skin making/leather	3	3.7
Manure	2	1.8

Source: Survey data (2017/18)

Overall the results showed that the majority of the households kept livestock for household consumption as well as for selling (as an income source). Households that keep livestock for household consumption are likely to improve their household food security status. Households who sell their livestock also generate a supplementary income for the household, increasing disposable income in the household therefore improving household food security in the process. Households are more likely to be motivated to practice peri-urban agriculture when they develop their farming practices into a business that contributes toward the generation of household income.

#### 5.3.4 Land sizes farmed by farming households in Tongaat

Briassoulis (2009) noted that access to land is a key element in ensuring food security. The respondents were asked to indicate the land sizes of their farms (size in ha of the arable land). Table 5.10 presents the results of the land sizes by the interviewed households in Tongaat.

The results showed that a greater proportion (about 38%) of the farming households were farming land between 1 - 3ha. The results suggested that the households of Tongaat were largely restricted by the scarcity of land in which they have available to practice their agricultural activities. Land ranging between 7 - 9ha and >10 ha was each owned by for 11% of the farming households. Disappointingly about 4 percent of the farming households indicated that they did not have any access to arable land that they owned, rather they practiced their farming activities on small vacant spaces outside their homes and backyards. The majority (about 58%) of the non-farming households indicated that they did not have access to any arable land with <1 ha of land available to them. The results suggested that the non-farming households of Tongaat are largely restricted by not having access to arable land available for them to practice their agricultural activities. About 23 percent of the non-farming households had access to land

of 1 - 3 ha. The minority (about 14%) of non-farming households were made up of the households that had access to > 10 ha of land. These non-farming households who had access to land but did not utilise it themselves either left the land fallow and/or leased it to other households.

Table 5.18: Land sizes of interviewed households in Tongaat

Size of land (ha)	Farming Households		Non-farming households		All households (combined analysis)	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
< 1	4	3.7	57	57.6	61	29.3
1 - 3	41	37.6	23	23.2	64	30.8
4 - 6	40	36.7	8	8.1	48	23.1
7 - 9	12	11.0	7	7.1	19	9.1
>10	12	11.0	4	4.0	16	7.7
<b>Total</b>	<b>109</b>	<b>100.0</b>	<b>99</b>	<b>100.0</b>	<b>208</b>	<b>100.0</b>

Source: Survey data (2017/18)

Overall, farming households had more access to land at their disposal as compared to the non-farming households (which could be one contributing factor that non-farming households were not practising any form of urban agriculture). Scarcity of land results in households to farming in small plots of land which contributes to decreased the quantity of food produced by households and rendering them vulnerable to household food insecurity. The scarcity and unavailability of arable land may discourage households to practice peri-urban agriculture. On the other hand, urban agriculture is regarded as an economically inefficient use of property land by governments and municipalities (Arku *et al.*, 2012). This is because governments are usually under the impression that if land is not economically rented and managed then it is inefficiently used. Again, practicing agriculture is still largely linked with the image of rural surroundings than urban surroundings. City planners are against the practice of urban and peri-urban agriculture because of the desired aesthetics they want to preserve.

### 5.3.5 Land tenure rights by households in Tongaat

Land tenure is the relationship that individuals and groups hold with respect to land and land based resources. The respondents were asked to indicate their land tenure rights. Table 5.11 shows the Land tenure rights of the interviewed households in Tongaat. The results showed that a greater proportion (44%) of the interviewed farming households practiced their farming activities on unspecified land. Only a small proportion (19.3%) of the interviewed farming households indicated that they had land ownership

rights (owned) the land they farmed. Those who practised share cropping (that is the households that depended on communal land) accounted for about 21 percent of the interviewed farming households.

Table 5.19: Land tenure rights of the interviewed households in Tongaat

Land tenure rights	Farming households		Non-farming households		All households (combined analysis)	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
Own land	21	19.3	8	8.1	29	13.9
Renting land	13	11.9	1	0.9	14	6.8
Sharing/ communal land	23	21.1	5	5.1	28	13.5
Unspecified land	48	44.0	28	28.3	76	36.5
No land	4	3.7	57	57.6	61	29.3
<b>Total</b>	<b>109</b>	<b>100.0</b>	<b>99</b>	<b>100.0</b>	<b>208</b>	<b>100.0</b>

Source: Survey data (2017/18)

Generally, these results showed that a small proportion of households had full control and land rights of the land for their farming operations. Sharing of land can be very tricky especially to those households who relied on communal land because of traditional authorities. Land tenure in communal areas has become rather controversial because there is an issue of who controls and regulates the land. Land cannot be accessed equally by everyone whereby unmarried women are excluded from being allocated land (Wolch *et al.*, 2014). Permanent cropping may not be allowed and land can be revoked by new leaders in time (Muzah, 2015). A greater proportion of households with unspecified land tenure rights suggest that the households may be practicing farming on land that may be unsuitable for practicing agriculture and may also pose a health risk to the households and the entire community. Again using unspecified land may be illegal. Households that own the land are more likely to be prosperous in their agricultural endeavours (Nzunda *et al.*, 2013). This is due to the fact that the households are able to access funding for expansion (in which land can be used as collateral for accessing bank loans) and preserve the land that they work in. Land that is not established or owned is usually abandoned by the households and can be heavily degraded. Households that have full land ownership rights for their own land are more likely to practice peri-urban agriculture because they have total control over their land. This is likely to improve the food security status of the households in question.



### 5.3.6 Challenges faced by crop and livestock farmers in Tongaat

The interviewed farming households were asked to indicate the major challenges pertaining to their crop and livestock farming activities. Table 5.20 shows the various challenges faced by households in Tongaat in their crop and livestock farming endeavours.

*Table 5.20: Challenges faced by interviewed farming households in their crop and livestock farming activities in Tongaat*

Farming challenge	Crop farming		Livestock farming	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Incidence of diseases <sup>1,2</sup> and pests <sup>1,2</sup>	35	32.1	67	61.5
Incidence of low rainfall (drought) <sup>1,2</sup>	19	17.4	68	62.4
Limited land <sup>1</sup> and poor rangeland management <sup>2</sup>	54	49.5	20	18.3
High temperatures <sup>1,2</sup>	31	28.4	24	22.0
Crop <sup>1</sup> and stock theft <sup>2</sup>	15	13.8	34	31.2
Lack of skills <sup>1,2</sup>	18	16.5	17	15.6
Lack of access to farming inputs/implements <sup>1</sup> and infrastructure <sup>2</sup>	19	18.3	7	6.4
Lack of operating capital <sup>1</sup>	35	32.1	-	-
Inadequate water resources <sup>1</sup>	35	32.1	-	-
High production <sup>1</sup> and feed costs <sup>2</sup>	31	28.4	-	-
Lack of labour <sup>1</sup>	17	15.6	-	-
Low temperatures <sup>1</sup>	3	2.8	-	-
Lack of veterinarian services <sup>2</sup>	-	-	56	51.4
High mortality rate <sup>2</sup>	-	-	53	30.3
Feed shortage <sup>2</sup>	-	-	51	46.8
Poor extension services <sup>2</sup>	-	-	35	32.1
Poor institutional support <sup>2</sup>	-	-	12	11.0
Incidence of predators <sup>2</sup>	-	-	4	3.7

Source: Survey data (2017/18)

Reported by crop farmers<sup>1</sup>; Reported by livestock

farmers<sup>2</sup>

The results revealed that limited land was a major problem in crop farming as indicated about 50% of the interviewed farming households. This is a major constraint that threatens the survival of urban and peri-urban agriculture as land is reserved for other purposes other than agricultural practices by the municipal authorities. Shortage of land negatively affects the production of farming households and therefore threatens the households' vision of ensuring household food security. Inadequate water resources; the incidence of diseases and pests and lack of operating capital were each reported by about 32 percent of the interviewed farming households as the second major challenge in crop farming. Lack of operating capital is detrimental to the survival of the households farming operations and their ability to expand the

enterprise. Coupled with these challenges was also the issue of high costs of production as reported by about 28 percent of the interviewed farming households. High costs of production suggested that households are under immense pressure to sustain their agricultural initiatives. This inhibits household in acquiring resources which would be beneficial to their agricultural production. This in turn will suppress production by households and therefore making them vulnerable to food insecurity.

As for livestock rearing, the results reveal that drought was a major problem as indicated by the majority (about 62%) of the interviewed farming households in Tongaat. Livestock farming is largely affected by drought because livestock largely depends on the availability of water. Stored water during drought periods becomes quickly depleted.

This is problematic to livestock as lack of water increases concentrations of nitrates and prussic acid. The interviewed farming households of Tongaat do not have the necessary drought risk management strategies in place as this would require capital, which they do not have. The incidence of livestock diseases was also a major challenge as indicated by about 62 percent of the interviewed farming households. This results in households losing some of their livestock. This is extremely detrimental to the farming households because they rely heavily on their livestock for household consumption and income generation. Therefore, it is imperative for the farming households to be able to minimise deaths resulting from diseases to improve the condition of their animals at all times. Feed shortage was also a challenge to livestock farming in Tongaat. About 47 percent of the interviewed farming households reported that they often ran out of livestock feed. This is a problem because feed is expensive to buy and also given that these households had limited land (pastures) available for livestock grazing. This in turn limits the number of animals the households choose to keep as they cannot be able to provide feed for large herds. Other livestock farming challenges indicated by the interviewed farming households in Tongaat included poor extension services (about 32%), lack of veterinarian services (about 51%), poor range management (about 18%), lack of infrastructure (about 6%), poor institutional support (11%), stock theft (31.2%), high mortality rate (30.3%), lack of skills (15.6%) and predators being the least (3.7%) of those challenges.

#### **5.4 A comparative analysis of the food security status between farming and non-farming households in Tongaat**

A comparative analysis of the food security status between farming and non-farming households in Tongaat was performed to validate the claims that peri-urban agriculture has the potential to improve household food security status. The food security status of the households was estimated by using the

HDDS and the HFCS tools/measures. The computed HDDS and HFCS estimates were then used as proxies for the food security status of the household/s.

#### 5.4.1 Household Dietary Diversity Score – Proportions of food groups consumed by households in Tongaat

The food consumption calculation was done using 12 food groups. Respondents were asked to indicate the type of foods consumed among the households in a 24-hour recall and their responses are shown in Table 5.21.

Table 5.21: Food groups consumed by households in Tongaat

Food types consumed	Farming Households		Non-farming households		All households (combined analysis)	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
Any bread, mabele, rice, noodles, biscuits, scones, fatcakes, other food made from millet, sorghum, maize, wheat	94	86.2	74	74.7	168	80.8
Any potatoes and sweet potatoes or any foods made from roots and tubers	96	88.1	67	67.7	163	78.4
Any yellow or orange and green vegetables	85	78.0	66	66.7	151	72.6
Any fruits	86	78.9	68	68.7	154	74.0
Any beef, pork, lamb, mutton, chicken or other birds, liver, kidney, hearts and other organ meats	76	69.7	69	69.7	145	69.7
Any eggs	77	70.6	66	66.7	146	70.2
Any fresh fish or dried fish	73	67.0	59	59.6	132	63.4
Any foods made from beans, peas or lentils	72	66.1	61	61.6	136	65.4
Any dairy products: milk, yogurt, cheese,	51	46.8	45	45.5	96	46.2
Any foods contain fat, butter or oil	75	68.8	68	68.7	143	68.8
Any sugar or honey	77	70.6	71	71.7	148	71.2
Condiments: tea, coffee, sauces, cool drink, juice	65	59.6	63	63.6	128	61.5

Source: Survey data (2017/18)

In this study, there were more (about 81%) household respondents who ate cereals (millet, sorghum, maize and wheat) (that is about 86 and 75 percent for farming and non-farming households respectively). Household respondents that ate foods made from roots and tuber constituted about 78 percent of the total sample (that is about 88 and 68 percent of the farming and non-farming households respectively). The least consumed food type was dairy product with a minority (about 46%) of the total sample reported that they consumed dairy products (that is about 47 and 46 percent of the farming and non-farming households respectively). Cereals were the most commonly consumed main ingredient since maize meal that is used for porridge preparation and pap, is the common cultural staple food in the study area. Roots and tubers were the second most important component of the diet for the interviewed households. Starch is part of the total carbohydrates, along with sugars and dietary fibre (Jacob, 2017). The consumption of starch has the potential of raising blood sugar and contributes to the number of calorie consumed. It is important to monitor the consumption of starchy foods because it has the same effects as eating sugary foods. Consuming starchy foods with lack of exercise contributes to raising blood sugar levels and weight gain contributing to diet related problems such as obesity.

#### **5.4.1.1 Household dietary diversity score according to the three classes/ groups consumed by households in Tongaat**

In order to get a deeper insight into the food groups consumed by the household, using the HDDS estimates, households were categorised into three (3) dietary classes/ groups. The 3 dietary classes/ groups were categorised as follows: <3 food groups (low dietary diversity); 4 to 5 food groups (medium dietary diversity) and >6 food groups (high dietary diversity). According to the results presented in Figure 5.21 about 12 percent of all households fell in the lower dietary diversity group (household consuming less than 3 food groups) and these were deemed to be food insecure. Overall, those respondents who were consuming between 4 - 5 food groups (the medium dietary diversity group) and deemed to be moderately food secure accounted for about 40% of the total sample (that is about 34 and 48 percent for farming and non-farming households respectively). However, the non-farming households in the medium dietary diversity group were slightly higher than the farming households. Households that consumed greater than 6 food groups (deemed to be food secure) accounted for a higher (about 54%) proportion for the farming households as compared to the non-farming households in which the households in this group that consumed greater than 6 food groups accounted for about 40 percent. Generally, these results would suggest that the farming households were better off in terms of their dietary diversity than their counterparts, the non-farming households.

Table 5.22: Household dietary diversity score according to the three classes/ groups consumed by households in Tongaat

Food groups consumed	Farming Households		Non-farming households		All households (combined analysis)	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
<3 (low dietary diversity)	13	11.9	12	12.1	25	12.0
4 – 5 (medium dietary diversity)	37	33.9	47	47.5	84	40.4
>6 (high dietary diversity)	59	54.2	40	40.4	99	47.6
<b>Total</b>	<b>109</b>	<b>100.0</b>	<b>99</b>	<b>100.0</b>	<b>208</b>	<b>100.0</b>
<b>Mean HDDS score</b>	<b>5</b>		<b>4.5</b>		<b>4.75</b>	

Source: Survey data (2017/18)

Overall, the average mean HDDS score was about 5 (All households). Results from both groups (the farming and non-farming households) show that close to half (about 48%) of the households were above the mean HDDS level. Using the mean HDDS as a cut-off point where there is no meaningful measure for wealth and household income, households which fall above the mean HDDS level can be regarded as food secure and those that fall below the mean HDDS level can be regarded as food insecure. Therefore, overall, the interviewed households could be regarded as food secure. However, it is important to note the proportion (54.2%) of farming households who were above the mean HDDS score was higher (about 54%) than the non-farming households (about 40%). Farming households do not rely on purchasing food hence they grew their own food without making use of monetary resources (Morse & McNamara, 2013). A study conducted by FAO (2009a) revealed that households in developing countries actually benefit from gardens which act as a main source of food to meet household consumption requirements. This is supported by the results from this study.

#### **5.4.2 Household Food Insecurity Access Scale**

The Household Food Insecurity Access Scale entails a collection of 9 universal questions established in order to thoroughly understand the access element of household food security. The HFIAS score represented the degree in which a household found themselves food insecure for the preceding four weeks. A household's HFIAS score was determined by adding the frequency of occurrence codes for each question for each household by adding the codes for each frequency-of-occurrence question. The

HFIAS score ranged from 0 to 27 for each household. A household that had a higher score was deemed to be food insecure. Therefore, a household that had a lower score was deemed to be food secure.

#### **5.4.2.1 Household Food Insecurity Access Scale categories**

The HFIAS category values were calculated for each household by assigning a code for the food insecurity category in which it falls. There are basically four food security categories which the households could possibly fall in namely: food secure, mildly food secure, moderately food insecure and severely food insecure. A food secure household experiences none of the food insecurity (access) conditions, or just experiences worry, but rarely. HFIA category = 1 if [(Q1a = 0 or Q1a = 1) and Q2 = 0 and Q3 = 0 and Q4 = 0 and Q5 = 0 and Q6 = 0 and Q7 = 0 and Q8 = 0 and Q9 = 0].

A mildly food insecure household sometimes or often worries about not having enough food and is unable to eat preferred foods, or eat a more monotonous diet than desired, or, however rarely, eat some foods considered undesirable. HFIA category = 2 if [(Q1a = 2 or Q1a = 3 or Q2a = 1 or Q2a = 2 or Q2a = 3 or Q3a = 1 or Q4a = 1) and Q5 = 0 and Q6 = 0 and Q7 = 0 and Q8 = 0 and Q9 = 0].

Moderately food insecure households sacrifice quality more frequently, by eating a monotonous diet, or, sometimes or often, undesirable foods. They sometimes, however rarely, start cutting back on quantity by reducing the size or number of meals, although they do not experience any of the three main severe conditions. HFIA category = 3 if [(Q3a = 2 or Q3a = 3 or Q4a = 2 or Q4a = 3 or Q5a = 1 or Q5a = 2 or Q6a = 1 or Q6a = 2) and Q7 = 0 and Q8 = 0 and Q9 = 0].

A severely food insecure household often graduates to cutting down on meal size or on the number of meals, and/or experiences any of the three most severe conditions (running out of food, going to bed hungry, or going the whole day and night without eating).

HFIA category = 4 if [Q5a = 3 or Q6a = 3 or Q7a = 1 or Q7a = 2 or Q7a = 3 or Q8a = 1 or Q8a = 2 or Q8a = 3 or Q9a = 1 or Q9a = 2 or Q9a = 3] (Coates *et al.*, 2007).

With regard to food access by the interviewed households, overall results show that the majority (about 66%) of the total sample indicated that they did not or rarely worried about food shortages (deemed to be food secure). However, a greater (about 72%) proportion of the farming households did not or rarely worry about food shortages when compared to their counterparts, the non-farming households (about 61%) in the same HFIAS category. Those households that indicated that they sometimes or often worry about not having enough food (deemed to be mildly food secure) constituted about 14 percent of the total sample (that is about 15 and 14 percent of the farming and non-farming households respectively). The minority (about 7%) of the total sample was made up of the household that frequently cut down on their meal size or on the number of meals (deemed to be severely food insecure). A higher (7%) proportion of

this group belonged to the non-farming households as compared to about 4 percent of the farming households who were in this same HFIAS category.

Table 5.23: Household Food Insecurity Access Scale categories of the interviewed households in Tongaat

Household Food Insecurity Access Scale category	Farming Households		Non-farming households		All households (combined analysis)	
	Frequency	Percentage %	Frequency	Percentage %	Frequency	Percentage %
Food secure (does not or rarely worries about food shortages)	78	71.6	60	60.6	138	66.3
Mildly food secure (sometimes or often worries about not having enough food)	16	14.7	14	14.2	30	14.4
Moderately food insecure (sacrifice quality more frequently)	11	10.0	15	15.1	26	12.6
Severely food insecure (cutting down on meal size or on the number of meals)	4	3.7	10	10.1	14	6.7
<b>Total</b>	<b>109</b>	<b>100.0</b>	<b>99</b>	<b>100.0</b>	<b>208</b>	<b>100.0</b>

Source: Survey data (2017/18)

It is quite evident from the results in Table 5.22 that farming households were better off in terms of food access than their counterparts, the non-farming households. The finding is supported by the studies by Shisanya and Hendriks (2011) and (Bhawra *et al.*, 2017) where they revealed that farming households were better off than non-farming households with regard to food access. This is because farming households are able to produce their own food rather than relying on financial capital to access food (Morse & McNamara, 2013).

### 5.5 A comparative analysis of the health status of the interviewed farming and non-farming households in Tongaat

The food security status of households may affect the health status of household members. Numerous studies have shown associations between food insecurity and adverse health outcomes among children. Studies of the health effects of food insecurity among adults are more limited and generally focus on the

association between food insecurity and self-reported diseases. Households were asked to indicate the occurrence of some food insecurity related diseases among its members (both adults and children) (that is if they had any household member/s that suffered from any of the indicated food insecurity related diseases at the time of the study). Table 5.23 shows the food insecurity related diseases affecting household members (both adults and children) of the interviewed households in Tongaat at the time of the study.

*Table 5.24: Food insecurity related diseases affecting household members (both adults and children) of the interviewed households in Tongaat at the time of the study*

<b>Adults</b>						
<b>Food insecurity related disease</b>	<b>Farming households</b>		<b>Non-farming households</b>		<b>All households (combined analysis)</b>	
	<b>Frequency</b>	<b>Percentage (%)</b>	<b>Frequency</b>	<b>Percentage (%)</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Hypertension	34	31.2	30	30	64	30.8
Hyperlipidaemia	35	32	9	9.1	44	21.2
Diabetes	45	41.2	40	40	84	40.4
Obesity	39	35.7	62	62.6	101	48.6
Heart attacks	1	0.91	0	0	1	0.4
Diarrhoea	28	25.7	24	24	52	25
Osteoporosis	13	11.9	16	16.2	29	13.9
Iron deficiency anaemia	21	19.2	8	8	29	13.9
<b>Children</b>						
<b>Food insecurity related disease</b>	<b>Farming households</b>		<b>Non-farming households</b>		<b>All households (combined analysis)</b>	
	<b>Frequency</b>	<b>Percentage %</b>	<b>Frequency</b>	<b>Percentage %</b>	<b>Frequency</b>	<b>Percentage %</b>
Malnutrition	14	12.8	3	3	17	8.17
Obesity	21	19.3	68	68	89	42.8
Underweight	11	10	4	17.2	15	7.2
Rickets	14	12.8	0	0	14	6.7
Diarrhoea	9	8.3	17	17.2	26	12.5
Kwashiorkor	0	0	0	0	0	0
Iron deficiency anaemia	13	11.9	9	9.1	22	10.6

Source: Survey data (2018)

Results showed that obesity was the common food insecurity related disease among adults as reported by almost half (49%) of the total sample. Obesity, was however, a more serious food insecurity related disease among the non-farming households (as indicated by the majority (about 63%) of the non-farming households) as compared to about 39 percent of their counterparts (the farming households) who



reported the same food insecurity related disease problem among its adult members. Diabetic adults constituted about 40 percent of the total sample (that is about 41 and 40 percent of the farming and non-farming households respectively). Other food insecurity related diseases reported by the interviewed households suffered by the adult household members for the total sample included hypertension (30.8%); hyperlipidaemia (21.1%); diarrhoea (25.0%); osteoporosis (13.9%); iron deficiency anaemia (13.9%) with adults that suffered from heart attacks constituting the minority (0.4%).

Results also showed that obesity was a serious problem in children. Overall, about 43% of the total sample reported obese children in their households. This problem appeared to be more among the non-farming households (as indicated by the majority (about 68%) of the non-farming households as compared to about 19 percent of their counterparts (the farming households) who reported the same food insecurity disease among its children members. Children in the household that suffered from diarrhoea constituted about 13 percent of the total sample (that is about 8 and 17 percent of the farming and non-farming households respectively). Other food insecurity related diseases reported by the interviewed households suffered by children household members for the total sample included malnutrition (8.17%); underweight (7.2%); rickets (6.7%) with adults no children that were reported to suffer from Kwashiorkor.

A study by Seligman *et al.* (2010) revealed that there was an association between food insecurity and clinical evidence of diet-sensitive chronic diseases. This supports the finding of this study because overall non-farming households suffered more from the diet sensitive diseases as compared to the farming households (also refer to *section 5.4.1*). As revealed by the results of this study, the households of Tongaat ate starchy based foods which has an effect on their blood sugar levels and could cause weight gain. Obesity in South Africa is a huge problem and it is evident in the results of this study. Child obesity is also problematic as it sets them up for serious health problems later on in life. About 13 percent of children are overweight in South Africa which is more than double the global average of 5 percent (Green, 2017).

## **5.6 Perceptions of households towards the practice of peri-urban agriculture**

Perceptions of households towards the practice of peri-urban agriculture were investigated. Respondents were asked to indicate their level of agreement and/or disagreement (posed on a five (5) point Likert scale) towards certain statements with regard to the practise of peri-urban agriculture. These statements would give some indication as to how households perceived the practise of peri-urban agriculture. The statements were subjected to an internal reliability test using the Cronbach Alpha statistics.

### 5.6.1 Cronbach Alpha reliability testing

A Cronbach Alpha reliability test was performed on the statements (with a Likert scale responses) that related to the perceptions of households towards the practice of peri-urban agriculture. Cronbach's Alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. It is considered to be a measure of scale reliability. Table 5.20 presents the results of the Cronbach's Alpha statistics.

Table 5.25: Cronbach's Alpha statistics (reliability analysis)

Reliability statistics	Farming households	Non-farming households	All households (combined analysis)
Cronbach's Alpha	0.723	0.740	0.741
N of Items	14	14	14

Source: Own Survey data computed from SPSS software (version 25) (2017/18)

It is to be noted that Cronbach Alpha is a coefficient of reliability or consistency rather than a statistical test. Internal consistency describes the degree to which all items in an investigation will measure a comparable variable and will therefore be linked to the affinity of the rest of the items in that investigation. The questionnaire Cronbach's Alpha statistic value of this study for all households (combined analysis) was 0.741 with farming and non-farming households having a value of 0.723 and 0.740 respectively. For the 14 statements (items) in the questionnaire regarding the perceptions of the interviewed households towards the practice of peri-urban agriculture, the Cronbach's Alpha statistic suggests that the items have relatively high internal consistency. It is noted that a reliability coefficient of 0.70 or above (close to 1) is considered acceptable in most social science research (Golnaz *et al.*, 2016).

### 5.6.2 Societal recognition perception towards the practice of peri-urban agriculture by households in Tongaat

The questions pertaining to the perceptions of respondents towards the practice of agriculture were asked and the results are presented in tables to follow.

Societal recognition is an important aspect to people as they have an inherent need to be recognized (Giannini *et al.*, 2017). Humans as a group have desires for their peers to notice and recognize them. This is currently evident in the social media age. Perceptions regarding societal recognition towards the practise of peri-urban agriculture consisted of three statements.

Table 5.26: Perceptions on societal recognition by households towards the practice of peri-urban agriculture in Tongaat

<b>Societal recognition: “Most of the people who are important to me, believe that peri-urban agriculture is essential”</b>						
<b>Level of agreement/ disagreement</b>	<b>Farming households</b>		<b>Non-farming households</b>		<b>All households (combined analysis)</b>	
	<b>Frequency</b>	<b>Percentage (%)</b>	<b>Frequency</b>	<b>Percentage (%)</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Strongly disagree	1	0.9	2	2.0	3	1.4
Disagree	10	9.2	16	16.2	26	12.5
Neutral	50	45.9	46	46.5	96	46.2
Agree	32	29.4	21	21.2	53	25.5
Strongly agree	16	14.7	14	14.1	30	14.4
<b>Total</b>	<b>109</b>	<b>100.0</b>	<b>99</b>	<b>100.0</b>	<b>208</b>	<b>100.0</b>
<b>Societal recognition: “The society will see me as a better person if I practice peri-urban agriculture”</b>						
<b>Level of agreement/ disagreement</b>	<b>Farming households</b>		<b>Non-farming households</b>		<b>All households (combined analysis)</b>	
	<b>Frequency</b>	<b>Percentage (%)</b>	<b>Frequency</b>	<b>Percentage (%)</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Strongly disagree	1	0.9	3	3.0	4	1.9
Disagree	10	9.2	13	13.1	23	11.1
Neutral	36	33.0	29	29.3	65	31.3
Agree	45	41.3	39	39.4	84	40.4
Strongly agree	17	15.6	15	15.2	32	15.4
<b>Total</b>	<b>109</b>	<b>100.0</b>	<b>99</b>	<b>100.0</b>	<b>208</b>	<b>100.0</b>
<b>Societal recognition: “People who are important to me think that I should get involved in peri-urban agriculture”</b>						
<b>Level of agreement/ disagreement</b>	<b>Farming households</b>		<b>Non-farming households</b>		<b>All households (combined analysis)</b>	
	<b>Frequency</b>	<b>Percentage (%)</b>	<b>Frequency</b>	<b>Percentage (%)</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Strongly disagree	3	2.8	6	6.1	9	4.3
Disagree	11	10.1	14	14.1	25	12.0
Neutral	46	42.2	38	38.4	84	40.4
Agree	34	31.2	25	25.3	59	28.4
Strongly agree	15	13.7	16	16.1	31	14.9
<b>Total</b>	<b>109</b>	<b>100.0</b>	<b>99</b>	<b>100.0</b>	<b>208</b>	<b>100.0</b>

Source: Survey data (2017/18)

The first statement being – “Most of the people who are important to me, believe that peri-urban agriculture is essential”. A greater proportion (about 46%) of the total sampled households were neutral on this assertion. About 25 and 14 percent of the total sampled households agreed and strongly agreed respectively that they would practise peri-urban agriculture, if most of people who are important to them

believe that urban agriculture is essential. The results also showed that the farming households were slightly more inclined (with about 29 and 15 percent having agreed and strongly agreed respectively) to this assertion as compared to their counterparts (the non-farming households) (with about 26 and 14 percent having agreed and strongly agreed respectively).

The second statement posed to respondents with regard to the societal recognition perception towards the practise of peri-urban agriculture was "*The society will see me as a better person if I practice peri-urban agriculture*". A greater proportion (about 40%) of the total sampled households' respondent in the affirmative to this assertion. About 31 percent and 15 percent of the total sampled households were neutral and strongly agreed that by practising peri-urban agriculture, the society would see them as better people. The results also showed that the farming households were slightly more inclined to this assertion (with about 42 and 15 percent having neutral and strongly agreed respectively) to this assertion as compared to their counterparts (the non-farming households) (with about 29 and 15 percent being neutral and strongly agreed respectively).

The third statement posed to respondents with regard to the societal recognition perception towards the practise of peri-urban agriculture was "*People who are important to me think that I should get involved in peri-urban agriculture*". A greater proportion (about 40%) of the total sampled households were neutral on this assertion. About 28 and 15 percent of the total sampled households agreed and strongly agreed respectively that they practised peri-urban agriculture, because the people who were most important to them thought that they should get involved in peri-urban agriculture. The results also showed that the farming households were slightly more inclined to this assertion (with about 31 and 14 percent having agreed and strongly agreed respectively) as compared to their counterparts (the non-farming households) (with about 25 and 16 percent having agreed and strongly agreed respectively).

The results of this study generally showed that urban and peri-urban agriculture is seen to have a positive societal recognition by households. This view is supported by a study by Guo (2012), that the practice of UPA contributes to the social inclusion of ostracized groups (comprising of the disabled, the elderly and women) by allowing them an opportunity to nourish their relatives and increase their household income and also improving their self-confidence. Chinese scholars also think urban agriculture offers a convenient space for social interaction and that it is the appropriate way to promote urban-rural integration (Qiu *et al.*, 2005b).

### 5.6.3 Attitude of households towards the practise of peri-urban agriculture in Tongaat

Two statements pertaining to attitude of households towards the practice of peri-urban agriculture were posed to respondents. Table 5.25 shows the results pertaining to the attitude of households towards the practice of peri-urban agriculture.

Table 5.27: Attitude of households towards the practice of peri-urban agriculture in Tongaat

Attitude: "I believe in practicing peri-urban agriculture as a hobby"						
Level of agreement/ disagreement	Farming households		Non-farming households		All households (combined analysis)	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
Strongly disagree	3	2.8	3	3.0	6	2.9
Disagree	10	9.2	11	11.1	21	10.1
Neutral	52	47.7	49	49.5	101	48.6
Agree	28	25.7	20	20.2	48	23.1
Strongly agree	16	14.6	16	16.2	32	15.3
<b>Total</b>	<b>109</b>	<b>100.0</b>	<b>99</b>	<b>100.0</b>	<b>208</b>	<b>100.0</b>
Attitude: "To me, peri-urban agriculture is easy to practice"						
Level of agreement/ disagreement	Farming households		Non-farming households		All households (combined analysis)	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
Strongly disagree	2	1.8	2	2.0	4	1.9
Disagree	11	10.1	11	11.1	22	10.6
Neutral	47	43.1	55	55.6	102	49.0
Agree	42	38.5	29	29.3	71	34.1
Strongly agree	7	6.4	2	2.0	9	4.3
<b>Total</b>	<b>109</b>	<b>100.0</b>	<b>99</b>	<b>100.0</b>	<b>208</b>	<b>100.0</b>

Source: Survey data (2017/18)

The first statement posed to respondents with regard to the attitude of households towards the practise of peri-urban agriculture was "I believe in practicing peri-urban agriculture as a hobby". A greater proportion (about 49%) of the total sampled households were neutral on this assertion. About 23 and 15 percent of the total sampled households agreed and strongly agreed respectively that they believed in practicing peri-urban agriculture as hobby. The results also showed that the proportion of farming households who answered in the affirmative to this assertion was slightly higher (with about 28 and 16 percent having agreed and strongly agreed respectively) as compared to their counterparts (the non-farming households) (with about 20 and 16 percent having agreed and strongly agreed respectively).

The second statement posed to respondents with regard to the attitude of households towards the practise of peri-urban agriculture was *“To me, peri-urban agriculture is easy to practice”*. A greater proportion (49%) of the total sampled households were neutral on this assertion. About 34 and 4 percent of the total sampled households agreed and strongly agreed respectively that peri-urban agriculture was easy to practice. The results also showed that a greater proportion of the farming households felt that practising peri-urban agriculture was easy (with about 39 and 7 percent having agreed and strongly agreed respectively) to this assertion as compared to their counterparts (the non-farming households) (with about 29 and 2 percent having agreed and strongly agreed respectively). An individual’s attitude/s are engrained by one’s own beliefs and has a great influence on an individual’s decision making process.

#### **5.6.4 Social value perception towards the practise of peri-urban agriculture by households in Tongaat**

Two statements pertaining to social value perceptions of households towards the practice of peri-urban agriculture were posed to respondents. Table 5.26 shows the responses to the social value perceptions of households towards the practice of peri-urban agriculture in Tongaat.

Society is moulded around its culture and its social values. Social values provide society with fundamental guidelines for social behaviour and conduct. These values include sacrifice, democracy, respect for human dignity, individuality, patriotism, equality and rationality which guide ones behaviour.

The first statement posed to respondents with regard to the social value perceptions of households towards the practise of peri-urban agriculture was *“Peri-urban agriculture is an effective way to access food”*. A greater proportion (about 41%) of the total sampled households agreed to this assertion. About 31 and 12 percent of the total sampled households were neutral and strongly agreed respectively that practising peri-urban agriculture was an effective way to access food. The results clearly showed that a slightly greater proportion of the farming households believed that practising peri-urban agriculture was an effective way to access food (with about 30 and 15 percent being neutral and strongly agreed respectively) to this assertion as compared to their counterparts (the non-farming households) (with about 31 and 9 percent being neutral and strongly agreed respectively).

The second statement posed to respondents with regard to the social value perceptions of households towards the practise of peri-urban agriculture was *“Peri-urban agriculture contributes to peri-urban poverty reduction”*. A greater proportion (about 43%) of the total sampled households were neutral on this assertion. About 36 and 12 percent of the total sampled households agreed and strongly agreed

respectively that practising peri-urban agriculture, would lead to urban poverty reduction. A comparison between the farming households and non-farming households show that the proportions of the farming households who believed that practising peri-urban agriculture, would lead to urban poverty reduction was slightly higher (with about 39 and 16 percent having agreed and strongly agreed respectively) to this assertion as compared to their counterparts (the non-farming households) (with about 36 and 9 percent having agreed and strongly agreed respectively).

Table 5.28: Social value perception towards the practise of peri-urban agriculture by households in Tongaat

<b>Social value: “Peri-urban agriculture is an effective way to access food”</b>						
<b>Level of agreement/ disagreement</b>	<b>Farming households</b>		<b>Non-farming households</b>		<b>All households (combined analysis)</b>	
	<b>Frequency</b>	<b>Percentage (%)</b>	<b>Frequency</b>	<b>Percentage (%)</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Strongly disagree	1	0.9	1	1.0	2	1.0
Disagree	14	12.8	18	18.2	32	15.4
Neutral	33	30.3	31	31.3	64	30.8
Agree	45	41.3	40	40.4	85	40.9
Strongly agree	16	14.7	9	9.1	25	12.0
<b>Total</b>	<b>109</b>	<b>100.0</b>	<b>99</b>	<b>100.0</b>	<b>208</b>	<b>100.0</b>
<b>Social value: “Peri-urban agriculture contributes to urban poverty reduction”</b>						
<b>Level of agreement/ disagreement</b>	<b>Farming Households</b>		<b>Non-farming households</b>		<b>All households (combined analysis)</b>	
	<b>Frequency</b>	<b>Percentage (%)</b>	<b>Frequency</b>	<b>Percentage (%)</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Strongly disagree	0	0	0	0	0	0
Disagree	9	8.3	10	10.1	19	9.1
Neutral	45	41.3	44	44.4	89	42.8
Agree	39	35.8	36	36.4	75	36.1
Strongly agree	16	14.7	9	9.1	25	12.0
<b>Total</b>	<b>109</b>	<b>100.0</b>	<b>99</b>	<b>100.0</b>	<b>208</b>	<b>100.0</b>

Source: Survey data (2017/2018)

A study by Gallaher *et al.* (2013) in Kenya found that communities that relied on one another developed a deeper sense of trust and were overall happier. With a positive social value perception towards the practise of peri-urban agriculture (access to food and poverty reduction), households would share their produce and assist other farmers and in turn increasing social interaction (Gallaher *et al.*, 2013). Again, Gallaher *et al.*, (2013) noted that farming households reported positive social interaction and higher levels of household food security.

### 5.6.5 Economic impact perception towards the practise of peri-urban agriculture by households in Tongaat

Two statements pertaining to the economic impact perceptions of households towards the practice of peri-urban agriculture were posed to respondents. Table 5.27 shows the responses to the economic impact perceptions of households towards the practice of peri-urban agriculture in Tongaat.

Table 5.29: Economic impact perception towards the practise of peri-urban agriculture by households in Tongaat

<b>Economic impact: “Peri-urban agriculture can reduce cost of importing fresh food”</b>						
<b>Level of agreement/ disagreement</b>	<b>Farming Households</b>		<b>Non-farming households</b>		<b>All households (combined analysis)</b>	
	<b>Frequency</b>	<b>Percentage (%)</b>	<b>Frequency</b>	<b>Percentage (%)</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Strongly disagree	0	0	0	0	0	0
Disagree	20	18.3	27	27.3	47	22.6
Neutral	40	36.7	35	35.4	75	36.1
Agree	37	33.9	26	26.3	63	30.3
Strongly agree	12	11.0	11	11.1	23	11.1
<b>Total</b>	<b>109</b>	<b>100.0</b>	<b>99</b>	<b>100.0</b>	<b>208</b>	<b>100.0</b>
<b>Economic impact: “Peri-urban agriculture can build an innovation driven economy”</b>						
<b>Level of agreement/ disagreement</b>	<b>Farming Households</b>		<b>Non-farming households</b>		<b>All households (combined analysis)</b>	
	<b>Frequency</b>	<b>Percentage (%)</b>	<b>Frequency</b>	<b>Percentage (%)</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Strongly disagree	0	0	3	3.0	3	1.4
Disagree	15	13.8	16	16.2	31	14.9
Neutral	31	28.4	27	27.3	58	27.9
Agree	50	45.9	44	44.4	94	45.2
Strongly agree	13	11.9	9	9.1	22	10.6
<b>Total</b>	<b>109</b>	<b>100.0</b>	<b>99</b>	<b>100.0</b>	<b>208</b>	<b>100.0</b>

Source: Survey data (2017/18)

The first statement posed to respondents with regard to the economic impact perceptions of households towards the practise of peri-urban agriculture was “*Peri-urban agriculture can reduce cost of importing fresh food*”. A greater proportion (about 36%) of the total sampled households were neutral on this assertion. About 30 and 11 percent of the total sampled households agreed and strongly agreed respectively that practising peri-urban agriculture would reduce the cost of importing food. The results indicated that the proportions farming households who believed that the practise peri-urban agriculture would reduce the cost of importing food was higher (with about 34 and 11 percent having agreed and



strongly agreed respectively) to this assertion as compared to their counterparts (non-farming households) (with about 26 and 11 percent having agreed and strongly agreed respectively).

The second statement posed to respondents with regard to the economic impact perceptions of households towards the practise of peri-urban agriculture was "*Peri-urban agriculture can build an innovation driven economy*". A greater proportion (about 45%) of the total sampled households agreed on this assertion. About 28 and 11 percent of the total sampled households were neutral and strongly agreed that practising peri-urban agriculture could build an innovation driven economy. The results also showed that the farming households had a slightly higher proportion that believed that practising peri-urban agriculture could build an innovation driven economy (with about 46 and 12 percent having agreed and strongly agreed respectively) to this assertion as compared to their counterparts (non-farming households) (with about 44 and 9 percent having agreed and strongly agreed respectively).

The urban poor are inclined to turn to informal markets whereby they can be active in selling produce generated from urban agriculture. They could either be street vendors or hawkers (Tornaghi, 2014). Households make use of this market however income generated from the informal sector is irregular and limited. Urban poor households do not have the opportunity to be choosy. The households can benefit from the practise of peri-urban agriculture as they can save money which would be previously allocated for food. Households are able to produce their own food requiring depending less on food imports and therefore the demand will decrease. The households are able to save money which they can invest into any business ventures that they are interested in.

#### **5.6.6 Health Impact perception towards the practise of peri-urban agriculture by households in Tongaat**

Two statements pertaining to the health impact perceptions of households towards the practice of peri-urban agriculture were posed to respondents. Table 5.28 shows the responses to the health impact perceptions of households towards the practice of peri-urban agriculture in Tongaat.

The study by McCormack *et al.* (2010) supported the claims in literature that urban agriculture improves the consumption of both fruits and vegetables among urban agriculture practitioners. Practising agriculture either farming or gardening is a lifetime activity. The health benefits derived from it have been advantageous to generations of farmers and gardeners. Farming and gardening provides good exercise activity (Bellows *et al.*, 2003).

Table 5.30: Health impact perceptions of households towards the practice of peri-urban agriculture in Tongaat

Health impact: "Home-based product consumption is healthier"						
Level of agreement/ disagreement	Farming Households		Non-farming households		All households (combined analysis)	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
Strongly disagree	1	0.9	4	4	5	2.4
Disagree	15	13.8	14	14.1	29	13.9
Neutral	35	32	32	32.3	67	32.2
Agree	38	34.9	35	35.4	73	35.1
Strongly agree	20	18.4	14	14.2	34	16.3
<b>Total</b>	<b>109</b>	<b>100.0</b>	<b>99</b>	<b>100.0</b>	<b>208</b>	<b>100.0</b>
Health impact: "Peri-urban agriculture can enhance healthy eating"						
Level of agreement/ disagreement	Farming Households		Non-farming households		All households (combined analysis)	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
Strongly disagree	1	0.9	3	3.0	4	1.9
Disagree	25	22.9	26	26.3	51	24.5
Neutral	32	29.4	30	30.3	62	29.8
Agree	32	29.4	26	26.3	58	27.9
Strongly agree	19	17.4	14	14.1	33	15.9
<b>Total</b>	<b>109</b>	<b>100.0</b>	<b>99</b>	<b>100.0</b>	<b>208</b>	<b>100.0</b>

Source: Survey data (2017/18)

The first statement posed to respondents with regard to the health impact perceptions of households towards the practise of peri-urban agriculture was "Home-based product consumption is healthier". A greater proportion (about 35%) of the total sampled households agreed on this assertion. About 32 and 16 percent of the total sampled households were neutral and strongly agreed that home-based product consumption is healthier. The results also showed that a slightly higher proportion of the farming households were confident that that home-based product consumption is healthier (with about 18 percent having strongly agreed) to this assertion as compared to their counterparts (the non-farming households) (with about 14 percent having strongly agreed).

The second statement posed to respondents with regard to the health impact perceptions of households towards the practise of peri-urban agriculture was "Peri-urban agriculture can enhance healthy eating". A greater proportion (about 29.8%) of the total sampled households were neutral on this assertion. About 28 and 16 percent of the total sampled households agreed and strongly agreed that practising peri-urban

agriculture would enhance healthy eating. The results also showed that a slightly higher proportion that believed that practising peri-urban agriculture would enhance healthy eating belonged to the farming households (with about 29 and 17 percent having agreed and strongly agreed respectively) to this assertion as compared to their counterparts (the non-farming households) (with about 26 and 14 percent having agreed and strongly agreed respectively).

#### **5.6.7 Knowledge Impact perception towards the practise of peri-urban agriculture by households in Tongaat**

Two statements pertaining to the knowledge impact perceptions of households towards the practice of peri-urban agriculture were posed to respondents. Table 5.29 shows the responses to the knowledge impact perceptions of households towards the practice of peri-urban agriculture in Tongaat.

Access to agricultural knowledge is important in transforming livelihoods of those relying on agriculture for a living and in enhancing food security (Berry *et al.*, 2015). This access to agricultural knowledge is influenced by infrastructure needed for information dissemination. Indigenous knowledge is local knowledge unique to a given culture or society. Such knowledge has been beneficial in assisting African farmers in their farming practices. Households that find practicing agriculture to be easy and not require any theoretical information are more likely to practice that type of agriculture (Frayne *et al.*, 2014).

The first statement posed to respondents with regard to the knowledge impact perceptions of households towards the practise of peri-urban agriculture was “*Though I have not practiced peri-urban agriculture, I am an expert regarding this activity*”. A greater proportion (about 34%) of the total sampled households agreed on this assertion. About 33 and 11 percent of the total sampled households were neutral and strongly agreed that although they have not practised peri-urban agriculture, they believed that they were experts regarding this activity. Interestingly, the results also showed a greater proportion of the non-farming households believed that they were experts with regard to peri-urban farming although they were not practising it (with about 26 percent having strongly agreed) to this assertion as compared to their counterparts (the farming households) (with about 12 percent strongly agreed).

The second statement posed to respondents with regard to the knowledge impact perceptions of households towards the practise of peri-urban agriculture was “*I think I am comparatively well-informed about peri-urban agriculture*”. A greater proportion (about 36%) of the total sampled households were neutral on this assertion. About 27 and 12 percent of the total sampled households agreed and strongly agreed that they were comparatively well-informed about the practise of peri-urban agriculture. The

results revealed that the a slightly higher proportion of respondents that believed that they were comparatively well-informed about the practise of peri-urban agriculture belonged to the farming households (with about 29 and 14 percent having agreed and strongly agreed respectively) to this assertion as compared to their counterparts (the non-farming households) (with about 26 and 10 percent having agreed and strongly agreed respectively). Authors such as Qiu *et al.* (2005a) and Guo (2012) on their studies in China, both indicated that urban agriculture plays a great part in teaching urban inhabitants on indigenous knowledge, agricultural methods and preserving local cultural diversity.

Table 5.31: Knowledge impact perceptions towards the practise of peri-urban agriculture by households in Tongaat

<b>Knowledge impact: "Though I have not practiced peri-urban agriculture, I am an expert regarding this activity"</b>						
<b>Level of agreement/ disagreement</b>	<b>Farming Households</b>		<b>Non-farming households</b>		<b>All households (combined analysis)</b>	
	<b>Frequency</b>	<b>Percentage (%)</b>	<b>Frequency</b>	<b>Percentage (%)</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Strongly Disagree	2	1.8	3	3.0	5	2.4
Disagree	20	18.3	20	20.2	40	19.2
Neutral	33	30.3	36	36.4	69	33.2
Agree	41	37.6	30	30.3	71	34.1
Strongly Agree	13	11.9	10	10.1	23	11.1
<b>Total</b>	<b>109</b>	<b>100.0</b>	<b>99</b>	<b>100.0</b>	<b>208</b>	<b>100.0</b>
<b>Knowledge impact: "I think I am comparatively well-informed about peri-urban agriculture"</b>						
<b>Level of agreement/ disagreement</b>	<b>Farming Households</b>		<b>Non-farming households</b>		<b>All households (combined analysis)</b>	
	<b>Frequency</b>	<b>Percentage (%)</b>	<b>Frequency</b>	<b>Percentage (%)</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Strongly Disagree	4	3.7	4	4.0	8	3.8
Disagree	20	18.3	23	23.2	43	20.7
Neutral	38	34.9	36	36.4	74	35.6
Agree	32	29.4	26	26.3	58	27.9
Strongly Agree	15	13.8	10	10.1	25	12.0
<b>Total</b>	<b>109</b>	<b>100.0</b>	<b>99</b>	<b>100.0</b>	<b>208</b>	<b>100.0</b>

Source: Survey data (2017/18)

Overall, results with regard to the perceptions of the interviewed households in Tongaat towards the practice of peri-urban agriculture is not a straightforward one. The results indicated some mixed feelings (perceptions) from all households (both farming and non-farming) with some being neutral (indifferent), others having positive and negative feelings with regard to the societal recognition; attitude; social value; economic; health and knowledge impacts towards the practice of peri-urban agriculture. However,

interestingly, a closer comparison between the two groups (farming and non-farming households) suggests that a slightly greater proportions of the farming households had positive perceptions towards the practise of peri-urban agriculture than their counterparts (the non-farming households). Perceptions can be an important aspect in influencing individuals' behaviour – in this instance the practice of peri-urban agriculture.

## **5.7 Chapter summary**

This chapter presented and discussed the descriptive results of the study namely on the household demographic characteristics; the present status on the practice of peri-urban agriculture by households in Tongaat; a comparative analysis of the food security status of households between farming and non-farming households (using the HDDS and HFIAS measures) and lastly the perceptions of households towards the practice of peri-urban agriculture in Tongaat. There were more females respondents than males who only accounted for both farming and non-farming households respectively. Single respondents accounted for a higher proportion for the farming households. On average, respondents were about 46 years old with farming households being slightly younger than non-farming households. The overall average number of schooling years was 9.45 years for all households. On average, respondents had a household size of about 9 members per household (all households - combined analysis). The results revealed that there is a high rate of unemployment with the majority of the total sample indicated that they were not employed. Results showed that a greater proportion of the households relied on government social grant as a source of income. The results from this study indicated that the majority of the interviewed households were earning less than (<ZAR2 500) which is below the South African minimum wage rate. The popular agricultural practice performed by households was field crops (which included cabbages, spinach, sweet potato and avocado). The popular livestock kept/reared by farming households was chicken. A greater proportion of all household sampled had access to arable land sizes of 1 - 3ha. The challenge faced by crop farmers was predominantly the issue of limited land as indicated by almost half of the farming households. As for livestock rearing, drought was reported as the main challenge by farming households.

According the HDDS measure, results showed that the majority of the farming households were consuming >6 food groups (deemed to be food secure) when compared to the non-farming households. Again, greater proportions of the non-farming households were consuming <3 and 4 to 5 food groups respectively (deemed to be food insecure and moderately food secure in that manner). Furthermore, a greater proportion of all the sampled households were above the mean HDDS. The HFIAS measure (a

food access measure) was used to supplement the HDDS results. The HFIAS results revealed that a larger proportion of the farming households had a comparatively better access to food (deemed to be food secure) than the non-farming households. Regarding the food insecurity related diseases, obesity was the largely reported health problem suffered by both adults and children for all the households. However, this problem was more prevalent in the non-farming households as compared to the farming households.

With regard to the household perceptions towards the practise of peri-urban agriculture, overall there were mixed feelings (perceptions) ranging from neutral, positive and negative with respect to societal recognition; attitude; social value; economic; health and knowledge impacts. However, a slightly larger proportions of the farming households showed an affirmative perception towards the practice of peri-urban agriculture than their counterparts (the non-farming households). The following chapter presents and discusses the empirical results of the study on the factors influencing the practice of peri-urban agriculture by households in Tongaat peri-urban area.

## 6 CHAPTER – SIX EMPIRICAL RESULTS AND DISCUSSION

### 6.1 INTRODUCTION

Following from the descriptive results in the previous chapter, this chapter presents and discusses the empirical results of the study. A probit regression model was used to determine the factors that influence the practice of peri-urban agriculture by households in Tongaat peri-urban area. A probit regression model is a statistical technique in which the probability of a dichotomous outcome is related to a set of explanatory variables (*see the methodology chapter*). Within this chapter, the independent (explanatory) variables are tested for their significance and conclusions are drawn based on the results. An in-depth explanation is provided for the statistically significant variables. Prior to running the probit model, a bivariate model was used. Only the significant variables that resulted from the bivariate analysis were inputted in the probit model.

### 6.2 Results of the bivariate analysis

The bivariate model involves the analysis to two variables in order to establish whether there is an empirical relationship (association) between the two variables. The advantage of using a bivariate analysis is that it could either be descriptive or inferential. As already indicated in the methodology chapter, this study made use of the correlation coefficients. The correlation coefficient between two continuous-level variables is also called Pearson's  $r$  or Pearson product-moment correlation coefficient. Twenty-two (22) explanatory variables were included in the bivariate model guided by literature on the possible factors that could influence the practice of peri-urban agriculture by households. These variables included age; gender; family size; educational level; employment status; access to farming inputs/implements (yes/no); receiving social grant (yes/no); land sizes; land tenure and perceptions on societal recognition; attitude; social value; economic; health and knowledge impacts towards the practice of peri-urban agriculture.

The results from the bivariate model (Table 6.1) showed that only 2 out of the 22 variables were significant. These variables are land sizes and land tenure. Pearson's correlation coefficients with  $p < 0.05$  were taken as being significant. These 2 significant variables from the bivariate analysis were further considered into the probit regression model. Further explanations of the statistical significance variables are given in the next sections of the probit regression analysis.

Table 6.1: Bivariate model results showing associations between the practice of peri-urban agriculture by households and the independent (explanatory) variables

Variable	Pearson correlation (r)	Sig. (2-tailed)
Age	-0.070	0.318
Gender	0.24	0.727
Family size	0.112	0.106
Educational level	0.081	0.245
Employment status	0.012	0.864
Access to farming inputs/implements	-0.129	0.063
Receiving social grant	-0.008	0.913
Land sizes	0.497***	0.000
Land tenure	-0.261***	0.000
Societal recognition perception <i>"Most of the people who are important to me, believe that peri-urban agriculture is essential"</i>	0.099	0.155
Societal recognition perception <i>"The society will see me as a better person, if I practice peri-urban agriculture"</i>	0.058	0.405
Societal recognition perception <i>"People who are important to me think that I should get involved in peri-urban agriculture"</i>	0.051	0.463
Attitude <i>"I believe in practicing peri-urban agriculture as a hobby"</i>	0.029	0.673
Attitude <i>"To me, peri-urban agriculture is easy to practice"</i>	0.124	0.075
Social value perception <i>"Peri-urban agriculture is an effective way to access food"</i>	0.095	0.173
Social value perception <i>"Peri-Urban agriculture contributes to urban poverty reduction"</i>	0.076	0.2777
Economic impact perception <i>"Peri-urban agriculture can reduce cost of importing fresh food"</i>	0.087	0.210
Economic impact perception <i>"Peri-urban agriculture can build an innovation driven economy"</i>	0.084	0.225
Health impact perception <i>"Home-based product consumption is healthier"</i>	0.060	0.393
Health impact perception <i>"Peri-urban agriculture can enhance healthy eating"</i>	0.081	0.247
Knowledge impact perception <i>"Though I have not practised peri-urban agriculture, I am an expert regarding this activity"</i>	0.077	0.268
Knowledge impact perception <i>"I think I am comparatively well-informed about peri-urban agriculture"</i>	0.078	0.265

Source: Own Survey data (2017/18) computed from STATA software (version 14)

\*\*\*, \*\* Denotes correlation is significant at the 0.01 and 0.05 levels (2-tailed)



### 6.3 Results of the probit regression model on the factors influencing the practice of peri-urban agriculture by households in Tongaat

The probit regression model was estimated using 208 observations to establish the factors influencing the practice of peri-urban agriculture by households in Tongaat using the STATA software version 14. Results in Table 6.2 indicate that both two of the independent variables that were inputted in the model were statistically significant in influencing the practice of peri-urban agriculture by households in Tongaat.

#### 6.3.1 Model fit statistics

A model fit test was conducted to assess the robustness of the model. Likelihood Ratio Chi-Square statistics was used to test the goodness-of-fit or predictive efficiency of the model (Table 6.2). The log likelihood of the fitted model that is Likelihood Ratio Chi-Square test is used to ascertain whether all predictors' regression coefficients in the model are simultaneously zero. In this case, the Likelihood Ratio Chi-Square test was significant at  $p < 0.01$  indicating a good predictive capacity of the model suggesting this was a good fit model. The likelihood ratio test statistic results of the model indicate that all variables are statistically significant.

Table 6.2: Probit model results on the factors influencing the practice of peri-urban agriculture by households in Tongaat

Variables	Margin	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
Constant	-	-2.1068	0.4009	-5.26	0.000	-2.8926	-1.3211
Land size							
1 – 3ha	0.6958	2.7407***	0.4559	6.01	0.000	1.8471	3.6344
4 – 6ha	0.8406	3.2382***	0.4797	6.75	0.000	2.2980	4.1784
7 – 9ha	0.6679	2.6605***	0.5169	5.15	0.000	1.6473	3.6737
>10ha	0.7223	2.8200***	0.5339	5.28	0.000	1.7736	3.8665
Land tenure							
Own land	0.4225	-0.5521**	0.2834	-1.95	0.051	-1.1076	0.0033
Renting land	0.5582	-0.0074	0.4251	-0.02	0.986	-0.8406	0.8257
Sharing/communal	0.5535	-0.0288	0.3025	-0.10	0.924	-0.6219	0.5642
Log-likelihood	-86.9236						
Number of observations	208						
LR chi2(7)	114.02						
Prob > chi2	0.0000						
Pseudo R2	0.3961						

\*\*\*; \*\* denote statistical significance at the 1% and 5% levels respectively

Dependent variable: Practicing any form of peri-urban agriculture (yes (1)/ no (0))

Source: Own Survey data (2017/18) computed from STATA software (version 14)

The variable **land size** was found to be positively correlated with the practice of peri-urban agriculture by households in the study area at 1% significance level with a p-value of 0.000. Having no access to land was used as the base (reference category) and the results show that the practice of peri-urban agriculture by households increases if a household belonged to the land size categories 1 – 3 ha; 4 – 6 ha; 7 – 9 ha and >10 ha while holding all other things constant. Overall, the model predicts that those households with access to larger pieces of lands are more likely practise peri-urban agriculture. Having access to land size 1-3ha versus having no land (reference group) increased the z-score by 2.741. Having access to land size 4-7ha versus having no land (reference group) increased the z-score by 2.238. Having access to land size 7-9ha versus having no land (reference group) increased the z-score by 2.661. Having access to land size >10ha versus having no land (reference group) increased the z-score by 2.820. An increase in the land size increases the likelihood to practise peri-urban agriculture because households would have more land in which they can perform various agricultural activities. The lack of land has been cited as a constraint on the practise of peri-urban agriculture as households are forced to farm on small plots of land and in some instances on illegal sites. The finding is in line with Bruinsma (2003) who revealed that the expansion of agricultural land area will significantly increase crop production. Nonetheless, Smith (2013) provides a contrasting view that sustainable agricultural intensification should be employed to promote agricultural production instead of expanding agricultural land as there is no more room to expand. This is especially true within the peri-urban areas, where land may be reserved for urbanization and not for agricultural production.

The variable **land tenure** was found to be negatively correlated with the practice of peri-urban agriculture by households in the study area. This variable was inputted in the model as a categorical variable with a household having unspecified land tenure rights (that is not having any land ownership rights) as the base (reference category). The construct “owning land” was statistically significant at 1% significance level with a p-value of 0.051 and a coefficient estimate ( $\beta = -0.5521$ ). Owning the land versus unspecified land tenure rights (the reference group) decreases the z-score by 0.552. The negative sign on the coefficient imply a negative relationship of the “own land” construct and the practise of peri-urban agriculture. The finding is in contrast with the expected outcome. The results revealed that owning land negatively influence that practice of peri-urban agriculture by Tongaats’ households. This finding is explainable given that land is a limited resource, especially in peri-urban areas. The results are supported by those of Badami and Ramankutty (2015) whereby households are inclined to farm only on small plots of land without necessarily acquiring land ownership rights. This is because the households do not have access to sufficient financial capitals to acquire land. However, the marginal effects predict a positive correlation between land ownership and the practise of peri-urban agriculture. This finding attest to the

assertion that land ownership is one of the most important factors of agricultural production (Badami & Ramankutty, 2015). Nzunda *et al.* (2013) further supports this finding that the households that own plots of land are more likely to be prosperous in their agricultural endeavours than those not owning the land. Households that own their land are more likely to practice peri-urban agriculture because they have total control over decisions about management of the land they possess.

#### **6.4 Chapter summary**

The chapter presented and discussed the empirical results on the factors influencing the practice of peri-urban agriculture by households in Tongaat. The factors influencing the practice of peri-urban agriculture were determined by using a probit regression model. Prior to the probit regression model, a bivariate analysis was performed to identify factors that had an association with the practise of peri-urban agriculture. Twenty-two (22) variables were inputted in the bivariate analysis however, only two variables land size and land tenure proved to be the important factors influencing the practice of peri-urban agriculture by households in Tongaat. The probit regression analysis revealed that the two variables land size and land tenure were statistically significant predictors that influence the practice of peri-urban agriculture. Land sizes was found to be positively correlated with the practice of peri-urban agriculture yet land tenure (own land) was found to be having a negative correlation with the practice of peri-urban agriculture. Overall, the model predicted both a positive marginal effect to the practice of peri-urban agriculture by households in Tongaat peri-urban area for the two variables land size and land tenure (own land). The following chapter presents the consolidated summary, conclusions and recommendations of the study.

## **7 CHAPTER SEVEN – SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

### **7.1 INTRODUCTION**

This chapter presents the summary, conclusions and recommendations for the study. It starts by giving a summary of the findings and how the research objectives were achieved. Secondly, conclusions were drawn following the key findings in order to identify areas of interest or conflict within the reviewed literature. Lastly, the chapter provides recommendations based on the findings of the study.

### **7.2 Summary**

The study was conducted in Tongaat situated in the eThekweni Municipality in the Kwa-Zulu Natal Province, South Africa. The aim of the study was an assessment of the contribution of peri-urban agriculture on household food security. Specifically, the study sought to:

- I. To describe the status of peri-urban agriculture by households in Tongaat peri-urban area.
- II. To distinguish analytically the food security status for farming and non-farming households in Tongaat peri-urban area.
- III. To investigate the perceptions of Tongaat peri-urban households toward the practice of peri-urban agriculture.
- IV. To determine the factors influencing the practice of peri-urban agriculture by households in Tongaat peri-urban area.

A quantitative approach, with a cross-sectional design was used to gather data. Stratified random sampling was employed, and a total of 208 households (109 farming and 99 non-farming households) were sampled. The study employed the Sustainable Livelihood Approach (SLA) framework to guide the study. In consideration, it would appear that this study achieved the desired depth of understanding, even having negotiated the challenge of providing adequate breadth, to include all the types of peri-urban agricultural practices. The sustainable livelihoods frameworks provided a vital contribution in this regard, as its livelihood capitals framed the perspective of the farming and non-farming households, while the resilience of livelihoods and institutional structures contexts broadened the focus. A cross sectional research design was employed where data were collected quick and cheap at a single point in time. A questionnaire was used to collect data by means of a survey method. Questionnaires, translated to isiZulu (the native language in the study area) were administered to individuals that were involved in preparing the food for the households to answer as recommended by FAO since the study's focus was to assess the contribution of peri-urban agriculture on the food security status of households. Raw data was captured and programmed on Microsoft Excel in the form of spreadsheets and later imported to Statistical

Package for the Social Science (SPSS) version 25 and STATA 14 software for analysis. For the first objective (i), to describe the status of peri-urban agriculture in Tongaat, descriptive statistics was applied; here frequencies; percentages; means and standard deviations were used by comparing the similarities and differences in responses given by the respondents. To achieve the second objective (ii), both the HDDS and HFIAS tools were used as proxies to comparatively estimate the food security status of the farming and non-farming households. A Likert scale measure was used to achieve the third objective (iii), which was to investigate the perceptions of Tongaat peri-urban households towards the practice of peri-urban agriculture. Lastly, a probit regression model was employed to answer the fourth objective (iv), which was to determine the factors influencing the practice of peri-urban agriculture by households in Tongaat peri-urban area. Results were presented in the form of tables and figures (graphs) and additional interpretations and meanings thereof provided in-text.

### **7.2.1 Findings from literature**

The findings presented herein relate to the main literature secondary findings the study made use of.

#### ***The status of peri-urban agriculture in South Africa***

Urban agriculture in South Africa is under the umbrella of the Integrated Development Planning (IDP). According to Austin and Visser (2002) based on the finding of the Council for Scientific and Industrial Research (CSIR), agriculture is not considered as an urban land use activity when planning in urban areas and urban agriculture is relegated in order to prioritise industrial and residential land use activities. Urban agriculture is unregulated in a sense that it used unauthorised rain-fed water and the utilization of high agricultural potential land has been given little attention in urban land use planning (Austin & Visser, 2002). The recipients of UPA are generally categorized as underprivileged urban households. The impact and occurrence of UPA in underprivileged urban households in Sub-Saharan Africa and especially in South Africa seem to be scarce. Burger *et al.* (2009) attempted to determine who the practitioners of urban agriculture were and their socio-economic status in South Africa. The report found that the Eastern Cape and Kwa-Zulu Natal Provinces had the highest UA practitioners and could also be attributed to the good soils and high summer rainfall found in those areas. According to a study by Burger *et al.* (2009), black South Africans were predominantly involved in UA and approximately 7.5 percent of urban agriculture practitioners cited urban agriculture as their main source of income.

#### ***The contribution of peri-urban agriculture to household food security***

Globally, it is estimated that 7.5 percent of the total world population from the age of 15 years and above constitute 406 million people who are extremely food insecure between the years 2014 to 2015 (Von Grebmer *et al.*, 2016). Sub-Saharan Africa accounts for 26 percent of the age group and represents 153

million people (Von Grebmer *et al.*, 2016). This region mentioned accounts for the highest prevalence of severe food insecurity rate in the world (FAO., 2017). Regions that are in the sub-Saharan African region with the lowest prevalence were southern Africa and western Africa with 20 and 23 percent respectively (FAO., 2017). Initiatives of UPA enables urban dwellers to become self-sufficient and receive a more nutritious diet. Poor urban households have greater access to more nutritious food and have these foods in larger quantities. A substantial number of studies have examined the relationship between food security and UA in cities in Sub-Saharan Africa. These studies have indicated that UA significantly contributes to improving the household per capita dietary energy requirement, child nutritional status, food quality, food access and reduced food prices (Armar-Klimesu, 2000; Crush & Frayne, 2010; Kutiwa *et al.*, 2010; Zezza & Tasciotti, 2010). Mwangi (1995), conducted a comparative study on low-income neighbourhoods in Nairobi by comparing those households who were farming and the non-farming households. Their findings revealed that households that were involved in farming were significantly food secure as compared to the non-farming households.

#### ***Perceptions of households towards the practise of peri-urban agriculture***

According to studies conducted by De Cock *et al.* (2013) and Olivier and Heinecken (2017), revealed that households that had a positive perception towards the practice of urban agriculture were more likely to be practitioners themselves and had an increased agricultural output. Social recognition and social value are important perceptions that influence households to practise peri-urban agriculture. This was evident in the study conducted by Gallaher *et al.* (2013) in Kenya, whereby farming households reported positive social interaction and higher levels of household food security. These farming households would share their produce and assist other farmers in turn increasing social interaction. According to McCormack *et al.* (2010), households were more likely to practice urban agriculture as they believed that it improves the consumption of both fruits and vegetables among urban agriculture practitioners. Since an individual's attitude is engrained by one's own beliefs and has a great influence on an individual's decision making process. Households that have a positive perception towards the practice of urban and peri-urban agriculture are more likely to practice it given the advantages of the practice (Stivachtis & Georgakis, 2011).

#### ***Factors influencing the practice of urban and peri-urban agriculture by households***

There are various factors influencing the practice of urban and peri-urban agriculture. Men usually leave their female counterparts at home to look after the family. Again, given the existing gender distribution, most African communities rely on women for labour in the agriculture sector which influences the agricultural practices (Lubwama, 1999; Grabbe *et al.*, 2013). The study conducted by Vos (2014),

revealed that as farmers grow older in age their productivity becomes less. Therefore, an increase in a farmer's age has negative influence on the practice of peri-urban agriculture thereby making them vulnerable to household food insecurity. A study conducted by Bhawra *et al.* (2017) revealed that households with higher levels of education among its members are able to expand their farming business and become successful. Employment status was considered important because it is a factor that can influence a household's food security status and the practice of peri-urban agriculture (Mkwambisi *et al.*, 2011). Urban and peri-urban agriculture is implemented as a poverty alleviation strategy to improve employment levels (Mwangi, 2015). Social grants in South Africa were introduced with the aim to alleviate poverty and increase household food security (Aliber, 2009). Social grants are important for the households as they provide money for destitute households to buy food because these households do not have savings and they spend whatever amount they receive. However, the availability of other sources of cash income to households as such social grants have been seen by some scholars to discourage the practise or involvement in other cash generating activities such as agricultural activities. Scarcity of arable land results in households to farming in small plots of land which contributes to decreased quantity of food produced by households and rendering them vulnerable to household food insecurity (Nzunda *et al.*, 2013). Land tenure has been cited to have an influence on the practice of urban agriculture. Households that own the land hypothesised to be more likely to be prosperous in their agricultural endeavours than those who do not own the land (Nzunda *et al.*, 2013).

### **7.2.2 Primary findings/results**

The findings presented herein relate to the main primary survey findings from this study.

#### ***The status of peri-urban agriculture in Tongaat***

The first objective sought to describe the status of peri-urban agriculture in Tongaat. Mainly descriptive statistics was applied; here frequencies and percentages were used by comparing the similarities and differences in responses given by the participants. Females were the dominant gender in the study area. Results showed that there were more (about 54%) females respondents (that is 56 and 53 percent for farming and non-farming households respectively). Generally, respondents were in the economically active age group. The mean age for the total sample was about 46 years old (that is about 45 and about 47 years old for the farming and non-farming households respectively). Overall, respondents were fairly educated in the study area. The average number of schooling years was 9.45 years for all households (that is 9.17 and 9.16 years for farming and non-farming households). It was noted that formal employment is still a challenge in the study area. The results revealed that there is a high rate of unemployment with the majority (51%) of the total sample indicated that they were not formally employed (that is about 65 and 34 percent for the farming and non-farming households respectively). A greater

proportion depends on government social grants as a source of income in Tongaat. Results showed that about 48 percent of the households relied on government social grant as a source of income. The results from this study also indicated that the majority (about 54%) of the interviewed households received a total household income less than (<ZAR2 500) which is below the South African minimum wage rate. The results reveal that labour for gardening activities was predominantly supplied by female household members. Twenty (20) and 17 percent of this labour was supplied by the elderly (respondents' grandmothers and their mothers respectively). A greater proportion (about 46%) of the interviewed farming households in Tongaat were growing field crops (which included cabbages, spinach, sweet potato and avocado) followed by large livestock rearing which accounted for about 40 percent of the sample, poultry (about 35%), fruits (about 4%) and flowers (about 3%). About 39 percent of the interviewed farming households in Tongaat reared chickens. Households indicated that they kept livestock mostly for household consumption. Households that indicated that they kept livestock for household consumption (meat and milk) accounted for about 68 and 33 percent respectively. Access to land appears to be an issue in the study area. The results revealed that an average proportion (about 38%) of the farming households were farming land between 1 - 3ha. The results suggested that the households of Tongaat are largely restricted by the scarcity of land in which they have available to practice their agricultural activities. Again, a greater proportion (44%) of the interviewed farming households reported that they practiced their farming activities on unspecified land. Only a small (about 19%) proportion of the interviewed farming households indicated that they had land ownership rights (owned) the land they farmed. The results further showed that limited land was a major problem in crop farming as indicated about 50% of the interviewed farming households. With regard to livestock rearing, drought was the major reported problem as indicated by the majority (about 62%) of the interviewed farming households in Tongaat.

***The contribution of peri-urban agriculture to household food security: A comparative analysis between farming and non-farming households in Tongaat***

The HDDS and HFIAS tools were used to analyse the food security status of the households. The results revealed that starch (cereals - millet, sorghum, maize and wheat) was the most consumed type of food as indicated by the majority (about 81%) of households (that is about 86 and 75 percent for farming and non-farming households respectively). The average mean HDDS was about 5. Using the mean HDDS as a yardstick for food security status of households, households which fell above the mean HDDS level were regarded as food secure and those that fell below the mean HDDS level were regarded as food insecure. Overall, a greater proportion of the total sampled households were above the mean HDDS. However, the majority that were above the mean HDDS belonged to the farming households as compared



to the non-farming households. The households were categorised into three (3) dietary classes/ groups. With regard to the HFIAS results, the minority of the total sample was made up of the households that frequently cut down on their meal size or on the number of meals (this group was deemed to be severely food insecure). A higher proportion of this group belonged to the non-farming households as compared to farming households who were in the same HFIAS category. The HFIAS results further revealed that a larger proportion of the farming households had a comparatively better access to food (this group was deemed as food secure) than the non-farming households never or rarely worried about food shortages in the household. It is quite evident from these results that farming households were better off in terms of food access than their counterparts, the non-farming households. The results confirmed the findings from literature that farming households are comparatively food secure than the non-farming households. When people live under limited dietary diversity or if they are forced to use severe coping strategies where nutrition is compromised, this may result in nutrient deficiency which will make them prone to a variety of diseases. This makes life more difficult for households because it has a potential not only to decrease labour productivity of a household but also to increase their health care bills. Regarding the food insecurity related diseases (problems), obesity was the largely reported health problem suffered by both adults and children for all the households. However, this problem was noted to be more prevalent in the non-farming households as compared to the farming households. This is because farming households were in a better position to diversify their food needs as already pointed out.

### ***Perceptions of households towards the practise of peri-urban agriculture in Tongaat***

A Likert scale measure was used to investigate the perceptions of Tongaat peri-urban households towards the practice of peri-urban agriculture. Perceptions on societal recognition; attitude; social value; economic; health and knowledge impacts towards the practice of peri-urban agriculture were investigated. Results showed that greater proportions of the total sampled households were neutral with regard to the social recognition perception, their attitude and the economic impact perception towards the practice of peri-urban agriculture respectively. On the other hand, greater proportions of the total sampled households showed positive responses with regard to the social value and the health impact perceptions towards the practice of peri-urban agriculture. Overall, respondents expressed mixed feelings (perceptions) with respect to societal recognition; attitude; social value; economic; health and knowledge impacts. However, it is worth noting that a slightly larger proportions of the farming households showed an affirmative perception towards the practice of peri-urban agriculture than their counterparts (the non-farming households).

### ***Factors influencing the practice of urban and peri-urban agriculture by households in Tongaat***

Both land size and land tenure were found to be important (significant) predictor variables that influence the practice of peri-urban agriculture in Tongaat. The variable land size was found to be positively correlated with the practice of peri-urban agriculture by households in the study area. On the other hand, the variable land tenure (own land) was found to be negatively correlated with the practice of peri-urban agriculture by households in the study area. Nonetheless, using the marginal effects, the model predicted a positive influence on the effect of both variables to the practice of peri-urban agriculture.

### **7.3 Conclusions**

A greater proportion of the households rely on government social grants which indicates that households are dependent on them as a livelihood source and for disposable income. The majority of the interviewed households earn less than (<ZAR2 500) which is below the South African minimum wage rate. This implies that the majority of the households are at risk of becoming food insecure and could benefit from practicing peri-urban agriculture to supplement their household income. Again, the majority of households in Tongaat were unemployed. This implies that there are times when the household members are without work and therefore not earning a stable income. High unemployment rate can make households to be extremely vulnerable to poverty and food insecurity. Farming households were comparatively better off in terms food diversity and food access. This implies that farming households are in a better position to be food secure than the non-farming households. This reinforces the notion that the practice of peri-urban agriculture is able to ensure food security among peri-urban households. Obesity was the most reported food security related issue for both adults and children from the total sampled households. However, the problem of obesity was most prevalent in the non-farming households. It is therefore important that households do not only just acquire food (access) but make sure that the food they eat is nutritious (diversity). It is through the practise of peri-urban agriculture that households can be able to diversify their food needs in addition to the food bought items. Farming households showed an affirmative perception towards the practice of peri-urban agriculture than the non-farming households. This could be that perceptions on the practice of peri-urban agriculture has a role as to whether households practice it or not (although this study was not able to establish the linkage). Land size and land tenure are important predictors to the practice of peri-urban agriculture by households. In order to address, the food security status of households in peri-urban areas, issues related to land need to be taken into account.

#### **7.4 Recommendations**

The practice of urban and peri-urban agriculture was introduced to alleviate poverty and increase household food security. However, the practice of urban agriculture still remains informal and unrecognised for the contribution it has to achieving household food security. Urban city planners and local authorities do not regard urban agriculture in their planning. Therefore, the practice of urban and peri-urban agriculture remains to be excluded. It would be imperative that relevant stakeholders take urban and peri-urban initiatives seriously for the survival and sustainability of the practice. This is why urban and peri-urban agriculture may continue to be underutilised by households that can benefit from the practice. Based on the findings of this study, it is important that land sizes and land accessibility is taken into consideration in order to expand the practice of peri-urban agriculture. This is because an increase in land sizes has a positive influence on the practice of peri-urban agriculture. Households can educate themselves about land tenure rights and seek assistance from various land sector organisations. These organisations are in place to facilitate, promote and consolidate support to the successful self-mobilization and self-organisation of homeless people, farmers, farm workers and landless communities.

#### **7.5 Suggestions for future research**

The study was an assessment of the contribution of peri-urban agriculture on household food security in Tongaat, EThekweni Municipality. The study revealed that significant proportions of both Tongaat's farming and non-farming households relied on at least one type of government social grant. However, the impact of the government social grant towards the households' food security status was not explored. This is because the results indicated that the households of Tongaat's peri-urban area relied heavily on social grants. Future research can focus on assessing the contribution of government social grants on the households' food security status. Farming and non-farming households of Tongaat's peri-urban area suffered from diet sensitive diseases. Majority of both adults and children suffered from obesity. Therefore, it would be appropriate to investigate the association of household food security with the occurrence of obesity for both children and adults in Tongaat's peri-urban area. Additionally, apart from assessing the factors determining the practice of peri-urban agriculture by households, the study did not assess the factors determining the food security status of the households. That would be crucial in getting a holistic understanding of various factors contributing to the food security status of households in Tongaat. Again future research could focus or pay attention to a specific peri-urban agricultural activities (enterprises) rather than looking at peri-urban agriculture in its entirety.

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## APPENDIX ONE – QUESTIONNAIRE



**UNIVERSITY OF ZULULAND  
FACULTY OF SCIENCE AND AGRICULTURE  
Department of Agricultural**

Questionnaire Survey: An assessment of the contribution of peri-urban agriculture on household food security in Tongaat, eThekweni Municipality.

**All information will be STRICTLY CONFIDENTIAL**

Participant Name (optional): \_\_\_\_\_

Participant Signature: \_\_\_\_\_

Date: \_\_\_\_\_ Start time: \_\_\_\_\_ End Time: \_\_\_\_\_ Interview

Code: \_\_\_\_\_

**Section A: Household demographics information**

✓ Tick

appropriate box

**1. Head of the household**

<b>a. Gender</b>		Female		Male	
<b>b. Marital status</b>		Single	Married	Divorced	Widowed
<b>c. Age</b>	< 16	16-29	30-50	51-60	>60
<b>d. Highest level of education of household head</b>					
How many years of school have you attended: _____					
<b>e. Highest level of education of any household member</b>					
How many years of school have you attended: _____					
<b>f. What is the size of your household</b>				<16 Children	>16 Adults
		Female			
		Male			

<b>2. What is your main occupation?</b>	
<b>a. How many adults in the household are employed</b>	
	Write number of those employed
Females	
Males	
<b>b. What is the average household monthly total income?</b>	
R 0 – R 499	R 1 500 – R 1 999
R 500 – R 999	R 2 000 – R 2 499
R 1 000 – R 1 4999	< R 2 500

<b>3. Is there anyone in the household who receives a social grant from government?</b>						
Yes				No		
<b>a. If Yes, indicate the type of grant received</b>						
Child only	Disability only	Pension (old age) only	Child and disability	Child and pension	Child disability and pension	Pension and disability

**Section B: Peri- Urban agricultural practices**

✓ Tick

appropriate box

<b>1. Do you practise any form of peri-urban agriculture?</b>				<b>If No,</b>	
<b>skip to Section C</b>					
Yes		No			
<b>2. Which agricultural activities do you practice?</b>					
Field crops		Fruits		Livestock	
Poultry		Flowers		Other	
<b>3. What do you consider to be the main problem in crop and vegetable production? (Rank 1 as the most important problem)</b>					
Problem		Rank	Problem		Rank
High temperatures			High production costs		
Low rainfall			Labour		
Low temperatures			Limited land		
Inadequate water resources			Theft		



Pests		Capital	
Lack of skills		Inadequate equipment	
<b>4. Who in the household works in the garden?</b>			
<b>5. How often to you eat food from the garden?</b>			
Daily	Once a week	Once in 2 weeks	Once a month
<b>6. Which species of livestock do you rear? (Rank species)</b>			
	<b>Class</b>	Cattle	Chickens
		Goats	Pigs
		Sheep	Other (Specify)
	<b>Number</b>		
	<b>Rank</b>		
<b>7. Why do you keep livestock? (Rank 1 as the most important reason)</b>			
Meat		Milk	
Status		Skin	
Lobola		Manure	
Sales		Draught power	

<b>8. Which problems are you facing in raising your livestock? (Rank 1 as the most important)</b>			
<b>Problem</b>	<b>Rank</b>	<b>Problem</b>	<b>Rank</b>
Lack of disease and pest control		Predators	
Poor extension services		Lack of infrastructure	
Lack of veterinarian services		Poor institutional support	
Poor rangeland management		Shortage of feed	
Stock theft		Lack of skills	
Drought		High temperatures	
High mortality rates		Other (Specify)	
<b>9. Do you ever slaughter an animal to consume in the household?</b>		Yes	No
<b>10. How often?</b>			
Once a month	Once in 3 months	Once in 6 Months	Once a year
<b>11. Size of land left for agricultural purposes?</b>			
<1	1-3	4-6	>10
<b>12. Land Tenure</b>			
Own land	Renting land	Sharing cropping	Unspecified land

**Section C: Information on the perceptions of people regarding peri-urban agriculture.**

✓ Tick appropriate box

1.

Perception	Strongly agree	Agree	Neither	Disagree	Strongly disagree
<b>Social Recognition</b>					
Most of the people who are important to me, believe that urban agriculture is essential.					
The society will see me as a better person, if I practice urban agriculture.					
People who are important to me think that I should get involved in urban agriculture.					
<b>Attitude</b>					
I believe in practicing urban agriculture as a hobby.					
To me, urban agriculture is easy to practice.					
<b>Social Value</b>					
Urban agriculture is an effective way to access food.					
Urban agriculture is involved in urban poverty reduction.					
<b>Economic Impact</b>					
Urban agriculture can reduce cost of importing fresh food.					
Urban agriculture can build an innovation driven economy.					
<b>Health impact</b>					
Home-based product consumption is healthier.					
Urban agriculture can enhance healthy eating.					
<b>Knowledge impact</b>					
Though I have not practiced urban agriculture, I am an expert regarding this activity					
I think I am comparatively well-informed about urban agriculture					

## Section D: Information on household food security status

### 1. Household Dietary Diversity Score (HDDS) (Tool adopted from Swindale & Bilinsky (2006))

Now I would like to ask you about the types of foods that you and anyone else in the household ate yesterday during the day and at night. Your responses will be a yes or no. Yes, in the instances where you ate the food type (1) and No in the instances you did not (0).

Code	Food	Yes	No	Specifics
A	Any bread, mabele, rice, noodles, biscuits, scones, fatcakes, other food made from millet, sorghum, maize, wheat			
B	Any potatoes and sweet potatoes or any foods made from roots and tubers			
C	Any yellow or orange and green vegetables			
D	Any fruits			
E	Any beef, pork, lamb, mutton, chicken or other birds, liver, kidney, hearts and other organ meats			
F	Any eggs			
G	Any fresh fish or dried fish			
H	Any foods made from beans, peas or lentils			
I	Any dairy products: milk, yogurt, cheese,			
J	Any foods contain fat, butter or oil			
K	Any sugar or honey			
L	Condiments: tea, coffee, sauces, cool drink, juice			

### 2. Household Food Insecurity Access Scale (HFIAS) (Tool adopted from Coates, Swindale & Bilinsky (2007))

Now I will ask you about your access to food over the period of the last four weeks (the previous month), and how often you may have encountered problems with getting food. Your responses will be a yes or no. Yes then you answer the follow up questions labelled as (a) (1) and No then you skip to the following question (0).

No.	Questions	Response Options	Code
1	In the past four weeks, was there ever no food to eat of any kind in your household because of resources to get food?	No=0 (skip to 2) Yes=1	
1a	How often did this happen?	1=rarely (once or twice in the past four weeks) 2=sometime (three to eight times in the past four	

		weeks). 3=often (more than eight times in past four weeks)	
2	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	No=0 (skip to 3) Yes=1	
2a	How often did this happen?	1=rarely (once or twice in the past four weeks) 2=sometimes (three to eight times in the past four weeks). 3=often (more than eight times in past four weeks)	
3	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	No=0 (skip to 4) Yes=1	
3a	How often did this happen?	1=rarely (once or twice in the past four weeks) 2=sometimes (three to eight times in the past four weeks). 3=often (more than eight times in past four weeks)	
4	In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	No=0 (skip to 5) Yes=1	
4a	How often did this happen?	1=rarely (once or twice in the past four weeks) 2=sometimes (three to eight times in the past four weeks). 3=often (more than eight times in past four weeks)	
5	In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	No=0 (skip to 6) Yes=1	
5a	How often did this happen?	1=rarely (once or twice in the past four weeks) 2=sometimes (three to eight times in the past four weeks). 3=often (more than eight times in past four weeks)	
6	In the past four weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food?	No=0 (skip to 7) Yes=1	
6a	How often did this happen?	1=rarely (once or twice in the past four weeks) 2=sometimes (three to eight times in the past four	

		weeks). 3=often (more than eight times in past four weeks)	
7	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	No=0 (skip to 8) Yes=1	
7a	How often did this happen?	1=rarely (once or twice in the past four weeks) 2=sometimes (three to eight times in the past four weeks). 3=often (more than eight times in past four weeks)	
8	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	No=0 (skip to 9) Yes=1	
8a	How often did this happen?	1=rarely (once or twice in the past four weeks) 2=sometimes (three to eight times in the past four weeks). 3=often (more than eight times in past four weeks)	
9	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	0 = No (questionnaire is finished)      1 = Yes	
9a	How often did this happen?	1=rarely (once or twice in the past four weeks) 2=sometimes (three to eight times in the past four weeks). 3=often (more than eight times in past four weeks)	

**Section E: Health status of household**

✓ Tick appropriate box

**1. Those suffered by adults**

<b>1.1 .Did you suffer from any of these illnesses during the last month?</b>	<b>Yes</b>	<b>No</b>
Hypertension		
Hyperlipidaemia		
Diabetes		
Obesity		
Heart attack		
Diarrhoea		
Marasmus <sup>1</sup>		
Osteoporosis		
Iron deficiency anaemia		

**2. Those suffered by children**

<b>2.1 .Did you suffer from any of these illnesses during the last month?</b>	<b>Yes</b>	<b>No</b>
Malnutrition		
Obesity		
Growth retardation		
Underweight		
Rickets		
Scurvy		
Diarrhoea		
Kwashiorkor		
Marasmus		
Iron deficiency anaemia		

Thank you for your time, do you have any questions?

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## APPENDIX TWO – ETHICAL CLEARANCE CERTIFICATE

**UNIVERSITY OF ZULULAND  
RESEARCH ETHICS COMMITTEE**  
(Reg No: UZREC 171110-030)



**RESEARCH & INNOVATION**

Website: <http://www.unizulu.ac.za>  
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### ETHICAL CLEARANCE CERTIFICATE

Certificate Number	UZREC 171110-030 PGM 2017/442					
Project Title	An Assessment of the contribution of peri-urban agriculture on household food security in Tongaat					
Principal Researcher/ Investigator	Khumalo NZ					
Supervisor and Co-supervisor	Dr. M Sibanda					
Department	Agriculture					
Faculty	Science & Agriculture					
Type of Risk	Low risk – Desktop research					
Nature of Project	Honours/4 <sup>th</sup> Year		Master's	x	Doctoral	Departmental

The University of Zululand's Research Ethics Committee (UZREC) hereby gives ethical approval in respect of the undertakings contained in the above-mentioned project. The Researcher may therefore commence with data collection as from the date of this Certificate, using the certificate number indicated above.

- Special conditions:**
- (1) This certificate is valid for 2 years from the date of issue.
  - (2) Principal researcher must provide an annual report to the UZREC in the prescribed format [due date-01 July 2018]
  - (3) Principal researcher must submit a report at the end of project in respect of ethical compliance.
  - (4) The UZREC must be informed immediately of any material change in the conditions or undertakings mentioned in the documents that were presented to the meeting.

The UZREC wishes the researcher well in conducting research.

  
 Professor Gideon de Wet  
 Chairperson: University Research Ethics Committee  
 Deputy Vice-Chancellor: Research & Innovation  
 01 December 2017

**CHAIRPERSON**  
 UNIVERSITY OF ZULULAND RESEARCH  
 ETHICS COMMITTEE (UZREC)  
 REG NO: UZREC 171110-030

05/12/2017

**RESEARCH & INNOVATION OFFICE**