



Socio-economic Contribution of Community Food Gardens to the Livelihoods of rural households in Lepelle-Nkumpi Local Municipality of Limpopo Province, South Africa

By

Nkele Dorcus Malahlela

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Faculty of Science and Agriculture

University of Fort Hare, South Africa

Supervisor: Prof A Mushunje

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DECLARATION

I, the undersigned, Nkele Dorcus Malahlela hereby declare that the work contained in this thesis is my own work. I hereby declare that this study is my own original work and that it has not previously, in its entirety or in part, been submitted to any university for degree purposes.

Signature:

Date:

Student no: 200717007

ABSTRACT

Community food gardens are regarded as a means through which rural households can improve their livelihoods. This study explores the contribution of community food gardens (CFG) to livelihoods in the Lepelle-Nkumpi local municipality in the Limpopo province. The objectives of this study are, firstly to explore the reason behind CFG participation and the reasons behind the participating possibility. Secondly, the study seeks to identify the socio-economic factors influencing the participation of households in CFG and lastly to determine the influence of CFG and other socio-economic variables on household food security status (HFSS).

Descriptive statistical analysis was used to describe the socio-economic characteristics and the reasons behind CFG participation and the reasons behind the participating possibility. The binary logistic regression model was used to analyse the determinants of household participation in community food gardens as well as the contribution of CFG to HFSS on Statistical Package for Social Science (SPSS) software version 21. Through a structured questionnaire, data was collected from a sample of 180 households which was obtained using multistage sampling.

Descriptive results on the characteristics of sampled households revealed that there are high levels of food security in the area with 70% being food secure of which around 42.2% are CFG participants and 30% are food insecure. Furthermore the descriptive statistical analysis indicated that participation of households in CFG is mainly to obtain a source of food among the CFG participants and to generate income amongst the non-participants. On the basis of descriptive analysis, this study concludes that source of food and income generation respectively are the main reasons behind CFG participation and the possibilities of becoming a participant.

Therefore the study accepts the research hypothesis stating that “There are social and economic reasons behind household participation and the possibilities of participating in CFG”.

Binary results for the determinants of CFG participation revealed that socio-economic variables such as household size, farm income, household monthly income, land size, household perception, marital status, agricultural training and homestead gardening significantly influence household decisions to participate in CFG.

This is an implication that socio-economic variables tested in this study are significantly influential to the household decision to participate in CFG, leading to the acceptance of the first hypothesis which states that “Socioeconomic factors determine the community food garden ownership or participation”. The results of the contribution made by CFG to HFSS showed that socioeconomic variables such as gender, age, household size, farm income, educational level, household monthly income, marital status, information access, formal employment status and CFG involvement significantly affect household food security status in the study area.

The result indicates a positive contribution to HFSS and implies that socio-economic variables tested in this study have a significant influence on HFSS, leading to the acceptance of the second hypothesis which states that “Community food gardens have a positive effect on food security status of household in Lepelle-Nkumpi Local Municipality Limpopo province.” Therefore it is relevant to concluded that in the area of Lepelle-Nkumpi local municipality, social economic factors plays a vital role in the participation of households in CFG as well as improving the state household food security status.

Keywords: Livelihoods, food insecurity, food security, Community food Garden (CFG); Household Food Security Status (HFSS)

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“Robala ka khutso Meta, Ngwato wa Meladi”

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LIST OF ACRONYMS

AHDDS:	Average Household Dietary Diversity Score
AHRLJ:	African Human Rights Law Journal
AIDS:	Acquired Immune Deficiency Syndrome
CASP:	Comprehensive Agricultural Support Programme
CFG:	Community Food Gardens
CFS:	Committee on World Food Security
DAFF:	Department of Agriculture Forestry and Fisheries
DFID:	Department for International Development
DoA:	Department of Agriculture
FAO:	Food and Agricultural Organization
GHS:	General Household Survey
HDDS:	Household Dietary Diversity Score
HFSS:	Household Food Security Status
HIV:	Human Immune Deficiency Virus
ILO:	International Labour Organization
IDP:	Integrated Development Plan
LPG:	Limpopo Provincial Government
NDA:	National Department of Agriculture
OLS:	Ordinary Least Squares
PSU:	Primary Sample Units
RSA:	Republic of South Africa

SADC:	South African Development Community
SL:	Sustainable Livelihoods
SPSS:	Statistical Package for Social Sciences
SSU:	Secondary Sample Units
UN:	United Nations
WFP:	World Food Programme

CHAPTER ONE

INTRODUCTION TO RESEARCH PROBLEM

1. Introduction

The Republic of South Africa (RSA) is currently classified as an upper-middle income country, yet it still ranks among countries in the world with the highest income inequality and absolute poverty pronounced in rural areas (Altman *et al*, 2009). Saunders (2004) defined poverty as the inability of individuals, households or communities to command sufficient resources to satisfy a socially acceptable minimum standard of living. Generally, poverty is viewed merely as income insufficiency but however, it includes the lack of adequate food, employment, lack of access to assets as well as social exclusion. Cousins (2005) pointed out that there is a strong and complex relationship between poverty, food insecurity and livelihoods.

Cousins (2005) further stated that to some extent, poverty eradication and food security are the sub-component of household livelihood security which in simple terms means gaining a living. Livelihoods are defined in the literature as an adequate stock and flows of food and cash to meet basic needs (Chapman and Tripp, 2004). The original Chambers and Conway's definition states that "a livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living (World Vision, 2006)." Wood *et al.*, (2000) pointed out that the state of livelihoods in rural areas is poorly influenced by major factors such as high population rate, poverty and food insecurity.

In most of the rural areas in South Africa referred to by the apartheid regime as the homelands, households engaged in primary activities to diversify income and food source to improve their

livelihoods and to reduce their vulnerability to poverty and food insecurity (De Satgé, 2002). Diversified sources could include a combination of salaries or wages obtained through employment, remittances, social grants, and even income or perhaps food generated through agricultural activity. Agriculture and social safety nets often form the backbone of livelihood in rural areas of South Africa, especially through subsistence production, old-age pensions and child support grants (Anseeuw *et al.*, 2001).

It is further said by De Satgé, (2002) that households' diversification of livelihoods sources depends upon different capabilities or resources within a household. According to Pauw (2007), households use available assets and capabilities with attempt to achieve their livelihood goals by engaging in a variety of productive activities. The most common type of productive activities in rural areas of South Africa is agricultural production of which many rural inhabitants are either directly or indirectly linked to as a source of food and income to achieve food security.

The South African agricultural sector is dualistic in nature and is divided into commercial and subsistence sectors at two ends of the spectrum, flanking small scale farmers in between (Department of Agriculture, DOA, 2002). Subsistence agriculture is one of the oldest human activities, and has become an important part of people's lives around the world, but especially more for the rural people in South Africa (Walter, 2003). Altman *et al*, (2009) also indicated that subsistence and smallholder production particularly in rural areas could greatly mitigate households' vulnerability to food insecurity and improved livelihoods.

The growing concern about the quality and cost of food, and food insecurity have increased interest in growing food locally on back yards (homestead gardens) and communal lands (community food gardens) (Twiss *et al.*, 2003). Homestead gardens are usually small plots of

land next to their homesteads that can be used to grow essential commodities for subsistence reasons (Abedin and Quddus, 1990), while Community food gardens (CFG) are group open spaces managed and operated by members of the local community in which food or flowers are cultivated. CFG are growing in popularity involving a wide range of farm groups such as schools, prisons, youth, elderly, hospitals, and local residents of neighbourhoods (Corrigan, 2011).

CFG are a form of group farming and according to (Srinath *et al.*, 2000), group farms are schemes involving multiple individuals not related by kin or employment relationships who share resources for the purpose of farming. Group farming is an approach, which relies on harmonized farming operations and collective management by a number of individuals of a locality who often grow staple crops, vegetables and fruits for subsistence purposes (Srinath *et al.*, 2000).

Galeski (1987) distinguished among different types of group farming based on their nature and origin and the purposes of the establishment. There are four types of group farming, namely group farms created by believers in an ideology, those created by landless families who were able to acquire the land but not to start individual family farms; those organized by government in order to reach national economic and social goals and lastly those organized by farmers in order to enjoy the advantages of larger operations, lower costs of production, more effective use of land, manpower, and capital and consequently higher economic returns (cooperatives) (Galeski, 1987). The most common type of group farming found in rural areas of South Africa are cooperative and CFG of which some are government funded while some are driven by contributions from the members of the group farm.

Though group farming is encouraged in South Africa its success and contribution to rural livelihoods is highly variable (Bembridge, 2000). Group farms such as cooperatives and CFG are generally beset by challenges resulting from the lack of adequate institutional and extension support and mainly low participation of households in maintaining and managing the group farms. This is due to the complex nature of households' needs with different reasons for participating or not participating in such projects (Mayende, 2004). It is assumed that people enter into gardening for varying reasons and the decision to participate in a homestead or communal food gardens would depend upon various factors and individual motivations and needs.

These forms of food gardens have a complex range of contribution towards meeting households' needs and improving livelihoods. Fernandez (2003) confirmed the complexity of community gardens and identified three benefits to community gardens, namely social, economic and environmental benefits. They are an important means by which the rural poor are able to feed their families and reduce their vulnerability to hunger and improve their state of life. Mundel and Chapman, (2010) state that CFG are not only a source of food but provide other benefits, such as community building, education, and promoting health. Hancock (2001) also suggested that they contribute to four types of capital: human, natural, economic and social.

Therefore, this study seeks to generally understand the socio-economic contribution of CFG to livelihoods of the rural household of Lepelle-Nkumpi local municipality. It seeks to determine the contribution of CFG participation to household food security status (HFSS) as a proxy to livelihoods.

1.1 Problem statement

African households were historically disadvantaged by the laws and educational systems of the apartheid regime and lost their land which was a source of livelihoods. The outcomes of the apartheid system are now referred to as the developmental issues of South Africa. They are illiteracy, unemployment and widespread poverty, combined with the historical loss of land and farming acumen which will continue to drive poor standards of living and food insecurity among black people in South Africa. Apartheid transformed livelihood systems in South Africa, causing poverty and food insecurity leading to poor livelihoods in rural areas (Hart, 2009).

The post 1994 government has attempted to address these challenges through Section 27(b) of The Constitution of the Republic of South Africa, which states that every citizen has the right to have access to sufficient food and water (RSA Constitution, 1996), yet Bryceson, (2000) indicated that ten years had passed, yet the question whether the macro-economic framework would actually deliver poverty eradication, and suggested a variety of ways to improve well-being through agriculture, employment creation and land reform remains sharply topical in rural South Africa.

The South African government developed The National Policy on Food and Nutrition Security in August 2013 with the goal to achieve an increased and better targeted public spending in social programmes which impacts on food security, to increase food production and distribution, including increased access to production inputs for the emerging agricultural sector, to Leverage Government food procurement to support community-based food production initiatives and

smallholders and The strategic use of market interventions and trade measures which will promote food security (Department of Agriculture Forestry and Fisheries DAFF, 2013).

Through The National Food and Nutrition Security Policy, the state has set out a number of programmes to support the food insecure population and promote food security across the country, and not much is documented on the outcomes of the investment towards achieving food security at household level. The general household survey 2011 reports that South Africa still has about 13.8 million individuals that experience inadequate access to food (STATS-SA, GHS 2011).

According to Statistics South Africa (2011), 80% of the population in Limpopo (a province situated in the north east of South Africa) lives in rural areas (StatsSA, 2011). The spatial distribution of the rural population corresponds with the former homelands, but a large number of people also still generate living from agriculture and social safety net (StatsSA, 2011). Limpopo province is amongst the provinces faced with challenges of food insecurity and poor livelihoods and households have adopted agricultural practices with the use of natural assets such as land for better livelihood options and quality of life (Nell *et al*; 2000).

These households have limited access to basic services such as water and electricity, their living conditions are further affected by poorly functioning markets, unemployment, lack of ownership of productive implements and low level of education attainment. This in turn leads to household food insecurity and poor livelihoods because food security pillars, accessibility, availability, utilization as well as stability cannot be attained while there households are faced with inadequate access or lack of such resources (StatsSA, 2002).

In respond to challenges faced by Limpopo and the rest of South Africa, there is substantial investment into community gardens. Millions of Rands are expended each year on the establishment and support subsistence producer through the Comprehensive Agricultural Support Programme (CASP), Illema-Letsema and Fetsa-Tlala production initiative (Department of Agriculture Forestry and Fisheries DAFF, 2014).

Further, community members devote many hours of their time to working in community gardens, yet there is uncertainty about the value of this investment and its contribution to Livelihoods in rural areas. Therefore it can be assumed that the households participate into CFG for various reasons, which include socio-economic needs and motivation. In response to the challenges of food insecurity facing Limpopo province, this study focussed on determining the factors influencing the participation of households in CFG and understanding the contribution of CFG to the livelihoods using household food security as a proxy.

1.2 Research objectives and hypothesis

- The broad objective of the study is to investigate the socio-economic contribution of community food gardens to livelihoods of rural people in Lepelle-Nkumpi Local Municipality, Limpopo province.

1.2.1 Research objectives

- To explore the socio-economic reasons behind household participation and the possibilities of participating in CFG;
- To investigate the determinants of community food gardens ownership or participation; and

- To assess the effect of community food garden participation on household food security status.

1.2.2 Research hypotheses

- There are social and economic reasons behind household participation and the possibilities of participating in CFG
- Socio-economic factors determine the community food garden ownership or participation in Lepelle-Nkumpi Local Municipality.
- Participation in CFG and other socio-economic factors contribute to household food security status.

1.3 Importance of the study

Literature indicate that community food gardens, has a potential to improve the state of household food security. It is important as well as vital to assess the contribution of such community gardens on socio-economic aspects such as food (in) security and unemployment, in a bid to assist homestead community food gardens to improve. This study seeks to understand the factors behind the participation of households in CFG as well as to assess the socio-economic contribution of CFG to the status of food security at household level. It is therefore significant because it could expose levels of food insecurity specific to Lepelle-Nkumpi local municipality in the Limpopo province as a result of discovering potentially the number of food (in) secured households participating in community food gardens.

This study will provide feedback on the contribution of community food gardens to livelihoods, which may help government agencies and policy makers to evaluate the progress of the

implemented programmes that may trigger policy and programme review. Solutions may be proposed to remedy problems associated with improving subsistence farming, ensuring optimal human access to one of the most basic elements of life: food. The empirical findings from this study will allow discovery of a relationship between food security and socio-economic variables. It will also add to the existing knowledge about the importance of community food gardens to socio-economic aspects and make recommendations that may assist in improving community gardens.

1.4 Limitations of the study

The study dealt only with primary agricultural production of community food gardens and their role towards household food security in Lepelle-Nkumpi local municipality. The research scope was further limited to social and economic aspects related to community food gardens involvement and household food security status. Therefore, the results of the study could not be generalized to the whole of Limpopo province and South Africa at large. Furthermore the study was only limited to 180 sampled households within the study area.

1.5 Assumptions of the study

The study assumes that the community food garden and household members that were interviewed have been honest in giving their responses. It further assumed that the enumerators were also honest and transparent during the data collection processes and that the sampled groups are a true reflection and representation of Lepelle-Nkumpi local municipality.

1.6 Outline of the study

This dissertation consists of six chapters of which chapter one is the introduction to the study. The second chapter reviews literature on rural livelihoods, food (in) security and community food gardening. The third chapter gives an overview of the study area and methodology which explains the research design, data collection procedures, the variables investigated and the method of data analysis. Chapter four presents the descriptive research results on the socio-economic characteristics of the respondent. In the fifth chapter, results of the empirical analysis are presented. Finally, chapter six presents the summary, conclusion as well as recommendations and future research areas.

CHAPTER TWO

LITERATURE REVIEW

2. Introduction

Studies on the roles and contribution of community gardens in rural livelihoods have been largely neglected or rather not well documented. This chapter reviews literature on the dynamics and the state of livelihoods in rural areas. It gives an overview of South African subsistence agriculture and the factors influencing the participation of households in subsistence agriculture. It further outlines the different forms of gardening with an emphasis on community food gardening and lastly the contribution of CFG to livelihoods with a specific focus on household food security status in rural areas.

2.1 livelihoods in rural households

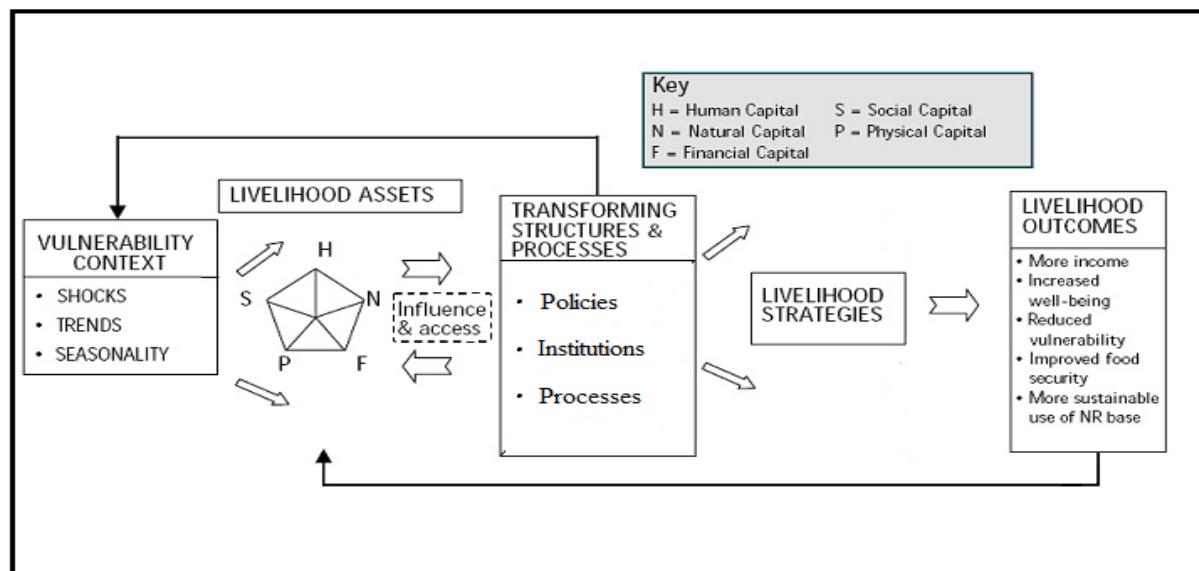
The concept of ‘sustainable rural livelihoods’ is increasingly central to the debate about rural development, poverty reduction, food security and environmental management. In recent years, a broad and comprehensive definition of the concept of livelihood has been developed, in connection to sustainability. Definitions of livelihoods are often unclear, inconsistent and relatively narrow. Drawing on Chambers and Conway (1991) among others, the Institute of Development Studies (IDS) team’s definition is as follows:

“A livelihood comprises the capabilities, assets (including tangible and intangible resources) and activities required for a means of living (Chambers & Conway, 1991).”

Chamber and Conway (1991) further indicated that a livelihood is sustainable when it can cope with and recover from stresses and shocks maintain or enhance its capabilities and assets, while not undermining the natural resource base. While the definition of a livelihood can be applied to different hierarchical levels, the authors Chambers and Conway (1991) stressed that it is used most commonly at the household level.

2.2 Sustainable livelihoods

In order to understand the dynamic forces of livelihoods in rural households, The Department for International Development (DFID, 2000), has developed sustainable livelihoods framework which was inspired by the work of Robert Chambers in the 1980s. The SL framework is a tool for development work. It highlights how to understand, analyse and describe the main factors that affect the livelihoods of the poor people. It emphasises on interlinks between the aspects of sustainable livelihoods. The structure below presents a sustainable livelihoods framework illustrating how internal and external aspects of a household impact on rural livelihood.



Source: DFID, 2000

Figure 2.1: The Sustainable Livelihood framework

Generally the framework shows how, in different contexts, sustainable livelihoods are achieved through access to a range of livelihood resources (natural, economic, human and social capitals) which are combined in the pursuit of different livelihood strategies (agricultural intensification or extensification, livelihood diversification and migration). Central to the framework is the analysis of the range of formal and informal organisational and institutional factors that influence sustainable livelihood outcomes (DFID, 2000).

The sustainable livelihoods framework is built on the belief that people need assets to achieve a positive livelihoods outcome. The ability to achieve sustainable rural livelihoods is dependent on the basic material, social, tangible and intangible assets that people have in their possession. Drawing from an economic metaphor, such livelihood resources may be seen as the ‘capital’ base from which different productive streams are derived. The following table outlines and describes the different types of ‘capitals’ contributing to sustainable rural livelihoods.

Table 2.1: Livelihoods Assets

Livelihood Assets	
Human capital	Skills, knowledge, health and ability to work
Social capital	Social resources, including informal networks, membership of formalized groups and relationships of trust that facilitate co-operation and economic opportunities
Natural capital	Natural resources such as land, soil, water, forests and fisheries
Physical capital	Basic infrastructure, such as roads, water & sanitation, schools, ICT; and producer goods, including tools, livestock and equipment
Financial capital	Financial resources including savings, credit, and income from employment, trade and remittances

Source: DFID 2000

2.2.1 Policies and institutions

According to DFID (2000), policies and institutions influence rural households' access to livelihood assets are also important aspects of livelihood framework. Institutions are the social cement which link stakeholders to access different kinds of capital outlined above to the means of exercising power. They define the gateways through which they pass on the route to positive or negative 'livelihood' adaptation (Scoones, 1998).

2.2.2 Livelihoods strategies

Rural poor use the different livelihood resources in the pursuit of different livelihood strategies. These livelihoods strategies are the way that people act in order to achieve their desired livelihood and they often follow in the face of existing policies and institutions, and livelihood outcomes they intend to achieve (DFID, 2000). The access that people have to different kinds of assets affects the strategies that they employ. Structures and processes in a given society also create possibilities and constraints on the strategies that people are able to use. According to Krantz, (2001) the core livelihood strategies to distinguished dynamics and outcomes are agriculture based activities and livelihood diversification.

2.2.2.1 Agriculture-based activities

Poor household in rural areas of the developing countries often struggle to ensure sustainable livelihoods by participating in more diversified activities (Carswell 2000). The poorest households are more reliant on agriculture-based activities involving both crop and livestock production for livelihoods (Baiphethi & Jacobs 2009). According to Bryceson, (2000) African

rural-dwellers value the pursuit of farming activities, thus subsistence production of food is still a major component of livelihoods in poor African countries. Subsistence production contributes to households livelihoods in different ways.

Van Rooyen (1997) observed that agriculture has the potential to contribute significantly to economic development and transformation through stimulation of income and employment to improve the standard of living within the African countries. It further contributes to food security (which is used as a proxy for livelihoods) at different levels both direct and indirect. Development Bank of South Africa (DBSA, 2000) has pointed out that agriculture is a cornerstone of South African rural economies and is important in terms of providing livelihood security. But however households are not always willing to participate in CFG but for different reasons. This is in relation to the study objective that seeks to explore the reasons behind participation and non-participation in CFG.

2.2.2.2 Livelihoods diversification

Baiphethi and Jacobs (2009) have stated that while farming still remains important for rural households, people are looking for diverse opportunities to increase and stabilise their incomes. Therefore, rural livelihoods are based not solely on agriculture but on a diverse array of activities and enterprises (Chapman & Tripp, 2004).

Diversity is the watchword and livelihoods' approach to solving complex rural development problems. According to Ellis, (2000) livelihood diversification is the process by which rural families construct a diverse portfolio of activities and social support capabilities in order to survive and to improve standards of living. It is a pervasive and enduring characteristic of rural survival and a strategy (made by necessity or choice) out of poverty, and towards more resilience

and sustainability Ellis (1998). This means that rural households rely not only on one source of income but more diversified incomes source to meet their differentiated needs.

2.2.3 Outcomes of livelihoods

Scoones, (1998) defined livelihood outcomes as achievements of livelihood strategies, such as more income and financial capital, increased well-being such as non-material goods, like self-esteem, health status, access to services, sense of inclusion, reduced vulnerability and better resilience through increase in asset status, improved food security generated through increased food production and a more sustainable use of natural resources. This gives an out sketch on outcomes that households anticipate in their participation in CFG.

2.3 Poverty, food (in) security and rural livelihoods

Poverty is a complex concept with conflicting definitions and considerable disagreement in terms of framings, methodologies, and measurements. According to United Nations (1995) poverty is defined as a condition characterized by severe deprivation of basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education and information. It depends not only on income but also on access to services. The International Labour Organization (ILO) further point out that the simplest level, individuals or families are considered poor when their level of living, measured in terms of income or consumption, is below a particular standard (ILO, 1995). However, the World Bank (2001) defines poverty as lack or inability to achieve of social and economic means to meet a basic life standard of which food security is a component.

Food security is defined by Hendriks and Msaki (2009) as a situation whereby all people have physical, social and economic access to sufficient, nutritious, healthy and safe food at all times to

meet their daily food dietary needs and preferences, while food insecurity is defined as the lack of food security that, at the extreme, is experienced in the form of hunger (Hendriks, 2005). Bickel, *et.al.* (2000) defined food insecurity as a situation whereby people have limited access and availability to adequate, nutritious and safe foods.

Poverty and food (in) security are interrelated multidimensional concepts. Their relationship is a complex one where several key dimensions such as lower levels of education, unemployment and higher cost of living are common. The most important issue facing rural households is inadequate access to food and income which are fundamentally outcomes of poverty (European Commission, 2000). Poverty is strongly correlated with food insecurity and livelihoods (Barrett, 2010). Therefore, it is necessary to address poverty and food security simultaneously to attain household livelihood security.

Chambers (1989) defined household livelihood security as adequate and sustainable access to income and resources to meet basic needs (including adequate access to food). Livelihoods can be made up of a range of on-farm and off-farm activities which together provide a variety of procurement strategies for food and cash. Thus, each household can have several possible sources of entitlement which constitute its livelihood. According to Drinkwater and McEwan (1992) the risk of livelihood failure determines the level of vulnerability of a household to income, food, health and nutritional insecurity. Food and nutrition security are subsets of livelihood security, the need for food is equally important to other basic needs or aspects of subsistence and survival within households. Food and nutrition are the element of food security and livelihoods.

2.4 The concept of food security

The roots of concern with food security can be traced back to the world food crisis of 1972–1974, and even beyond that, at least to the Universal Declaration of Human Rights in 1948, which recognized the right to food as constituting a core element of what can be defined as an adequate standard of living (United Nation, 1948, cited in Maxwell & Frankenberger, 1992). The concept of food security has evolved, developed, expanded and diversified in recent years, as a result of the diverse nature of the problem (Overseas Development Institute ODI, 1997, cited in Drimie & Mini, 2003).

During the 1970s, understanding of the concept of food security was based mainly on the idea that food insecurity was a food supply problem; much attention was focused on the self-sufficiency strategies adopted at a national level, such as strategies of ensuring the production of adequate food supplies and of maximising the stable flow of such supplies. In realising these strategies, the focus was laid on the implementation of measures aimed at reducing price variability and financing the additional costs of exceptional imports at the international level (Maxwell, 2001).

In the recent years the concept of food security became a sustainable development issue, linked to health through malnutrition, but also to sustainable economic development, environment, and trade. Devereux and Maxwell (2001) have argued that “Food security is no longer seen simply as a failure of *agriculture* to produce sufficient food at the *national* level, but instead a failure of *livelihoods* to guarantee access to sufficient food at the *household* level and this in line with Sen.’s (1981) ‘entitlements approach.

The concept of food (in) security is a complex phenomenon determined by the interaction of a broad range of agro-ecological, environmental, socio-economic, political and biological factors. It is closely linked to the concept of livelihoods as a proxy. The analysis of the food-security situation in poverty-stricken areas has increasingly included a livelihood perspective. The basic definition of food security is that it refers to the state that exists when all people, at all times, have physical social and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (World Food Summit, 1997).

Anderson (1990) stressed that it is significant as well as vital to distinguish between food security at different levels as the status of food security and approach to assess food security differs from one level to another. Those levels include national, community and household levels. Food security at national level refers to the condition whereby the nation is able to manufacture, import, retain and sustain food needed to support its population with minimum per capita nutritional standards.

At community level, food security is defined as the condition whereby the residents in a community are able to access safe, culturally accepted, nutritionally adequate diets through a sustainable system that maximizes community self-reliance, while food security at household level refers to the availability of food to every member within a household at all times. A household is regarded as food secure when the members of the family do not live in hunger or fear of starvation.

Further, Dasgupta (1993) stated that a more complete account of a household's food security would also include both the food produced by the household members and the cash they earn and use to purchase food, how nutritious their diets are, and how food is distributed and used within

the household, therefore the concept of household food security may be broken-down into four key dimensions: availability, access, utilization of food and stability which relates to the factors influencing the household food security.

The Food Agricultural Organization Statistics Division (FAO, 2006) defined Food availability in relation to the following three elements: production, distribution and exchange. It is a physical availability of quantities of food from own production, commercial imports or donors available for human consumption. The elements of food access are affordability, allocation and preference. Food access is the adequate income or other means to acquire food quantities needed. Food utilisation can be defined in terms of nutritional value, social value and food safety. It refers to proper use, processing and storage techniques; adequate food and nutrition knowledge practices towards a better nutrient absorption and metabolic utilization. Lastly, food stability which refers to people's ability to access and utilize food that remains stable and sustained over time.

The state of community and household food security is more than having physical or geographic access to healthy food choice. Having physical access to a fresh food outlet does not ensure affordability, ethnic preference, variety, and quality of food Centre for Studies in Food Security (CSFS, 2010). Food insecurity, the opposite of food security, can therefore be described as a condition in which people lack the basic food intake necessary to provide them with the energy and nutrients required for fully productive lives (FAO, 1996).

There are two types of food insecurity, namely chronic and transitory. According to Sadoulet and De Janvry (2001), *chronic* food insecurity refers to situations where, on average, food availability is below the required level, of which the root cause is poverty. The short-term

decline in food supplies due to drought, fluctuations in income or unrealistic pricing is referred to as *transitory* food insecurity.

Food security is a core human right, an essential factor of human development and crucial to stable international relations. Food insecurity is a threat to physical wellbeing and normal social activity FAO (2002). Dowler (2003) asserted that ‘food poverty’ is a synonym for food insecurity, a proxy for livelihoods, resonating current wider thinking about food security as more than physical efficiency of food consumption but also including the ability ‘to acquire or consume an adequate quantity or quality of food in socially acceptable ways, or the uncertainty that one will be able to do so.

2.5 Food (in) security status in South Africa

Hart *et al* (2009) have supported the argument that South Africa seems to be food secure at national level but the same cannot be said about households in rural areas. South Africa has extremely high levels of absolute poverty and food insecurity, particularly in rural areas, as compared to other middle income countries around the world (Altman *et al.*, 2009; Earl, 2011). According to the Department of Agriculture (DoA, 2002) issues of poverty and food insecurity in South Africa begun during the advent of apartheid in 1948 which created inequalities in the provision or minimal access to education, health and social services. This led to a dramatic increase in the levels of poverty and food insecurity in rural areas.

The Department of Agriculture (DoA, 2002) further indicated that the situation was further exacerbated by the creation of homelands at the beginning of the apartheid era in 1948. Majority of the people were denied their political rights and excluded from participating in the economic mainstream which led to extreme social and economic inequalities and exclusion (Labadarios *et*

al, 2009). These inequalities include inequalities in terms of access to land, other resources and implementation of policies that exacerbate household food insecurity, hunger and malnutrition in rural areas of South Africa (DoA, 2002).

The post-apartheid government introduced The South African Constitution to correct the policies of the apartheid regime. Chapter 2, (Section 27.1b) of The South African Constitution provides that every citizen has the right to access sufficient food and water, and the government should take appropriate legislative measures to realise this objective (Human Science Research Council HSRC, 2004). Yet, inhabitants of large parts of rural South Africa live in poverty and the prevalence of food insecurity while some live in a fear of starvation. This emanates from a series of entangled causes such as economic stagnation, decreased formal employment opportunities, poor agricultural policies, adverse climatic factors, environmental degradation and the devastating impact of HIV/AIDS (Oxfam, 2007).

Earl (2011) indicates that out of 196 000 tons of food brought in by the World Food Programme (WFP) in most parts of the region, 150 000 tons was exported from South Africa, thus an indication that the country has a huge responsibility to ensure food security stability in the whole region as well as national food security (Earl, 2011). South Africa is also said to be food secure at national level and the net exporter of agricultural produce, mainly staples and fruits. However, the General Household Survey (STATSA, GHS 2013) has indicated that about 13.6 million rural people continue to wallow in abject poverty and food insecurity which compromises their livelihoods. Du Toit (2011) has also asserted that the food security condition at household level is not the same as at national level in rural areas of South Africa.

2.6 Food security and livelihoods strategies in rural South Africa

The General household survey (STATS-SA, GHS 2011) points out that food insecurity is a long-term challenge to about 13.8 million of the population experiencing inadequate access to food. As a result, food security has become one of the top priorities on the National Developmental goals. On 11 September 2013, Cabinet approved the National Policy on Food and Nutrition Security, together with the Household Food and Nutrition Security Strategy and the Fetsa Tlala Food Production Initiative to facilitate a policy system to achieve food security and eradicate hunger and malnutrition. This was shown through increased spending on social programmes. Feeding schemes, child support grants, free health services for children and pregnant and lactating women, pension funds, provincial public works programmes and community food garden (CFG) initiatives were all introduced as ways to improve household food security (DoA, 2002).

2.7 Food gardens (CFG) and Household food (in) security

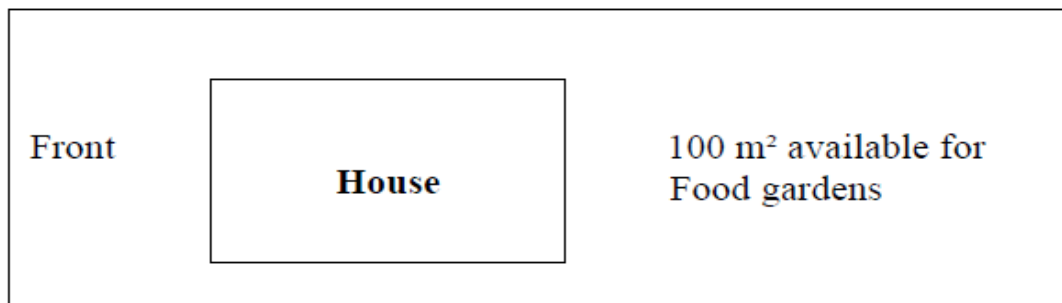
2.7.1 Defining food gardening

The problem that comes with trying to define what food gardens are is the fact that the gardens are very diverse in size, form or function (London-Lane, 2004). They are defined generally as a piece of land, whether individual or communal used and managed for the production of food, which may include production of livestock and crops produced for subsistence (Nell *et al*, 2000; Fernandez, 2003). Walter (2003) further indicated that food gardens are sites where people produce crop and fruit but also use these spaces to educate others about agriculture. Literature further defines food gardens as a farming system that incorporates a number of factors; these include social, economic and physical factors (London-lane, 2004). Herbach (1998) observed

that gardens are viewed in a multidimensional manner as well as according to aspects of their being and the benefits they bring.

2.7.2 Forms of Home gardens in South Africa

The most common forms of food gardens in rural South African are homestead and community food gardens. Nell *et al* (2000) defined homestead gardens as a piece of land behind a house that is used for the production of food for the household as illustrated in Figure 2.2 below. It is fully managed by the beneficiaries who are household members.



Source: Nell *et al* 2000

Figure 2.2: Structure of a homestead garden

While generally the term “community food gardens” is defined by the literature as open spaces which are managed and operated by members of the local community in which food or flowers are cultivated’ (Kingsley *et al.*, 2009). They are created by a group of individuals to grow food and the community. A broad spectrum of activities takes place in community food gardens and offers a chance for people to gather, network and to socially and economically empower themselves as residents of a neighbourhood or community (Pudup, 2008). They are ‘created and managed by the community itself and depend upon a cohesive social network to organize and manage the gardens’.

2.7.3 CFG and reasons for participation

Middleton (2009) defined community gardens as places for growing food crops, flowers and herbs in the company of friends and neighbours. It may also be a place to reconnect with nature or get physical exercise. Gautan *et al.*, (2004) recognises Community gardens as traditional sources of food and nutrition and therefore are important contributors to food security and livelihoods of farming communities and their products are primarily intended for family consumption and utilization in many countries.

Community gardens have attracted different meanings, uses, and purposes to different societies and communities. Households participate in food gardens in an attempt to honour the available land and grow sufficient, safe and nutritious food. According to Armstrong (2006) rural households' most commonly expressed reasons for participating in gardens were access to fresh foods, to enjoy nature, and health benefits. However Koyenikan *et al.* (2007) noted that households engage in own production with a purpose to attain benefits such as source of food production, improvement of household health and nutrition, generation of income and social cohesion.

According to Marsh (1997) home gardens are known as the best method of a supplementary food production system for a household and can be regarded as a source of food. They often provide community people with self-reliant strategies for obtaining healthy and affordable food (Malakoff, 1995). Patel, (1991) observed that CFG improve access to food, and hence, better nutrition while Armstrong, 2000 noted an increased physical activity and relief from stress. Home gardening is one of the strategies that have a potential of enhancing food security for the

poor (Mutotsi *et al.*, 2006). Participation in CFG results in the increased social capital through the development of social ties and an increased appreciation of social diversity (Hancock, 2001).

Kirsten *et al.*, (2000) noted that income is the principal determinant of food security in South Africa. According to Kurtz (2001) CFG alleviate financial pressure for residents of low-income communities by providing cheaper sources of food, creating income and employment for the community. Crookes (2003) also noted that farming generates income in kind, in the form of food to reduce household expenditure on food and attain household food security and improved livelihoods.

2.7.4 Constraints faced by community food gardens in rural areas

The South African agricultural sector is dualistic in nature; it features a modern, highly capitalised commercial sector co-existing with a traditional, low technology and small-scale communal sector (Ortmann and King, 2006). Dixon *et.al* (2005) explains that the term smallholder only refers to their limited resource endowment relative to other farmers in the sector. Smallholder farmers are farm households with access to means of livelihoods in land relying primarily on family labour for farm production to produce for self-subsistence and often for market sale (Ellis, 1988).

The National Department of Agriculture (NDA, 2005) suggested that the major characteristics of production systems of smallholder farmers are of simple, out-dated technologies, low returns, high seasonal labour fluctuations and women playing a vital role in production. In addition, Perret (2003) indicated that there are various constraints that impede the growth of smallholder farmers varying from systems constraints, and allocative constraints to environmental-demographic constraints.

Furthermore NDA, (2005) also indicated that most smallholder farmers had a limited access to land and capital and received inadequate or inappropriate research and extension support resulting in chronically low standards of living. This is due to the unproductive and inefficient use of land in the absence of appropriate research and extension services. Due to historical imbalances, South African smallholder farmers are also constrained by socio-economic, technical and institutional factors such as shortage of capital goods, failure to secure markets and lack of extension services among others (Nel and Davies, 1999).

On the basis that the majority of rural people are engaged in agricultural production, improvement in the smallholder farm sector increases the chances of poverty alleviation (Machethe, 2004). However, such an objective can only be attained with a vibrant smallholder farm sector (Machethe, 2004). A vibrant small holder sector means the ability to access to appropriate extension and research support availability, access to input and output markets and the quality of natural resources available, which in return maybe important contributors to food production outcomes hence livelihood improvement.

2.7.5 Benefits and contribution of CFG to household food security and livelihoods

According to the Food and Agriculture Organization (FAO, 2007), CFG have been widely promoted as a food insecurity intervention mechanism although their impact and effectiveness has not been well researched and documented (FAO, 2007). They are said to enhance household food security through direct access to diverse nutritious foods, increased purchasing power from savings on food bills, income from the sale of surplus produce, and provision of food stocks during seasonally lean periods (Faber, 2007).

They are the greatest investments in our society, they are seen as an important element of wealth creation among the poor (Sotshongaye, 2000). An increase in the value of production in community gardens may come with a significant shift on the livelihood status of the households involved through employment creation and income generation. The Food and Agriculture Organisation of the UN (FAO, 2007) pointed out that successful agricultural development projects promote food security, self-sufficiency and self-reliance through greater community control of agriculture and food systems.

While food gardens do supplement the income of poor rural households, previous studies have shown that they also have non-economic benefits at the individual and social levels. Most common benefits of community gardens include; social development, enhanced health, access to fresh foods, saving or making money, education, an individual's psychological and physical sense of well-being (Sommers1984). Among the social benefits, community gardens build friendships, provide cultural diversity, reduce crime, and beautify neighbourhoods (Patel, 1991, Landman 1993, Schmelzkopf 1996).

According to Glover (2004), community gardens are where social capital is produced, accessed and used by community networks. The social networks and connections serve multiple purposes within the community and community gardens. They include an exchange of labour and material, but most importantly the exchange of knowledge (Fernandez, 2003). By people interacting together, they learn to share their aspirations, information, challenges, threats and fears thus leading to growth within individuals and community (Delgado, 1999).

In some instances community food gardens are used for aesthetic reasons; they are used to beautify the surrounding, with all the green and colours (Westphal, 1999) for a beautiful and

enjoyable environment not only in urban but in rural areas as well. Herbach (1998) also highlights other uses of community food gardens, identified are the internal and non-economic aspects to gardening, these include the enhancement of a person's psychological, spiritual and physical sense of well-being. In addition FAO (2006) stated that food gardens allow people to practice what is referred to as "experiential learning", where people learn by doing rather than being given something. Gardens teach them to be able to produce enough for their family consumption and probably have something left over to sell without needing help from another person.

Evidence about the contribution of community food gardens can be visible over time, in South Africa and other South African Development Community (SADC) countries such as Lesotho where Mashinini (2001) pointed out that community food gardens established in the 1960s improved the nutrition of beneficiaries by providing fresh vegetables to combat chronic malnutrition and diseases like pellagra and leprosy. The gardens also promoted employment, income generation and empowerment of women and landless households. A study by Mjonono *et al.*, (2009) in South Africa found that producing and selling food improved household food security.

2.8 Conclusion

This chapter gave a background on the concept and aspects of food security at different levels, how it relates to livelihoods and poverty. The state of food security and its causes were also discussed in this chapter. It further gave an overview of livelihoods strategies of rural households and factors and reasons for participation in community food and gardening in general. This chapter also gave an understanding on the concept of food gardening, gave different forms of

gardens, the definition of CFG, their benefit, challenges and how they are used to attain household food security and improve rural livelihoods.

This chapter concluded that agriculture plays a major role in attaining household food security and improving livelihood in rural communities in South Africa. Food gardens are major practice in most rural households because of the benefits that they bring. Evidence clearly indicates that rural people rely on sources of income such as pension fund, social grant and informal employment and food gardens for different socioeconomic reasons. Notwithstanding the apparent importance of food gardens on livelihoods improvement, attaining food security and poverty alleviation, there is a need for further research on rural food gardens inclusive of CFG.

CHAPTER THREE

DESCRIPTION OF THE STUDY AREA AND METHODOLOGY

3. Introduction

This study was based on the two aspects of community gardens that were chosen by the researcher and they were social and economic. The study required the usage of a variety of methods and tools in order to some extent appreciate or estimate the reality of community food gardening, understanding of the benefits and contribution to rural household livelihoods. This chapter presents the description of the study area, research design, sampling procedure as well as data analysis.

3.1. Description of the Study area

According to the Limpopo Provincial Government (LPG, 2011), Limpopo province is a semi-arid area with a potential in agricultural productivity, owing to its rich fruits and vegetable production. It is comprised of five districts namely: Mopani, Vhembe, Sekhukhune, Capricorn and Waterberg districts. Generally Vhembe and Mopani are considered to be major producers of fruits, vegetable and crops while Sekhukhune and Waterberg are dominated with livestock, few fruits and vegetables. Capricorn District is located on the northern side of South Africa. It derives its name from the Tropic of Capricorn, along which it is situated. Capricorn region is predominantly rural in nature. It consists of the following five local municipalities: Aganang, Blouberg, Lepelle-Nkumpi, Molemole and Polokwane as presented in the Figure 3.1below.

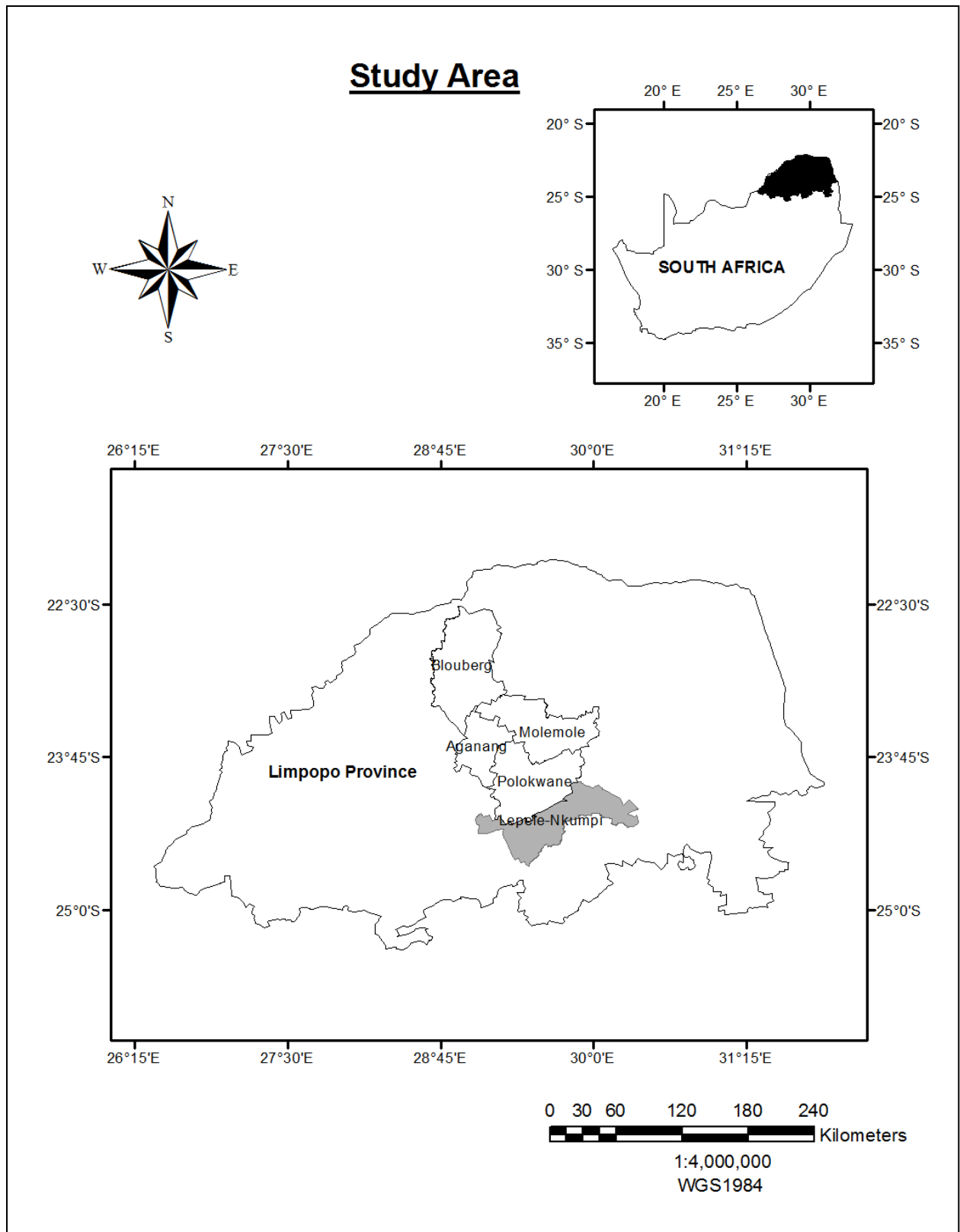


Figure 3.1: Map showing Lepelle-Nkumpi Local Municipality

The study was conducted in Lepelle-Nkumpi local Municipality, one of the local municipalities within the Capricorn District Municipality found in the Southern part of the Capricorn district, about 61km from Polokwane. Some of the major economic sectors within the area include social and community services, agriculture, forestry, hunting, wholesale and retail as well as personal services (StatSA, 2003). The area was chosen through purposive sampling. This area is predominantly rural with a population of approximately 241 414 people, 58 483 households and covers 3,454.78 km², which represents 20.4% of the district's total land area (StatSA, 2012).

The municipality is divided into 29 wards which comprises a total of 110 settlements. About 95% of its land falls under the jurisdiction of Traditional Authorities, in terms of Section 81(2) (a) of the Municipal Structures Act, 1998. The following are the leaders of the traditional authority within Lepelle-Nkumpi local municipality, Kgoshi Kekana III, Kgoshigadi Ledwaba, Kgoshi Mathabatha, Kgoshigadi Mphahlele, Kgoshigadi Seloane and Kgoshi Thobejane (IDP, 2006). The components of this chapter research design, sampling procedure, data collection and analysis are discussed in the next section.

3.2. Research design

Johnson *et al.*, (2006) recognises two main approaches or paradigm to research, the first approach being quantitative and the second being qualitative. According to Neuman, (2003) quantitative research approach focus on gathering hard data in the form of numbers to enable evidence to be presented in quantitative form while qualitative research approach focus on data represented or summarized in a narrative or verbal forms. Johnson & Onwuegbuzie, (2004) indicate that mixed method approach may be drawn from the use of both quantitative and qualitative research.

Mixed methods approach to research is becoming increasingly recognized as the third major research methods, approaches, or other paradigm characteristics. The exact mixture that is considered appropriate depends on the research questions and the situational and practical issues facing a researcher. All three research paradigms are important as we attempt to solve the manifold and complex problems facing us in the field of education.

A mixed methods research approach was used to investigate the determinants of CFG participation and to explore the effect of CFG on the status of food security to the households in Lepelle-Nkumpi local municipality. Creswell *et al.*, (2003) defines mixed methods as:

“A collection or analysis of both quantitative and qualitative data in a single study in which the data is collected concurrently or sequentially, is given a priority, and involves the integration of data at one or more steps in the process of research.”

The mixed methods approach adopted in this study consisted of survey questionnaires and face to face interviews. This approach was chosen for a number of reasons. First, as Hanson *et al.*, (2005) suggested, using mixed methods allows researchers to simultaneously generalize from a sample to a population and to gain a richer, contextual understanding of the phenomenon being researched.

It also allows for complementarity, by measuring overlapping but also different elements of a phenomenon. For example, the quantitative methods in this research were used to measure certain levels or rankings of variables, while the qualitative methods were used to explore the influences, perceptions, or experiences of these variables (Gray, 2009). Additionally, the use of a combination of methods helps to strengthen the validity of the findings as it ensures that the

results converge or corroborate one another and that the inherent bias of one measure is counterbalanced by the strength of the other (Gray, 2009).

3.3. Unit of analysis

Unit of analysis is the most basic element of a scientific research project. It refers to the subject (the who or what) of a study about which an analyst may generalize. In this study Households within the Lepelle-Nkumpi local municipality being both participants and non-participants of CFG constitute the unit of analysis. The following section describes the sampling procedure used in the study to obtain the sample size.

3.4. Sampling procedure

Sampling is a process of selecting units from a population of interest, so that by studying the sample, the results obtained from the sample may be generalized to the population from which the sample had been drawn (Leedy & Ormrod, 2001). Thus, the characteristics obtained from the sample should reflect approximately the same characteristics as the population. Sampling is generally considered to fall into two major categories, i.e. probability and non-probability sampling (Burns, 2000).

However Kumar (1996) classified the sampling design into three categories, probability sampling, non-probability sampling and 'mixed' sampling. Probability sampling refers to the inclusion of the entire population within the sampling based on the representation of each sector (Krosnick, 1999). On the other hand, non-probability sampling is defined as an inability to predict such inclusion (Leedy & Ormrod, 2010) and mixed sampling to incorporate the use of both probability and non-probability sampling. It is most visible when making use of sampling

techniques such as multistage sampling which is referred to as a sampling plan where the sampling is carried out in stages using smaller and increasingly smaller sampling units at each stage.

In multi-stage sampling, the sample is selected in stages, often taking into account the hierarchical (nested) structure of the population (Lavrakas, 2008). The target population of elements is divided into first-stage units, often referred to as primary sampling units (PSUs), which are the ones sampled first and then secondary sampling units (SSUs) are selected within each primary unit. The multistage sampling technique was chosen primarily for cost and feasibility (practicality) reasons and because it does not require a complete list of members in the target population, which greatly reduces sample preparation cost. Figure 3.2 below illustrates how multistage sampling was used in the study.

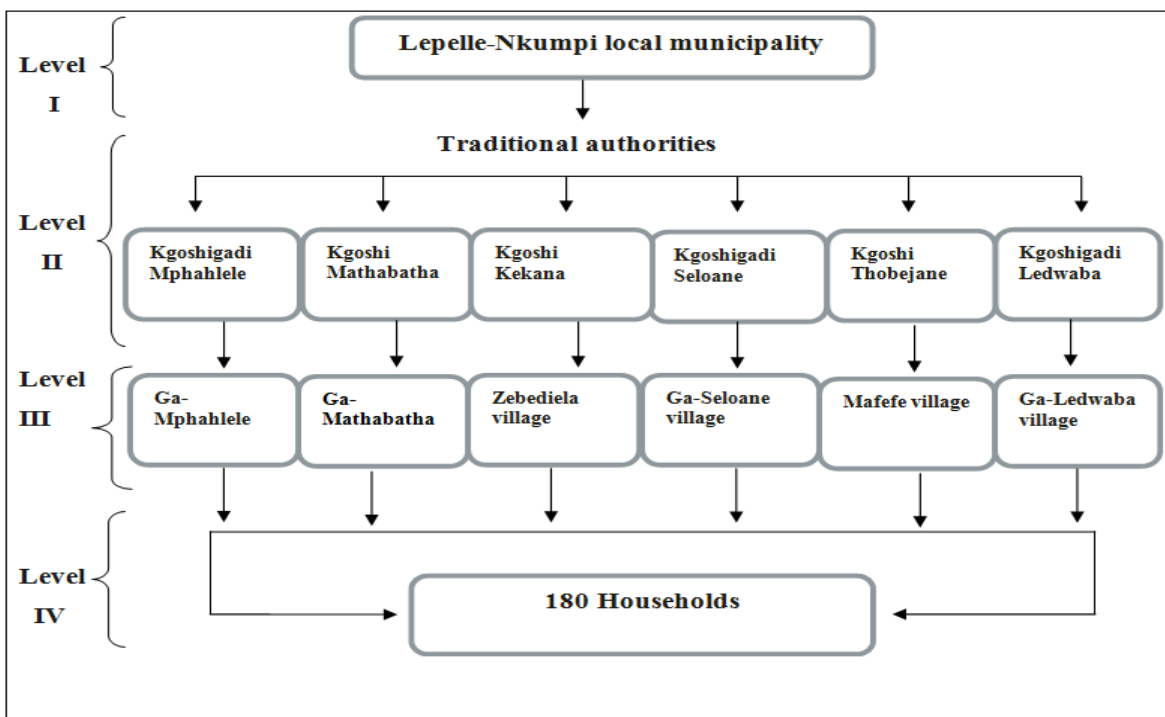


Figure 3.2: Sampling procedure

3.4.1 Sample size

According to Bless and Smith (2000), there are advantages associated with using the total population for field survey. Data obtained from the whole population is a true reflection of the population and more reliable when compared to sample data. The use of the total population requires time and resource availability. This study therefore used the sample of 180 households and the above approach due to time and financial constraints.

Table 3.1: Distribution of respondents per tribal authority

Province	Tribal Authority	CFG participants	CFG non-participants	Total
Limpopo, Lepelle-Nkumpi local Municipality	Kgoshigadi Mphahlele	15	15	30
	Kgoshi Mathabatha	15	15	30
	Kgoshi Kekana	15	15	30
	Kgoshigadi Seloane	15	15	30
	Kgoshigadi Ledwaba	15	15	30
	Kgoshi Thobejane	15	15	30
Total		90	90	180

Table 4.2 shows that 30 respondents were selected from each participating tribal authority for field survey (15 participating and 15 non-participating households). The study used equal proportions of households within the participating tribal authorities due to the unknown number of participants and non-participants within the tribal authorities.

3.5. Data collection methods

In an attempt to achieve the objectives of this study, a structured questionnaire was developed as a tool for primary data collection. An additional household dietary diversity score (HDDS)

questionnaire adopted from FAO (2007) was used to capture household dietary diversity score for classification into either food secure or insecure. Prior to the main survey, both questionnaires were pre-tested in the village selected under Mphahlele tribal authority. The pre-testing informed some improvements on the questionnaire. The questionnaire referred to in **Annexure A** was designed to capture information on a range of potential socio-economic indicators related to household participation into CFG as well as their contribution to HFSS.

Data was collected, sequentially over a two-month period with the help of an enumerator and extension officers from the area. Heads of the households were interviewed in a face to face setup. In the absence of the head, the spouse or any family member who is directly involved in the farming activities was interviewed. The interviews were carried out in *Sepedi* (the local language of the people) in order to minimize misunderstandings and gain farmer confidence. Bless and Smith (2000) stressed that an interviewer administered interview is an important tool of data collection because it reduces omission of difficult questions by respondents and misinterpretation and misunderstanding of words accordingly.

3.6 Data Analysis

3.6.1 Description Analysis

According to Bless and Smith (2000), descriptive statistics is the discipline of quantitatively describing the main features of variables used. They are useful in analysing households' characteristics and the relationship between the variable aimed at summarizing a data set. Descriptive statistics (cross tabulation) was used in this study to describe and compare the major CFG participating and non-participating households' characteristics within the study area for the following major parameters: household characteristics (gender, age, marital status, education,

land ownership etc.) it was further used to describe the reasons or intended reasons for CFG participation.

3.6.2 The determinants of CFG

Several methods can be used to explain the relationship between dependent and independent variables. Such methods include linear regression models, probit analysis, log-linear regression and discriminant analysis (Mohammed & Ortmann, 2005). However, binary logistic regression was chosen because it has more advantages, especially when dealing with a dependent variable that has two categories. Linear regression model (also known as Ordinary least squares regression (OLS)) is the most widely used modelling method for data analysis and has been successfully applied in most studies (Montshwe, 2006).

Hosmer and Lemeshow (2000) referred to logistic regression as a technique that predicts a categorical dependent variable on the basis of continuous and categorical independent variables. Binary logistic regression is a logistic regression that applies to binary (0, 1) variables (e.g. fail or pass...). Generally, logistic regression is preferred by many researchers because it allows one to see the effect every variable has on the model and is well suited to examine and establish relationships between the dependent variable and the independent variables. According to Kleinbaum (1994), there are two main reasons for using logistic regression in economics research. Firstly, the logistic function is flexible, easily applicable, and secondly the interpretation of the results is straight forward and meaningful.

The Binary logistic regression model was used in the study to address two objectives as applied in a study by Montshwe (2006). Firstly, to investigate the socio-economic determinants of community food garden ownership/participation in Lepelle-Nkumpi Local Municipality. The

following model was employed to estimate the probability that socio-economic factors are the determinants of community food gardens participation.

The general logistic regression model:

$$\text{Logit } (P_i) = \ln (P_i / 1 - P_i) = \alpha + \beta_1 X_1 + \dots + \beta_n X_n \dots \dots \dots (1)$$

Where:

$\text{Log} [(P_i / (1 - P_i))] = \text{logit for CFG participation choice}$

P_i = Predicted probability that Y equals to one (CFG participants)

$1 - P_i$ = Predicted probability that Y equals to zero (CFG non-participants)

α - Intercept term

β = Estimated parameters;

X = represents covariates

μ_i = the error term.

The specific model:

$$\text{CFG} = B_0 + B_1 X_1 + B_2 X_2 + B_3 X_3 + B_4 X_4 + B_5 X_5 + B_6 X_6 + B_7 X_7 + B_8 X_8 + B_9 X_9 + B_{10} X_{10} + B_{11} X_{11} + B_{12} X_{12} + \mu_i \dots \dots \dots (2)$$

3.6.2.1 Variables used

The questionnaire was designed to capture data on a number of factors that might Influence farmers' decisions on whether to participate in CFG, and socio-economic factors including CFG, influencing household food security status. Table 4.2 below presents a summary of variables used to assess the determinants of CFG in Lepelle-Nkumpi local municipality.

Table 3.2: Variable description and measure for CFG

Variable	Description	Unit of Measure	Expected relationship
Dependent variable			
CFGP – Community Food Gardens Participation	1 if the household is CFG participant; 0 otherwise	Dummy	
Independent Variables			
X ₁ – Gender	1 if gender of the household head is male; 0 otherwise.	Dummy	(-)
X ₂ – Age	Age of the participant member in the household	Number (Years)	(-)
X ₃ – Education level	The household head acquired level of educational level	Categorical	(+)
X ₄ – Household size	The number of members in the household.	Number	(-)
X ₅ – Farm income	The amount of income the households receives from agricultural production	Categorical	(+)
X ₆ – Household monthly income	The household’s monthly income except from agricultural produce	Categorical	(+)
X ₇ –Number of Income sources	The number of income sources the household have	Categorical	(+)
X ₈ –Arable land size	The size of arable land owned	Numeric	(+)
X ₉ –Arable land ownership	1 if the household head own land; 0 otherwise	Dummy	(+)
X ₁₀ – Farming information access	1 if the household have CFG access information, 0 if otherwise	Dummy	(+)
X ₁₁ – Farmers perception on CFG	The perception of household on CFG and their benefits, 0 if otherwise	Categorical	(+)
X ₁₂ Marital status	The household head’s marital status	Categorical	(+)
X ₁₃ – Homestead gardening	1 if the household is involved in homestead gardening, 0 if otherwise	Dummy	(+)
X ₁₄ – Dependency ratio	The ratio of employed to unemployed household members	Number	(-)
X ₁₅ – Agricultural training acquired	1 if the household head acquired agricultural training; 0 otherwise	Dummy	(+)
X ₁₆ – Formal employment status	1 if the household head is employed; 0 otherwise	Dummy	(+)
X ₁₇ – Social safety nets	1 if the household receives a social grant or pension fund; 0 otherwise	Dummy	(+)
X ₁₈ .. Ownership to livestock	1 if the household own a minimum of livestock, 0 otherwise	Dummy	(+)

The next section presents the analytical tool used in the analysis of the contribution of CFG and other socio-economic factors to household food security status. It outlines the household food security measure, the tool used to classify household into food secure or food insecure and the analytical model used to test the Contribution of CFG and socio-economics variable to HFSS.

3.6.3. Contribution of CFG and socioeconomics variable to HFSS

3.6.3.1 Household Food security measures

Hart *et al* (2009) indicated that food security is a broad concept. The meaning and the measurement are multifaceted condition of complex causality. Food insecurity is related to, yet distinct from, concepts such as poverty and malnutrition (Webb *et al.* 2006), and is experienced at a range of spatial scales from households to regions, as well as a range of time scales. Given its broad definition, it is no surprise that food security eludes precise measurement.

Anderson (1990) recognizes the distinction in national and household food security hence distinguished measures are for food security. At national level, Gross Domestic Product (GDP), in particular commercial imports are used to estimate food security. At household's level, several indicators are used to examine the status of food security. Hart *et al* (2009) revealed that in South Africa there are no specific and accepted measures of food security and there are no regularised ways of monitoring it. Researchers in South Africa are using various methods to assess food security at household's level depending on the objectives and purpose of their study. Some of the recognised and used measurements include Household Food Insecurity Access Scale (HFIAS) and Household Dietary Diversity Score (HDDS).

Household Food Insecurity Access Scale is a brief survey instrument developed by Food and Nutrition technical Assistant (FANTA) to assess whether a household has experienced problems with food access during the past 30 days. It is premised on the notion that the experience of food insecurity by households tends to cause predictable reactions as well as responses that can be captured and quantified through a survey (Coates *et al.*, 2007). The measured results are then assigned categorical designations namely food secure, mildly, moderate or severely food insecure on a scale 0-27, with a higher number representing a higher level of food insecurity (Coates *et al.*, 2007).

According to Deitchler *et al.* (2010), the HFIAS reflects the three universal domains of the experience of inadequate household-level food access: anxiety about household food supply; insufficient quality, which includes variety and preferences; and insufficient quantity of food supply, the amount consumed, and the physical consequences of insufficiency. HFIAS has its advantage, it tends to be cost effective, more sensitive to changes in household food insecurity and also user friendly (Kirkland *et al.*, 2007). However, it has a longer recall period of 30days.

Dietary diversity is another measure of household food access. Hoddinott and Yohannes (2002) define dietary diversity as the sum of the number of different foods or food groups consumed by an individual or household over a specific time period. This indicator is a proxy for quality of diet and is highly correlated with adequate caloric and protein intake, quality of protein consumption, and household income (Ruel, 2002). The use of dietary diversity as a proxy for consumption stems from the fact that households consume a wider variety of foods when their income is high.

Evidence from multi-country analysis suggests that household-level dietary diversity is strongly associated with per capita consumption (a proxy for income) and energy availability, suggesting that dietary diversity could be a useful indicator of household food security defined in relation to energy availability (Ruel, 2004). There are two possible methods of calculating dietary diversity, the first is a simple sum of the number of different foods eaten by that person over the specified time period; and the second is to calculate a weighted sum, where the weights reflect the frequency of consumption, and not merely the number of different foods (Hoddinott and Yohannes, 2002)

An analysis of the food and nutritional technical assistance project by Hoddinott and Yohanne (2002) has established that dietary diversity is a good indicator of the access dimension of household food security. The same authors indicate that household dietary diversity is a reflection of the household's economic capacity to consume a variety of foods. The use of dietary diversity as a proxy indicator of household food access has several advantages compared to other indicators.

According to Swindale and Bilinsky (2006) and Hoddinott and Yohannes (2002), the indicator is attractive for many reasons. A high dietary diversity is highly correlated with factors such as caloric and protein sufficiency, the percentage of animal protein and household income. It is also an attractive indicator because data gathering is straightforward. While household dietary diversity reflects the household's access to food, the individual dietary diversity, on the other hand, serves as a proxy measure of the nutritional quality of the diet of an individual.

This study adopted and used the simple sum of the number of different foods eaten by a household member over the specified time period with a recall period of 24 hours as chosen by

(FAO, 2006), because it is less subject to recall error, less cumbersome for the respondent and also conforms to the recall time period used in many other dietary diversity studies (Kennedy *et al.*, 2007). The disadvantage of this measure is that the simple form of this measure does not record quantities and it is not possible to ask about frequency of consumption of particular quantities. It is not possible to estimate the extent to which diets are inadequate in terms of caloric availability.

3.6.3.2 Classification of households

First, the HDDS was calculated for each household using variable labelled A - O or ranging from 0 to 15. HDDS (0-15) is the total number of food groups consumed by members of the household. Values for A through O were either “0” or “1” meaning no and yes respectively. Second, the average (mean) HDDS indicator was calculated using the formula in Figure 3.3 below for the sample population (Swindale *et al.*, 2005) to help classify household into either food secure or food insecure.

Average HDDS	Sum (HDDS)
	Total Number of Households

Source: Swindale 2005

Figure 3.3: Computing an average HDDS

Households were classified as shown below:

- 1 - food secure, if $HDDS \geq AHDDS$ (if the household dietary diversity score is above or equal-to the average household dietary diversity score)

- 0 - food insecure, if HDDS < AHDDS (if the household dietary diversity score is less than the average household dietary diversity score)

The following food group was adopted in the study to classify the sampled households into either “food secure” or “food insecure” guided by the average HDDS.

Table 3.3: HDDS Food groups

Question Number	Food Group	Examples
A	Cereals	bread, noodles, biscuits, cookies foods made from millet, sorghum, + insert local foods e.g. ugali, nshima, porridge or pastes or other locally available grains
B	Vitamin a rich vegetables and tubers	pumpkin, carrots, squash, or sweet potatoes that are yellow or orange inside + other locally available vitamin-A rich vegetables
C	White tubers and roots	White potatoes, white yams, cassava, or foods made from roots.
D	Dark green leafy Vegetables	Sweet pepper, dark green/leafy vegetables, including wild ones + locally available vitamin-A rich leaves such as cassava leaves etc.
E	Other vegetables	including wild vegetables
F	Vitamin a rich fruits	Ripe mangoes, papayas, other locally available vitamin A-rich fruits
G	The fruits	other fruits, including wild fruits
H	Meat	beef, pork, lamb, goat, rabbit, wild game, chicken, duck, or other birds, liver, kidney, heart or other organ meats or blood-based foods
I	Eggs	fresh or dried fish or shellfish
J	Legumes, nuts and seeds	beans, peas, lentils, nuts, seeds or foods made from these
K	Milk and milk products	milk, cheese, yogurt or other milk products
L	Oils and fats	oil, fats or butter added to food or used for cooking
M	Sweets	sugar, honey, sweetened soda or sugary foods such as chocolates, sweets or candies
N	Spices and caffeine or alcoholic beverages	spices, coffee, tea, alcoholic beverages or local examples
O	Other	Anything the household ate outside home

Source: FAO, 2007

3.6.3.3 Measuring the contribution of CFG and socioeconomics variable to HFSS

Furthermore the binary logistic regression model was used, to assess the impact of community food garden participation to the food security status in Lepelle-Nkumpi Local Municipality.

The general logistic regression model:

$$\text{Logit}(P_i) = \ln(P_i / 1 - P_i) = \alpha + \beta_1 X_1 + \dots + \beta_n X_n \dots \dots \dots (3)$$

Where:

$\text{Log} [P_i / (1 - P_i)]$ = logit for household food security status

P_i - Predicted probability that Y equals one (household is food secure)

$1 - P_i$ - Predicted probability that Y equals to zero (household is food insecure)

α - Intercept term

β - Estimated parameters;

X - Represents covariates

μ_i - the error term.

The specific model:

$$\text{HFSS} = B_0 + B_1 X_1 + B_2 X_2 + B_3 X_3 + B_4 X_4 + B_5 X_5 + B_6 X_6 + B_7 X_7 + B_8 X_8 + B_9 X_9 + B_{10} X_{10} + B_{11} X_{11} + B_{12} X_{12} + \mu_i \dots \dots \dots (4)$$

Table 3.4: Variable description and measure for Household Food Security Status

Variable	Description	Unit of Measure	Expected relationship
Dependent variable			
HFSS – Household Food Security Status	1 if the household is food Secure; 0 otherwise	Dummy	
Independent Variables			
X ₁ – Gender	1 if gender of the household head is male; 0 otherwise.	Dummy	(-)
X ₂ – Age	Age of the participant member in the household	Number(Years)	(-)
X ₃ – Education level	The household head acquired level of educational level	Categorical	(+)
X ₄ – Household size	The number of members in the household.	Number	(-)
X ₅ – Farm income	The amount of income the households receives from agricultural production	Categorical	(+)
X ₆ – Household monthly income	The household’s monthly income except from agricultural produce	Categorical	(+)
X ₇ –Number of Income sources	The number of income sources the household have	Categorical	(+)
X ₈ –Arable land size	The size of arable land owned	Numeric	(+)
X ₉ –Arable land ownership	1 if the household head own land; 0 otherwise	Dummy	(+)
X ₁₀ – CFG access to Information	1 if the household have information access on CFG, 0 if otherwise	Dummy	(+)
X ₁₁ – Farmers perception on CFG	The perception of household on CFG and their benefits	Categorical	(+)
X ₁₂ – CFG involvement	1 if the household is a participants; 0 otherwise	Dummy	(+)
X ₁₃ – Marital status	the household head’s marital status	Categorical	(+)
X ₁₄ – Homestead gardening	1 if the household is involved in homestead gardening, 0 if otherwise	Dummy	(+)
X ₁₅ – Dependency ratio	The ratio of employed to unemployed household members	Number	(-)
X ₁₆ – Agricultural training acquired	1 if the household head acquired agricultural training; 0 otherwise	Dummy	(+)
X ₁₇ – Formal employment status	1 if the household head is employed; 0 otherwise	Dummy	(+)
X ₁₈ – Social safety nets	1 if the household receives a social grand or pension fund; 0 otherwise	Dummy	(+)
X ₁₉ .. Ownership to livestock	1 if the household own livestock, 0 otherwise	Dummy	(+)

Data was coded and processed using the Statistical Package for Social Scientists version 21 (SPSS). Descriptive statistics were used together with the binary logistic regression model to analyse the relevant data. The main descriptive indicators that were employed are frequency, percentage, mean values and crosstabs for all the variables. These are useful in analysing household characteristics as well as analysing the relationship between variables. In that regard, the binary logistic regression model was used as a specific analytical tool to test the research hypothesis: Determinants of CFG as well as its contribution to HFSS.

3.7 Ethical consideration

Permission to conduct the study was obtained from Lepelle-Nkumpi Local Municipality and an ethical clearance certificate from the University of Fort Hare. The Participants were informed about the nature of the study to be conducted and were also not coerced to take part. Their participation was on voluntary basis, promises were not made to the household member to convince them to take part. The researcher ensured the rights; privacy, dignity and confidentiality of participants were respected throughout the data collection process as outlined by Leedy and Ormrod (2001).

3.8 Conclusion

This chapter gave an overview of the study and the methodological framework used in this study. It gave a description of the study area, its demographic location and social, cultural and economic characteristics. The chapter further outlined different methodological procedures followed in choosing analytical tools that best suit the study objectives. It outlined the research design, sampling procedures and size, data collection tool and analytical tools. The following table gives a summary of the objective, hypothesis and analytical tools used in this study.

Table 3.5: Summary of objective, hypothesis and analytical tools

Objective	Hypothesis	Analytical Tools
To explore the socio-economic reasons behind household participation and non-participation in CFG	There are social and economic reasons behind household participation or non-participation in CFG	Descriptive statistics
To investigate the determinants of community food gardens ownership or participation	Socio-economic factors determine the community food garden ownership or participation in Lepelle-Nkumpi Local Municipality.	Binary Logistic Regression Model
To assess the impact of community food garden ownership to the household food security	Community food gardens have a positive effect on household food security status in Lepelle-Nkumpi Local Municipality Limpopo province	Binary Logistic Regression Model

CHAPTER FOUR

DESCRIPTIVE RESULTS AND DISCUSSIONS

4. Introduction

This chapter presents the results, interpretation and the discussion of the central findings of a survey conducted in Lepelle-Nkumpi local municipality. The socio-economic characteristics of the sampled households are provided. It also compares the socio-economic characteristics of the CFG participants and non-participants of the sampled households. Within the chapter, descriptive statistics such as mean, maximum and minimum values, frequencies and percentages were used to analyse the data obtained from the survey. The following sections describe the social and economic characteristics of households as well as the reasons behind CFG participation and non-participation in the study area.

4.1 Household socio-economic characteristics

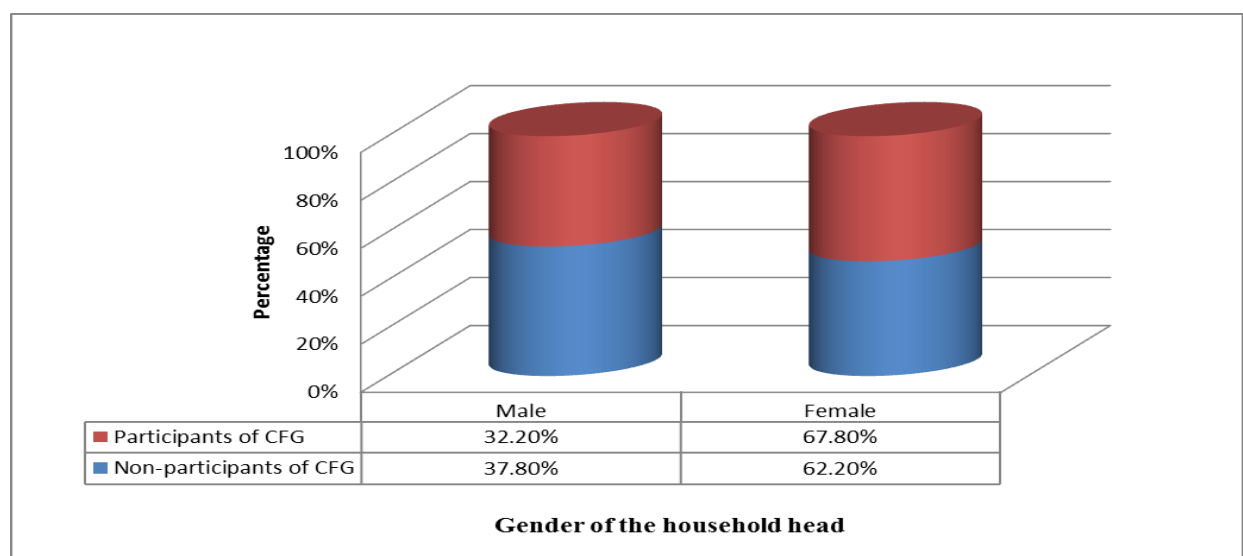
According to Lionberger (1960), socio-economic characteristics are among forces that encourage or discourage change in the behaviour of rural people towards agriculture. Recent studies have shown a great link of significance between individuals, their socio-economic status and their involvement and participation in agricultural development (Kongolo, 2002). Bembridge (1987) argued that the human element is the key factor in agricultural and rural development because of their decision making abilities, which are of paramount importance to improve their livelihoods (food security status).

Farming is the human function, but socio-economic factors influence the complexity of men and consequently their success and benefits from agriculture. Meenar & Hoover (2011) who assessed

issues of community food insecurity, hunger, and the impact of community gardens on Philadelphia neighbourhoods argued that socio-economic factors may be important determinants of household participation in community gardens. There are number of socio- economic factors which influence participation of households in CFG. This chapter will only focus on the socio-economic factors that were analysed and discussed in the previous chapter.

4.1.1 Gender distribution of a household head

According to Kehler (2001), rural women have historically played a crucial role in agriculture as food producers to improve their standard of living. This is more evident in developing countries such as Nigeria, South Africa, Ghana, etc., where female producers constitute more than half of the agricultural labour (Manuh, 1998). Mushunje (2005) further pointed out that the sex of household head had a potential to influence the ability of the household to source income and access to assets such as land and capital that have a direct bearing on agricultural productivity and livelihoods. The analysis on the gender of the household head was carried out from a sample of 180 households for this study and the results are as shown in Figure 4.1 below.



Source: Survey data (2014)

Figure 4.1 Gender distributions of the households

The results in Figure 4.1 above show that amongst households participating in CFG, there were about 67.8% of female and 32.2% male-headed households. Similar to the CFG non-participants are female headed households still dominated with about 62.2% female and 37.8% male headed households. The general findings of this study indicate that sampled households in this study are dominantly female headed. The rational for this finding could be that their male counterparts migrated to cities for job opportunities and better wages. Ortmann and King (2006) also noted that there are fewer male participants in agriculture due to their involvement in non-agricultural activities, such as manufacturing, mining, brick making, car repairs etc.

4.1.2 Age of the households head

Age is a crucial factor that could determine participation of individuals in household activities and reflect changes in labour allocation over the life span (Adhikari, 2005). According to Kabubo-Mariara (2008) age may mean experience in managing common resources and the accumulation of capital within a household. Maxwell *et al.*, (2001) further suggest that it is related to an individual's choices and decision making because the way in which an individual thinks is closely related to the number of years an individual has lived.

Age can therefore be regarded as one of the factors influencing the household decision to participate in agricultural activities such as CFG. Table 4.1 below shows the distribution of household by age for both CFG participants and non-participants. The age range between 20-35 years is high by 3.4% amongst the participants as compared to non-participants, while there is a difference of 3.3% between the participant and non-participant within the age group 36-45 years.

Among Household heads participating in CFG the highest participating age group is youth (20-35 years) and the least participating group is old aged between the ages of 66–75 and older than 76 years.

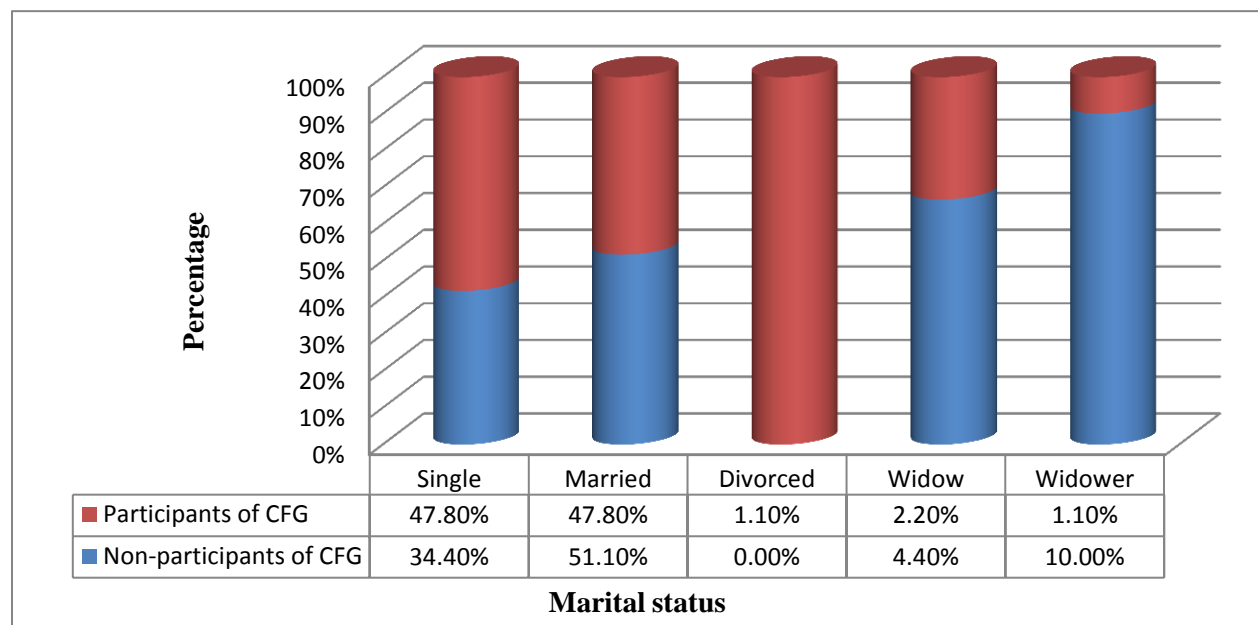
Table 4.1: Age distribution of household heads

Age of the household head		
Age range	Participants	Non-participants
	Percentage	Percentage
20- 35 years	25.6%	22.2%
36 - 45 years	21.1%	24.4%
46 - 55 years	26.7%	18.9%
56 - 65 years	13.3%	12.2%
66 - 75 years	6.7%	12.2%
76 years and older	6.7%	10.0%
Total	100%	100%

The high participation rate among the youth could be that they are still active to take on the activities within the CFG as well as an understanding of the effect CFG have on their livelihoods, while the low participation rate among the old age group could be that they are not as active as youth and they also receive old age social grant. The findings of this study are in line with Galrneau *et al.*, (2003) who stated that younger people tend to be more willing to participate and adapt than their older counterparts while they contradict with the findings of a study conducted by Banski (2003) who highlighted that young people across Africa are moving from rural areas to urban areas in search of better opportunities because most rural areas have little economic activities. Adhikari (2005) further supported the study by highlighting that older people are mostly unable to perform actively in the agricultural sector.

4.1.3. Marital status of the household head

Marriage is the union of a man and a woman who make a permanent and exclusive commitment to each other if the type that is naturally (inherently) fulfilled by bearing and rearing children together (George *et al* 2010). According to Randela (2005), in the African context, the marital status of households is usually used to determine the stability of a household in terms of food security. It is generally believed that married household heads tend to be more stable in terms of the household's wellbeing than unmarried heads (Randela, 2005).



Source: Survey data (2014)

Figure 4.2 Marital status of the household head

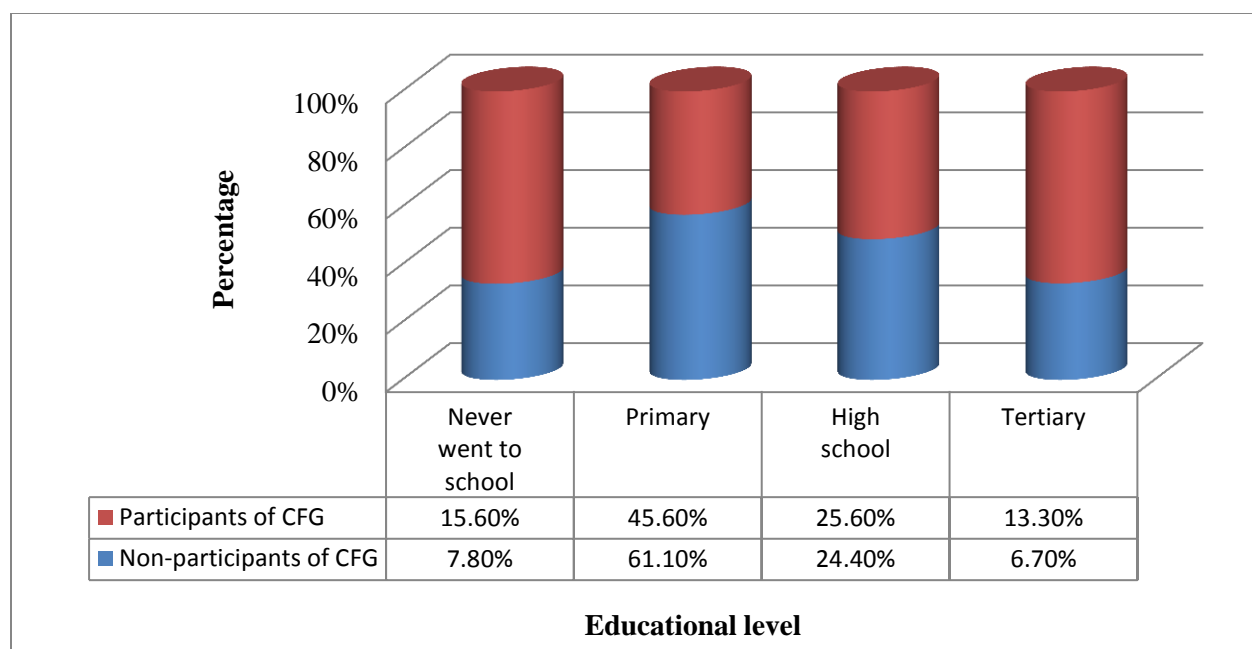
Household marital status was classified into six categories but however none of the household heads reported separated. Figure 4.2 above shows the distribution of households head by marital status. The Figure shows more than 50% of CFG non-participants are married while 34.4% are single. It further indicates an equal proportion of about 47.8% for both single and married

households head among the CFG participants. From the general response, majority of the households heads inclusive of both the participants and non-participants fell within the category single and married while minority reported being widows, widowers and divorcees.

The rationale behind this finding reveals that a household's marital status has less influence on the household's participation in CFG. The study finding on marital status contradicts with Zhang (2005), who suggested that marriage makes families better off partly by allowing individuals with families to specialize, which yields greater productivity, hence income. This is because of similarities between single and married households head status in terms of their state of participation in CFG.

4.1.4 Educational level of household head

World Bank (2008) referred to educational level as the number of schooling years a household head has attended and often influences the household economic activity choices. According to Najafi (2003), educational attainment by the household head could lead to awareness of the possible advantages of subsistence agricultural practices and possibilities of formal employment. Najafi (2003) further adds that education influences the literacy level of the household head influencing their probability of being formally employed as well as enabling them to make informed decisions that will impact positively to their livelihoods. Figure 4.3 below shows the educational levels of households in Lepelle-Nkumpi local municipality



Source: Survey data (2014)

Figure 4.3: Educational level of a household head

Figure 4.3 above present findings of the study on households' level of education for both CFG participant and non-participants. There are commonly high levels of illiteracy within both the CFG participants and non-participants. The findings reveal that about a total of 45.6% of the CFG received up to primary education while only 13.3% received up to tertiary education. On the other hand more than 60% of the CFG non-participants received up to primary education, while only 6.7% received up to tertiary level. This finding generally implies low literacy level among the population within the Lepelle-Nkumpi local municipality. The rationale behind low literacy level could be that lack of motivation, lack facilities such as schools and a poverty background.

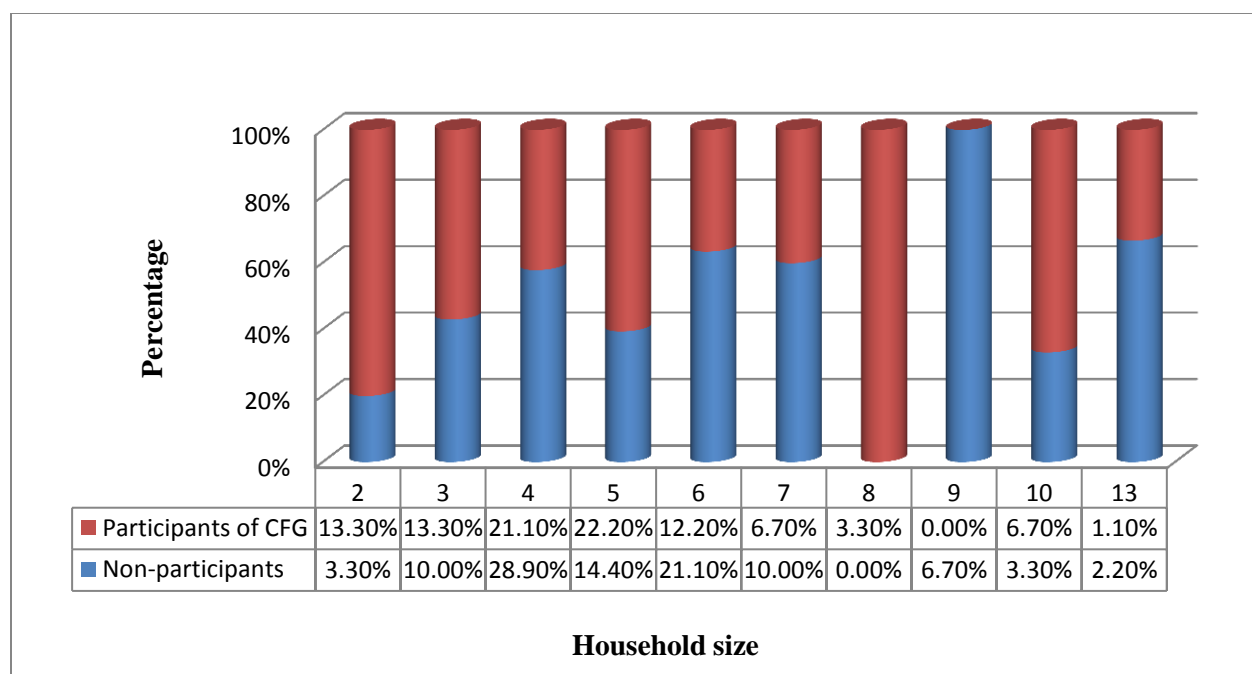
The findings of this study are in line with Banmeke and Omoregbee (2009), who noted that there is low literacy level amongst the rural dwellers. Further, these findings also noted that household

heads who attended school up to tertiary may also participate in CFG as part of social networking which contradicts with an argument put forward by World Bank (WB, 2008) that households with more years of schooling would be expected to seek non-farm employment because of its economic rewards.

4.1.5 Household size

According to Delgado (1999) households with larger family size are more likely to become successful as a household because they had more labour to work on the farm. This means that large family size is advantageous, because it translates to available labour capacity. However, Paddy (2003) pointed out that while increasing family size tends to provide households with the required labour for agricultural production, larger families tend to put pressure on consumption than its labour contribution to production. Figure 4.4 below present household distribution on household size.

According to the figure 4.4 below, an overall range for the households size ranges from 2 to 13 members. Households within the CFG participants (3.3%) dominate highly in the household size of about 8 members while the non-participants (6.7%) dominate highly on a household of about 9 members. The results indicate an overall of high households' size within the study area among both participants and non-participants. This may be a justification for participating or not participating in CFG, but it however depends on other factors such as dependency ratio and employment status which have an implication on household food security and are discussed below.

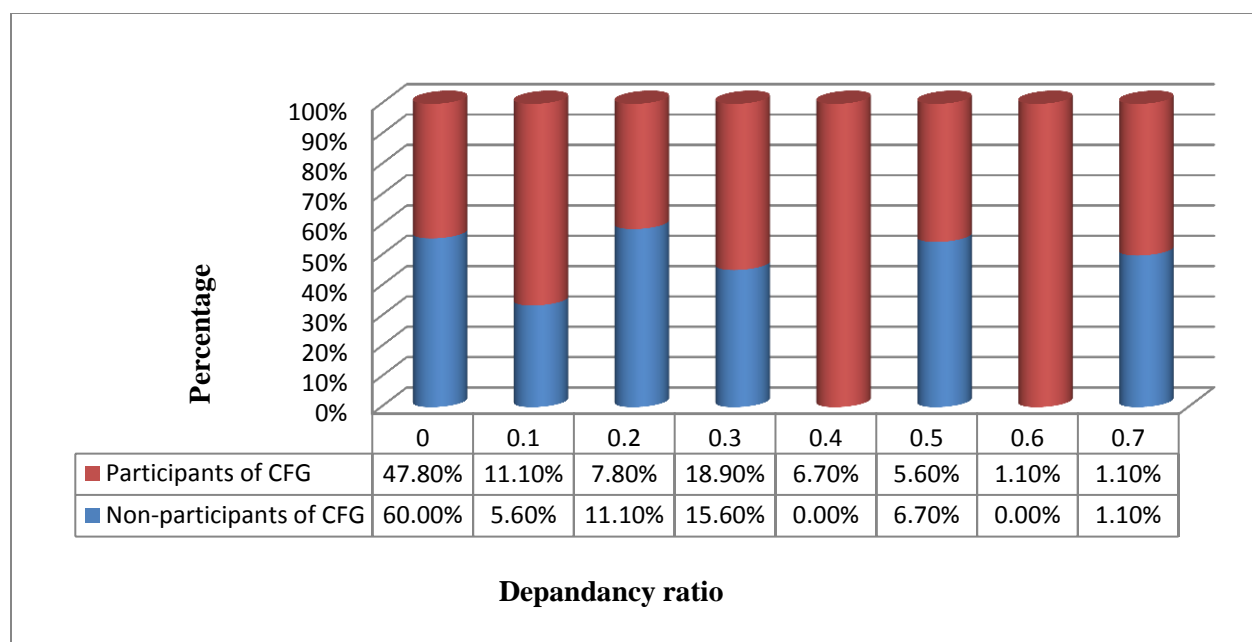


Source: Survey data (2014)

Figure 4.4: Household size

4.1.6 Dependency ratio

Dependency ratio is the ratio of the number of unemployed household members to the number of employed members. It can also be represented in percentage and it tells how many members of a household are employed and to which number of dependents do they respond to. In a situation where the ratio equals to 0.0 (zero), this implies that the household does not have an employed member of the household from which the rest of the members depend upon. Figure 4.5 below shows the distribution of households by dependency ratio.



Source: Survey data (2014)

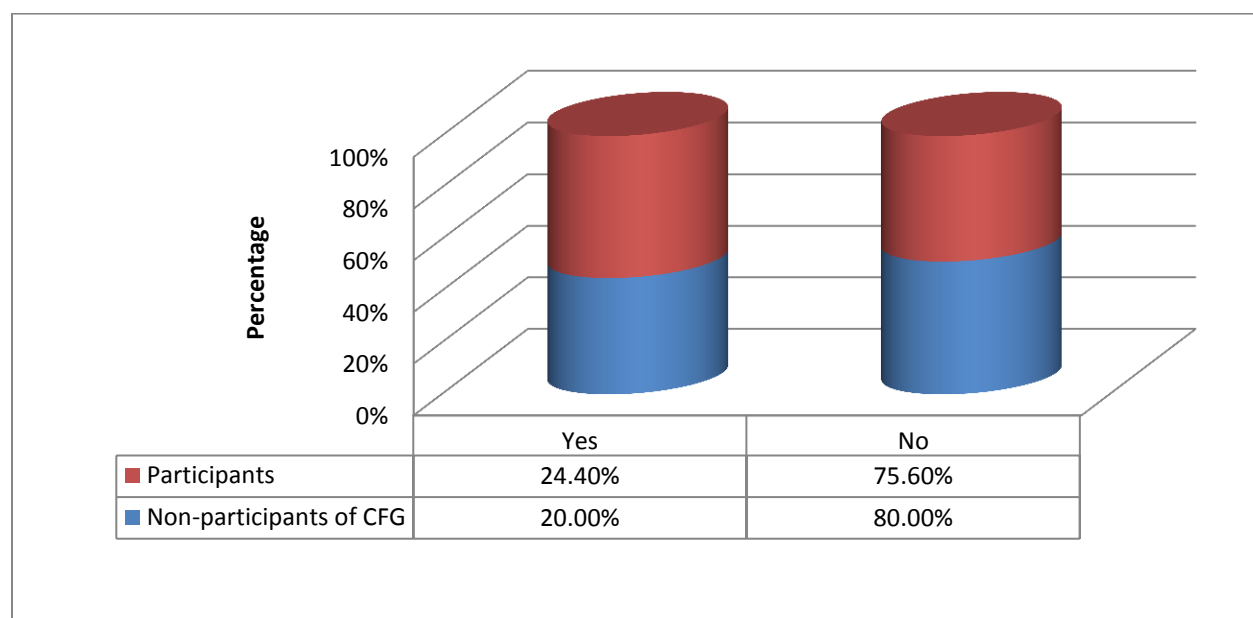
Figure 4.5: Dependency ratio

The number of working household members has an influence on the household income level which is closely related to the livelihood status. Figure 4.5 above indicates high levels of dependency among both CFG participants and the non-participants. There are about 47.8% of CFG participants without an employed family member they can depend upon, while on the other hand there is also about 60% of the non-participating households without a source of dependency, generally the findings of this study revealed that a large portion of the households lacked a source of dependency. The rationale behind these findings may be due to a high rate of unemployment in rural areas and nationally.

4.1.7 Formal Employments status

Employment status of household head is another factor that may affect farmer decisions to participate in CFG. This is because the nature of employment a household head is engaged in is a

source of income which could be channelled towards. According to Matshe and Young (2004) rural household heads without formal employment, participate in agricultural labour markets, in self-employment or wage employment in the rural nonfarm economy, while some receive transfers from household members who have migrated to urban areas for improvement on livelihoods and food security. The sampled households were asked about their employment status (formally employed or not) and the results are shown in the figure 4.6 below.



Source: Survey data (2014)

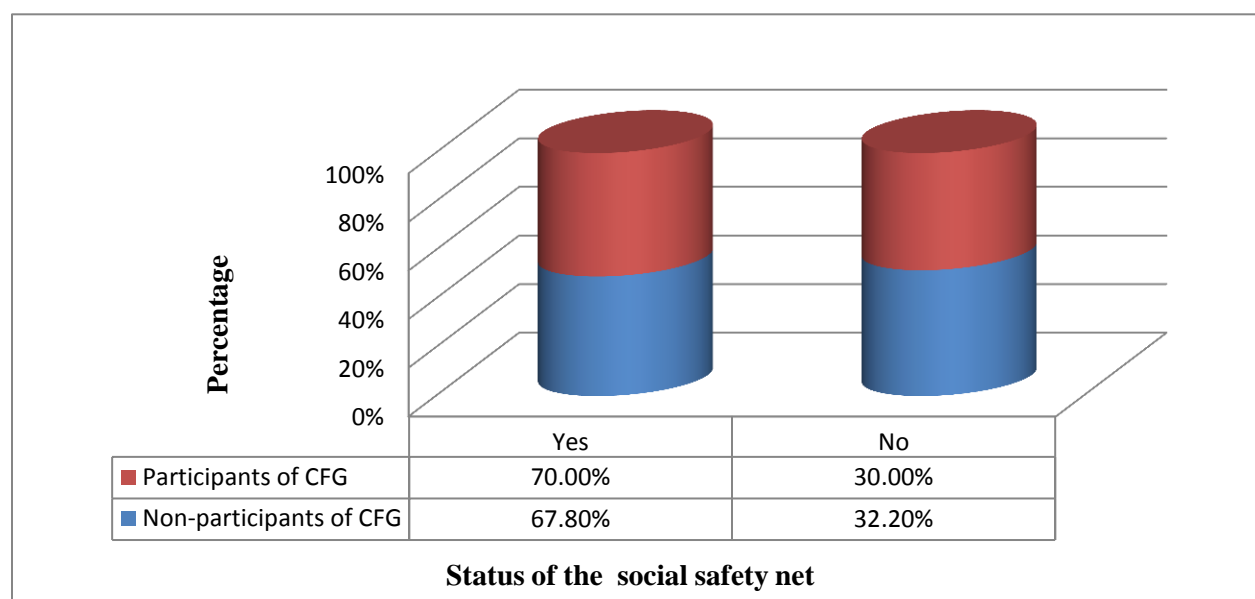
Figure 4.6: Employment status of household head

Figure 4.6 above indicates that from an overall of CFG participants, about 24.4% are formally employed while about three quarters (75.6%) are non-formally employed. This may be one of the rationales behind their participation in CFG to generate livelihoods within their households. On the other hand about 80% of non-participation households remain none formally employed while only 20% of the non-participants are formally employed. This maybe that 80% of these households engage in informal employment such as casual labour and others on farm activities

such as home gardening. Generally the results of this study indicate high levels of informal employment engagements in the rural Lepelle-Nkumpi local municipality which maybe as a result of a high illiteracy level projected earlier in the study and may impact negatively on the state of household food security used as a proxy for livelihood in this study. These findings are in line with the findings of Ajani et al (2010) who concluded that most households in rural areas are engaged in non-formal employments with some basic literacy especially in their local language and depend mainly on non-formal employment for livelihoods.

4.1.8 .Social safety nets

According to Anseeuw *et al.*, (2001) rural households create a living from various sources: production, own labour, trading, and transfers (grants and remittances). This last form of entitlement grants and remittances often forms the backbone of livelihood in rural areas of South Africa, especially through old-age pensions and child support grants (Perret, 2003). Respondents were asked if they do receive any kind of social safety net and Figure 4.7 below presents the findings of the household status of social safety nets.



Source: Survey data (2014)

Figure 4.7: Social safety nets receiving status

The results presented in Figure 4.7 above show that about 70% of households participating also receive social safety nets while 67.8% of none participating households also receive social safety nets. The results generally indicate that high levels of dependency upon social safety nets amongst both CFG participants and non-participants. The implication for this maybe that households view social safety nets as sources of food security used as a proxy for livelihoods and that may develop less interest in farming activities to improve their livelihoods.

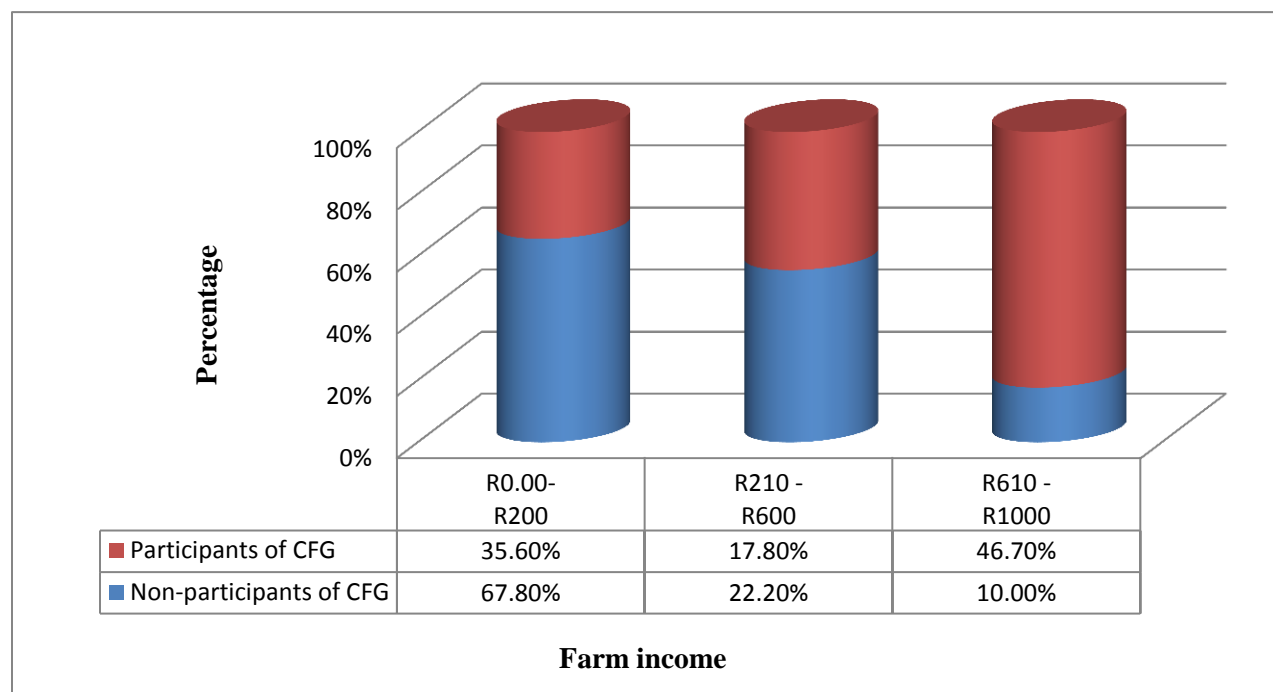
Some of the income sources reported were; agriculture, wages from other informal employment, sales of fire woods, remittances etc. These results are in line with the results from the 2005/2006 income and expenditure survey of South African households as reported by Stats.SA (2008) which underscored the importance of income from work such as those from formal employment as one of the major sources of household income and the growing importance of social grants as a substantial source of income for many households especially the poorer ones.

4.1.9 Farm income of the households

On farm income emerged mainly from two sources that is the sale of crops produced and the sale of livestock. On the other hand, off farm income may include income from sources such as casual labour, remittances and beer brewing. Respondents were asked of the total amount of income they generated from the sales of crops and livestock or the quantity of products sold and the cost in year period. The findings are therefore presented in Figure 4.8 below.

The findings of this study generally show that CFG non-participants do receive farm income. About 22.2% of them receive between R210 to R600, while only 10% receive between R610 and R1000. This maybe that CFG non-participants engage in other farm activities besides CFG, those could be homestead gardening, livestock and chicken rearing. The results further indicate that about 46.7% of the CFG participants receive a farm income between R610 and R1000 while about 35.6% receive between zero and R200.

The rationale for this could be that those receiving between R610 and R1000 engage in farm activities for extra food and have more surpluses to sell, while those earning R200 and less may be engaging in farm activities as main sources of food, with none or less surplus to sell. The findings of this study indicate that the low level of farm income may be due to low productivity. A survey conducted by Rwelamira and Kirsten (2003) found that the contribution of agriculture to household total income was less at only 6%.



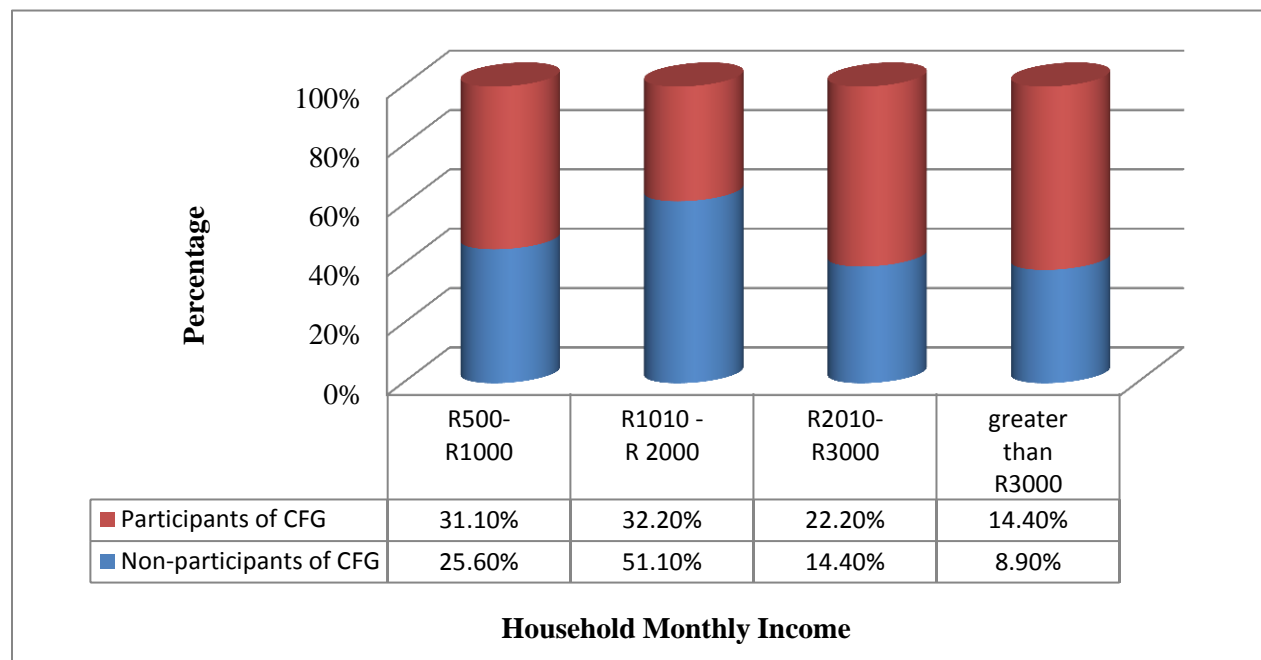
Source: survey 2014

Figure 4.8: Farm income household received

4.1.10 Household's monthly income

Monthly income refers to the monthly earnings of the households from various source, however this study excludes farm income from the total monthly income of a households. The respondents were asked about all the income they received per month excluding the one from agricultural sales. The distribution of households according to four income categories in relation to the CFG involvement is presented in Figure 4.9 below.

Figure 4.9 below shows that CFG non-participants (67.3%) receive income mainly between R500 and R2000 and about (63.3%) of CFG participants receive between R500 and R2000. This generally indicates that majority of households in Lepelle Nkumpi local municipality receive monthly income less than R2000 a month.



Source: Survey data (2014)

Figure 4.9: Household monthly income

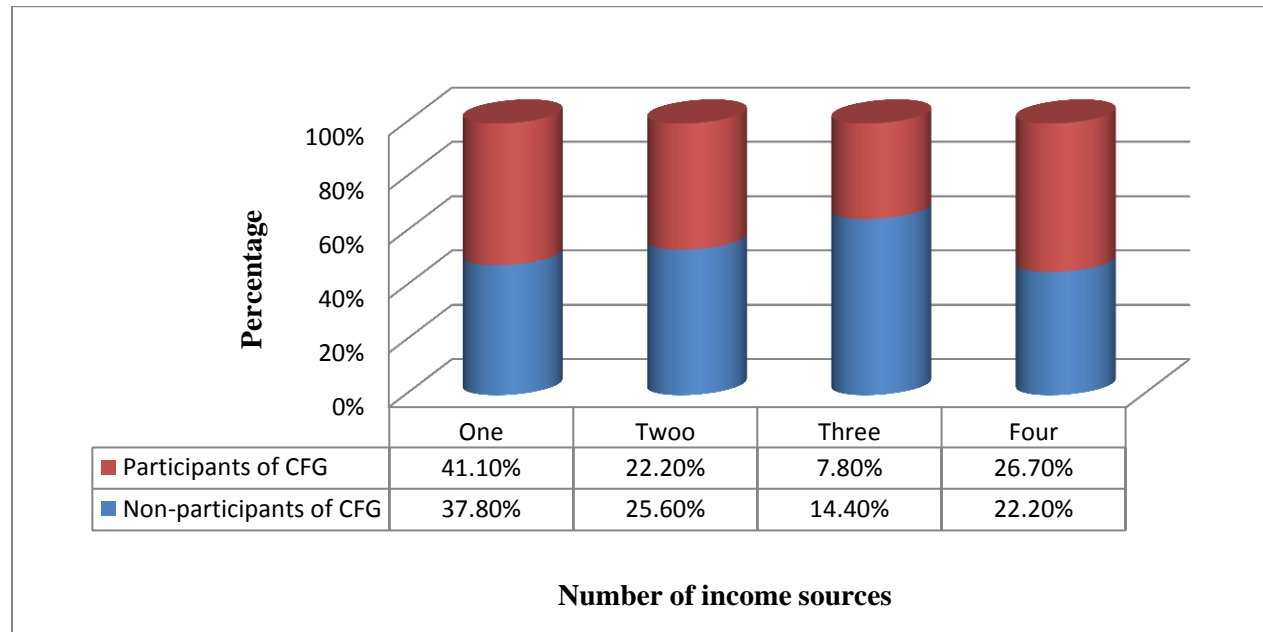
Furthermore a small portion of about 14.4% of CFG participants and 8.9% of CFG non-participants receives more than R3000 a month. The findings of this study may mean that there are low levels of livelihood in the study area hence income diversification could be essential. Existing literature shows that income plays an important role in enhancing the food production and in helping households to have greater access to better quality foods (Thamaga-Chitja *et al.*, 2004).

4.1.11 Number of income sources

Matshe and Young (2004) discovered that contrary to the ideal image of rural households as pure farmers, rural households rely on many activities and income sources. Rural livelihoods diversify their income as a source of livelihoods. Ellis (1998) noted income diversification as a process by which households construct a diverse portfolio of activities and social support capabilities in order to improve their living standards and manage risk. Ellis (1998) further noted that income generation is one of the components of livelihood strategies in rural and urban areas.

Figure 4.10 below presents the distribution of household according to the number of income source relative to their CFG involvement status. The figure indicates a less diversified income pattern among both the CFG participant and non-participant. About 41.1% of CFG participating and 37.8% of non-participating household rely mainly on one income source. The findings generally indicate high dependency upon one source of income among both the CFG participants and non-participants. This may be as a result of less job opportunities in rural areas. The findings in this study differ from the assumptions of the study by Block and Webb (2001) who concluded

that rural areas are more diverse compared to urban areas because urban areas are limited regarding on-farm activities.



Source: Survey data (2014)

Figure 4.10: Number of household income sources

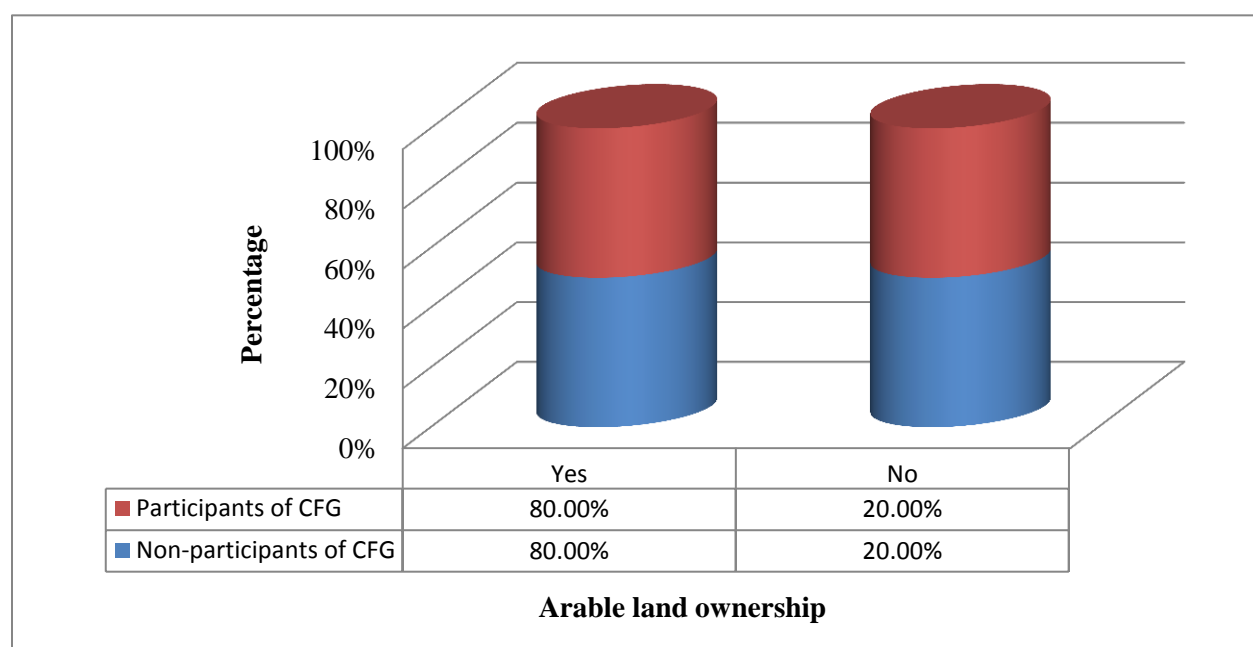
4.1.12 Household ownership to arable land

According to Thornton (2008) land access in the post-apartheid period in South Africa has been loaded with many problems especially in areas of the former homelands. However, Holden & Yohannes (2002) underscored the significance of landownership in promoting land-related investments such as agricultural production. Randela *et.al* (2000) further emphasised that agricultural productivity can be influenced by land ownership because farmers who do not own land can be reluctant to develop and maintain the land.

In Rural areas, land is owned by traditional authorities, and the residents of the area are given authority over a small piece of land for residential and agricultural practices. Figure 4.11 below

presents households' distribution on the state of arable land ownership for both CFG participants and non-participants.

According to Figure 4.11 below majority of households, about 80% of both CFG participants and non-participants had ownership to arable land as per traditional system of ownership. This maybe that land ownership in rural areas is inherited from the fore-parents with an approval of traditional leaders and some are granted the right to use by the tribal authority. The results further indicate that 20% of CFG did not have ownership to arable land, but however their CFG participation did not depend upon ownership to arable land. Generally these findings suggest that the participation of household in CFG may be influenced by household's ownership to land.

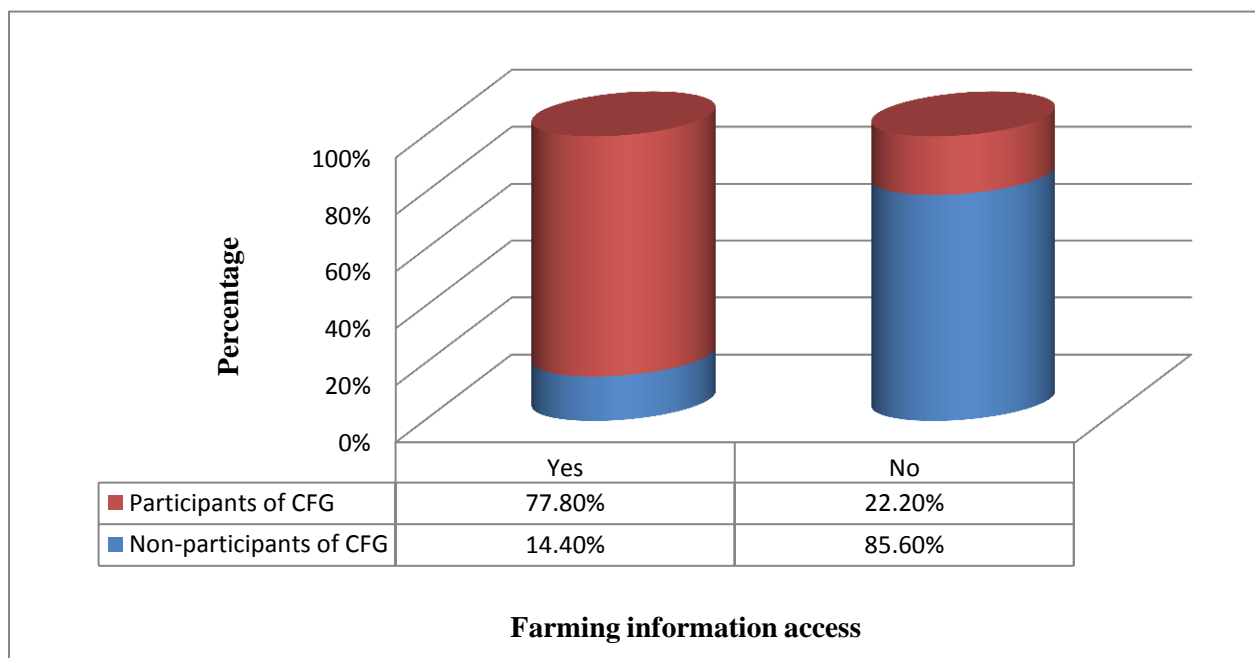


Source: Survey data (2014)

Figure 4.11: Household ownership to land

4.1.13 Farming Information access

Access to information plays a pivotal role on an individual's perception and decision making. According to Doron (2005) the availability of high quality, reliable information may influence how people think and act and is a key requirement for decision making. Lack of information could sometimes be associated with failure to participate in CFG (Cronje et al., 2003). The Figure 4.12 presented below shows the distribution of household's characteristics on farming information accessibility.



Source: Survey data (2014)

Figure 4.12: Household access to information about CFG

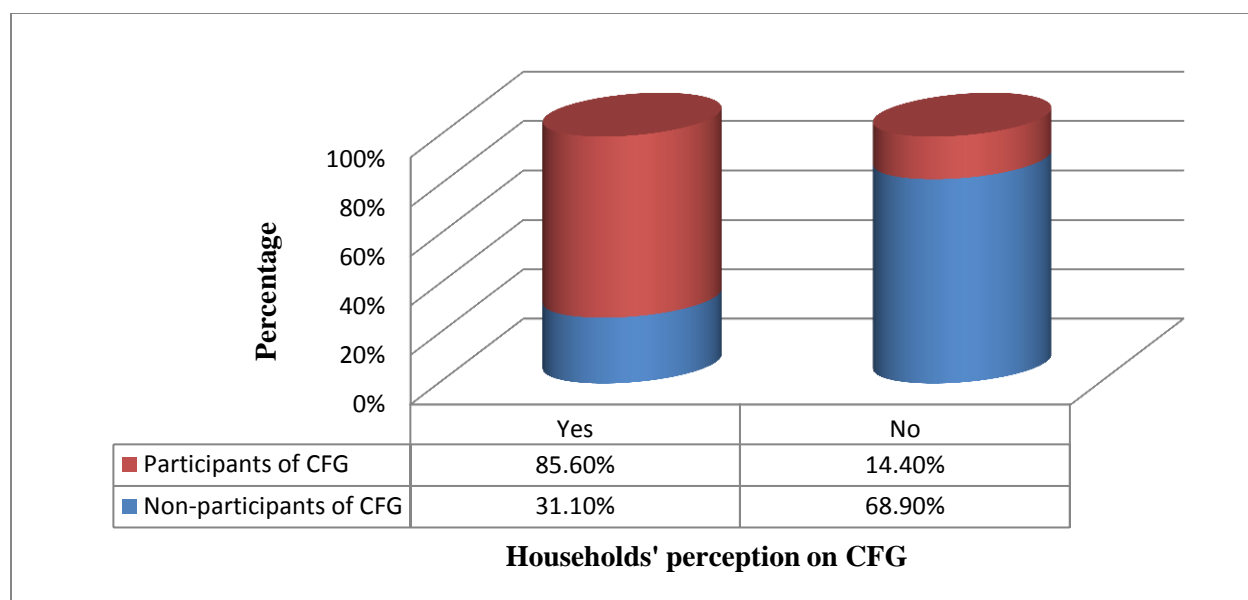
The total of 77% of the CFG participants had access to farming information while only 14.4% of the non-participants had access to farming information. The results further indicate that a large portion of CFG non-participants had no access to information. This maybe an indication behind their involvement status in CFG, meaning that lack of information could be the reason behind their decision not to be involved in CFG. The results generally indicate that access to farming

information has an influence on the decision of household CFG participation in CFG. This is shown by the high levels of participation amongst the households who received farming information in Figure 4.12 above. The findings are in line with Jaleta *et al* (2009) who found out that market participation was determined by access to information.

4.1.14 Household perceptions

Sidibé (2005) referred to “farmer’s attitudes or perception” as the degree of farmers’ positive or negative feelings towards participating in on farm activities. Individual’s perception and attitude may have an influence on their day to day decision making o participate in various activities including subsistence farming practices. Prokopy (2009) further indicated that personal constraints relates to an individual’s actual availability to participate based upon his or her other obligations such as work and family. The respondents were asked about their view on CFG and its contribution to households’ livelihoods. Figure 4.13 below shows the distribution of households’ perception towards CFG and its contribution.

The Figure 4.13 below further reveals a positive perception among the total of 85.6% of CFG participant while a small portion about 14.4% had a negative perception. Amongst the CFG non-participants, a larger portion of about 68.9% had negative toward CFG and their effect on household livelihoods. These findings indicate that individual perception plays a significant role in influencing households’ decision to participate in CFG. A negative attitude has a direct bearing on the household decision to participate in CFG while a positive attitude increases participation in CFG.

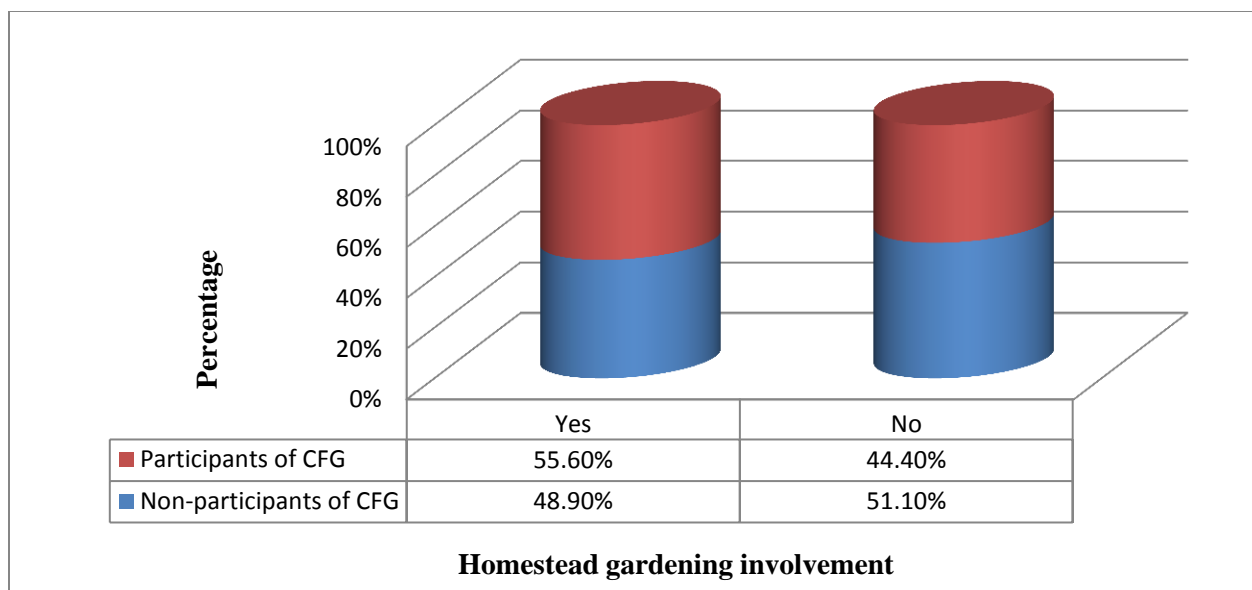


Survey data (2014)

Figure 4.13: Household perception on CFG

4.1.15 Household involvement in homestead gardening

Literature defines homestead gardening as an area of land that is being farmed or cultivated, within the household in the backyard while CFG take place most in communal land and are owned by the community (London-lane, 2004). Despite CFG being regarded as a source of livelihoods for many rural dwellers, Homestead gardening is also viewed as a way through which livelihood can be improved (Nell *et al* 2000).



Source: Survey data (2014)

Figure 4.14: Household homestead gardening involvement

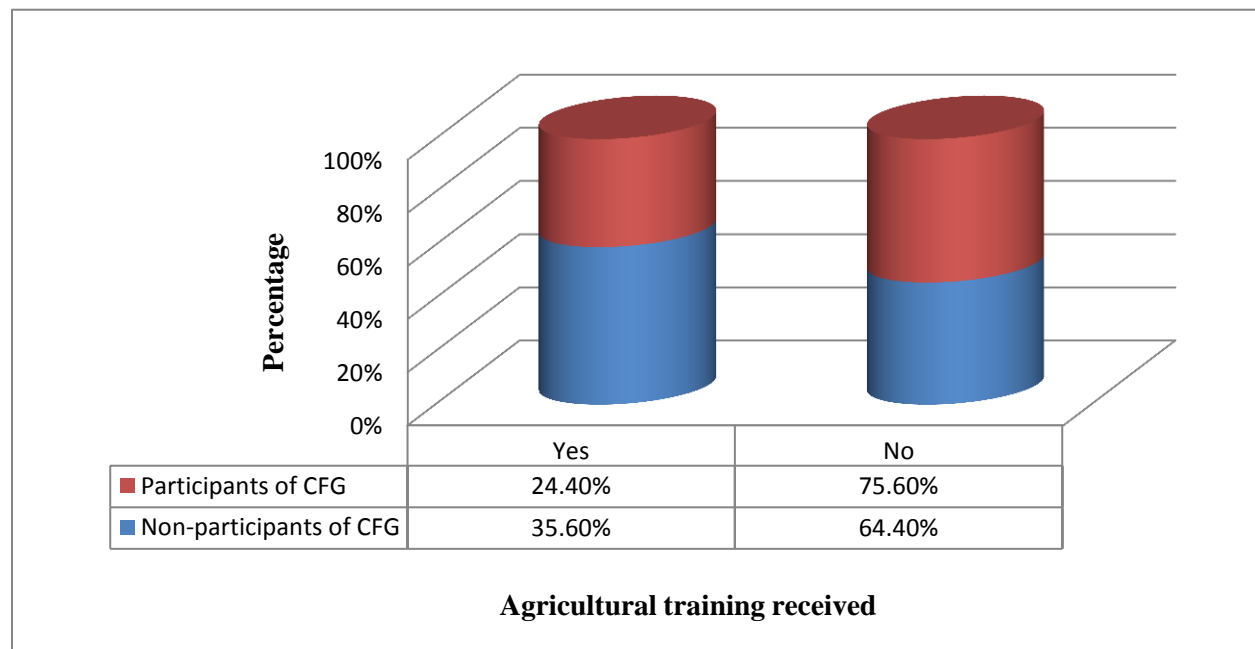
Figure 4.14 above indicates that among the overall of household heads participating in CFG, about 55.6% also participate in homestead gardens while 51.1% are non-participants in both the CFG and homestead gardens. The result further shows that there are about 48.9% of households participating only in homestead gardens. This may be due to various challenges such as distance from home to CFG, lack of commitment from the members as well as conflict faced by CFG.

The findings of this study also show about 44.4% of households participating only in CFG, this may be as a result of land constraints within the homestead or for community empowerment purposes. Generally the findings indicate that household may derive common benefits from both CFG and homestead gardens.

4.1.16. Household's distribution on Agricultural training received

Agricultural training in this study refers to training that a household head received regarding agricultural practices such as production and management of agricultural commodities, marketing, processing etc. while on the other hand agricultural experience refers to the practical knowledge and the number of years that the household head has in agricultural practice.

According to Amani (2013), training is obtained through community empowerment programmes as well as extension services which play a crucial role by empowering farmers with farming techniques, knowledge and management skills. Farmers training for the promotion of agricultural practice are similar to education (Sidibé, 2005). As a result farmers who receive regular training are expected to have a higher probability of participating more than farmers who do not have access to training services. The respondents were asked if they were trained on any of the aspects of farming, including production, farm management, cooperative etc. within the past 10 years. Figure 4.15 below presents the distribution of households regarding agricultural training.



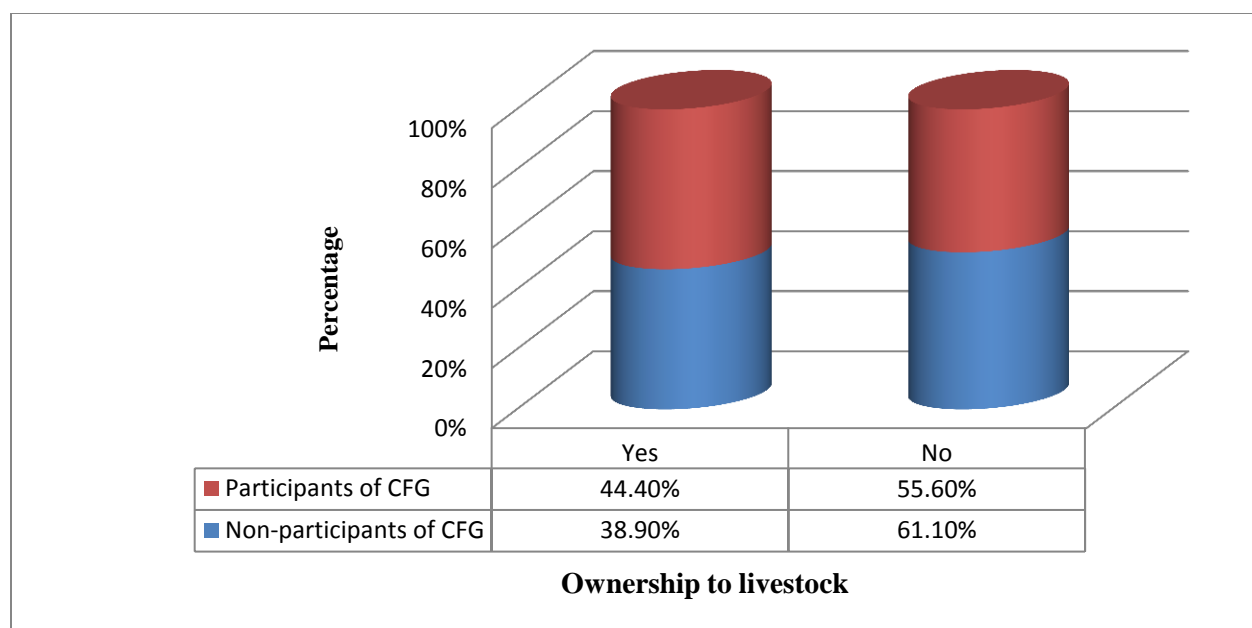
Source: Survey data (2014)

Figure 4.15: Agricultural training received

The findings of this study show a high rate of participation in CFG amongst the household heads who did not receive training. About 75.6% of CFG participating households have no form of training received while only 24.4% of the households participating in CFG received training. Generally this study suggests that receiving agricultural training does not guarantee participation in CFG. This is indicated by a larger portion of household participating in CFG without training. Therefore it may be concluded that agricultural training is not a determinant of CFG participation.

4.1.17 Household ownership to livestock

Livestock ownership was used in this study as a determinant of CFG participation. Livestock in rural areas serves as sources of food and income for many households' livelihoods. However Nqeno (2011) indicated that livestock such as cattle in rural areas is used for agricultural development as a source of draught power and transportation. They can also be sold into cash to finance household needs and agricultural inputs. Thus, this may influence household decision to participate in CFG. Household were asked if they do have a minimum quantity of five (5) in any of the livestock categories such as cattle, goats, sheep or pigs being the most common types of livestock kept in rural areas. Figure 4.16 below presents household distribution on livestock ownership.



Source: Survey data (2014)

Figure 4.16: Households livestock ownership

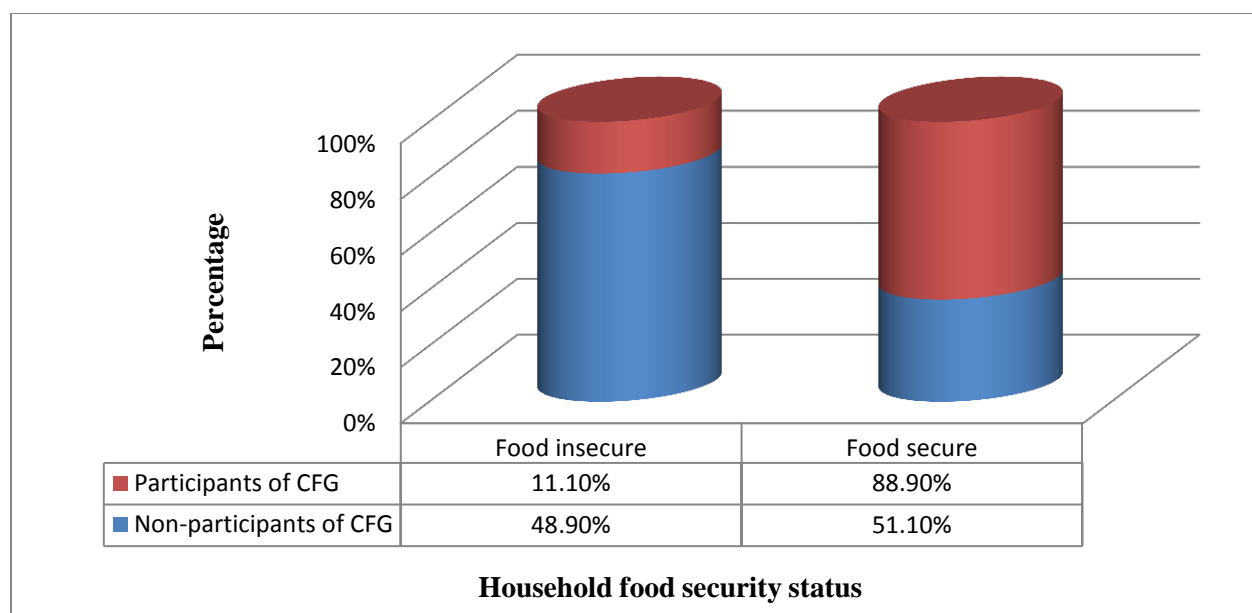
The results in Figure 4.16 show that, on overall 44.4% of CFG participants had ownership to the types of livestock mention in the previous paragraph which is greater as compared to a total of 38.9% of non-participating households having ownership to livestock. About 55.6% of CFG participants and 61.1% of non-participants had no ownership to livestock. Generally the result shows low level of livestock rearing amongst both the CFG participants and non-participants in the study area. Livestock production or ownership may serve as an alternative source of food security used as a proxy for livelihoods but however the findings suggest that livestock owners have less influence on household's decision to participating in CFG.

4.1.18 Distribution of household food security status by CFG involvement

Households in rural areas participate in community food gardens mainly to generate food and income which improves the standard of living (Schmelzkopf, 1996). According to Faber (2007)

CFG are said to enhance household food security through direct access to diverse nutritious foods, increased purchasing power from savings on food bills, income from the sale of surplus produce, and provision of food stocks during seasonally lean periods. The participation of household heads in CFG may come with a significant shift on the livelihood status of the households. Food security status was assessed for the households with a purpose of identifying whether CFG involvement has an influence on HFSS. Figure 4.17 below presents a distribution of households' food security status.

The results presented in figure 4.17 below shows high levels of food security in the area, particularly among the CFG participating households. There are about 88.9% of the CFG participants deemed food secure while a small portion of about 11.1% remain food insecure. The rationale behind the high level of food security among the CFG participants may be due to the contribution of CFG to food security used as a proxy for livelihoods. The results further indicate that about 51.1% of non-participants were deemed food secure while 48.9% still remains food insecure. Generally these findings suggest that CFG participants have a high probability of being food secure. This implies that CFG have a potential to improve household food security hence livelihoods in rural areas. The results of this study are in line with a statement issued by FAO (2006) that community gardens constituted the affected and the vulnerable households promoting production of their own food to ensure food and nutrition security.



Source: Survey data (2014)

Figure 4.17: Distribution of HFSS by CFG involvement

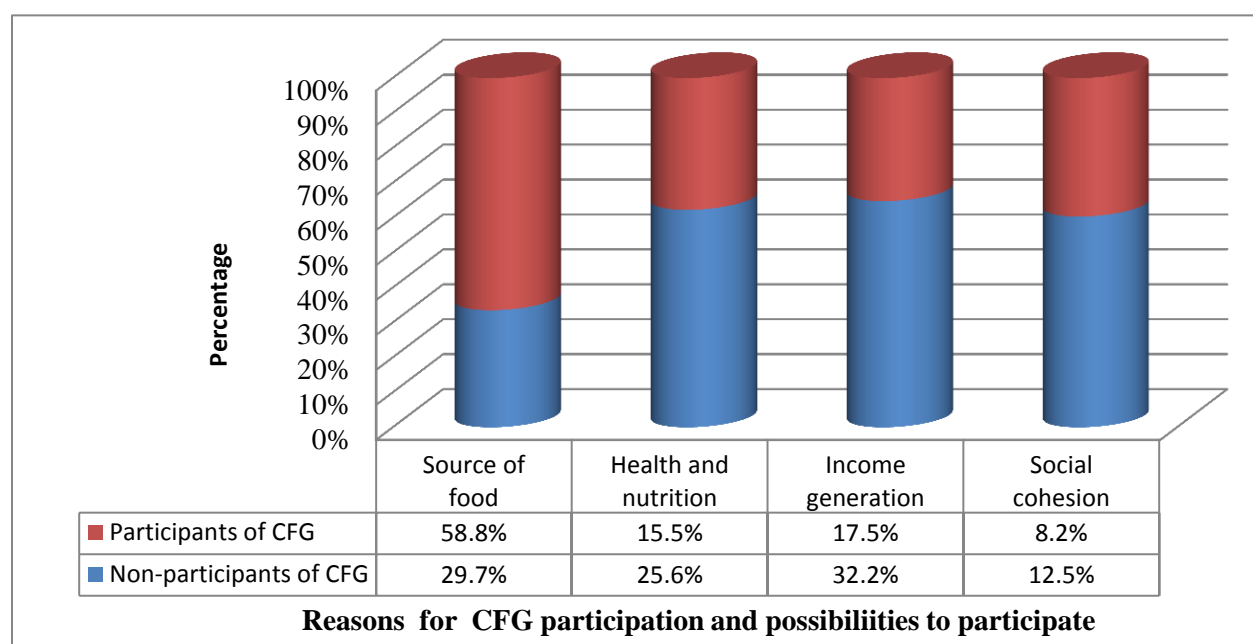
The findings of this study are further be used in the next section to classification of households into food secure or insecure. Furthermore the variable CFG involvement is also being tested as an independent variable against household food security status to capture its relation or contribution to household food security status hence livelihoods.

4.2 Reason for CFG participation

According to Sotshongaye (2000), CFG are the greatest investments in our society, they are seen as an important element of wealth creation among the poor. Their value of production may significantly improve the level of household food security hence livelihoods in rural areas.

Community gardens have attracted different meanings, uses, and purposes to different societies and communities. According to However Koyenikan *et al.* (2007), rural households engage in own home with a purpose to attain benefits such as source of food production, improvement of

household health and nutrition, generation of income and social cohesion. The respondents were asked to choose the reasons behind their participation or the possibility to participate in CFG from a list of four reasons outlined above by Koyenikan *et al.* (2007). The Figure 4.18 below present results on the reasons behind their participation or the possibility to participate in CFG.



Source survey 2014

Figure 4.18: Reasons for CFG participation and possibilities to participate

Figure 4.18 above shows the different reasons rural households engage in CFG and reasons behind the possibilities of non-participants to be participants. Majority (58.8%) of CFG participants indicated that the main reason behind their participation is mainly a source of food production while only 8.2% regard their reason for participation as social cohesion. The results further indicate that about 17.5% and 15.5 mainly consider income generation and Health and Nutrition respectively as their main reason for CFG participation.

More than 50% of the respondents indicated source of food as their main reason for participation in CFG. This maybe as a result of high rates of unemployment, and low incomes factors in rural households. The assumptions for this findings maybe that households lack purchasing power hence they substantiate household food consumption by own food production. The finding concurs with a study by Wakefield *et al.* (2007) who found that participating in community gardening led to increased access to food, improved nutrition, increased physical activity, and improved mental health.

The findings of this study indicate that income generation and source of food would be considered the main reasons behind the possibilities to participate in CFG by 32% and 29.7% respectively. The rationale for these findings may be that non-participants in CFG do not consider CFG as their main source of livelihood hence their participation maybe to generate extra livelihoods. The findings are in line with a study conducted by Meenar & Hoover (2011) who found out that household on government assistance, and seniors were more likely to be the recipients of produce, but not participate in community food gardens.

4.3 Conclusion

The chapter has discussed the different household socio-economic characteristics of the study population comparing CFG participants to non-participants. Generally the results indicate that the some of socio-economic factors tested in this study have an effect on the household involvement in CFG. Results of this study suggest that household characteristics such as gender, marital status, farm income, farmers' perception access to information, have an influence on household CFG involvement. This is because CFG involvement was found to be more prevalent

in female headed households and also indicated a high probability of household food security among the CFG participants.

The results further indicate that households have social and economic reasons behind their participation and the reasons behind the possibilities to become CFG participants. It was found that the main reason behind the participation in CFG was mainly for food at 58.8%, followed by income generation at 17.5% among the participating households while the reasons for non-participants to consider participating in CFG would be mainly income generation at 32.2% and source of food 29.7%. These findings generally imply that household participate in CFG food gardens mainly as source of food and income.

CHAPTER FIVE

RESULTS AND DISCUSSION

5. Introduction

This chapter presents empirical results, inclusive of the classification of households into either food secure or food insecure using the HDDS model outlined in chapter 3 and the binary logistic regression model which was used to assess the determinant of CFG as well as the effect of CFG involvement to the household food security status. The binary regression model was used as an analytical tool to ascertain the principal factors influencing the participation of households into community food gardens and the influence of community food gardens to household food security status. Correlation analysis was conducted with the aim of discovering the relationship between the dependent and the independent variables. The following sections present the household classification, empirical results as well as conclusion.

5.1 Households classification on the state of food security

According D'Haese *et al.* (2011), households can be classified into three classes of food security statuses. The three classes are: severely food insecure, moderately food insecure, and food secure, but FAO (2006) recognizes the lowest level of classifying household on food security status, that is either food secure or food insecure. The household dietary diversity score played a major role in the classification of household as either food secure or food insecure. This was done through the use of average household dietary diversity score outlined in chapter three of this report. The average household dietary diversity score (AHDDS) computed is shown in the table 5.1 below.

Table 5.1 Average household dietary diversity score

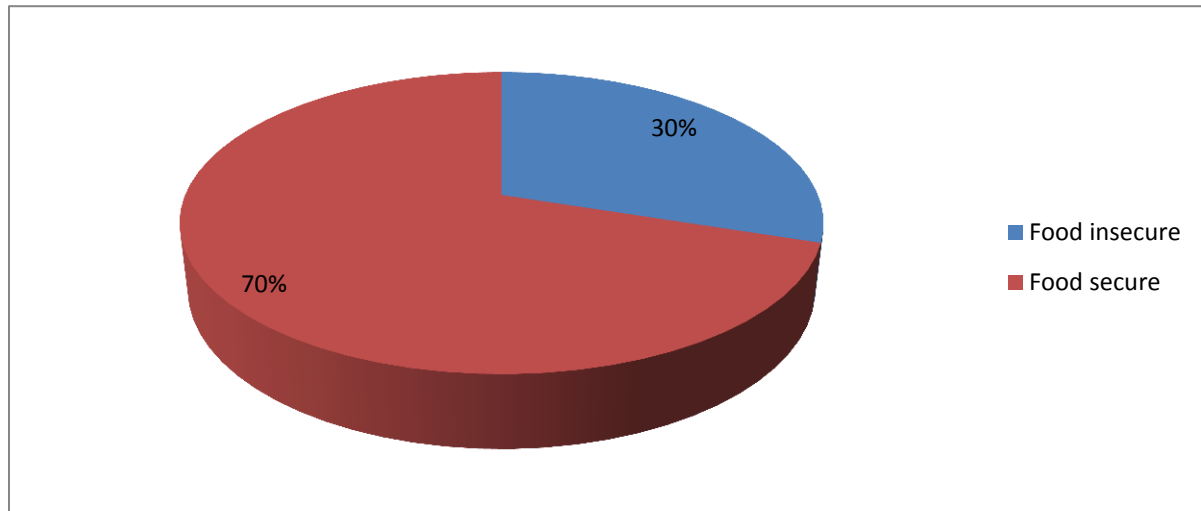
Average household dietary diversity score				
N	Minimum	Maximum	Mean	Std. Deviation
180	4	9	6.19	1.007

Food insecurity is a global dilemma mainly visible in the African continent but South Africa has recently been food secure at least at the national level Hart *et al* (2009). On the other hand, food insecurity at household level still remains a challenge in many rural areas where agriculture is viewed as source livelihoods (Landman, 2003).

According to May & Carter, (2009), increased subsistence production has the potential to improve the food security of poor households in both rural and urban areas by increasing food supply and reducing dependence on purchasing food in a context of high food price. In the previous chapter, the results on food security status relative to the CFG involvement were presented where about 88.9% of the CFG participants were deemed food secure while a small portion of about 11.1% remain food insecure. Furthermore, the results revealed that about 51.1% of non-participants were deemed food secure while 48.9% still remains food insecure.

The average household dietary diversity score presented in Table 5.1 was used to classify households into either food secure or food insecure and to give an overall level of food security including both CFG participants and non-participants. The results indicate that there are high levels of food security in the area of Lepelle-Nkumpi, where 70% of the sampled households were deemed food secure while 30% were deemed food insecure inclusive of both CFG

participants and non-participants as shown in Figure 5.1below. Figure 5.1 below presents the general state of households' food security including both CFG participants and non-participants.



Source: survey 2014

Figure 5.1: General household food security status

5.2. Data analysis

5.2.1 Socio-economic determinants of CFG

A binary logistic regression model was used to test the socio-economic characteristics against household's decision to participate into CFG as well as the effect of CFG on HFSS. The binary logistic specification is suited to models where the endogenous variable is dichotomous, which in this case are the CFG participants and non-participants as referred to in chapter three.

Household involvements in community food gardens were measured using a bid value of one or zero, where one represents participants and zero represents non-participants. Socio-economic variables listed in chapter three, in Table 3.7.3 were considered for the model and tested for their significance at 10%, 5% and 1% level. The binary logistic regression therefore provides a model

of observing the probability of a household becoming either participant or non-participant. Table 5.2 below, shows the relationship between the CFG involvement and the independent variables, estimated coefficients (β values), standard error and significance values.

Table 5.2: Socio-economic determinants of CFG

INDEPENDANT VARIABLES	B	S.E.	df	Sig.	Exp(B)
GENDER	.102	.491	1	.835	1.108
AGE	.047	.161	1	.769	1.049
EDUCATIONAL LEVEL	-.198	.306	1	.518	.820
HOUSEHOLD SIZE	.043	.119	1	.716	1.044
FARM INCOME	.637	.333	1	.056*	1.891
HOUSEHOLD MONTHLY INCOME	.586	.307	1	.056*	1.796
NUMBER OF INCOME SOURCES	.067	.222	1	.763	1.069
ARABLE LANDSIZE	.321	1.180	1	.786	1.378
ARABLE LANDOWNERSHIP	.192	.558	1	.730	1.212
FARMING INFORMATION ACCESS	-2.221	.586	1	.000***	.109
FARMERS' PERCEPTION	-1.309	.577	1	.023**	.270
MARITAL STATUS	-.409	.261	1	.004***	.664
HOMESTEAD GARDENING	-.425	.457	1	.352	.654
AGRICULTURAL TRAINING	-.024	.486	1	.960	.976
DEPENDANCY RATIO	1.888	1.531	1	.217	6.608
FORMAL EMPLOYMENT	-.979	.662	1	.139	.376
SOCIAL SAFETY NETS	-.344	.517	1	.506	.709
OWNERSHIP TO LIVESTOCK	-.027	.457	1	.953	.974
MODEL SUMMARY					
-2 LOG LIKELIHOOD	145.816^a				
COX & SNELL R SQUARE	0.438				
NAGELKERKE R SQUARE	0.584				

Significant at 1%*, 5% ** 10%* probability level**

Table 5.2 presents the results of the binary regression model and the measures of goodness-of-fit. The R indices defined by Cox and Snell (0.438) and Nagelkerke (0.584) lies between 0 and 1, confirming the goodness-of-fit of the model which exists when the Cox and Snell value for R-

squared possibly is 1.0. The results of the regression model on the socio-economic factors influencing the household's decision to participate in CFG are presented in Table 5.2 above and the following section presents results and a discussion on each of the significant variables.

The results indicate that farm income, household monthly income, information access, household perception and marital status significantly influence the household's decision to participate in CFG. The results further reveal that educational level, farm income, household monthly income have a direct influence while information access, households' perception and marital status *inversely* influence the probability that a household becomes CFG participant. Below is a discussion on the variable farm income of the household

5.2.1.1 Farm income of a household

For this study, the variable farm income was found significant and relates positively with the household's decision to participate in CFG(s), *ceterus paribus*. The positive significant coefficient of farm income indicates a positive influence on household decision to participate in CFG. This implies that farm income increases with a positive change in the decision of household participation in CFG by 0.637%. This is evidence that households view income generated from the agricultural practices as their source of inspiration to participate in CFG.

These findings are in line with Duffour (2010) who affirms that subsistence and smallholder sectors are regarded as sources of livelihood for the majority of populations in rural areas through food production, employment and income generation.

5.2.1.2 Household monthly income

The results of this survey indicate that the variable household monthly income was significant at 10% significance level and imply that it is significantly important in explaining the variations in CFG involvement. The positive sign indicates the positive relationship between household monthly income and CFG involvement. This means that the probability of households being CFG participants increases with an increase in household monthly income.

These findings contradict with that of Halberg (2009), who found that low income households participate in CFG to supplement food security efforts by increasing the availability of nutritious foods and generate income. However Halberg (2009) further noted that households with high income participate in CFG for social cohesion. Therefore the study concludes that CFG has a potential to supplement food and income in rural areas with low income. This maybe through sales of on farm product to generate income or through reduction of purchased food.

5.2.1.3 Farming Information access

Access to farming information is associated with a negative probability of being CFG participant. The sign of the coefficient ($= -2.221$) is negative and significant at 1% level. This implies that the probability of households being CFG participant decreases with increase in the ability to access information on CFG. Households' heads with farming information may be reluctant to participate in CFG depending on the characteristics of farm information accessed. The findings of this survey contradict with that of Ge & Helfert (2008), who established that making quality influential decisions depends upon access and the quality of information to support these decisions. Based on the findings, the study concludes that access to farming

information has little effect on the households' decision to participate in CFG. However, it may influence the decision when it is relevant, reliable and of high quality.

5.2.1.4 Perception of household heads on CFG

A negative and significant relationship was found between perception of the household heads and participation in CFG. The odds ratio (= -1.309) means that a household with a negative perception towards CFG have 1.3% probability of participation in CFG. Household heads that perceive CFG negatively have a lesser chance of being participants. Perceptions may be developing from the type of information that the household head receive, and information that does not match household need and expectation develops a negative perception and affects their decision to participate. The findings of this survey are in line with that of White (2002), who indicated that an individual perception plays a major role in day to day activities and decision making.

5.2.1.5 Marital status of the household heads

Marital status was found significant at 1% significant level. The negative coefficient indicates a negative relationship between marital status and CFG involvement. Marital status of household heads decreases the chance of a household participating in CFG. The results suggest that married couples have a lesser probability of becoming CFG participants. The findings of the study concur with the statement made by Canning, *et al.*, (2010) that in economic terms, married families are seen as an economic unit that lives together and shares resources and responsibility for the common benefit.

Married couples, particularly women may be reluctant to participate in CFG. This may be that in an African context, husbands are the providers for the family and marriage comes with more responsibilities of taking care of the day to day activities of a household. Kiriti and Tisdell (2002) further indicated that marital status may influence the decision for home gardening and land use because of cultural and power factors within the family. Based on the results, the study therefore concludes that marital status influences the decision of a household to participate in CFG negatively. Furthermore the next section seeks to establish the relationship between CFG involvement and other socio-economic variables and the state of household food security.

5.2.2 The contribution of CFG and other socio-economic variables to HFSS

The binary logistic was used to determine the contribution of CFG and other socio-economic variables to the dichotomous dependant variable, household food security status. Food security status was measured using a bid value of one or zero, where 1 represents food secure and 0 represents food insecure. The logistic regression then provides a model of observing the probability of a household becoming food secure or food insecure. The dependent variable is therefore the household food security status (HFSS) which was measured using HDDS as outlined in chapter three. The following section presents regression results on the contribution of CFG involvement and other socio-economic variables to the state of household food security in the study area.

Table 5.3: The contribution of CFG and other socioeconomic variables to HFSS

INDEPENDENT VARIABLE	B	S.E.	Df	Sig.	Exp(B)
GENDER	-2.000	.627	1	.001***	.135
AGE	-.379	.191	1	.047**	.684
EDUCATIONAL LEVEL	1.458	.430	1	.001***	4.296
HOUSEHOLD SIZE	-.047	.129	1	.716	.954
FARM INCOME	-1.289	.434	1	.003***	.276
HOUSEHOLD MONTHLY INCOME	.733	.382	1	.055*	2.080
NUMBER OF INCOME SOURCES	-.090	.243	1	.711	.914
ARABLE LAND SIZE	.758	1.226	1	.536	2.134
ARABLELAND OWNERSHIP	.522	.596	1	.381	1.686
FARMING INFORMATION ACCESS	-2.928	.845	1	.001***	.054
FARMERS PERCEPTION	-1.024	.682	1	.133	.359
CFG PARTICIPATION	2.126	.636	1	.001***	8.380
MARITAL STATUS	.722	.293	1	.014**	2.058
HOMESTEAD GARDENING	.175	.492	1	.722	1.191
AGRICULTURAL TRAINING	-.347	.551	1	.529	.707
DEPENDANCY RATIO	1.089	1.620	1	.502	2.971
FORMAL EMPLOYMENT	1.254	.722	1	.083*	3.503
SOCIAL SAFETY NETS	1.010	.625	1	.106	2.747
OWNERSHIP TO LIVESTOCK	-.129	.493	1	.794	.879
MODEL SUMMARY					
-2 LOG LIKELIHOOD	121.829^a				
COX & SNELL R SQUARE	0.420				
NAGELKERKE R SQUARE	0.596				

Significant at 1%***, 5% ** 10%* probability level

Table 5.3 above provides the parameter estimates for the binary Logit model. The estimates of R indices, defined by Cox and Snell and Nagelkerke are **0.420** and **0.596** respectively. The R^2 value of both indices lies between 0 and 1, confirming that the goodness-of-fit of the model. This implies that about **59.6%** of the likelihood of households being food secure is strongly explained by the independent variables.

The survey results show that gender, age, educational level, farm income, household monthly income, information access, CFG involvement, marital status and formal employment status significantly affect household food security status in Lepelle-Nkumpi local Municipality. The results further reveal that educational level, household monthly income, marital status, employment status and CFG involvement positively affect food security, while gender, age, farm income and information access negatively influence the probability of a household being food secure. The following section presents results and a discussion on each of the significant variables tested in this study.

5.2.2.1 Gender of the household head

Gender was a relevant factor of food security among households. The factor was significant at 1% level with an odds ratio ($B = -2.160$). These findings show that households headed by females are more likely to be food secure than those headed by males. Thus female headed household have 2.0% probability of becoming food secure than male headed households. On the contrary, Mohammadi *et al.* (2011) reported that severe food insecurity was more frequent in female-headed households.

However, according to Ojogho, (2010), rural women have historically played a crucial role in agriculture in food production and food security. This is more evident in developing countries such as Nigeria, South Africa, Ghana, etc. (Manuh, 1998). Karki (2009) also highlighted that rural women alone are responsible for up to 50 percent of the world's food production and they also contribute about 60 to 80 percent of the production in many developing countries. Based on the results the study therefore concludes that female headed households have a higher probability of being food secure compared to male headed households.

5.2.2.2 Age of the household head

The results show that at the 5% significance level, age is negatively related to household food security. These findings suggest that the probability of household heads being food secure is higher among younger household heads than the older ones. Thus an increase in the age of the household heads leads to a reduction in the probability of being food secure by 0.3%. According to the results in chapter four on age and household size, an increase in age leads to an increase in household size which requires an increase in the food basket. Further, as age increases it lessens the chance for better job opportunities.

Similar to these findings, Bashir *et al.* (2012) found an inverse relationship that existed between age of the household head and household food security. They reported that increasing the age of the household head reduces the chances of the household to be food secure by 3%. However, according to Barrientos (2003), social assistance programmes for the elderly persons in South Africa are quite prominent and are concerned with reducing poverty and food insecurity among the elderly people and their households.

5.2.2.3 Educational level of the household head

The education level of the household head was significant across the food security model as indicated in Table 5.2 presented above. Education of the household head contributes positively in influencing household food security *ceteris paribus*. Household heads with a high level of education are more likely to be food secure. Thus an increase in the level of education increases the chance of household to be food secure. According to FAO (2009), there is a strong correlation between education, empowerment and food security. It is emphasized that education

in different forms such as formal or non-formal as well as skills training is very useful as it tends to develop the capacity of people to enhance food security.

The findings of this study are in line with Amaza *et al.* (2009) who argued that the level of education enhances food security and reduces poverty, by determining the different opportunities one can get in order to improve livelihood strategies. Bashir *et al.* (2012) further affirmed that rural households headed with education of up to intermediate level were more likely to be food secure. This confirms the positive effect that the education of household heads has on household food security.

5.2.2.4 Farm income of the household

The negative significant coefficient of farm income indicates its negative influence on household food security. The significance value of 0.003 implies that access to farm income negatively influences the HFSS of Lepelle-Nkumpi local municipality. According to Dollar and Kraay (2002), agricultural development is important to eradicating poverty and hunger in the developing world. However, this study reveals that earnings from agricultural practice affect the HFSS negatively. In contrary to these findings, Peacock *et al* (2004) infers that, subsistence agricultural growth can eliminate rural poverty and food security. However the weakness of agriculture is the high percentages of uncertainty in the outcomes of the production. This means that it may not be sensible to speculate that farming can stabilise household income and sustain rural livelihoods.

5.2.2.5 Household monthly income

The variable household monthly income was found to be significantly important in explaining the variations in household food security status. Household income is positively associated with the food security status of a household with coefficient ($= 0.733$) implying that an increase in the monthly income of the household changes food security status positively. These findings are consistent with similar studies on food security. Bashir *et al.* (2010) also found a positive impact of monthly income on food security. Another study by Onianwa and Wheelock (2006) in the USA found a positive relationship between a household's food security status and household monthly income. This implies that household monthly income may be used to purchase food and ensure consistency in the availability of food in households. This may be due to the quality, reliability and relevancy of the information and how it is used for food security initiatives.

5.2.2.6 Farming information access

De Alwis & Higgins (2001) reported the importance of information access towards decision making. According to Ge & Helfert (2008), making quality decisions depends upon access and the quality of information to support these decisions. Access to information is an important determinant of farmer's decision to participation in agricultural activities and achieves food security, especially in subsistence-oriented households in rural areas.

The variable information accessibility was found significant with a negative relationship to HFSS. The odds ratio ($B = -2.928$) means that household access to information on food security related matters increase with a negative change on the HFSS by 2.9%. Contrary to the findings of this study, Nkhori (2004) suggested that information increases the ability of households to use their resources efficiently and the locative effect of knowledge enhances household ability to

obtain, analyse and use the information for their daily living. This finding of the study generally suggests that households head with access to information have 2.9% probability of becoming food insecure.

5.2.2.7 CFG involvements of the household heads

Community gardens act as a survival strategy for the poor in many communities to share resources together in order to meet their daily basic needs and mutual obligations. CFG have benefited participants who derive their food and income from it. According to Rukuni, *et al* (2006) community gardens contribute to the affected and vulnerable household's food security. They have supported families through income and food throughout the year, (Scoones, 2010). CFG involvement was analysed to draw the social and economic contribution on HFSS.

CFG involvement is associated with a positive probability of being food secure. The sign of the coefficient ($B = 2.126$) is positive and significant at 0.001%. This implies that participants of CFG have 2.126% a probability of being food secure. These findings concur with the results in a study by Baiphethi and Jacobs (2009) on the contribution of subsistence farming to food security in South Africa. Akrofi *et al.* (2010) also found that food items from food gardens significantly contributed to food security of rural households. Scoones (2010) substantiated that gardens are an important basis for livelihood strategies in rural areas.

5.2.2.8 Marital status of a household heads

The variable marital status was found significant at 5% significance level. The positive coefficient indicates a positive influence on household food security. An improvement in the level of food security within married couples in households is expected holding other

independent variables constant. Per every unit of married household head, the household food security status improve by 0.722% .This implies that there is sufficient proof to support the notion that household marital status improves household food security status.

This is different from the results presented in the previous section relating marital status to CFG which indicated that married couples are reluctant to participate. The rationale behind the positive effect of marital status to HFSS relates to the notion discussed earlier in chapter four that males migrate to cities to better their livelihood and that of their family while others engage in off farm activities that benefit more compared to agricultural activities such as CFG.

The finding of this survey are in line with the results of the study conducted by Zhang (2005) who suggested that marriage makes families better off partly by allowing individuals with families to specialize, which yields greater productivity, hence income. Zhang (2005) further highlighted that sharing of economic and social resources and responsibilities in married households heads yields economies of scale. Furthermore, it is also stressed that married couples share the costs of maintaining a household, therefore they are more likely to have high incomes and become food secure.

5.2.2.9 Formal employment of a household heads

South Africa is characterised by a high unemployment rate, inequality and poverty in rural areas. Fetsa-Tlala concept document 2013/14 report by the Department of Agriculture Forestry and Fisheries noted and recognized agriculture as a way to create employment, generate food and income in order to combat food insecurity in the country. Barrientos (2003) also noted that the purpose of the safety nets programme is reducing poverty and inequality in the high unemployed population in rural South Africa.

Formal employment was significant and had a positive coefficient of ($B = 1.254$). This shows it is essential in influencing HFSS. Formal employment status of a household heads improves household food security by 0.083%. According to the General Household Survey (STATSSA GHS, 2011) many households in South Africa who are formally employed are likely to be food secure. It indicates that, about 62% of South Africans are formally employed and formal salaries serve as a desirable and reliable source of income and hence contribution to food security.

In line with these findings, Jodha (2001) stressed that formal employment contributes significantly to sustainable food security and poverty alleviation within a household. The descriptive results presented in chapter four indicate a high rate of unemployment which may be as a result of low literacy levels. Therefore, the study concludes that investment in education increases the probability of securing formal employment to improve household state of food security used as a proxy for livelihoods in this study.

5.3 Conclusion

This chapter provided empirical evidence of socio-economic determinants of CFG as well as the relationship between CFG involvement and HFSS household food security status in rural households of Lepelle-Nkumpi local municipality. These socio-economic factors were defined and tested using the binary logistic regression model.

The statistically significant predictor variables with a direct influence on household decision to participate in CFG are farm income and household monthly income while those with an inverse relationship are information access, household Perceptions and marital status. The implication of these results is that the participation of household heads in CFG depends upon the social and economic status within the households. According to Aliber (2009), households participate in

agriculture for various reasons in South Africa namely, main source of food and income, and extra source of food and income.

Further, the results indicated that statistically significant predictor variables with a direct effect on HFSS are educational level, household monthly income, CFG involvement, marital status and formal employment status while gender, age, farm income and information access have an inverse relationship with HFSS. Generally, these results indicate that socio-economic aspects have a significant effect on the state of food security in rural households of Lepelle-Nkumpi local municipality. On emphasis, CFG involvement improves food security status and improves livelihoods in rural areas. According to Scoones (2010), CFG have supported families through income and food throughout the year. Rukuni, *et al* (2006) affirmed that gardens contribute to the affected and vulnerable household's food security.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6. Introduction

This chapter provides an overall summary of the research report and draws conclusions on the basis of the research findings. It further evaluates the initial study objectives and hypothesis with respect to the results. Lastly the chapter generates recommendations on the basis of the research findings.

6.1 Research summary

The aim of the study was to analyse the socio-economic contribution of CFG on food security status of the households in Lepelle-Nkumpi local municipality. The main objective of the study was to gain an understanding of the role played by community food gardens in improving food security status in rural households and to assess the determinants of CFG involvement in the study area.

Primary data was collected in face to face interviews through a structured questionnaire from a sample of hundred and eighty (N=180) households in the study area. The study used a set of analytical techniques from statistical package for social science to analyse the data. The descriptive statistical analysis was used to describe households' socio-economic characteristics as well as the reasons behind CFG participation and the reasons behind the possibilities to participate in CFG. Further, binary regression modelling was used to assess the socio-economic determinants of community food gardens participation as well as the contribution of CFG to HFSS.

Data from a sample of 180 households obtained through multistage sampling process was analysed using the binary logistic regression model where the dependant variable from the first model was CFG (1 = CFG participants and 0 = CFG non-participants) and Household food security status (1 = food secure and 0 = food insecure) as the dependent variable in the second model. A number of socio-economic variables were used as explanatory variables. The Household Dietary Diversity Score modelling introduced by FAO (2006) was used as a proxy to classify households into either food secure or food insecure. Seventy percent (70%) of the sampled households were deemed food secure with 46, 5% being CFG participants and 23.5% while about 30% of the households were deemed food insecure.

The descriptive analysis showed that the main reason behind the participation of CFG was source of food while among the non-participants the reason behind the possibilities to participate in CFG would be income generation. Socio-economic characteristics of households were proven to have an influence on both the decision to participate as well as household food security status. Socio-economic factors such as farm income, monthly income, information access, household perception and marital status showed a significant effect on the decision of household heads to participate in CFG, while on the other hand factors such as gender, age, educational level, farm income, monthly income, information access, marital status, formal employment and CFG involvement proved to have a significant contribution to the food security status of households in Lepelle-Nkumpi Local Municipality.

6.2 Research conclusion

Community gardens have long played a role in development strategies world-wide and particularly in South Africa. Governments see them as a useful means of training resource poor households to be more self-sufficient in food production. They are particularly promoted among the very poor areas of South Africa. In the area of Lepelle-Nkumpi local municipality households participate in community gardens largely for economic and social reasons. The range of reasons for participating in CFG is fairly broad and is a thought for food production and income generation. They are often a forum for networking, education and training as well as deriving other benefits such as information sharing.

Kantor (2001) indicates that CFG has been found to promote food security in several ways. Kantor further reported that community gardening improved households' food security by increasing the quantity, quality, and affordability of food for local residents. Johnson and Smith, (2006) also noted that CFG have also been found to contribute to family food budgets by reducing the amount of money that must be spent on purchasing food from other sources. The results of these study revealed evidence that social and economic factors are the driving forces behind households' participation in community food gardens as well as household food security status in the area of Lepelle-Nkumpi local municipality.

The descriptive analysis showed that the main reason behind the participation of CFG was source of food while among the non-participants the reason behind the possibilities to participate in CFG would be income generation. Therefore the study concludes the socio-economic reasons are the rationale behind CFG participation in Lepelle-Nkumpi local municipality.

On the basis of socio-economic variables influencing household participation in CFG, variables farm income, household monthly income, information access; household perception and marital

status proved to have a significant effect on households' participation in CFG. These findings have led to the acceptance of the hypothesis stating that “socio-economic factors determine the community food garden ownership or participation in Lepelle-Nkumpi Local Municipality”.

The findings of this study also show that CFG has proven to be a significant contribution to HFSS, leading to the acceptance of the second hypothesis stating that “community food gardens have a positive effect on household food security status in Lepelle-Nkumpi Local Municipality. Based on the discussed findings, this study concludes that socio-economic factors contribute to household decision to participate in CFG. Further, the study concludes that CFG participation has a significantly positive contribution to HFSS. In conclusion this study also provides evidence that the community food gardens contribute to improved livelihoods in rural areas, indicated by a high level of food security used as a proxy for livelihoods among households participating in CFG compared to non-participants, 44.4% and 25.6% respectively.

6.3 Recommendations

The South African government through its programmes aimed at improving food security at all levels has focused on improving food supply through own food production and promoting self-sufficiency within various agricultural sectors. However, ensuring improved livelihoods in the study area, the study suggests further improvement in following key policy areas:

6.3.1 Recommendation for CFG

The study recommends that the South African government should highly recognize and support community food gardens when developing policies and strategies towards developing rural areas, due to the fact that rural households are pushed by socio-economic factors into participating in community food gardens. This proves the potential that CFG have in improving livelihoods. Promotion of CFG will lead to improved food quality and access, and a high farm return. Noting the various challenges facing CFG management, advisory services are recommended to enhance farm income.

This study further recommends improved extension services in improving the distribution of relevant information to rural households in the study area. This will make households aware of the socio-economic benefits of participating in CFG, thus positively influencing their perception about CFG. Based on the high levels of illiteracy limiting households' to opportunities to improve their state of food security and livelihoods, the study recommends the investment in agricultural education and empowerment of rural dwellers.

6.3.2 Recommendation for HFSS

Generally, the level of education of household heads was quite low in the study area. However, education of household heads tends to be a significant determinant of household food security. Hence it is recommended that development efforts should be directed at providing equal access to affordable and quality educational opportunities to households in the study area. Formal employment has proven to be a significant determinant of household food security. The results revealed low levels of income in the study area. Anseeuw *et al.*, (2001) suggested that agriculture and social safety nets often form the backbone of livelihood in rural areas of South Africa, especially through subsistence production, old-age pensions and child support grant.

The study therefore suggests that rural households should be empowered through the community projects initiative and training. Based on the high levels of illiteracy limiting household heads' access to employment opportunities which may affect the state of food security and livelihoods, the study recommends that there should be serious investment in education and empowerment of rural dwellers.

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ANNEXURE A

Household survey questionnaire

Date: _____

Purpose of the questionnaire is to collect data that would help assess the socioeconomic characteristics and determinants of community food garden in Lepelle-Nkumpi Municipality, Limpopo province.

The information provided in the questionnaire will remain confidential, and will only be used for research purposes.

SECTION A: SOCIOECONOMIC VARIABLES

Name of Respondent: _____

House number: _____

Q1. Gender: Male Female

Q2. Age of the household head (in years)

20 -35yrs	36 – 45yrs	46 -55 yrs	56 – 65yrs	66 – 75 yrs	76 years and Greater
1	2	3	4	5	6

Q3. What is marital status of the household head? Single Married Divorced

Widow Widower Separated

Q4. Are you currently formally employed? Yes No

Q5. What is your highest level of education? Never attended Primary

Secondary Tertiary

Q7. How many members live in the household? _____

Q8. How many members are employed? _____

Q9. Did your received any agricultural training? Yes No

Q10. Do you have experience in agricultural production? Yes No

Q11. Do you have information about community food gardens? Yes No

Q12. If yes to Q11, How much farm income is received per month?

R0 – R200	R210 – R600	R610 – R1000	R1010 – R2000	Greater than R2000
1	2	3	4	5

Q13. Doe the household receive pension fund or social grand? Yes No

Q14. Does the household **own** arable land? Yes No

Q15. If yes to Q14. How much? _____

Q16. Does the household own any livestock? Yes No

Q17. Does the household receive any sort of farm income? Yes No

Q18. If yes, how much? _____

Q19. What is the household's monthly income except farm income?

Less than R500	R501 –R1000	R1001 – R2000	R2001 – R3000	Greater than R3000
1	2	3	4	5

Q20. How many income sources does the household have?

One and less	Two to three	Greater than three
1	2	3

Q21. Does the household practice homestead gardening (backyard gardening)? Yes No

Q22. Does your household participate in community food garden? Yes No

Q23. What is the main reason(S) behind your participate in CFG or the possibility of becoming CFG

Participants?

“Tick the appropriate box below”

Reason for participation/ possibilities for participation	
Source of food production	1
Improve health and nutrition	2
Income generation	3
Social cohesion	4

Q24. What is your view about the following statements?

“Community food garden makes food available and generate income to the household members

positive	Negative
1	2

DIETARY DIVERSITY QUESTIONNAIRE

Please describe the foods (meals and snacks) that **any household** eaten yesterday during the day and night, at home **not** outside of the home.

Question Number	Food Group	Examples	Yes = 1 No = 0
A.	cereals	bread, noodles, biscuits, cookies foods made from millet, sorghum, + insert local foods e.g. ugali, nshima, porridge or pastes or other locally available grains	
B.	Vitamin a rich vegetables and tubers	pumpkin, carrots, squash, or sweet potatoes that are yellow or orange inside + other locally available vitamin-A rich vegetables	
C.	White tubers and roots	White potatoes, white yams, cassava, or foods made from roots.	
D.	Dark green leafy vegetables	Sweet pepper, dark green/leafy vegetables, including wild ones + locally available vitamin-A rich leaves such as cassava leaves etc.	
E.	Other vegetables	including wild vegetables	
F.	Vitamin a rich fruits	Ripe mangoes, papayas, other locally available vitamin A-rich fruits	
G.	The fruits	other fruits, including wild fruits	
H.	Meat	beef, pork, lamb, goat, rabbit, wild game, chicken, duck, or other birds, liver, kidney, heart or other organ meats or blood-based foods	
I.	Eggs	And fresh or dried fish or shellfish	
J.	Legumes, nuts and seeds	beans, peas, lentils, nuts, seeds or foods made from these	
K.	Milk and milk products	milk, cheese, yogurt or other milk products	
L.	Oils and fats	oil, fats or butter added to food or used for cooking	
M.	Sweets	sugar, honey, sweetened soda or sugary foods such as chocolates, sweets or candies	
N.	Spices and caffeine or alcoholic beverages	spices, coffee, tea, alcoholic beverages or local examples	
O.	P. Other	Did the household eat anything outside of the home	