A LIVELIHOOD BASED ANALYSIS OF THE CONTRIBUTION OF COMMUNITY GARDENS TO FOOD SECURITY IN MSUNDUZI AND UMNGENI MUNICIPALITIES IN KWAZULU-NATAL, SOUTH AFRICA.

Tatenda Charmaine Mudzinganyama

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African Centre for Food Security

School of Agricultural, Earth and Environmental Sciences

College of Agriculture, Engineering and Sciences

University of KwaZulu-Natal

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Prof. A. Bogale

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Prof. H. Shimelis

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Abstract

South Africa is a net food exporter, however, scores of households in the rural and peri-urban and urban areas are food insecure. Some households in the peri-urban areas of uMngeni and Msunduzi Municipalities of KwaZulu-Natal have sought to alleviate their households from food insecurity through community gardens, which are widely promoted and used as a means to increase food supply. This study was centred on a livelihood based analysis of the contribution of community gardens to food security in Msunduzi and uMngeni Municipalities, KwaZulu-Natal. A survey was conducted among 46 participants and data was collected through the use of Livelihood- based Participatory Analysis (LiPA) tools. LiPA emerged as a tool for analysis with the development of sustainable livelihoods approach. Livelihood analysis made use of participatory methods to evaluate the following Framework of African Food Security indicators: improvement of risk management and resilience; increase in supply of affordable food; increase in economic opportunities for the vulnerable; and improvement in dietary diversity. Gardening helped to supply the participants with fresh produce, however, gardening did little to improve the participants risk management and economic opportunities. Drought, theft and insects were identified as the major factors limiting the success of community gardens. Despite the challenges, the community gardeners were indeed benefiting from community gardening therefore, further research could be carried out to compare food security among households involved in community gardening and those not involved.

Table of Contents

List of Figures

List of Tables

Acronyms

CBO	Community Based Organisations
FAFS	Framework for African Food Security
HIV /AIDS	Human Immunodeficiency Virus/ Acquired Immune-deficiency Syndrome
KZN	KwaZulu-Natal
LiPA	Livelihood-based Participatory Analysis
NGO	Non- Governmental Organisations
RWH	Raw Water Harvesting
WWVA	Wholistic World View Analysis
CAADP	Comprehensive African Agriculture Development Programmed
QFFQ	Qualititative Food Frequency Questionnaire
EAR	Estimated Average Requirement
DGLV	Dark Green Leafy Vegetables
ARC	Agriculture Research Council
DFID	Department for International Development
SLSO	Sustainable Livelihoods Support Office
SLA	Sustainable Livelihoods Approach
IFAD	International Fund for Agriculture Development

Chapter 1
1.1 Introduction

1.1.1 Introduction to problem setting

Food insecurity has traditionally been viewed as being highest among rural households compared to urban households as there are limited livelihood strategies in rural areas (Bonti-Ankomah, 2001). However, results from a recent survey carried out by the African Food Security Urban Network show that food insecurity is no longer just a rural phenomenon rather it is largely affecting urban households as more and more people move to the urban areas (Eglin, 2010). It was indicated that 81% of 6 500 Southern African households that participated in the survey reported inadequate food provisioning. Furthermore, these households reported that they were not receiving adequate spread of food types in their diets and on average households ate five out of twelve food types like meat, grain based food and dairy diets (Eglin, 2010). Urbanisation has compromised food security as it has led to the loss of food production areas in the outskirts of cities resulting in ever increasing rates of urban and peri-urban malnutrition amongst the poor (FAO, undated; Eglin, 2010). Rapid urbanisation coupled with accelerated and unplanned processes of economic recession, increasing food prices and impacts of climate change has had detrimental effects on food security (FAO, undated).

Food security is made up of four pillars that are food availability, food access, utilisation and stability of supply (FAO, 1996). These four pillars combined show that food security has two main components which are ability to be self-sufficient in food production through own production; and accessibility to markets and ability to purchase food items (Bonti-Ankomah, 2001). Self-sufficiency in food production can be improved through gardening. Gardening refers to small scale cultivation of a range of food plants in gardens (van der Veen, 2005). Gardening takes many forms and this study focused on community gardens. A community garden is in some sense a public garden in terms of ownership, access and degree of democratic control and they exist in many nations in both rural and urban areas (Ferris *et al.*, 2001).

Community gardening serves as a source of fresh, affordable food that helps to improve family nutrition. Furthermore community gardens are a viable tool that link up directly with four of the major cornerstones of community development which are health, education, training, economic development and job creation (Wimpie *et al*., 2000; Cothron, 2009; Payne

and Fryman, 2010). Advantages of community gardening are usually countered by the constraints such as poor leadership; knowledge and skills; insecure land tenure and poor water supply (Karaan and Mohammed, 1998; Hallberg, 2009, Milburn and Vail, 2010).

1.2 Importance of study

The challenges that are faced in community gardening coupled with evidence of community gardening failure has provided a platform for criticism of community gardens (Armstrong, 2000). Community gardens have been criticised of having poor project design, poor management and monitoring, unrealised expectations and lack of sustainability. They are only viewed as feasible projects for households with access to land, water, technical assistance, leaving out many of the food insecure (Marsh, 1998; Armstrong, 2000; McCormack *et al*., 2010; Cothron, 2009). Such criticism of community gardening indicates that even though community gardens have a long history there is not much literature known to endorse the real benefits of community gardening.

The importance of the study, therefore, is to carry out a livelihood based analysis of community gardens and their contribution to food security. This study seeks to draw the attention of interested stakeholders involved in community development programmes in KwaZulu-Natal, South Africa to the importance of community gardens as a viable tool for food security.

1.3 Research problem

The objective of this study is to assess the food security status of households participating in community gardens in the Msunduzi and uMngeni municipalities of KwaZulu-Natal. In order to investigate this it was necessary to answer the following questions:

Sub-problem 1: Do community gardens increase the dietary diversity of the households community gardeners'.

Sub-problem 2: Was there a decrease and/or increase in the expenditure on food by the community gardeners when they were involved in gardening?

Sub-problem 3: Do the community gardens in Mpophomeni and uMngeni increase economic opportunities of the participants?

Sub-problem 4: Have the community gardens in Mpophomeni and uMngeni helped the participants to improve risk management and resilience?

1.4 Study limits

Due to resource constraints the study was limited to two community gardening groups in Msunduzi Municipality and one group of homestead gardeners from uMngeni Municipality. These homestead gardeners were included in the study for comparative purposes. The research was limited to the social, economic and environmental aspects related to production in the respective communities. Therefore, the results cannot be generalised to the whole of South Africa, but can be used as a point of reference.

1.5 Assumptions

The study was based on four assumptions. The first assumption was that the tools used accurately gathered the information needed for this investigation. Second, it was assumed that the participants would participate in the study voluntarily. Third, it was assumed that the participants would be honest. Finally, the data collection tools where designed in English and translated to *isiZulu*. Answers were recorded in English for analysis and interpretation. Therefore, the study assumed that data was translated correctly from English to *isiZulu* and from *isiZulu* to English.

1.6 Outline of dissertation

This chapter presented the importance of the study, research problems, limitations and assumptions of the study. Chapter 2 outlines the related literature on community gardens, their history, and description, justification, and their roles, and the challenges community gardens experience. The chapter concludes by reviewing how community based organisations can help to improve the performance and sustainability of community gardens. Chapter 3 presents the methodology and outlines the sample characteristics. Chapter 4 provides a brief background of the three study groups while chapter 5 presents the results. Conclusion and recommendations are presented in chapter 6.

Chapter 2
2.1Literature review

2.1.1 Introduction

Over the past three decades world agriculture has increased food production by 17% more calories per person. This is enough to provide for everyone in the world with at least 2.720 kilocalories (kcal) per person per day (FAO, 2002). However, despite this increase in production countless mouths are hungry, millions are undernourished, and this may be attributed to people having insufficient land to grow or income to purchase enough food (World Hunger Education Service, 2011).

The prevalence of the acute hunger and undernourishment has negated the progress towards the achievement of the Millennium Development Goals (MDG) and World Food Summit (WFS) target of halving the number of undernourished in the world. This goal is far from being reached as the number of undernourished people keeps soaring. In the past two decades alone the number of hungry people has risen from 842 million to 1.02 billion.

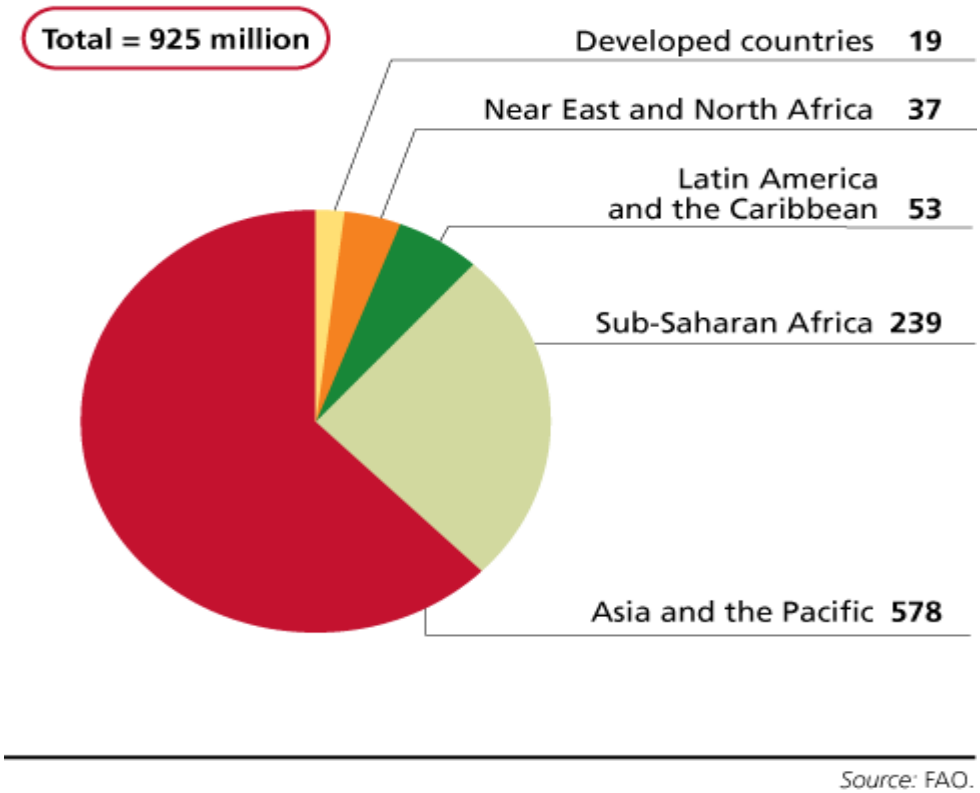

Figure 2.1: Number of hungry people in the world (925 million hungry people in 2010).

The distribution of undernourished people in the world is shown in Figure 2.1 (Shisanya, 2007; FAO, 2010). As shown in Figure 2.1, the distribution of the undernourished varies from region to region. More than 70 % of malnourished children live in Asia, 26% in Africa and 4% live in Latin America and the Caribbean. For many of the malnourished children their plight begins during the pre-natal care with 1 out of 6 children being born with low birth weight (FAO, 2010). Effects of undernourishment in the foetus result in neonatal deaths as well as learning disabilities, mental retardation, poor health among other effects. Distribution of the undernourished can also be depicted using the Global Hunger Index Scale. The Global Hunger Index (GHI) is a tool adapted and further developed by the International Food Policy Research Institute (IFPRI) to comprehensively measure and track global hunger (GHI, 2010).

GHI incorporates three interlinked hunger-related indicators which are the proportion of undernourished in the population, the prevalence of underweight in children and the mortality rate of children (GHI 2010). The index ranks countries on a 100-point scale, with 0 being the best score (no hunger) and 100 being the worst. Values less than 5.0 reflect low hunger; 5.0 - 9.9 reflect moderate hunger; 10.0 – 19.9 indicate a serious problem; 20.0 – 29.9 are alarming and values of 30.0 or higher are extremely alarming (GHI, 2010).

Global Hunger Scale for 2010 showed that the GHI for sub-Saharan Africa declined by 14 points over the past two decades.

South Asia experienced a decline of 25 points which was a notable improvement from the acute level of malnutrition that has resulted in Asia being the host of 70% of the malnourished children in developing countries (World Hunger Education Service, 2011). Near East and North Africa experienced a decline of 33 points each respectively. The highest progress was recorded in Southeast Asia and Latin America and the Caribbean were the GHI scores decreased by 40 points or more (GHI, 2010). The declines in the GHI the respective continents indicates that progress was made in the achievement of MDG 1 in the past two decades.

African countries like Ethiopia and Ghana made significant progress in reducing hunger in the past two decades. Ghana managed to cut its GHI score by more than 50 points while Ethiopia's GHI score fell from 43.5 to 30.8 (Anon, 2009). The decline in the GHI indicates a positive contribution towards the attainment of the Millennium Development Goal 1 (MDG1). However, despite this progress, several countries in Africa still suffer from acute hunger and undernourishment. For example, fifteen per cent of Uganda's population suffers

from undernourishment while DRC and Eritrea have a rate of 76% and 68% undernourishment respectively (Anon, 2009).

In Southern Africa, Mozambique experienced a decline of 13 points in its GHI score. However, over the past two decades countries like Swaziland experienced a 14 points increase in their GHI score and this has been attributed to high prevalence of HIV, and AIDS coupled with high income inequality (GHI 2010). Zimbabwe, once regarded as the bread basket of Africa, experienced a 12 point increase in its GHI score (GHI, 2010). This increase was attributed to the economic collapse that led to an increase in the proportion of underweight children and child mortality. Such increases in GHI scores retarded progress towards the attainment of MDG1.

South Africa, on the other hand, is epitomised as being nationally food secure in terms of aggregate food availability. However, the food is neither evenly distributed, nor fully consumed within the country which has resulted in rampant household food insecurity. This is a stark reality of wide spread poverty that underpins hunger (Faber *et al*., 2007).

In response to poverty, poor households often cope with poverty by adopting monotonous diets that are based mainly on starchy staples, with little or no animal products and few vegetables and fruit (Faber *et al*., 2007). Most South African households consume only 196g of vegetables and fruit per person per day and this is about half of the recommendation of the World Health Organisation daily intake of more than 400g of vegetables and fruit per person per day (Rose and Charlton, 2001).

The burden of poor health is most common among the rural and urban poor as reflected by a greater proportion of these groups having high levels of stunted and underweight children. Stunting and underweight affect one out of five and almost one out of 10 children respectively (NFCS-FB, 2005). Furthermore, 10% of the children in the rural and urban poor areas were classified as overweight and 4% as obese due to consumption of cheap processed foods that are high in energy (NFCS-FB, 2005).

According to the World Summit in 1996 “food security is achieved when all people at all times have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life” (World Food Summit 1996). In order to achieve food security, hunger levels and undernourishment need to be

reduced by adopting policies and interventions that deal more broadly with the underlying causes of under nutrition and improve household food availability (GHI, 2010).

Household food availability can be improved by engaging in food gardening like community gardening and home gardening. Food gardening is an age old tradition that is widely practised although it is repeatedly undervalued and resisted by generations of public officials. Food gardening can provide a long term solution to the dietary diversity of less privileged communities (UNDP, 1996).

This chapter begins by defining community gardens and thereafter, it goes on to give an account of the history of community gardens and describes the role they play in the lives of the gardeners and the community. Factors that affect the efficiency of community gardens are assessed and then the chapter will be concluded by looking at the impact of community gardens and how community gardens can be improved through community based organisations. The point of the community garden study is not to test academic theories but to gather useful information that can help make a community garden program work well.

2.2 Community Gardens

The term community garden encompasses two completely different things that together form such activity as gardening and human communities. The term community can be defined as a collection of people with differing but harmonious views, skills, perceptions that with some outside intervention develop in a cooperative way to achieve agreed outcomes (Holland, 2004). Gardening, on the other hand, can be defined as an activity that involves growing plants and it differs from farming by scale and intent. It is understood as a smaller production of food for a family or community or pleasure and community gardens are a product of a combination of these two terms (Holland, 2004).

The American Community Gardening Association (ACCGA, 1998) defines a community garden as any place where two or more people garden together. The KwaZulu-Natal Department of Agriculture and Environmental Affairs (KZNDAEA), (1999) policy defines a community garden as an area of land to be used by a group of people to produce fruit and vegetables. Community gardens are pieces of land communally worked by a group of community garden members from the same community with the same interests or goals (KZNDAEA, 1999). It can be found in the urban, sub-urban or rural areas, it is a place where

flowers or vegetables can be grown. A community garden can be made up of one plot or many individual plots and it can be found at a school, hospital or home (KZNDAEA, 1999).

Community gardens are commonly established on unoccupied plots where land for home gardens is limited. The size of community gardens ranges from a quarter of a hectare to a few hectares (KZNDAEA, 1999). Community gardens are distinguished from a private garden in that a community garden is in some sense a public garden in terms of ownership, access, and degree of democratic control (Ferris *et al*., 2001). The South African government has introduced projects like community gardens which involve members of community and encourages them to work together with the aim of obtaining financial and technical support (Anonymous, 2002). Instead of the community passively relying on outside assistance to assist the hungry, food security movement through the use of community gardens advocates self-reliance and empowerment in solving nutrition related problems. By advocating for food security through community gardening, the local government will be weaning the local communities from anti-hunger advocates that only address the immediate needs of individuals without considering the long-term effects (Hallberg, 2009). Community gardens are not just a modern day phenomenon rather they date back in history and their history has to be taken into account in order to have an understanding of their importance to human livelihood.

2.2.1 History of community gardens

Community gardens began prior to the 20th century in response to food shortages. The birthing of the Industrial Revolution in the mid-eighteenth century resulted in the rapid movement from local labour-intensive agriculture to machine-driven, monetary economy (Kearney, 2009). In response to the change, community gardens were adopted as a means to remain connected to the land in the midst of rapid industrialisation. The demand for gardens led to the passing of the Allotment Acts of 1887 and 1890 in Britain which required that allotment gardens be allocated to each gardener (Kearney, 2009). These allotment gardens provided agricultural land for city dwellers and migrants from the country side that had been displaced from their rural homes through the double movements of enclosure and industrialisation. This happened because large scale agriculture became more profitable and landowners evicted peasants from the commons that they traditionally cultivated and obtained wood for fuel and other resources (Crouch, 1988 cited in Irvine *et al*, 1999).

This history of allotment did not end there. Bassett (1981 cited in Irvine *et al*., 1999) and Warner, (1987 cited in Irvine *et al*., 1999) state that allotment gardens occurred in the industrialising country of the United States of America when the municipal leaders invented allotment gardens in the 1890s in the midst of a severe economic depression. Successive moments of economic and social crisis saw the recurrence of allotment gardens in the United States of America (Kearney, 2009). During the late 19th century, rapid migration to cities and an economic depression led to a demand for cheap food (Saldivar-Tanaka and Kransy, 2004). In both cases, allotment gardens answered the need for food when incomes did not allow the urban poor to purchase adequate quantities of food through the market (Bassett 1981; Warner, 1987 cited in Irvine *et al*., 1999). In New York, for example, community gardens first emerged during the early 1970s in low moderate-income neighbourhoods where vacant lots were made use of in a bid to reclaim small parcels of land and to anchor their neighbourhoods (The Enterprise Foundation, 2002).

The growth of community gardening and urban agriculture in the contemporary developing world seems to mirror aspects of this history. Irvine *et al*., (1999) pointed out that this is shown by the writers of the Ecologist in their response to Our Common Future. These writers compared the history of English allotments to the experience of rural populations across the developing world in the last half century where, for example, the process of the economic development in the developing world was likened to the process of enclosure of common land which subsequently resulted in privatisation (Irvine *et al*., 1999). This comparison can be related to developing South Africa, were vegetable production goes as far back as 1913. The 1913 Land Act, which was set in motion by white vegetable farmers that could not compete with black farmers in the production of maize and vegetables, brought about the privatisation of common land and the relocation of black farmers into homelands. Thirteen percent of South Africa was made up homelands while 87% was claimed as "white land" (Laing, 1996).

The relocated blacks were grossly populated in the homelands. The grossly populated homelands experienced continuous increases in population size and this ultimately led to an increase in food insecurity. This forced the inhabitants of these grossly populated homelands to cultivate the little land that was available and produce vegetables for household consumption (Laing, 1996). Food insecurity was further exuberated due to high levels of unemployment. The food insecurity levels and unemployment levels continued to worsen in the post-apartheid era. For example in a survey done by Statistics South Africa (STATSSA,

2005) the average rate of unemployment in KwaZulu-Natal over September 2001- September 2005 was 32%. Such high levels of unemployment stimulated the KwaZulu-Natal Department of Agriculture and Environmental Affairs to support community gardening initiatives, as they were seen as a good accessible and affordable source of nutritious and safe food (STATSSA, 2005).

2.2.2 Roles of Community Gardens

Community gardens are exceptional in their ability to address an array of public health and survival issues across the lifespan of the community members (Twiss, *et al.*, 2003). Stocker and Barnett (1998), state that the role of community gardens as change agents for sustainability is threefold. The first role is production of food, and provision of fresh, safe foods that are a fundamental product for physical and ecological sustainability.

Second, a community garden provides an opportunity for social and cultural interactions. Many people join community groups looking for companionship among their kindred with shared goals. The creation of a community garden can provide opportunities for community members to work together on common projects and home skills in groups. The garden can also provide a place for recreation and meetings (Hallberg, 2009).

Third, community gardens can function as research, development, design, demonstration and dissemination sites for community science, horticultural techniques and innovative technologies (Stocker and Barnett, 1998). This way the community garden can bring about economic development and sustainability into the community. Community gardens can also serve as a central place to carry out training courses in agricultural production. During these courses, the techniques can be taught and at the same time, the garden can be developed through intensive gardening by the trainees. The garden may serve as a focal point for community revitalisation and planning efforts (The Enterprise Foundation, 2002). These roles combine to give community gardens the potential to be very effective change agents in the community.

2.2.3 Justification for Community Gardens

Community gardens are unique among parks and home gardens. Saldivar-Tanaka and Krasny (2004) state that community gardens are unique because of their ability to combine the different elements of parks, home garden and open spaces. Unlike community gardens, formal parks do not address issues of food security, community development or offer a safer place for socialising.

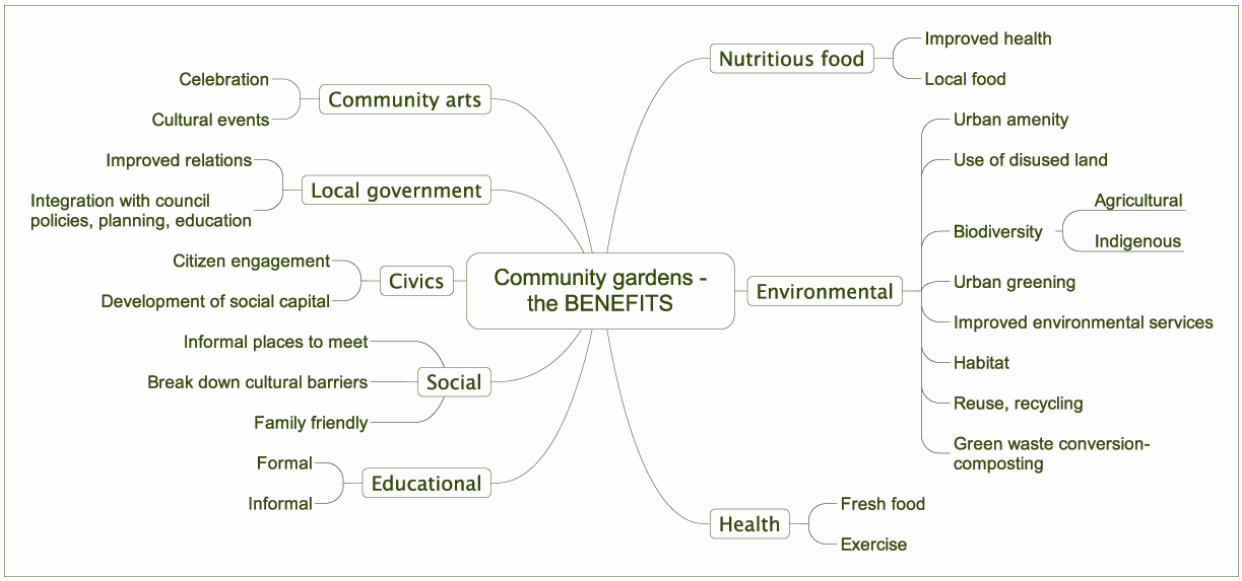

Figure 2.2 Benefits of community gardens (Grayson, 2008).

Community gardens are proactive sites that play important roles in civil societies in urban areas. Grayson (2008) summarises the benefits from community gardens as depicted in Figure 2.2.Community gardening is a good way to turn unused lots within urban areas into productive land (Villas-Boas, 2006). Community gardens provide food close to the people and this reduces transportation and keeps people from using empty space to dump garbage locally. Gardening enhances a person's psychological, spiritual and physical sense of well-being and it allows a variety of organisations to meet a diverse set of objectives and goals like overcoming crime and instilling social cohesion. The gardens also provide a means to partially address issues of food security in low-income urban neighbourhoods (The Enterprise Foundation, 2002).

Marsh (1998), however, criticised gardening as not being a cost effective means of nutrition intervention as compared with fortification, supplementation and targeted subsidies. However, literature counters such studies stating that community gardens are a good means to supplement food security efforts since they are a good accessible source of nutritious foods to

low-income urban residents. Though community gardens alone cannot eradicate food insecurity, they offer a number of benefits to the society. They supply nutritious fruits and vegetables which help to reduce the risk of cardiovascular disease, some cancers and numerous other chronic diseases (Arneson *et al*., 2010). They have a positive impact on the environment through environmentally friendly and sustainable agriculture. Furthermore community gardens increase urban revitalisation, reduce hunger, generate income for low-income neighbourhoods, reduce crime, soil erosion and water contamination through the use of organic farming practices (Villas-Boas, 2006; Hallberg, 2009).

A community gardening project also serves as a platform to expose participants to nutritional information and recipes that help the communities to improve their daily diets and at the same time promote moderate exercise hence resulting in improved physical health and better mental outlook (Hallberg, 2009). In addition, the community garden can be used as a site where community members can learn new ways of cooking vegetables using fresh vegetables. The families can rediscover the art of cooking by the seasons and learn to take advantage of delicious freshly harvested produce. It also helps the families to develop a taste for unfamiliar but nutritious vegetables. Gardening is a very palatable way to encourage links between the garden and the community (Payne and Fryman, 2001).

Household production of food is safer and buying the food close to home provides the best, freshest ingredients possible. Furthermore, through gardening food options are no longer dictated by the industrial food market and the gardeners have the ability to eat real traditional foods rather than imitations (Ussery, 2007). An analysis done by Maunder and Meaker (2007) from the 1999 National Food Consumption Survey data shows that rural households involved in own production had higher intakes of several nutrients like vitamin A, folate, vitamin B6, vitamin C, calcium and iron compared to non-producing rural groups. In Urban areas, energy, vitamin A, vitamin C and calcium intakes were increased in children in households in the crop producing group compared to intakes in the non-producing households.

Local Governments benefit from investing in community gardens because the development and maintenance of costs of community gardens are typically less than those of traditional parks. Furthermore, gardens offer ethnic minorities a place to express their ethnic identity by providing a place to grow specialty food items not otherwise available and also a place to connect with their agrarian cultural heritage (Milburn and Vail, 2010).

Marsh (1998) stated that community gardens have often been criticised for their poor design, management and monitoring; and the expectations of the gardeners are often not realised and there is lack of sustainability. However, literature has shown that if gardens are officially authorised and promoted they can become an important component of urban development and make more food available to the urban poor therefore, improving the nutritional and health standards of the poor, enabling them to earn some additional income and provide employment (Irvine *et al*., 1999). Drescher (2001) summarised the importance of community gardens by saying that these gardens link up directly with four major cornerstones of community development: health; education; and training; economic development; and job creation.

2.2.4 Description of community gardens

The description can be split into six categories and these are summarized in the Table 2.1.

Table 2.1: Types of community gardens

Types of community gardens	**Description**
Collection of individual plots (Ndlovu, 2007).	The activities in the garden are both communally and individually driven. Each member has an individual plot within the bigger community garden. The plot is serviced by the individual only and the individual is governed by garden rules and regulations. The Ogagwini community garden in KwaZulu-Natal is organised in this manner (Ndlovu, 2007).
Collectively Worked Garden (Stocker and Barnett, 1998).	The garden is collectively worked on either solely for the benefit of the group that works it, like the Green Skills Organic Garden, Western Australia, or for the broader community, like the Alternative Technology Centre's Organic Garden, Western Australia (Stocker and Barnett, 1998).
Leisure Gardens (Ferris *et al*., 2001)	These are organised for a neighbourhood with relatively high proportion of apartment dwellers and people without gardens. They contain 20 to 50 plots enclosed by a chain link fence where gardeners grow flowers and vegetables and usually contain picnic or barbeque space as in the case of New York City gardens (Ferris *et al.*, 2001).
Entrepreneurial gardens (Ferris *et al*., 2001).	This type of a garden is diverse and is clearly driven by the need to alleviate poverty and social exclusion. The produce is sold and the garden serves the purpose of offering jobs and generating income for the participants (Ferris *et al*., 2001).
Therapy gardens (Ferris *et al*., 2001).	These gardens play the role of being restorative and quiet gardens and offer rehabilitation programmes to people who have suffered barriers to social inclusion. An example of this type garden is the AIDS Memorial Grove, San Francisco in the United States of America (Ferris *et al*, 2001)
Demonstration (Ferris *et al*., 2001).	These are devoted to public education and to demonstrate that a small scale property is economically and ecologically sustainable like the Garden for the Environment in San Francisco, United States of America (Ferris *et al.*, 2001)

Community gardens are grassroots efforts and have the potential to provide social, political and environmental benefits to direct participants and the surrounding community. However, despite these benefits community gardens face a wide range of obstacles that affect their long term viability. Their success lies in the efficiency of the gardeners and on their source for advisory, technical, financial, and political support (Milburn and Vail, 2010).

2.3 Promoting efficiency of community gardens

The success of community gardens is the product of many factors like community characteristics, location, site characteristics, economic challenges and leadership. However, two of the most threatening factors to the long- term viability of gardens are lack of sustained interest and the loss of land (Milburn and Vail, 2010). A community garden will thrive if it manages to secure land tenure, sustain the interest of gardeners and act effectively as a community development tool. The development and administration of the garden is also central to the success of the garden. Garden projects must also include wide range of community issues like crime and drug abuse in its agenda and be based in a community management and leadership approach (Payne and Fryman, 2001).

In order for a community garden to function in a community, it must be based on an inclusive process of development. This may include working with a small group of stakeholder (at least 8 to 10), starting out small, and developing a vision for a larger design so that there is a plan for additions as the need arises (Pohl-Kosbau, 2007 cited in Milburn and Vail, 2010). Starting off small is recommended especially where one is not sure of the extent to which the garden will gain popularity and the number of available volunteers. Even with a small start, a vision for a larger design is recommended (Payne and Fryman, 2001).

One thing that should be taken note of is that there is no single design, approach or feature that can deliver secure land, sustained interest, and support community building. Rather a combination of these factors can create a space that effectively responds to the needs of the community and the design process needs to be a collaborative effort (Pohl-Kosbau, 2007 cited in Milburn and Vail, 2010). Successful long-term community gardens overcome obstacles by basing the growth of community gardens on four “seeds”. These “seeds” as stated by Milburn and Vail (2010) are site selection and appropriate design of garden, secured

land tenure, sustained interest and community development which will be discussed in the following sections.

2.3.1 Site selection of community garden

Certain factors need to be considered when selecting a garden site and determining its feasibility for sustaining a garden. First of all, the site should be large enough to accommodate the garden spaces and elements that best respond to the needs of the community. The size of the site is mostly dependent on the number of members. The selected site should be suitable for a community garden in terms of its ownership, geographic and physical characteristics. Land tenure, ownership, supporting partners, current and surrounding land uses, adjacent resources and access to the site should also be considered (The Enterprise Foundation, 2002; Payne and Fryman, 2001). The garden site should be compact, more square or circular rather than long and linear. A compact site will ensure all plots can be close to a centralised facility like a community tool shed.

An ideal garden should be located within walking distance of the gardener's homes. This will increase the amount of activity in the garden and therefore make the garden safer and better maintained. The walking distance depends on the individual's health and preferences but the garden should on average be within 5 to 10 minutes' walk (Milburn and Vail, 2010). Gardens near renters or condominium owners, senior citizens, low-income families and people with different ethnicities are often successful.

The physical design of a community garden makes an enormous difference on how inclusive and welcoming the garden feels to gardeners and visitors. Older gardeners and people with disabilities need special consideration in garden design (Payne and Fryman, 2001). Some active groups in the garden may have cultural traditions that help them feel more at home and these traditions may also enrich the entire garden. Encouraging inclusion means thinking beyond the tradition of individual community vegetable gardens. Inclusion calls for flexibility, creativity and mindfulness of the entire community. For example, the Latino community gardens in New York, United States of America have garden structures, design and plants that reflect the country of origin the gardeners and garden members. All the gardens have small wooden houses called Casitas which are used to display pictures, store musical instruments and serve as places to sit, relax, socialise and play games (Saldaviar-Tanaka and Kransy, 2004).

The number of garden plots is based on anticipated participation and their size varied according to the needs of the gardeners. Individually managed plots encourage a sense of ownership and attachment to place, yet it is also important to reserve some communal plots (Milburn and Vail, 2010). Soil quality component of any garden is important. Even if the site contains the appropriate soil, the group should research past land uses to determine the risk of contamination from heavy metals like lead, mercury and cadmium. If potential contamination from past land uses is suspected then the soil should be tested, preferably by an environmental company (The Enterprise Foundation, 2002).

One concern in a community garden is security and vandalism. To help to reduce this there is need for fencing. Surls *et al*., (2001) suggested that eight-foot high fences reduce the problem to manageable levels. However Milburn and Vail, (2010) precaution by saying that the issue of fencing is contentious and should be considered within the context of the community and its cultural specific values as some people believe that fences block out the community for which the garden is intended. In addition, compost bins are needed as they enable easy disposal of debris and plant material on site as well as serving as a free source of nutrient-rich soil (Emerson, undated).

2.3.2 Land Access

Secure land tenure is important for the longer-term and of success of the garden (Holland, 2004). Lack of secure land creates uncertainty in the ability of community gardens to serve as a reliable food source for low income households. Insecurity over tenure can often blight a community's development of a garden in the long-term since growers often plan for seasons ahead and may regard lack of tenure as a barrier to garden development (Kearney, 2009). For example, in the case of the Complexo Aeroporto, Brazil community garden, the coomunity had everything ready to start with the garden construction but unfortunately the owner of the area changed his/her mind when it was time to sign the contract and that delayed the beginning of the cultivation because the organisers had to look for other places (Villas-Boas, 2006). This disappointed the workers to the extent that some of them abandoned the project.

For gardens to be sustainable a permanent or long-term land arrangement from the onset is necessary, as this will help to sustain the interest and dedication of the gardeners. Securing property does not address all the concerns a community garden might face but this allows gardeners to develop the site with fewer physical constraints (Kearney, 2009). The common options for land tenure arrangements include leases, land trusts, and partnering opportunities.

Many community gardens operate on leased land. Milburn and Vail (2010) defined a lease as a contract with a landowner (lessor) allowing the leases use of the land for a specified amount of money and period of time. However, leases can be terminated on short notice and are not ideal for establishing land tenure. When entering into a long term lease, the lessee is wise to partner with an organisation with long-term stability such as an established non-profit organisation or land trust.

Another way to obtain land can be through a land trust. A land trust is where a non-profit organisation actively works to conserve land by undertaking or assisting in land or conservation easement acquisition. The type of land a trust protects depends on the focus and goals of the trust, but these can be closely aligned with the objectives of a community garden (Payne and Fryman, 2001; The Enterprise Foundation, 2002). Trusts manage gardens directly or lease space to garden organisations. Compared to a typical lease, a land trust affords greater security as the land is permanently protected as open space or designated for use as a community garden (Milburn and Vail, 2010). Land in urban centres can also be accessed through municipal land and also through churches and school grounds. As part of accessing the land fencing is one of the key constraints.

2.3.3 Sustained Interest

Securing land is just one ingredient necessary for protecting the future of community gardens. Without the interest and support from gardeners and their surrounding communities community gardens would not exist. Therefore several other factors need to be considered when developing a community garden and these include community outreach, leadership opportunities, training and funding (Kearney, 2009). These will help to maximise initial and sustained community interest in the project.

The location of a community garden has a substantial impact on the engagement of people in the project. According to McNair (2002 cited in Milburn and Vail 2010) the garden should be close in proximity to the intended gardeners and be no more than a short walk away. Once the location of the garden has been decided, there has to be community outreach (Anon, 2007) Reaching out to gardeners and non-gardeners within the neighbourhood where a community garden is located is essential to the long-term success of community garden projects (Flint, 2007; Mathers, 2007 cited in Milburn and Vail, 2010). The surrounding community should be invited to the initial planning meetings for the garden, as this will ensure that the project will

embrace the ideas and hopes of a wide spectrum of community members. These meetings will also determine the structure of the garden and its role in the community (Kearney, 2009).

Community engagement in the early stages of the development maximises the likelihood of the garden's long term success. Such engagement involves educating the community about the benefits of the community gardens and informing members of the community how they can share in the benefits of gardening (Payne and Fryman, 2001; The Foundation Enteprise, 2002). The organisers of community garden have to be prepared to continue outreach through the life of the garden (Bradley *et al*, 2007 cited in Milburn and Vail, 2010). Interest can also be retained by restructuring the garden to serve a different demographic group such as youth groups.

Ideally, the initial motivation for starting a community garden should come from within the community, as this helps ensure that the ideas and goals of the project are developed by local residents rather than by an outside organisation (Mattessich *et al*, 1997 cited in Milburn and Vail, 2010). Successful community building efforts tend to occur in communities containing at least some residents who(m) most community members will follow and listen to, who can motivate and act as spokespersons and who can assume leadership roles in a community-building initiative (Kearney, 2009; Milburn and Vail, 2010).

Leadership is enhanced by delegation. Payne and Fryman (2001) explain this statement by saying that people who succeed at completing small manageable tasks are empowered and encouraged to assume greater responsibility. Allowing participants to share in leadership tasks encourages involvement and aids in replacing leaders or filling new leadership roles as they appear (Monde *et al*., 2006). Leadership opportunities need to be limited to two years so that nobody feels like they own a certain position in the community gardening project. Leadership development is also enhanced by allowing community gardening participants to voice opinions and participate in decision-making process (Mattessich *et al*, 1997 cited in Milburn and Vail, 2010). Furthermore by promoting inclusive decision making process community garden organisers avoid potentially fractious issues like leadership conflicts that may arise in the future (Payne and Fryman, 2001).

Training for community gardeners also helps to sustain their interest in the garden. For example the Abalimi Bezekhaya organisation, in Cape Town, South Africa, runs several training courses to cater for people's varying level of expertise. The training that the organisation provides is a basic three day course on organic gardening (Small, 2007). The

course covers the deep trench system which involves digging a trench, filling with compost, covering with soil and planting crops immediately above. The organisation offers bursaries for training, as they are aware that most trainees cannot afford to pay full cost of training and after the training they receive a certificate which helps them find employment as gardeners or caretakers of a garden, assistant landscapers, etc. Abalimi in partnership with the South African Institute for Entrepreneurship developed a Master Gardeners training which serves as a good platform for illiterate gardeners to move from survival to subsistence and eventually to commercial level (Small, 2007).

Funding can be obtained through fundraising, seeking donations, securing grants charging fees etc. Charging a fee to participate in a community garden is a standard practice. Fees generally contribute to maintenance costs but provides the additional benefit of sustaining involvement as people who contribute want to get their money's worth. The willingness or lack of willingness to pay nominal fees reflects the true level of commitment to a garden project (Payne and Fryman, 2001; Milburn and Vail, 2010). In the Vukani community garden in Ogagwini, KwaZulu-Natal, South Africa, the members of the community garden that are interested in joining the community garden have to pay a minimum of R10.00 joining fee. The money is for buying seeds and other necessities in the community garden, however, a member maybe required to pay an additional amount if need arises like buying seeds and pesticides (Ndlovu, 2007).

A garden may be run independently or by an organisation. Usually an organisation such as a community based organisation, city department, non-profit, church, school or housing complex can run the community garden. The gardeners typically manage the garden under the umbrella organisation (Payne and Fryman, 2001). The organisation assists with certain aspects of the garden like providing technical resources, educational opportunities, building materials, staff, financial assistance and the organisational structure influences the character and functioning of a community garden (Milburn and Vail, 2010). Sustaining interest in the garden through the various factors discussed above is of great importance, as this will ensure that the community garden develops into a community developing tool.

2.3.4 Community Development

Community development refers to community members analysing their own problems and taking action to improve economic, social, cultural or environmental conditions as well as feeling as a part of the community as a whole (Saldivar-Tanaka and Krasny, 2004).

Community gardens offer a particular combination of factors that enhance their potential to be excellent community building tools. These gardens offer a non-threatening place for interaction among people of all ages, culture, income levels and offers activities that involve a wide range of skills that non-gardeners can get involved in such as carpentry and nutrition education (Saldivar-Tanaka and Krasny, 2004).

Community development through community gardens can be enhanced if the community garden gets connected to a larger network of community groups and organisations which provide gardeners with services like training and information on issues like funding. Networking results in the merging of agendas among partners, increases support for the garden and nurtures a collective passion to make deep and long lasting positive change in a community (Payne and Fryman, 2001). Coalitions may also be formed with local businesses, faith-based groups, schools and civic organisations. These coalitions broaden the impact of garden projects and build long-term community relationships. The Latino Gardens, in New York, United States of America, have formed coalitions with other gardeners and garden support groups and through these coalitions they work together to do fundraising, publications, workshops, rallies, outreach and support other local campaigns (Saldivar-Tanaka and Krasny, 2004).

Through good planning and commitment, community gardens can be effective tools for community economic development. The garden can offer community economic development through initiatives like job training where participants develop job readiness, self-confidence and specific job skills. In job skill training emphasis may be given to horticulture, or making and marketing value added products from the garden products (Payne and Fryman, 2001). Other approaches involve entrepreneurial and micro-enterprise training programs. These programs are designed to enable participants to succeed in small enterprises they start themselves rather than work for an employer (The Enterprise Foundation, 2002). Training helps to build skills and enlarge perspectives of the garden. Gatherings for training, information sharing and mutual support are crucially important for community gardeners as they are a platform to connect with people who share in a common vision. To ensure high visibility and attendance, garden organisations should actively publicise opportunities for training and technical assistance (Milburn and Vail, 2010).

The Siyazama Community Allotment Garden Association (SCAGA) and Abalimi Bezekhaya are community projects situated in the Cape Metropolitan areas that decided to become

livelihood level gardens in order to bring about community development. A livelihood garden is a subsistence garden with a commercial component that serves as an anchor for a number of social and economic initiatives identified by gardeners and these can include crafts and refreshments for tourists, childcare and soup kitchens (Small, 2007). This enables the gardens to be multifunctional entrepreneurial and community initiatives. Furthermore the livelihood garden can also incorporate part-time and non-gardeners who wish to benefit from the gardening activity while doing something they like (Small, 2007).

Community gardens can also bring about community development through the inclusion of the youth in the community garden. Gardens help the youth meet academic, work related and social challenges and can help families provide appropriate support and direction for their teenagers. Lack of youth is often cited as a key constraint and threat to the future of the agriculturally based-livelihoods. The key to working with the youth is making sure they feel welcome in the garden and youth benefit from a clear structure and supportive guidance. They deserve empowered inclusion in decision making and being included in opportunities to take leadership roles (Payne and Fryman, 2001).

The Miracle Garden in Phoenix Arizona, United States of America offers youth a constructive alternative to gangs and crime. The Miracle Youth Garden's youth leaders have brought success to the garden and have helped other youth as well as many adult volunteers to achieve growth in knowledge, attitude, and behaviour. The participants of the Miracle garden have gained knowledge in horticulture, entrepreneurship, and job readiness, as well as in organisational, communication, employment, leadership and community building skills. The youth also help others to develop attitudes that foster self-confidence, camaraderie, interest in learning and pride in what they accomplish (Payne and Fryman, 2001).

2.4 Impact of Community Gardening

The benefits derived from a community garden can seldom be put in any economic equation. Often, community gardens have been a catalyst for positive change in distressed neighbourhoods and they go beyond just providing healthy foods for the communities involved but go a step further to bring about social interaction, improve the value of property in the neighbourhoods, reduce crime, as well as provide a source of exercise for the gardeners (Hallberg, 2009). The impact of community gardens can be seen in the examples given in Table 2.2:

Table 2.2: Impact of community gardens

Name of Community Garden	Impact
Abalimi Bezakhaya, Cape Town South Africa, (Small, 2007)	They assist many communities, individuals and community based organisations to develop their own organic vegetable gardens in order to improve their dietary diversity, improve household food and nutritional security and provide sustainable additional income for the gardeners (Small, 2007).
Siyazama community allotment garden association (SCAGA), Cape Town, South Africa (Small, 2007)	It is a leading micro-urban agriculture model where the poor learn to grow crops for sale and household consumption. The association is a livelihood level garden that provides job opportunities. The project has been a catalyst for other groups to apply for land and has had resounding impact on the local environment as soil fertility inputs have decreased (Small, 2007).
Complexo Aeroporto, Riberao Preto in Brazil (Villas-Boas, 2006)	The garden is a source of cheap and fresh vegetables for the community and has transformed the area that was once a dumping site into a beautiful place (Vallas-Boas, 2006).
Genesee County, Michigan, United States of America (Alaimo *et al*., 2008)	Participation in community gardening resulted in increased fruit and vegetable consumption and improved health (Alaimo *et al*., 2008)
Toronto Gardens in Toronto, Canada (Irvine *et al*., 2009).	The gardens serve a variety of communities like public housing projects and, senior citizen's residences. The food that is harvested is consumed privately or directed to community kitchens and the excess is distributed through local food banks (Irvine *et al*, 2009)
Success gardens, New York, United States of America (The Enterprise Foundation, 2002).	The garden provides an outdoor space where youth and adults can learn from formal instructors and informally from each other. The garden also serves as community parks where social events take place (The Enterprise Foundation, 2002).

The desirable outcomes for any community garden are summarised by Payne and Fryman (2001), as a place where there is increased leadership opportunities for residents; increased mentoring relationships between adults and youth and an environment to increase neighbourhood associations and coalitions among other outcomes. However, in as much as community garden have all these potential benefits the benefits come with challenges tagged to them and these challenges need to be addressed effectively.

2.5 Challenges in Community Gardens

Community gardens consistently face challenges of start-up costs; inadequate skills and knowledge among participants; crime; vandalism; land tenure; and changes in seasons and climate (Hallberg, 2009). These challenges have been summarised in Table 2.3 together with the possible solutions.

Table 2.3: Challenges and possible solutions

Challenges	Typical problems	Possible solutions
Costs	Tools; equipment; seeds; land rentals; site management and maintenance (Milburn and Vail, 2010).	Funding will help to ease the burden of start-up costs and these can be obtained through fundraising, seeking donations, securing grants charging fees (Milburn and Vail, 2010; Payne and Fryman, 2001).
Land	Most gardens are situated on sites not owned by the gardeners and this leaves them exposed to high levels of instability because the availability of their plots can change at any given time since the community garden site can be allocated for other uses (Neighbourhood Gardens Association, 2009).	To curb land tenure challenges, gardeners can make use of vacant lots and abandoned properties or former dumping sites. Land trusts can also be acquired through gardening associations (Neighbourhood Gardens Association, 2009).
Management	Many gardens are usually managed by a dedicated individual or a small group; this puts the garden at risk of failure if these people lose interest in gardening or are no longer able to be involved in the project (Urbis Keys Young (UKY), 2004).	To avoid this, management of community garden needs to be flexible and transferable to new people (Urbis Keys Young (UKY), 2004).
Water	For example the Complexo Aeroporto community garden in Brazil suffered from acute water problems because the water in the	A solution to this problem could be through the government supplying free water to community gardens. Alternatively raw water storage watering

	Ribeirao Puerto, Brazil was expensive (Villas-Boas, 2006).	system can be used for food production, or drum-drip irrigation can be used (Small, 2007; Stimie et al, 2010).
Vandalism	Vandalism of tool sheds; plots and crops (Brown and Carter, 2003).	A few practices can be adopted to reduce the incidents of vandalism like locking tools in the tool shed, planting a "vandal's garden", this is a garden that can be at the entrance of the garden were unauthorized people can get food from (Brown and Carter, 2003).
Skills	Gardeners have inadequate skills and knowledge (Pennsylvania Horticultural Society, 2009)	This can be overcome if gardeners attend some gardening training projects like the Pennsylvania Horticultural Society which offers a course called garden tenders for those interested in starting a community garden (Pennsylvania Horticultural Society, 2009)

The problem of water has been, to a great extent, effectively addressed by Abalimi Bezekhaya in Cape Town, South Africa. The organisation demonstrates drum-drip irrigation at garden centres and leading projects. Drum-drip irrigation was developed in anticipation of future water shortages. The drum or tank is filled with water and it provides just the right amount of water pressure into the drip-lines. The drum or tank also gives exact control over the amount of water delivered. This system of watering is very important in summer when there is a tendency to overwater using other systems. Overwatering results in high running costs and leaching of nutrients of the topsoil. The system applies water directly to the plants. It is simple to operate, repair and it is relatively inexpensive (Small, 2007).

Another solution is raw water storage watering system for home production. The raw water storage captures run-off from the soil surface during rainstorms and stores it for use during dry periods. The water can be stored in underground tanks called Rain Water Harvesting (RWH) Dams (Stimie *et al*., 2010). Raw water storage enables production during the dry season, thereby providing a source of food to the household during the off season period. The Raw Water Harvesting Dams stores large volumes of water of up to 30 000 litres in underground tanks unlike the above ground water tank that store up to 5000 litres. Raw water harvesting is more efficient than other methods like roof run-off in above ground water tanks. The roof run-off above ground tanks provides much less water than surface water meaning

that the tank does not fill up regularly enough to enable sufficient water for food production. (Stimie *et al*, 2010).

2.5.1 Production Constraints in community gardening

The agricultural function of food systems has historically been marginalised by planning theory as a separate rural feature. Orthodox planning ideology traditionally regarded food systems as exogenous function unrelated to planning processes (Drescher 2000). However, recent food crises in the developing world necessitate that food systems be integrated into the planning systems of cities. This also requires that agricultural functions be integrated into urban morphology with certain areas reserved for intensive agricultural production as they are seen as a viable source of fresh produce especially for the vulnerable (Mubvambi and Mushamba, 2006)

The Cape Town Spatial Distribution Framework provides the spatial framework in which agriculture is practised as an integral function of municipal land-use systems. The CTSDF reserves high potential and unique agricultural land beyond the urban edge exclusively for agricultural purposes to ensure food security. These urban edges include Tygerberg Hills/Philadelphia, Bottelary and Blackheath. The urban edge limits the value of peripheral agricultural land, thereby preventing investors from speculating in developable agricultural land. The urban edge promotes urban agriculture, particularly in areas where it can provide employment and additional income in deprived communities. All agricultural activities are permitted except for animal husbandry (City of Cape Town Metropolitan Municipality, 2010a). In addition the Cape Town Urban Agriculture Policy was adopted by the Cape Town authorities who have started to prioritise public interest in better public nutrition, additional household income and food security by integrating agriculture with other urban uses (Purushothamana *et al*., 2004).

However, the urban edge is not an indefinite barrier to urban growth and the viability and practicality of the proposed metropolitan urban edge has only been estimated to be sufficient to accommodate development needs up to the year 2021. The municipal framework does not spatially plan for urban agriculture in its plans and frameworks, but only promotes formal urban agriculture in principle. Thus urban agriculture is not protected as a land use and has to compete with more profitable land uses resulting in urban agriculture been supported in theory and supressed in practice (Kirkland, 2008) .

2.6 Institutional Arrangement

The challenges given above can be effectively addressed when the community garden has a well-structured management. In KwaZulu-Natal, South Africa, community gardens are managed according to a constitution which is usually drawn up by the garden members with the help of extension officers, facilitators from non-governmental organisations and facilitators from community based organisations (KZNDAEA, 1999). Community garden members select a committee to fulfil management duties. These management duties include arrangement of water supply and irrigation schedules; organisation of bulk buying of inputs; receiving of contributions; record-keeping; and handling of general garden matters. If management issues of a community garden are taken care of the community garden will have higher chances of being sustainable (Crosby *et al*., 2000).

Sustainability and management of a garden can also be enhanced by outside influences like training of members, administration of the community garden, and securing of land tenure. Training and management skills can be imparted to community gardeners though Community Based Organisation. Community based organisation is defined by Chechetto-Salles and Geyer (2006) as an organisation that provides social services at the local level; their activities are based primarily on volunteer efforts. Community based organisations are initiated by members of a neighbourhood with the purpose of addressing issues in their own vicinity. These organisations are primarily found in impoverished areas (The Enterprise Foundation, 2002).

Community based organisations have the potential to be excellent partners in community garden development efforts. A collaboration between community based organisations and community gardens can benefit the gardeners because these organisations understand neighbourhood dynamics and they have the trust of the community (Hallberg, 2009). Community based organisations also have expertise in identifying public and private sources of funding for community development projects. Many funders prefer to finance open-space projects as part of the fabric of overall community revitalisation rather than a stand-alone activity (The Enterprise Foundation, 2002). For example, in KwaZulu-Natal members of the Umphumela co-operative perceived the idea of collective farming as a means of improving opportunities for government funding. Since government encourages formalised grouping before funds can be allocated, the cooperative had the strong belief that one day their efforts

would be recognised and acquisition of funding from government will come to fruition (Dlamini, 2010).

In addition, initiatives like community gardens can be used to the advantage of Community Based Organisations to create self-empowering solutions to reduce hunger in their communities, crime, increase the value of regenerated and unused land, increase social cohesion between community members and promote healthy diets (The Enterprise Foundation, 2002). Through the relationships formed among the gardeners, community based organisations, community residents, local government and other interested stakeholders strong coalition can be created that can be used to press towards a reduction of food insecurity especially among the poor in the different communities (Chechetto-Salles and Geyer, 2006;Hallberg, 2009).

A study carried out by Dlamini (2010) in KwaZulu-Natal showed that formation of co-operatives resulted in the creation of employment especially in rural areas where livelihood strategies are limited. The cooperative was also seen as a platform to share ideas and impartation of knowledge and information to one another, for example, seventy-four percent from Inyamvubu co-operative, and sixty-seven percent from Ingwe-Mndeni and Umphumela co-operative reported receiving learning skills like farming from such cooperatives. However, like in any other organisation setbacks like clashing opinions were common coupled with unsatisfactory decision making and lack of commitment were some of the major setbacks faced by the co-operatives. Therefore to counter such setbacks it is essential that each co-operative should have strong constitution that clearly states actions against problematic members and a system agreed upon by everyone to manage clashes (Dlamini, 2010).

2.7 Food Gardens in South Africa: Overview of methodologies

The link between food-gardens and food security is obvious and therefore it is of paramount importance to review methodologies that seek to measure the impact of food gardens. For the purpose of this study, methodologies used in past studies on food gardens were reviewed to gain understanding and appreciate the ways in which impact of food gardens on food security can be measured. Methodologies reviewed were categorised and compared according to the data collection tool used, impact of different types of food gardens on household food security, case studies and sample size.

2.7.1 Comparison of Household Food Insecurity Access Scale (HFIAS) and Coping Strategy Index (CSI).

Household Food Insecurity Access Scale (HFIAS) measures the access component of household food insecurity based on an in depth understanding of household food insecurity at household level (Coates *et al*., 2006). This method was used to assess the impact of community gardening on household food security status in the Maphephetheni Uplands of KwaZulu-Natal, South Africa (Shisanya, 2007).

The HFIAS methodology was compared to the Coping Strategy Index (CSI). CSI measures the number and frequency of application of consumption reduction responses used by households facing real, perceived and anticipated food shortages (Msaki, 2010). When traced over time, the CSI can monitor long-term trends in food insecurity and help identify the causes of malnutrition (Msaki, 2010).

CSI was used to investigate the household food insecurity coping strategies in Umbumbulu District of KwaZulu-Natal, South Africa. Coping Strategies Index (CSI) measures behavioural responses used to manage household food shortages (Msaki, 2010). Msaki (2010) defined coping strategies as people's response to conditions under which they do not have enough to eat. There are three basic types of coping strategies to food shortages: immediate and short-term alteration of consumption patterns; the longer-term alteration of income earning or food production patterns; and one-off responses such as asset sales (Msaki, 2010).

The HFIAS study in Maphephetheni comprised of 53 households participating in community gardens. The survey was fully engaging as the survey used a food security measurement questionnaire, focus group discussions; face to face survey and pre-prepared prompts and probe. On the other hand the CSI study in Umbumbulu consisted of 200 households and data was collected using a structured consumption questionnaire during two consecutive household surveys (Hendriks, 2005; Msaki, 2010). During the survey, information on household coping strategies was collected from the person who was in charge of preparing food and seeing to it that the members of the household ate (Maxwell *et al*., 1999; Msaki, 2010).

Both methods showed that when confronted with an economic and social environment that limits or changes access to food, respondents made compromising changes to their diets (Mujonono, 2008; Msaki, 2010). Respondents from Maphephetheni (HFIAS) indicated that

when other sources of food were exhausted, payments for work became a significant source of food (Shisanya, 2007). Although community gardening contributed somewhat to household food supply, the households participating in community gardens in the Maphephetheni Uplands were generally severely food insecure (Shisanya, 2007). The same was true for the Umbumbulu participants. The analysis of the data collected using CSI showed that about 64 per cent of sampled households relied on less preferred and less expensive foods when they faced food shortages (Msaki, 2010).

HFIAS and CSI are innovative tools that can be adapted for use in diverse communities. HFIAS, on one hand, can be easily adapted to suite the context of the informants and representatives from any survey population (Shisanya, 2007). CSI, on the other hand serves as a good tool for monitoring food security projects, as well as a good proxy for food intake, food budget shares, food frequency, income status and the presence or absence of a malnourished child in the household (Maxwell *et al*, 1999).

In the Maphephetheni study, HFIAS tool adequately captured household food insecurity access in terms of anxiety, uncertainty, quality and quantity of food consumed, however, inquiry on the utilization component should have been included in the tool so that full scale enquiry in household food security could be achieved (Shisanya, 2007). Furthermore the results generated using these methods studies cannot be compared between studies because the methodologies include contextual data that varies from place to place (Maxwell *et al*, 1999).

2.7.2 Comparison of two studies in KwaZulu-Natal

Ngidi (2007) and Chingondole (2007) carried out surveys in KwaZulu-Natal. One study was carried out by Ngidi (2007) and it was aimed at assessing the impact of crop production on household food security of households in Maphephetheni and Umbumbulu, KwaZulu-Natal. The second study was carried out by Chingondole (2007) to investigate the socio-economic impacts of morbidity and mortality on coping strategies among community garden clubs. The study sought to contribute to understanding the impact of morbidity and mortality on women's coping strategies within the context of rural women engaged in subsistence agriculture based livelihoods (Chingondole, 2007).

Both studies made use of qualitative and quantitative methodologies. A combination of qualitative and quantitative methodologies gives balance to a study while increasing the

accuracy of the study as qualitative methods assist in attaining rich, real, deep and valid data (Chingondole, 2007). Ngidi's (2007) study had a sample size of 268 participants from Umbumbulu and Maphephetheni. Chingondole's (2007) study, on the other hand, had an average of six members per garden club. The study made use of two garden clubs that are predominantly dominated by women. The data in Chingondole's (2007) study was collected over two years that is 2003 and 2004 respectively.

Chingondole (2007) conducted the surveys in three phases between September 2003 and October 2005. Survey one served as a baseline, round two of the survey was carried out with the aim of determining changes and trends at household and community levels that impacted on livelihood issues while survey three focused on the contribution of community gardens to sustainable livelihoods to better understand the impact of morbidity and mortality on coping strategies (Chingondole, 2007).

The Coping Strategy Index (CSI) was part of survey two and used to determine the levels or extent of food insecurity (Chingondole, 2007). Sustainable livelihood analysis, which was part of survey three, was done using seasonality calendars, ranking and scoring (Chingondole, 2007). A semi-structured household survey was used to collect information regarding household composition, community garden tasks, personal condition of health, and funeral costs among other tasks (Chingondole, 2007). In addition, garden club members were asked to draw a typical uplands household on a flip chart indicating demographic information (Chingondole, 2007). Data was analysed using Chi-square tests, paired samples t-tests, frequency and descriptive statistics (Chingondole, 2007).

In Ngidi's study crop seasonality charts and Coping Strategy Index (CSI) tool were used to measure the impact of crop production on household food security. The types of crops produced were investigated using crop seasonality charts while the household food security was measured using (CSI). Focus group discussions were used to collect data on seasonality charts. Data indicated the types of crops, the time of the year that particular crops were produced and the distribution of crop harvests throughout the year. The study also made use of secondary data sourced from Umbumbulu and Maphephetheni (Hendriks, 2005; Chingondole, 2007). Ngidi's (2007) study also made use of secondary data. The secondary data included income and expenditure, food security coping strategies information, household consumption information and demographics which were sourced from past studies in Umbumbulu and Maphephetheni (Hendriks, 2005; Chingondole, 2007).

Ngidi's (2007), use of secondary data was profitable in that secondary data is readily available, however, it is prone to misinterpretation. For example, during the research process of the secondary data, recall and measurement errors could have been possible sources of error and certain questions could have been influenced by social desirability of the researcher. Such errors compromise the quality of the data when is it used as secondary data in other studies (Ngidi, 2007).

Furthermore, the researcher clearly states in his conclusion that findings through this methodology were not sufficient to conclusively state if the production levels currently practiced can solve food security. This implies that the methodology can be improved. Methodologies can be supplemented with methods that can be estimated (for example Crop estimates) or a pre and post-test, that is, household food security data could be collected before and after the existence of gardens as this could give a clearer picture of what the contribution of crop production to household food security was (Ngidi, 2007). Although it was time consuming for Ngidi (2007) to use the seasonal chart, the technique was beneficial in that it managed to incorporate the participants through their direct participation in group discussions and this enabled the researcher to capture the subjective opinions of the participants (Bergeron, 1999).

It is commendable that Chingondole (2007) made use of a combination of innovative methodologies which included both quantitative and qualitative methodologies. Qualitative methodologies promoted participants' active participation in data collection and ensured that the study is people-centred. However, to improve the quality of the study home gardening activities could be included in order to better understand the role of subsistence agriculture as in coping with the effects of morbidity and mortality in Maphephetheni uplands. The study could also focus on women engaged in community gardens and non-community garden members to compare how morbidity and mortality influence the coping strategies of women from two different groups.

The focus was on women as they are critical food producers and central to household food security and rural livelihoods since they provided most of the agricultural labour in community gardens. Women not only have a central role in community gardening but also in non-farm activities and household chores. The prevalence of morbidity and mortality had negative effects on women's coping strategies as they had to care for the sick and dying household members thus adding more pressure to the existing workloads of women and

reducing the resilience of women to cope with livelihood insecurity shocks and stresses (Chingondole, 2007).

2.7.3 Ndunakazi Project in comparison to the Lusikisiki Project

Ndunakazi project in KwaZulu-Natal, South Africa is a crop-based project that was supported by the Medical Research Council and agriculturists from the Agricultural Research Council (ARC) with the aim of improving the vitamin A status of community members through production and consumption of provitamin A-rich vegetables and fruit (Faber *et al*., 2011). Existing community-based growth monitoring activities in Ndunakazi were used as a platform for the promotion and implementation of home gardening. The Lusikisiki project on the other hand was carried out in the Eastern Cape, South Africa. The project adopted and replicated some of the key lessons from the Ndunakazi project (Faber *et al*., 2011).

In the Ndunakazi project, demonstration gardens were established at each growth monitoring site. The demonstration gardens served as training centres for planting pro-vitamin A-rich vegetables (Faber *et al*., 2011). Two cross-sectional surveys were used to measure the effect of the gardening project on maternal knowledge, dietary intake and the vitamin A status of children two-to-five year old. The two surveys were carried out in two phases; one at baseline and a follow-up survey 20 months later (Faber et al., 2011). To improve the accuracy of the survey a neighbouring village that had similar community-based growth monitoring activities but no home gardening project served as the control village (Faber *et al.*, 2011).

Within the 20 month period of the survey, 71% of the mothers from Ndunakazi could name at least 3 food sources of vitamin, 82% could name the colours (yellow/orange and dark-green) of vitamin A-rich vegetables and 74% could name at least one symptom related to vitamin A deficiency (Faber *et al*., 2011). The control group, on the other hand, showed poor results. Only 18% could name the colours of vitamin A-rich vegetables, 15% could name at least one symptom related to vitamin A deficiency and only 27% could name at least one symptom related to vitamin A deficiency (Faber *et al*., 2011). The advent of home gardening projects brought about an improvement in the dietary diversity as the intake of yellow/orange-fleshed and dark green leafy vegetables increased, with at least 85% of the vitamin A intake being from provitamin A-rich fruit and vegetables. Furthermore, prevalence of vitamin A deficiency decreased from 58% at baseline to 34% in Ndunakazi (Faber et al., 2011).

The Ndunakazi project had high input and close monitoring from the research team, however, the Lusikisiki project sought to reduce input from the research team by focusing on technology transfer, mobilization of the local community and involvement of the local governmental departments of health and agriculture (Faber *et al*., 2011). In the Lusikisiki project, agricultural extension officers served as agricultural advisors and as the link between the researchers and community members involved in the project (Faber *et al*., 2011). Agricultural extension officers were responsible for providing nutrition education and for monitoring the growth of children one-to-five years old with the support of the department of health. Trained project health volunteers were responsible for cultivating and promoting provitamin A-rich vegetables with the support agricultural extension officer (Faber *et al*., 2011).

The project was built on existing structures and activities which include decision making, problem solving and promotion activities that were linked with existing monthly farmer forum meetings among other activities (Faber *et al*., 2011). Orange-fleshed sweet potato field nurseries were established to ensure a continuous supply of cuttings. Training in gardening activities was done at both the demonstration gardens and field nurseries, while the homesteads at these sites were used to demonstrate the preparation and processing of orange fleshed sweet potato (Faber *et al*., 2011).

The results show that project activities improved caregivers' knowledge of vitamin A nutrition, consumption and cultivation of provitamin A-rich vegetables. A number of key lessons have been derived from the project like contribution of provitamin A-rich plants as part of a diversified diet, the use of natural resources as part of this diversification strategy and the contribution of community-led production to nutrition among other lessons (Faber *et al*., 2011).

The Lusikisiki project lacked a quantitative baseline data. As a result observed differences between participating and non-participating households were not conclusive (Faber *et al*., 2007). The approach for the Ndunakazi and Lusikisiki project focused on provitamin A-rich crops and this was an unbalanced approach as people need a range of nutrients not only vitamin A. However, production of provitamin A-rich crops was shown to improve dietary intake of not only vitamin A, but also some other micronutrients (Faber, *et al*., 2011). The Ndunakazi and Lusikisiki projects both used community based growth monitoring as platform to promote the production and consumption of provitamin A-rich vegetables and fruit. Other

entry points that can be potentially used include schools, clinics, crèche and community gardens (Faber *et al*., 2011).

2.7.4 Impact of home gardens on dietary diversity

Good nutrition in a sound socio-economic environment is the foundation of health and well-being in the early years of a child's physiological and psychological development (Selepe, 2010). With this in mind, Faber *et al*., (2007) and Selepe (2010) investigated the impact of home gardens on nutritional status of children. Faber *et al* (2007) carried out the study in two neighbouring rural villages in KwaZulu-Natal while Selepe (2010) carried out the study in a home garden project in Eatonside, the Vaal Triangle in South Africa.

The study by Faber *et al*., (2007) was carried out with the purpose of determining the contribution of dark-green leafy vegetables (DGLV) to total micronutrient intake of two to five year old children (Faber *et al*, 2007). This study was motivated by the high prevalence of vitamin A deficiency (45.9%) in preschool children in the Guquka and Ndunakazi areas of KwaZulu-Natal Selepe (2010). On the other hand, carried out the study using a home gardening project called the Vaal Triangle Intergrated Research Project located in an informal settlement in the Gauteng Province (Selepe, 2010) were approximately 42 percent of the households in the Vaal Triangle live in poverty, food insecurity and rampant under nutrition (Selepe, 2010).

For the purpose of data collection, a baseline survey was carried out in KwaZulu-Natal to determine the vitamin A status and dietary intakes of children aged 2-5 years (Faber *et al*., 2007). Demonstration gardens within the Ndunakazi village were used as training centres for crop production. A preliminary study was carried out at the garden sites and the results showed that the intake of yellow/orange fleshed and dark-green leafy vegetables increased due to vegetable production resulting in an increase in the intake of vitamin and various other essential micronutrients (Faber *et al*., 2007). Results from the preliminary study were used to carry out a repeated cross-sectional dietary study using an average sample size of 77 during the months of February, May, August and November of 2005. Caregivers of two to five year old children were also interviewed (Faber *et al*., 2007).

Dietary intake was quantified by five consecutive repeated 24 hour recalls. Food intake reported in household measures was converted into weight using the MRC Food Quantities Manual, while the SAS software package were used to convert food intake to macro and

micronutrients using the MRC Food Composition Tables as the food database (Faber *et al*., 2007). Dry oats were also included and were used to quantify portion sizes of certain food items like cooked food. The dry oats resembled the amount of food consumed and it was measured using a measuring cup to quantify the portion of cooked food consumed by the children (Faber *et al*., 2007).

The contribution of dark green leafy vegetables like spinach to total intake was calculated and expressed as a percentage of total intakes (Faber *et al,* 2007). The estimated average requirements (EAR) of the dietary intakes (DRIs) were used as reference value for dietary adequacy. The EAR is the average daily nutrient intake amount estimated to meet the requirement of half the population. Dietary intake for the group was considered nutritionally adequate if the mean intake for the group was at or above the Adequate Intake (Faber et al., 2007).

While the Faber *et al*., (2007) study was based on secondary data from a preliminary study, Selepe's (2010) study was based on primary data from a baseline survey. The baseline survey was carried out using a sample of 100 households that were purposely selected from the informal settlement in the Vaal Triangle. Children aged two to five years (n=40) were selected for the project from the sample (Selepe, 2010). Use of primary data reduces error in subsequent data analysis whereas secondary data is prone to bias, as the researcher will not be aware of errors that occurred during the data collection and analysis.

Selepe (2010) carried out preliminary observations of living conditions, availability and accessibility of basic service thereafter a pilot study was carried using ten households. The home gardening study was undertaken in five phases namely planning meetings, baseline survey and training of households on home gardening, planting of seeds and evaluating the impact of home gardens (Selepe, 2010). Socio-demographic questionnaire, qualitative food frequency questionnaire (QFFQ), 24- hour recalls and anthropometric measurement were engrafted in the data collection process and used in five phases to measure the impact of home gardens on nutritional status of children (Selepe, 2010).

A pilot study was carried out at the beginning of the data collection process in Selepe's (2010) study. Although it was time and resource consuming, the pilot study was a good exercise as it was a good means to ensure that the study was of high quality and precision. The study was carried out in five phases. This was cumbersome work that could have resulted in the loss of data over the study period therefore compromising the results of the study.

Twenty-four hour recalls were used in both studies and this made the studies prone to responder bias as participants were familiar with the research process. Furthermore, the researchers made use of different dry grains to resemble the amount of food consumed; this could have also made the studies prone to responder bias as the participants may depict false amounts using the grains.

Both studies relied mostly on quantitative data to come up with a conclusion. In as much as food security and food security interventions are based on mostly quantitative data, it is of paramount importance to capture the qualitative data from the participants. Qualitative data has the ability to capture the views, ideas, and opinions of the participants that would have otherwise been missed through quantitative data collection.

2.7.5 An evaluation of perceived benefits and constraints of community gardens

Abalimi Bezekhaya is a community gardening organisation operating in the townships of the Cape Metropolitan Area. This organisation was started in 1983 by the Catholic Welfare Development as an organisation that helps the poor communities alleviate the problem of malnutrition through home vegetable gardening (Karaan and Mohamed, 1998). Among other activities, Abalimi supports small scale organic community urban agriculture projects in poor and deprived areas of Nyanga and Khayelitsha in Cape Town Metropolitan Area (Kirkland, 2008).

The work of Abalimi Bezekhaya was compared to the community gardens in the Bergville and Hlanganani districts of KwaZulu-Natal. The study in KwaZulu-Natal was carried out with the purpose of providing feedback from the extension officers and community garden members to the KwaZulu-Natal Department of Agriculture and Environmental Affairs (Mpanza, 2008).

There were thirteen gardens which had plots contracted to Harvest of Hope, however, due to resource and time constraints the study chose five areas for the study sample and each area in the sample represented the different circumstances in which gardening is promoted by Abalimi Bezekhaya. The sample areas included Masincedane in Nyanga East, SCAGA in Khayelitsha, Eden in Khayelitsha, Sakhe in Khayelitsha Makahaza and Bambanani in Nyanga. Questions asked included direct impact of Harvest of Hope on the stability and general health resulting from involvement in urban agriculture, impact of sustainability of

Harvest of Hope on urban agriculture, possibilities offered through Harvest of Hope to the Urban Agriculture Projects (Kirkland, 2008).

Assessment of Abalimi Bezekhaya's gardens was done using a case study, participant observation, survey questionnaires, interviews, documentation review and SWOT analysis. During the case study a single case is analysed in a tightly structured way with the aim of finding principles that can be extrapolated to similar cases. A case study allows an in depth understanding of the context and human factors behind data that may be collected by other ways. The purpose is to document the story or sequence of events over time related to a particular project and look at how people have dealt with change and why change has occurred in specific ways. Through monitoring and evaluation, case studies can add life and meaning to what might otherwise be just data (Kirkland, 2008).

The strengths of using a case study method to evaluate Abalimi Bezekhaya made it possible to obtain detailed information on specific topic and it provided interesting perspectives that can only be gained by a closer look at the overall project or situation. The case study provided important background and human context for data generated by other means. Furthermore, it was useful in unpacking complex situations where many variables interrelate and where outcomes and impacts are liable to vary across different populations (Kirkland, 2008). On the other hand, the weaknesses of case studying were that it generally cannot be considered representative which is why it is good to combine this method with others. Also there is risk of losing focus and subjectivity (Kirkland, 2008).

Participant observations, which were useful in gaining useful information, were also incorporated. Participant observations were useful in building trust and rapport between the stakeholders, project staff and researcher. Another method used was the survey which is a more general term and may involve questionnaires and face to face interviews. The questionnaire may include open questions which may prove to be difficult to analyse as people may differ in ability and willingness to answer open ended questions. The questionnaire may alternatively have close ended questions which are less time consuming for participants to fill in (Kirkland, 2008).

Documentation review was also used as part of the Kirkland's methodology for assessing Abalimi Bezekhaya and this facilitated an understanding of historical evolution of a project or organisation through documentation. Abalimi had background information on garden project evaluation reports, journal articles, dissertations and data on Harvest of Hope was in the form

of sustainability index charts. Through documentation review one can get good background information about a current activity or baseline information on a particular indicator as well as explanations for changes observed. Although documentation review provides valuable information the reliability of the documentation must be checked, contradictory evidence noted and information gaps identified. (Kirkland, 2008).

The strengths, weaknesses, opportunities and threats analysis was useful in qualitatively assessing the project. It was an adaptable and flexible method that allowed perception to be recorded and encouraged joint action. According to Kirkland (2008) strengths are those things that work and weaknesses are the things that do not work so well. Opportunities are ideas to overcome weaknesses and build on strengths and threats are things that constrain or threaten the range of opportunities for change. SWOT analysis takes past and current mistakes and weaknesses and transforms them into constructive learning processes (Kirkland, 2008)

While Abalimi Bezekhaya was evaluated through a compound methodology made up of case study, documentation review, survey questionnaires and interviews, the KwaZulu-Natal community used documents such as past survey reports, project registers and KZNDAEA policy documents on community gardens as baseline information. These provided guidelines that were followed in conducting the interviews (Mpanza, 2008). Performing a baseline survey is important as it ensures that the researcher has adequate information regarding the study that they seek to carry out. The baseline survey can furthermore act as a platform of comparison with current study findings.

In Mpanza's study, Kwazulu-Natal was divided into five extension regions during the first phase of the study. Each of the five regions had more than six districts and in each district there were more than 60 community gardens. For each region, extension officers from only one district were interviewed (Mpanza, 2008). Bergville and Hlanganani were already part of the study due to the researcher's involvement in these districts while Vryheid, Eshowe, Mbumbulu were selected through random stratified sampling (Mpanza, 2008).

Extension Officers from each district were interviewed as a group and they were asked to rank the status of community gardens in terms of willingness, commitment and participation of community gardeners in gardening. Responses were recorded on flip charts by group

facilitators and additional notes were made by the person responsible for recording the proceedings (Mpanza, 2008).

The second phase of the study involved in-depth interview of community gardeners using a structured questionnaire. The participants were asked to evaluate the success of the community gardens (Mpanza, 2008). Data collected included demographic information, community garden members' expectations, problems, frustrations, and awareness of policy guiding funding of community gardens (Mpanza, 2008). Gender analysis was done to explore division of labour, access and control to land. After information was collected through group interviews, the participants were asked to rank them in order of the most important problem and the most important crop in the community garden (Mpanza, 2008). Survey data was captured on Microsoft Excel spread sheet.

Qualitative approach was thereafter applied to the community gardeners through which they were able to express their views of the gardening activities and evaluate the stakeholders involved in their community gardens. Direct observations were done on all community gardens identified by the Extension Officers in order to collect information that may have not been reported by the community garden members. Observations were done on types of crops grown and plot sizes and these observations were used to supplement and validate data collection and information gathered during interviews (Mpanza, 2008).

The KwaZulu-Natal study incorporated the use of pair wise ranking in collecting data. This qualitative approach to data collection provides an in-depth understanding of the meanings and definitions of the situation presented by the informants. Qualitative studies offer the opportunity to study human interaction, historical purposes and social reality in an in-depth way (Mpanza, 2008). According to Karaan and Mohammed (1998) evaluation using the participatory approach has proven to be effective in eliciting and adding relevant information to the study.

2.8 Summary

The literature review show that community gardens are not just a modern day phenomenon rather it is an ancient tradition that has been passed down the generations and revived time and time again over the past decades. Community gardens are not just confined to the developing nations but they are popular in the developed world and they are renowned for their outstanding benefits to the community as stated in earlier sections of the literature

review. Community gardening is not a complete solution to food insecurity rather it is one of the tools that can enhance food security among the low-income neighbourhoods. If well nurtured, community garden can develop from a subsistence form of agriculture into a livelihood that can help to improve the lives of gardeners. Furthermore collaboration of community gardens and community based organizations can enhance the performance of community gardens and extend the impact of community gardens beyond the garden gate into the community and abroad.

Chapter 3
3.1 Livelihood Participatory Analysis (LiPA) Tools

3.1.1 Background of the LiPA tools

A livelihood, according to Carney (1998), comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain and enhance its capabilities and assets both now and in the future, while not undermining the natural resource base (Hussein, 2002).This description of sustainable livelihoods can be disaggregated to highlight five key elements. The first three key elements focus on livelihoods where concerns over work, employment and poverty reduction are linked with broader issues of adequacy, security, well-being and capability. The last two elements add the sustainability dimension, looking in turn at the resilience of livelihoods and the natural resource base on which they depend hence forming the sustainable livelihoods approach (Carney, 1998).

Sustainable Livelihoods Approach seeks to identify the important assets in livelihood, their trends over time and space as well as the nature and impacts of environmental, economic shocks and stresses. Thereafter, interventions are then designed to address any vulnerability and possibly enhance livelihoods through diversification of income streams (Young *et al*., 2011). Sustainable livelihoods approaches do not replace other rural development approaches but build on and strengthen them (Carney, 1998). Livelihoods analysis enables policy makers, project managers and community-based facilitators to analyse rural and urban-based livelihoods in order to strengthen livelihoods and determine the impact of various developmental interventions on livelihoods (Albu and Scott, 2001).

The use of Sustainable Livelihoods Approaches dates back to the 1970s when it was integrated as an idea in food security operations of several organisations (Hussein, 2002). Over time sustainable livelihoods approach has developed from a mere idea to a precept used in various organisations with its adoption increasing rapidly in the past decade. Sustainable livelihood approaches should be people centred, empowering, responsive and participatory, promote holistic, sustainable, strengths-based, disaggregated, long-term and flexible development. It should be conducted in partnership with multi-level appreciation (Hussein, 2002).

There is a great diversity in the interpretation of the livelihoods approach and this is reflected in the variety of Sustainable Livelihoods (SL) frameworks and the way in which SL approaches are implemented. In some instances the frameworks have been modified to include a wider range of assets or new concepts regarding structures and processes (Albu and Scott, 2001). The most widely used framework is that of the Department for International Development (DFID) framework. Other similar frameworks have been devised by CARE, Oxfam and the United Nations Development Programmes among many others (Hendriks *et al*, 2009). Frameworks may differ theoretically; however, these frameworks share the same underlying ideology of understanding causes of vulnerability and seeking ways to strengthen assets and capabilities.

Sustainable livelihoods approaches came to prominence in the UK Department for International Development as a follow-up process to the White Paper on International Development of 1997 (Farrington *et al*., 1999). DFID consulted widely in order to increase its understanding of the nature of poverty and how it might be addressed and the sustainable livelihoods framework was an outcome of this consultation (Farrington *et al*., 1999). In order to facilitate the adoption of Sustainable Livelihoods in DFID, a change management office called the Sustainable Livelihoods Support Office (SLSO) was established. This office sought to promote understanding and practice of Sustainable Livelihoods Approach (SLA) among DFID staff, partners, other agencies and development practitioners. Their aim was to facilitate the sharing of knowledge and experience of livelihood approaches (Solesbury, 2003).

The SLSO has also helped to raise awareness and develop thinking and practice of SLA, and establishment of a platform called Livelihood Connect which is a web-based platform to encourage internal debate and facilitate lesson-sharing on SLA. In addition, SLSO supported DFID'S Rural Livelihoods Department in establishing technical support to international agencies interested in SLA and setting up trust funds for rural livelihoods programmes like the FAO and IFAD SL trust funds (Solesbury, 2003). The SLSO then set up the Sustainable Livelihoods Resource Group to bring together agencies and specialists from a wide range of development-related disciplines to discuss and advise on theoretical and practical issues emerging from SL work (Hussein, 2002).

Following the World Food Summit of 1996, there was renewed commitment to food security for all and reaffirmation that poverty eradication is essential to improve access to food. In line

with this commitment, the Food and Agriculture Organisation incorporated sustainable livelihoods (SL) by enshrining SL principles in their core strategy to eradicate food insecurity and rural poverty through more equitable access to resources in rural livelihoods (Solesbury, 2003).

For example in Kabul, Afghanistan, the FAO collaborated with the Ministry of Agriculture Irrigation and Livestock and other relevant ministries to ensure that nutrition, food security, livelihoods and gender issues are integrated relevant government strategies like the Agricultural Master Plan. FAO implemented and promoted successful community-based food security, nutrition and livelihood projects. Through this project the FAO provided financial resources and technical support to partners on food processing, vegetable gardening, nutrition, rapid market assessments, monitoring and evaluating nutritional impact (FAO, 2008).

Implementation of SLA through FAO has met a number of challenges, one of them being FAO's technical assistance programmes experiencing difficulties in marrying technology-driven and needs-driven approaches in the field. Furthermore there have been challenges in raising awareness and building capacity in SL principles and methods among FAO staff among other challenges (FAO, 2010). To counter the challenge of raising awareness, FAO hopes to address these challenges by translating SL concepts into different languages and adapting workshop and training materials to the wide range of countries and cultures with which it works (FAO, 2010).

Oxfam, an independent British development and emergency relief organisation, defines food security as a situation when everyone has at all times access to and control over sufficient quantities of good quality food for an active healthy life (Young et al., 2011). Oxfam adopted a SL approach in the early 1990s and has applied it in both development and emergency relief contexts. Since 1994 Oxfam integrated its SL approach with a rights-based framework which considers the right to a sustainable livelihood as a social and economic right. The organisation seeks to realise the right to sustainable livelihood alongside rights to health, education, life, security and equity. Oxfam considers a sustainable livelihood to include economic and environmental equity and sustainable livelihoods for future generations (Hussein, 2002).

Oxfam usually carries out emergency programmes in areas where it already has development programmes and often has good knowledge of people's different sources of food. In cases

where people are unable to meet their immediate food needs and their lives are at risk, the first task is to increase their access to food and rehabilitate the malnourished (Young *et al*., 2011). In acute cases where people lose their normal food sources, the initial response is usually food aid and feeding programmes. This food aid may become a form of livelihood support. This is especially true when food aid is provided at an early stage of a slow-onset of emergency hence preventing selling off of assets to buy food and this means that people can save money that would otherwise be spent on food and use this to maintain their livelihoods (Young *et al*., 2011).

This study made use of the Livelihood-based Participatory Analysis tools (LiPA) (Hendriks *et al*., 2009). LiPA emerged as a tool for analysis with the development of sustainable livelihoods approach and the realisation that people are the centre of development (Hendriks *et al*., 2009). Livelihoods analysis enables policy makers; project managers and community-based facilitators to analyse rural and urban-based livelihoods; to strengthen livelihoods; determine the impact of various developmental interventions on livelihoods and; formulate policy and inform development interventions that focus on increasing food and livelihood security (Ashley and Carney, 1999).

Livelihood analysis allows for a simple, creative exploration of the complex inter-relationships of people, resources, environments, realistic livelihood opportunities and policy options (Hendriks *et al*., 2009). Livelihood analysis seeks to promote livelihood strategies. Livelihood strategies are defined as the activities people engage in for a living such as cultivation, wage labour, trading and hawking to achieve livelihood goals such as food and cash to satisfy human needs (Hendriks *et al*., 2009). Livelihood strategies are not static but constantly changing in response to changing circumstances in the external environment. Livelihood analysis approaches are useful in helping to unpack complex problems; understand where people are at, what their issues are and as a result influence institutional change and policy reform. This makes livelihood approaches useful in setting a development agenda for new projects or programmes and in deciding what are the possible and best interventions and helps in evaluation of current projects, programmes, institutions and policies (Hussein, 2002).

Livelihood analysis makes use of participatory methods that are empowering and are not extractive providing a holistic understanding of the need for and the likely focus and objectives of subsequent development activity. Participatory livelihoods analysis provides a

more realistic picture of the experience of people and the opportunities available to them and provides a powerful way to engage country decision makers and technical experts in participatory dialogues in non-threatening learning environments (Hendriks *et al*., 2009).

3.1.2 The LiPA Process

The LiPA process is based on DFID Sustainable Livelihoods Analysis Framework which was amended to include ideas from the Learning about Livelihoods Frameworks and enriched by experience gained through applying the facilitatory process to various communities (Hendriks *et al*., 2009). The process is arranged to provide discussion related directly to the Comprehensive Africa Agriculture Development Programme (CAADP) plan to directly assist countries with dialogue and planning for food security.

Due to the participatory nature of the LiPA process the research was conducted in a workshop setting using the guidelines in Appendix B. The purpose of carrying out the LiPA process in a workshop setting was to identify and classify vulnerable people and groups, understand their livelihoods, explore the impact that shocks and stresses could have on these households and what the shocks and stresses maybe and understand the effectiveness of country policies and programmes in meeting the needs of these households in order to better target more efficient programmes to mitigate vulnerability, respond to crises and protect and promote the livelihoods and food security of vulnerable people (Hendriks *et al*., 2009).

During LiPA participants of the workshop should be selected from the study areas. The communities were initially informed about the research through telephone calls and word of mouth. The researcher visited the study area a week prior to the workshop to organise a venue, ensure that the necessary stakeholders were informed about the workshop and make sure that all protocol was observed. This was done to ensure that unnecessary hindrances would be avoided once the workshop had commenced. The venues of the workshop were conducted in friendly conducive environments, away from officials that could have otherwise affected the quality of the responses in the workshop. The venues were a flexible space where chairs were easily arranged for group work and where refreshments were served during the workshop. The workshops in Msunduzi were carried out in one of the homes of the participants while the workshop at uMngeni was carried out at the Masibumbane Mission offices. The researcher met the co-facilitators prior to the workshop to prepare for the meeting and ensure that a team had been established to facilitate the workshop. Once the venue and participants were in place, the researcher went to carry out the survey.

3.2 Data collection tools

Bradley and Schneider (2004) stated that participatory tools are specific activities designed to encourage joint analysis, learning and action. A personal toolkit was designed for this research taking into account the culture, resources, needs and capabilities of local people. The tools included in the tool kit relate to the analysis that was carried out using the Framework for African Food Security (FAFS) indicators shown in Table 4.1 (Appendix). These indicators were the resilience score, proportion of expenditure spent on food, increase in economic opportunities, and dietary diversity score.

Each indicator was measured using the responses that were given by the respondents. The resilience of the participants was measured from the uncertainties that they stated and the possible intervention they would like to receive for each uncertainty. If the participants felt that they were able to cope with the occurrence of the uncertainties it meant that they had a high level of resilience, however, if the participants were unable to cope with the impact of the uncertainties and recover using their personal assets then that indicated their vulnerability and the need for external intervention.

The proportion of expenditure spent on food was measured by comparing the difference in expenditure patterns of the participants when they had access to sufficient quantities of vegetables from their gardens and when they had insufficient quantities. Increase in economic opportunities was measured by the extent to which the gardening activities increased the income per capita of the participants. These economic opportunities were defined by whether or not the participants received income from the selling of vegetables and the responses were subjective. An improvement in the dietary diversity implied that there was an increase in the dietary diversity score. The dietary diversity score was measured by looking at the seasonal harvesting pattern.

3.2.1 Getting started

To start off the workshop participants were asked to write the names they want to be called on sticky labels in bold capitals. This was carried out in order for the researcher and the facilitators to know them and for the creation of a personal, friendly and legible atmosphere (Chambers, 2002). Thereafter the workshop proceeded into the main activities of the day.

3.2.2 Seasonal calendars

A seasonal calendar helps to identify periods of greatest difficulty and vulnerability or other significant variances that have an impact on people's lives. Seasonal calendars are also useful for exploring the temporal relationships between recurring events in a community (De Negri *et al*., 1998). This technique was carried out by consulting the participants. Data was collected on a predesigned matrix containing months in the columns and seasonal flows as rows. Seasonal flows that may be considered are harvests, income, expenditures, labour, food, and cash and so on (Bergeron, 1999). De Negri *et al*., (1998) clearly stated that a seasonal calendar should reflect the indigenous concepts of time and does not have to start with January. Community members were asked how they would organise the calendar. After the time intervals were laid out horizontally, vertical rows were then created, with each row representing a different seasonal factor.

In this case, the tool was used to collect data on crop harvest and variations in consumption and food supply from gardens throughout the year. For consumption, the informants considered the food they need to buy when supplies from the community garden have depleted and when money for such food items is needed. Markers of distinct colour were chosen and used to represent the cycle being described, that is, different markers for beetroot, cabbage, carrots and so on (Bergeron, 1999). The main crops that are grown were considered and each one was rated according to their relative importance in terms of their harvest and diet.

To carry out the activity, the calendar was laid and the participants gathered around. Once the purpose of the activity was explained the exercise commenced with the harvest of the most important vegetable crop in that community. For example the month in which cabbage was harvested the most, five marks were placed in the cell corresponding to the delegated month. Subsequent marks were added to other months in which cabbage is harvested. The participants needed to understand that the number of marks corresponds to the relative amounts obtained in each month, so that months with greatest harvests had the highest numbers and those with lowest harvests had the lowest number. Intermediary months received from two to four marks, and months without harvests were left blank. Each timeline was revised in a similar fashion for each crop. The timelines for each crop were inversely classified to indicate periods of greatest scarcity and the months of greatest scarcity receive the greatest number of marks (Bergeron, 1999).

3.2.3 Ten-seed technique

According to Jayakaran (2007), the 10 seed technique is a modified Participatory Learning and Action (PLA) tool that is extremely versatile because it lends itself to easy modification. It is a tool that is useful in gathering in qualitative information on various issues, especially related to the perceptions of the community and the way people see themselves in relation to others. The technique is done in groups of 8 to 10 in order to give everyone a chance to actively participate and get an equal chance to share views. The 10 seed technique was used in problem, uncertainty and expenditure analysis. The technique is very simple to understand, learn, and easy to practice (Jayakaran, 2007).

The procedure in the ten-seed technique is similar for the problem, uncertainty and expenditure analysis. In the case of expenditure analysis the group was asked to imagine that the total expenditure of the village for the whole year was represented by 10 seeds. The participants were then asked to group the seeds into clusters to show what those various expenditure heads were (Jayakaran, 2007). The exercise helped the researcher to understand the expenditure patterns of the different groups and to analyse if gardening is helping the gardeners to decrease the proportion of expenditure spent on groceries. The procedure was repeated for the problem and uncertainty analysis and the information from the ten seed technique was then used in the Wholistic World View Analysis.

3.2.4 Wholistic World View Analysis (WWVA): understanding community realities

World view analysis is a participatory tool for understanding a community's perception of what it does to survive and continue with life processes. It is used for carrying out a participatory needs analysis for development interventions that will impact the community (Jayakaran, 2007). The worldview analysis tool brings together the information collected using ten-seed technique exercises. In this study the researcher used this tool to triangulate the data collected and to assess if gardening is helping to improve risk management and resilience. WWVA incorporates the use of the ten seed technique in its analysis (Jayakaran, 2007).

The information collected using the ten-seed technique in the expenditure; problem and uncertainty analysis was added to the WWVA diagram (Figure 4.2). The outline of the diagram was carried out by making three concentric circles on a large sheet of paper. The innermost circle represented areas where the community exerts its influence and has control

over. The middle circle showed areas that outsiders associated with the community exert influence over and control and finally, the outermost circle represented areas that are outside of the control of both the community and external stakeholders (Jayakaran, 2007). The circle was divided into segments like spokes of a wheel and the number of issues determined the total numbers of segments as shown in Figure 4.2. The segments represented sources of problems faced by the community, uncertainties they encounter as a group, and expenditure proportions. In order to make it easier colour coding was used to represent the different categories of sources of issues on the diagram (Jayakaran, 2007).

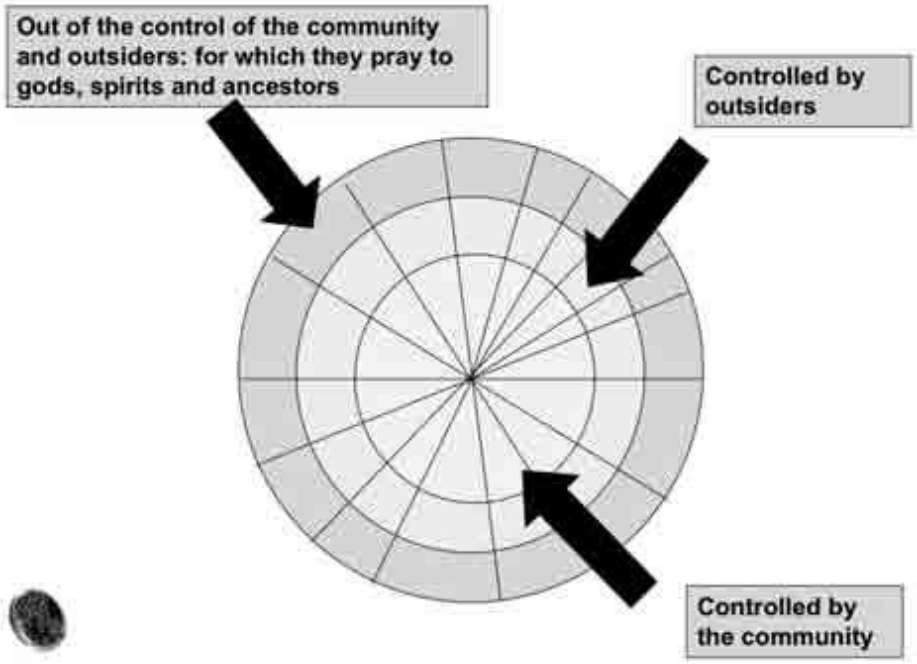

Figure 3.1: Illustration of Wholistic World View Analysis (Jayakaran, 2007)

When the diagram was ready, the researcher explained the rest of the process to the community. The participants made use of the ten-seed technique to distribute the ten-seeds into each segment allotted to an issue. The segments in which the seeds were placed indicated which particular issues the communities were vulnerable to and which issues the communities had the capacity to address. The seeds in outer circle showed the vulnerabilities of the community while the seeds in the inner circle showed the capacities of the communities. The exercise was conducted once the participants understood how it is carried out (Jayakaran, 2007). When the diagram had been filled in and completed, the facilitator marked out the community's greatest vulnerabilities (outer circle) and their greatest

capacities (inner circle) (Jayakaran, 2007). The vulnerability with the highest number of seeds was indicated as the first development priority followed by the next highest and so on. The exercise helped to assess if the gardening projects were effectively addressing the vulnerabilities of the community (Jayakaran, 2007). The data collected was then analysed using the FAFS indicators and the different groups were compared using descriptive and correlation statistics. The results were then presented in chapter 5.

Chapter 4
4.2 Back ground to Study Sites

The study area was identified through purposive sampling method. This method is entirely based on the judgement of the researcher (Bless and Achola, 2006). The sample consisted of the elements with the most desirable characteristics. In this case the most desirable characteristic were participants involved in community and home gardens in the Msunduzi and Umngeni Municipalities, KwaZulu-Natal.

4.1 Msunduzi Municipality

The Msunduzi Municipality (Figure 4.1) is located in the province of KwaZulu-Natal, approximately eighty kilometres inland from Durban. It is the second largest centre in KwaZulu-Natal and it encompasses Pietermaritzburg which is the capital of the province and the main economic hub of Umgungundlovu District Municipality. The municipality is made up of peri-urban and semi-rural areas with a population of 523000. It is situated at a junction of an industrial corridor from Durban to Pietermaritzburg and an agro industrial corridor stretching from Pietermaritzburg to Estcourt (Msunduzi Municipality, 2010).

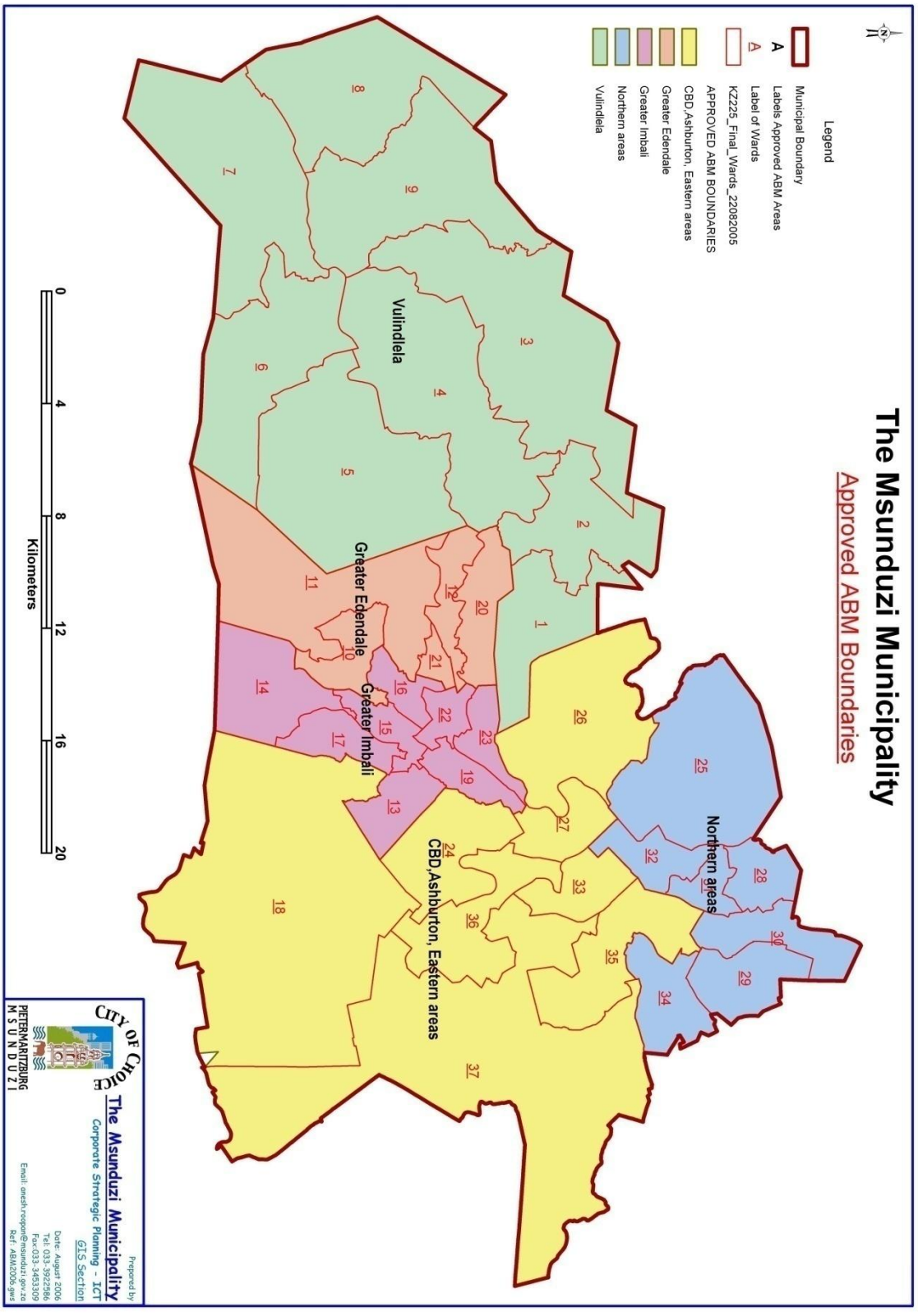

Figure 4.1 Msunduzi Municipality Map (Msunduzi Municipality, 2010)

4.2 The uMngeni Municipality

The uMngeni Municipality is located approximately 26 km from Pietermaritzburg. The uMngeni Municipality is made up of eleven wards and was established in the 1940's. The capital of the municipality is Howick. The municipality is made up of manufacturing enterprises, leisure and agricultural sector and the municipality lends itself to beef and dairy farming, timber production and the cultivation of vegetables (uMngeni Municipality, undated).

The study sample consisted of two community gardens from Msunduzi Municipality and one study sample from uMngeni Municipality. The community gardens in Msunduzi were Thuthukani Community Garden in Tumble Weed and Umthombo Wempilo in Mbali. These community gardens were chosen because they showed the characteristics that the researcher could make use of in the study. The study sample in uMngeni is from Masibumbane Mission in Mpophomeni. The homestead gardens were included in the survey for comparative purposes because they operate as a community based project similar to the community gardens therefore, making it possible to compare them.

Chapter 5
5.1 Background of case studies

The chapter will look at homestead gardens then community gardens. The background of homestead gardening will be preceded by a literature review section on home gardens and this will help a reader to have a better understanding of homestead gardening and how they fit into this study. Thereafter the researcher will give a brief background of the community gardens.

5.1.1 Home gardens

Many types of vegetable gardens are established in different parts of the world depending on the local agro-ecology and local customs and conditions (Wanasinghe, 2003). There is an enormous diversity in home gardens (Hoogerbrugge and Fresco, undated). Some are known as backyard, kitchen, farmyard, compound, mixed or homestead gardens and they are one of the oldest production systems known. Their persistence is proof of their intrinsic economic and nutritional merit (Marsh, 1998). Home gardens as defined by Hartivegsen and A'Bear (2004) are mixed cropping of fruits, vegetables, trees and condiments that serves as supplementary sources of food and income. As a system of permanent land use, the home garden has well-defined boundaries and is located at or within reasonable distance from the residence (Hoogerbrugge and Fresco, undated). Wanasinghe (2003) defines a garden as a place where horticultural crops are grown. Usually the functions and output of the home garden complement field agriculture. While field crops provide the bulk of energy needed by the household, the garden supplements the diet with vitamin rich vegetables and fruits, energy-rich vegetable staples, herbs and condiments (Marsh, 1998).

According to Hartivegsen and A'Bear (2004) home gardens have appeared on the international development agenda since the 1950s, however, unlike other fields gardens seldom attracted sustained support from development agencies. This has changed over the past two decades. For example the Food and Agriculture Organisation has seen the perceived importance of home gardening and have sought to promote home garden practices among women in Africa and Asia in line with the Millenium Development Goal of eradicating extreme poverty and hunger while promoting gender equality (Koyenikan, 2007).

The purpose and function of a garden is largely shaped by their purpose for the users. A home garden does not need to be on the residence to qualify. Where the garden is planted or what it

must consist of is completely dependent on the family's needs and resources. The garden may be purely for subsistence or partially market orientated and it can consist solely of vegetable crops mixtures of annual and perennials (Hartivegsen and A'Bear, 2004).

The need for home gardening in developing countries arose from the rapid increasing migration from rural areas into large cities which have posed challenges of providing adequate food for the urban (Hartivegsen and A'Bear, 2004). For example, Himmelgreen and Romero-Daza (2010), state that in Lesotho, the Lesotho Homes with Urban Gardens (HUG) project was implemented in order to expand food security programming from rural to peri-urban areas. In addition to this project the Catholic Relief Services Home with Urban Garden (CRS-HUG) project focused on home gardens as a means to mitigate the impact of rising food prices on urban households, and to increase access to the food. The project was anticipated to expand food security in two ways. First, households will gain direct access to the fresh vegetables from their gardens which in turn would ease the burden of food costs in proportion to income. Second, the sale of surplus vegetables would provide a secondary source of income for program households (Himmelgreen and Romero-Daza, 2010).

Advocates of gardening like Marsh (1998) stated that home gardening can be a sustainable strategy for improving food security and incomes when gardens are well adapted to local agronomic and resource conditions, cultural traditions and preferences. Sustainability of homestead gardens comes through minimising environmental degradation; and avoiding destruction of the gardening activities through maintaining productivity (Marsh, 1998). Through the use of small-scale agriculture like gardening, homestead land or underutilised marginal land can be turned into a productive source of food security. Crop production in homestead gardens brings about a great variety of vegetables. Each of the plant types cultivated contributes towards the livelihoods of the gardeners, through providing food security, soil erosion control, animal fodder or soil fertility improvement (Adey, 2007).

Homestead gardens make a significant contribution to household food security, as both traditional and introduced crop can be grown. For example in the Valley of a Thousand Hills in KwaZulu-Natal some traditional crops are more drought-tolerant than many introduced crops, thus growing both traditional and introduced crops spreads the risk of food production during periods of unexpected or prolonged drought (Adey, 2007). Furthermore, homestead gardening contributes an important percentage of non-grain supply in many developing countries therefore adding significantly to urban food self-sufficiency (Wanasinghe, (2003).

5.1.2 Case Study 1: Masibumbane Mission, Mpompomeni

The participants from Mpompomeni were clients of Masibumbane Mission. The Mission is an outreach programme of the Hilton Methodist Church. Masibumbane is a Non- Profit and Public Benefit Organisation made up of Christians from various denominations. The mission has a number of projects in its portfolio. These projects include physical care project, social grants support project; Mawube Nathi crocheting project; homestead garden project; money club project; youth project; discipleship group; Jehovah Jireh job and micro-business creation project, crèche/preschool project; and prayer support group (Masibumbane HIV/AIDS Mission, 2007).

The researcher carried out a livelihood based analysis of the homestead garden project. The group of participants was made up of people who are either infected or affected by HIV/AIDS. The group was made up of 13 females and 10 males. These participants were trained at Qedindlala community garden for three months. Training would range from basic tilling the land, seeding to harvesting the produce. The training was done once a week for three months. After completing the training they were assisted by the trainers to start their own home garden and were provided with inputs and fencing for the garden site. The new home garden owner remains accountable to the trainers throughout the lifespan of the garden and continues to get further assistance. The participants made money from selling their produce to local community members. Qedindlala makes money from selling fresh produce to the locals and the participants from Masibumbane Mission also benefit financially from the produce sold as well as from Masibumbane mission which gives them food and money for hospital visits.

Since Masibumbane has a number of projects that the clients can engage in, it is therefore, not mandatory for each member to have a garden. The clients that decide to engage in gardening should have the enthusiasm for gardening because it is their enthusiasm that what will drive them to continue gardening and eventually become full time members of the Qedindlala community garden where they can work and get a regular income.

5.1.3 Case Study 2: Tumble weed- Thuthukani Community Garden

This was a community garden consisting of 38 members. The community garden was made up of individually cultivated plots and each member was governed by garden rules and

regulations. The community garden was established on land that had been designated by the municipality as a dumping site. The gardeners cleared the dumping site and initiated the community garden project. They divided the land into small separate plots that were individually fenced. The community garden sought financial assistance and eventually they received funding from the National Development Agency through Lima, a local non-governmental organisation. Through Lima, the community gardeners received training, inputs and lessons on how to cook their vegetables while preserving their nutritional content. The organisation is still actively involved in the community garden. The gardeners continue to receive support and leadership empowerment through the Lima facilitators. At the time of the survey the community garden had been facing acute water shortages and Lima has been helping them to resolve the problem by securing funding for them to get water pipes installed in the community.

5.1.4 Case study 3: Umthombo Wempilo

This was a community garden made up of 8 senior citizen women who garden together on a former dumping site. They split the garden into four sections and each section was worked on by two people. The garden was similar to the collectively worked garden that was described in the literature by Stocker and Barnett (1998) in that the garden was worked on solely for the benefit of the group that worked on it, in this case the Umthombo Wempilo members. The Umthombo Wempilo gardeners consume most of their produce, and give some vegetables to those who are in desperate need of vegetables especially the sick in the community. The gardeners received training to do gardening from Lima and the facilitators also taught them how to cook the vegetables in a manner that preserves the nutrient content of the vegetables. The community gardeners continue to receive assistance from Lima. With this background in mind the next chapter presents the results and discussions of the study,

Chapter 6
6.1 Results and Discussions

In this chapter the results were presented and discussed according to the sub-problems which are as follows:

- Do community gardens increase in the dietary diversity of the community gardeners' households?
- Was there a decrease in the expenditure spent on food by the community gardeners when they were involved in gardening?
- Do the community gardens in Msunduzi and uMngeni increase economic opportunities of the participants?
- Have the community gardens in Msunduzi and uMngeni helped the participants to improve their risk management and resilience?

6.1.1 Change in dietary diversity

The data on the change in dietary diversity was collected using seasonal calendars (Table 6.1). Seasonal calendars were used in this study to show the different vegetables that the participants harvested from their gardens and the months in which the vegetables were harvested. Crosses (x) where used to indicate the months in which the participants receive the most harvests and the months in which the participants receive the least harvests. Five crosses indicated the highest harvests while one cross indicated the lowest harvests (Table 6.1). The dietary diversity was high were there was high harvests of different vegetables throughout the year and low were there was poor harvests.

Table 6.1 Seasonal garden crops growing calendars for Masibumbane Mission (in Mpompomeni); Thuthukani (in Tumble Weed); Umthombo Wempilo (in KwaPata)

Month	**Masibumbane**				**Thuthukani**				**Umthombo Wempilo**			
	Spin	Carrot	Cab	Turn	Spin	Beet	Carrot	Let	Spin	Beet	Beans	Pot
Jan	xxxxx	xxx	xx	x	xxxxx	xxxxx	xxxxx	xxxxx			xxxxx	xxxxx
Feb	xxxxx	xxx	xx	x	xxxxx	xxxxx	xxxxx	xxx			xxxxx	xxxx
Mar	xxxxx	xxx	x	x	xxxxx	xxxxx	xxxxx	xxx			xxxxx	xx
Apr	xxxxx	xxx	x	xx	xxxxx	xxxxx	xxx	xx			xxxx	
May	xxxx	xxx	x	xxx	xxxx	xxxxx	xxxxx				xxx	
Jun	xxx	xxx	xxxxx	xxxxx	xxx	xxxxx	xxxxx		xxxxx	xxxxx		

Jul	xx	xxx	xxxxx	xxxxx	xxx	xxxxx	xxxxx		xxxxx	xxxxx		
Aug	xxxxx	xxx	xxxx	xxxx	xxxx	xxxxx	xxxxx	xx	xxxx	xxxx		
Sep	xxxxx	xxx	xxx	xxx	xxxxx	xxxxx	xxxxx	xxx	xxxx	xxxx		
Oct	xxxxx	xxx	xx	xx	xxxxx	xxxxx	xxxxx	xxx				
Nov	xxxxx	xxx	xx	xx	xxxxx	xxxxx	xxxxx	xxxxx				
Dec	xxxxx	xxx	xx	xx	xxxxx	xxxxx	xxxxx	xxxxx			xxxxx	xxxxx

Key: Spin = spinach

Cab = cabbage

Turn = turnip

Let = lettuce

Beet = beetroot

Pot = potatoes

x = indicates the months in which the participants receive the most harvests and the months in which the participants receive the least harvests. The more the x's the higher the harvests.

The seasonal calendar in Table 6.1 shows four types of vegetables that were harvested the most by the three groups. Masibumbane homestead gardeners harvested spinach; carrot; cabbage; and turnip, while Thuthukani gardeners harvested spinach, beetroot, carrot and lettuce. Umthombo Wempilo received the highest harvests from spinach, beetroot, beans and potatoes. All three groups harvested spinach. Masibumbane and Thuthukani harvested spinach throughout the year while Umthombo Wempilo harvested spinach during winter. Umthombo Wempilo gardeners had their highest spinach harvests in winter while Masibumbane and Thuthukani gardeners had their lowest spinach harvests in winter due to the absence of irrigating facilities. The Umthombo Wempilo gardeners attributed their high winter harvests to their autumn planting season between April and May. The Umthombo Wempilo planted their vegetables according to seasons and times of the year when they could maximise on yields for a certain crop as their space was limited.

Carrot is grown throughout the year by the Masibumbane and Thuthukani gardeners and the harvests are almost consistent throughout the year as shown in Table 6.1. Beetroot production was carried out by the Thuthukani and Umthombo Wempilo gardeners only. According to the

gardeners in Thuthukani beetroot was harvested throughout the year whereas gardeners from Umthombo Wempilo stated that they harvested their beetroot between June and September and attributed this to their autumn planting season. Thuthukani and Umthombo Wempilo gardeners made use unused lots as their gardening sites and this is in line with Villas-Boas (2006) literature on the ability of community gardens to turn unused lots within urban areas into productive land.

Cabbage and turnip were harvested by the Masibumbane gardeners throughout the year and the biggest harvests were collected between July and August thereafter the harvests depleted. The gardeners attributed the depletion in cabbage harvests to small insects that damage cabbage leaves. To curb the impact of small insects their trainers would provide methods like using solutions made from household detergents to get rid of small insects. This remedy for small insects was common to all three samples. On the other hand Thuthukani gardeners grow lettuce and the participants harvest lettuce most of the year except from May to July. The participants noted that their lettuce is harvested as soon as it ripens because it rots quickly and it tends to have a bitter taste as the lettuce season comes to an end.

Beans and potatoes production was carried out by the Umthombo Wempilo participants. Beans were harvested from December to May, while potatoes were harvested from December to March. The Umthombo Wempilo gardeners stated that they do not plant all their potatoes at the same time because they want to eat them at different times of the year. The Umthombo Wempilo participants leave some of the green beans to dry up then they consume the seeds in the off season period as dry beans. In addition, the Umthombo Wempilo gardeners used pumpkin leaves and wild plants like *imbuya* to supplement spinach in their diets during the off season period.

The gardens helped to improve dietary diversity. The seasonal calendars showed that the gardeners were receiving a nutritious supply of vegetables from their gardens. This validates community gardens as a good source of nutritious vegetables and as a good means to supplement food security efforts of low-income urban residents (Arneson *et al*,2010). Although the calendars were time consuming, the researcher agrees with Ngidi (2007) that the seasonal chart was beneficial in that it managed to incorporate the participants through their direct participation in group discussions and this enabled the researcher to capture subjective opinions of the participants (Bergeron, 1999).

The gardens helped to improve supply of vegetables to the participants. The gardens also offered a variety of vegetables as the seasons change. The beans cultivated by the Umthombo Wempilo gardeners are a good, nutritious and affordable source of protein that can be used to supplement meat in the diet of the gardeners and their households since most the household cannot afford to buy meat regularly. Furthermore the seasonal calendars helped to identify the periods of greatest difficulty and vulnerability as the seasons changed and the food supply from gardens changed (De Negri *et al*., 1998).

An increase in the consumption of vegetables also increased the intake of nutrients by the gardeners (Maunder and Meaker, 2007). The nutrient uptake was further improved through cooking techniques that had been imparted to the community gardeners through their Lima facilitators; these cooking techniques ensured that there would be minimal loss of nutrients from vegetables during the cooking process. The off season period did not leave them desperate since they had other wild plants like *imbuya* and pumpkin leaves to consume and these were also nutritious and packed with nutrients. The dietary diversity of the homestead gardeners and the community gardeners was similar therefore indicating that community gardens and homestead gardens can be used interchangeably to improve dietary diversity of households.

These findings showed that the community gardens were indeed exceptional in their ability to address an array of public health and survival issues as shown by their ability to produce a diverse range of vegetables that promote dietary diversity (Twiss *et al*., 2003). The community gardens also proved to be change agents that brought sustainability. This sustainability was threefold in production of fresh, safe food; second, provision of a place for social and cultural interactions and third as research, development, design and demonstration sites (Stocker and Barnett, 1998).

Although Marsh (1998) criticised gardening as not being a cost effective means to nutrition intervention as compared with fortification, supplementation and targeted subsidies, the gardens from this study did prove to be a means to partially address issues of food security in low-income urban neighbourhoods as shown by the diverse range of foods produced from the gardens that provide diverse range of vitamins and nutrients inexpensively (Villas-Boas, 2006; Milburn and Vail, 2010)

6.1.2 Change in expenditure on food

Expenditure on food was measured using the ten-seed technique. The ten-seed technique is a participatory tool that makes use of ten-seeds. These ten-seeds were used to represent the participants' expenditure. During the activity the participants were asked to identify their major expenses and represent the seeds proportionally with their expenses before gardening and after gardening. An increase in the supply of vegetables lead to a decrease in the proportion of expenditure used on food and the opposite is true when there was inadequate supply of affordable food.

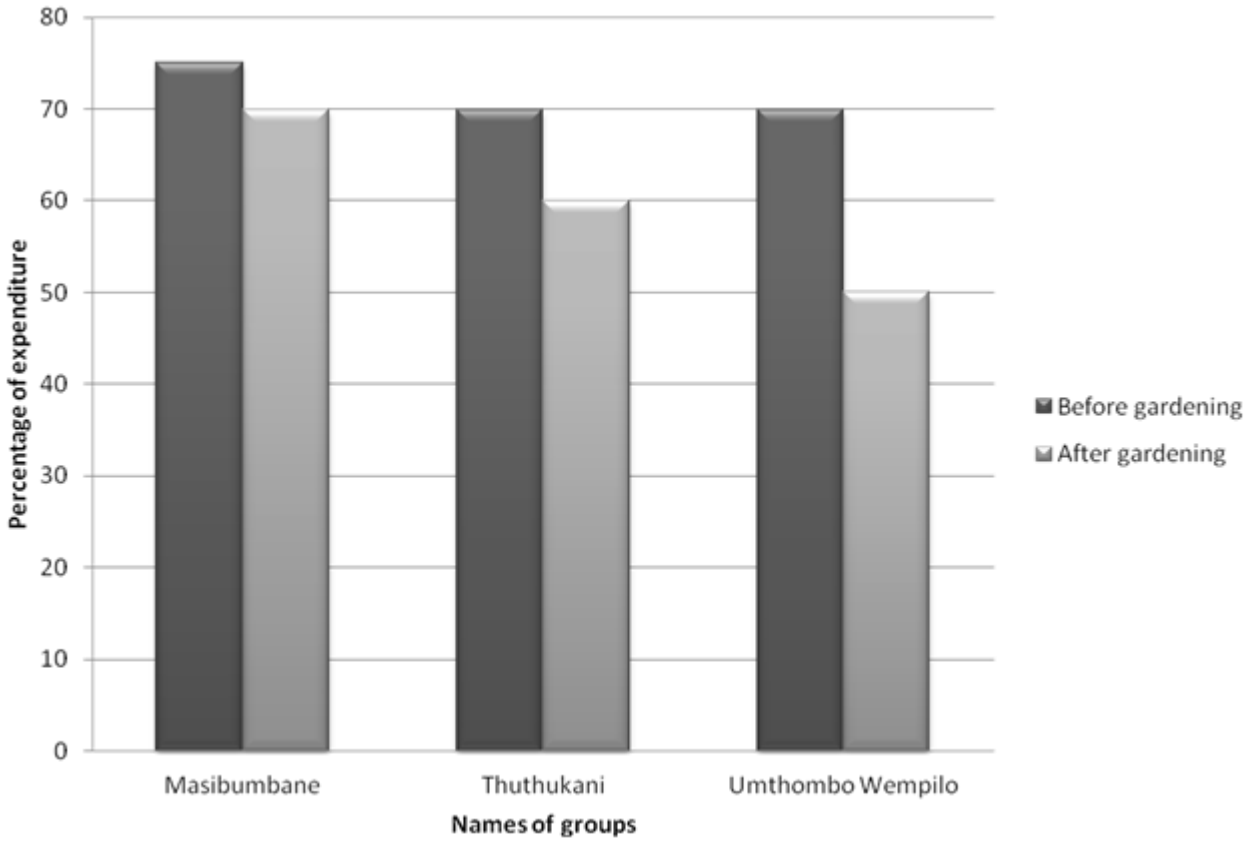

Figure 6.1 Change in expenditure on food before and after gardening for Masibumbane, Thuthukani and Umthombo Wempilo, KwaZulu-Natal, October 2010

The proportion of expenditure on fresh produce was represented as percentages in the Figure 6.1. From the graph the Masibumbane participants were using at least 75% of their expenditure on food before they started homestead gardening. After the Masibumbane

participants engaged in gardening, the expenditure on fresh produce decreased to 70%. Thuthukani and Umthombo Wempilo also experienced similar changes. Thuthukani participants' expenditure on food decreased by 10% from 70% to 60% while the Umthombo Wempilo participants experienced a decrease of 20% in expenditure spent on fresh produce after engaging in community gardening. The decrease in expenditure on fresh produce could be attributed to harvesting substantial quantities of vegetables from their gardens and this indicates an improvement in the supply of affordable food through gardening. This is in line with the Complexo Aeroporto, Riberao Preto in Brazil where the garden became a source of cheap and fresh vegetables for the community (Villas-Boas, 2006).

However, the increase in the supply of affordable fresh produce was highly seasonal for the Umthombo Wempilo gardeners. The increase in the supply of affordable vegetables from the garden was only from July to December, thereafter, the participants revert to the proportion of expenditure they spend on fresh produce when they are not gardening. Even though they were able to supplement their diet with some of the wild plants like *imbuya*, vegetables like spinach, cabbage, potatoes and beetroot are still household essentials that need to be purchased when the participants are not harvesting vegetables from the community gardening. This corresponds with Shisanya (2007) findings in Maphephetheni Uplands were despite the increase in fresh produce supply through community gardens, the fresh produce did not suffice the household requirements leaving the household fresh produce insecure.

6.1.3 Change in risk management and resilience

Risk management and resilience was measured using the respondents' responses to the uncertainties that they face in their gardening activities. During the activity uncertainty was defined as the lack of assurance that a certain event like drought will not occur. Uncertainty is based on the subjective judgement of the individual therefore, the degree of vulnerability to an uncertainty was measured based on the judgement of the respondents.

All the respondents identified drought, insects and theft as the major uncertainties. The Masibumbane participants were most vulnerable to insects than any other risk factor and they resolved that the uncertainty of insects can only be solved through the intervention of external stakeholders like the government and other interested stakeholders. The respondents believed that through donations in the form of insecticides and pesticides they could be able to control the impact of insects on their gardens. The total dependence of the homestead gardeners on

the external stakeholders shows that gardening has done little to improve the resilience of the participants to natural disasters and in the event that the participants' gardens are infested with insects they will not be able to cope on their own without government intervention.

On the other hand, Thuthukani participants indicated that they were mostly dependent on themselves to get rid of insects because they had been empowered by their Lima facilitator to make use of homemade remedy using garlic, sunlight, chillies and water. These home ingredients were blended together to get rid of insects. The participants also anticipated help from interested stakeholders to donate insecticides for their gardens. The response of the Thuthukani participants was similar to that of the Umthombo Wempilo gardeners. Though insects had detrimental effects on their vegetables, the Umthombo Wempilo participants believed that they had the ability to control them through the homemade remedy that had been given to them by their Lima facilitator. Furthermore each participant made monthly contributions towards the purchasing of insecticides. This shows that community gardening in collaboration with organisations like Lima has helped them to improve the resilience of community gardeners to natural occurrences like insect infestation. In addition to the insecticides Adey (2007) findings in KwaZulu-Natal suggested that the practice of crop diversification through crop rotation could be an effective means to combat pest and disease out breaks were some crops maybe be resistant to some pests, insects or pathogens.

Drought was the major concern of the Thuthukani and Umthombo Wempilo gardeners. The Umthombo Wempilo gardeners indicated that they totally depended on the external stakeholders to help them cope with the effects of drought. The participants stated that the effects of drought on their gardening activities had been further aggravated by the absence of water pipes in their gardens and this has resulted in the gardeners opting to use buckets to fetch water from their homes in order to water their gardens. There was no ready water source in the gardens. Furthermore their garden was located near gum trees and they desired to see the gum trees uprooted since gum trees are popular for absorbing a lot of moisture from the soil. Therefore, the gardeners desired that the external stakeholders could intervene by installing efficient water pipes in their garden and uprooting the trees.

On the other hand, the Thuthukani respondents expressed total dependence on the supernatural forces to relieve them of drought. The participants had already been assured of installation of water pipes by their Lima facilitator and the participants believed that it was now up to the supernatural forces to provide them with adequate rains for efficient water

supply. The Masibumbane homestead gardeners indicated that they expect their help to come from the external stakeholders and the occurrence of natural rains. They requested for assistance in the form of nets to protect their crops from hail storm and tanks to harvest rain water. The participants' total reliance on external stakeholders and supernatural forces shows that gardening has done little to improve the resilience and risk management of the gardeners. Without external intervention, the gardeners cannot efficiently cope with the impacts of drought on their gardening activities.

These water challenges were in line with the Complexo Aeroporto community garden in Brazil and the proposed solution was for the government to supply free water to community gardens (Villas-Boas, 2006). Alternatively the Abalimi Bezekhaya in Cape Town, South Africa adopted drum-drip irrigation which can be adopted by any garden project as it uses a simple drum or tank to give exact amounts of water to the crops without overwatering or under watering the plants (Small, 2007).

All three groups stated that their gardens were a major target of theft and vandalism and this is in line with Brown and Carter's (2003) literature concerning vulnerability of community gardens to vandalism of tool sheds, plots and crops. When it came to addressing issues of theft, the Masibumbane homestead gardeners were totally relying on external stakeholders like the police and supernatural forces to assist them in curbing crime as shown by the allocation of all their seeds to the outer circle and outer most circle of external stakeholders and supernatural forces.

Although there had not been any official communication with the government and other interested stakeholders at the time of the study, the participants were looking forward to receiving assistance in the form of tower lights from the government and other interested parties. These tower lights could be erected near their homes so that they can spot thieves moving in their yards. The participants believed that the supernatural forces could intervene and help to reduce the rate of theft in the community and in their homestead gardens. This shows that the participants were not able to cope with the issue of theft on their own without external intervention.

The Thuthukani believed that if they could unite they could reduce the rate of theft in their gardens. The participants stated that this could be possible if each and every gardener could have their own key to the garden and if the community could unite in order to expose thieves. In addition to their own efforts the gardeners sought to receive donations of barbed wire for

their gardens from the government or other interested stakeholders. The gardeners believed that through prayer the supernatural forces could intervene and help to expose the thieves. The gardeners' positive response shows that although they are vulnerable to theft they believed that they had the ability to work together and reduce the rate of theft in the community without having to completely rely on external help.

The Umthombo Wempilo gardeners also shared the same beliefs with the Thuthukani gardeners that through prayer the supernatural forces could intervene and reduce the rate of theft from their community gardening by exposing the thieves. The Umthombo Wempilo expressed their total reliance on the supernatural forces. The participants believed that the supernatural forces are the only means by which they will be able to cope with the envy of their community members and the laziness of the youth who want to vandalise their garden. They hope that the community members will opt to join them and work in the garden instead of stealing from the garden. The participants' total reliance on supernatural forces shows that on their own they do not have the capacity to cope with the thieves. The gardeners' vulnerability could be further attributed by the fact that the gardeners are elderly women with little or no support from the youth in their community.

All the participants expressed total reliance to the external stakeholders and supernatural forces by allocating all seeds to external players when addressing the issue of theft. This shows that the participants are highly vulnerable and they do not have the capacity to recover speedily from the impact of theft on their gardens. Furthermore, the participants' responses to all the uncertainties show that both the homestead gardeners and community gardeners are highly vulnerable to the uncertainties. The response of the participants indicates that if their gardens are made more secure through fencing as was suggested by gardeners in Mpanza's (2007) study then their participation in gardening would improve as they would feel that their crops are more secure and their efforts are not going to waste.

6.1.4 Increase in economic opportunities

Data on the increase in economic opportunities was collected using the participants' responses to the livelihood survey conducted during the Wholistic World view analysis. The results were based on the subjective responses of the participants and they are summarised in Table 6.2

Table 6.2 Comparison of the participants' perception of gardening in Masibumbane, Thuthukani and Umthombo Wempilo participants, KwaZulu-Natal, October 2010.

Homestead gardeners	**Community gardeners**
1. The Masibumbane gardeners sold their vegetables to their neighbours and local community.	1. The gardeners sold excess vegetables to the local community and donated some of their produce to the needy. The produce was primarily for consumption.
2. There was a substantial increase in income due to vegetable sales and the income was used to supplement household income.	2. There was a slight increase in income due to vegetable sales.
3. Households saved money on food through consumption of vegetables and used the money for other household needs.	3. Households also saved money on food and there was more money for other household needs like electricity.
4. Gardeners want to continue gardening and turn their home gardening activities into a viable livelihood activity through collaboration with their local community garden.	4. The Thuthukani community gardeners also want to continue gardening and form a cooperative through which they will sale their produce collectively. However, the Umthombo Wempilo gardeners were mostly content with the casual sales and consuming their produce.

The results in Table 6.2 show that there was no difference in the economic opportunities availed to the participants through gardening. The homestead gardeners experienced similar economic opportunities to that of the community gardeners. The Masibumbane gardeners showed much enthusiasm in their gardening activities and the opportunities that gardening could provide for them. At the time of the survey, the participants had been consuming most of their garden produce and selling excess produce to neighbours. The participants believed that they could increase their sales if they continued to collaborate with Qedindlala, the local community garden. The participants received training from the community garden and upon completion the gardeners became full time members of the garden and started to work in the community garden for a minimum wage. Through their collaboration with Qedindlala community garden, the participants sought to continue gardening and reach a stage when they

will be able to acquire land through government assistance and produce for purely commercial purposes. The participants believed that this could be an avenue to create employment opportunities for their community members and turn their gardening activities into a reliable livelihood.

This shows that the gardeners were certainly passionate about gardening and expanding their gardening activities beyond their backyards and further indicates that gardening could provide possible economic opportunities that they could explore with the help of external stakeholders. This is in line with the Siyazama community allotment garden association which has benefited from gardening through selling of vegetable produce. The association has turned gardening into a livelihood that provides job opportunities for the locals and catalysed the formation of other similar projects (Small, 2007).

The Thuthukani community gardeners also showed enthusiasm similar to that of the Masibumbane participants. The gardeners sought to continue gardening and if possible reach a stage when they could combine their individual harvests and sale the produce together as a cooperative through assistance from external stakeholders. At the time of the survey, the participants were consuming most of their produce and selling extra vegetables to the local community. This showed that community gardening had not only helped to improve the diets of the participants but had also served as a supplementary source of income through vegetable sales.

On the other hand the Umthombo Wempilo participants showed that they were content with consuming most of their produce and selling or donating any excess produce. This is similar to Mpanza (2007) which indicated that community garden projects sufficed household food supply with little or no excess for income generation. The participants did not have plans of turning the garden into a livelihood activity.

6.1.5 Comparative Analysis of the three groups

Thuthukani community garden had no access to irrigation; rather, their garden was dotted with municipality water taps. This enabled each member to have ready access to water for their individual plots in the community garden. The Umthombo Wempilo gardeners had no irrigation or water tap in the garden and had to fetch water from their homesteads instead. This resulted in the members focusing their vegetable growing on natural seasonal patterns. The members planted vegetables that would be in season at a particular period of time inorder

to maximise yields as the season permitted. For example they grew spinach in June and July when the vegetable is naturally in season. By following seasonal patterns they sought to minimise labour of carrying water. The Masibumbane homestead gardeners had ready access to water taps from their homesteads thus explaining the growth of vegetables through-out the year.

Land size for all the groups varied. The Thuthukani members had similar sizes of plot. The size of land for the Masibumbane homestead gardens varied from homestead to homestead while the land for the Umthomno Wempilo gardners was determined by the size of the former dumping site now turned into a garden. With this in mind the output varied from plot to plot and group to group and output was dependent on how well each group utilised their apportioned piece of land.

Extension support was mainly in the form of advice and periodical help from Non-governmental organisations. At the time of the study the only group that had active assistance from a non-governmental organisation was Masibumbane through which they received assistance in the form of food, transport money for clinic visits and facilitation of training at the Qedindlala community garden. The other two groups had periodical assistance from non-governmental organisation extension workers and these organisations gave them assistance and advice as and when funds permitted.

Overall, gardening is a potential livelihood activity that has the potential to improve the economic opportunities of all the three groups and the food gardens also proved to be effective grassroots efforts that have the potential to provide social and environmental benefits to direct participants and surrounding community (Milburn and Vail, 2010).

Chapter 7

7.1 Conclusion and recommendations

This was a feasibility study on a livelihood based analysis of the contribution of community gardens to food security in Msunduzi and uMgeni Municipalities in KwaZulu-Natal, South Africa. The following key sub-problems were addressed:

- Did community gardens increase the dietary diversity of the community gardeners' households?
- Was there a decrease in the expenditure on food due to community gardening
- Have the community gardens in Mpompomeni and uMngeni helped the participants to improve their risk management and resilience?
- Did the community gardens in Mpompomeni and uMngeni increase economic opportunities of the participants?

Low-income households in developing countries are often the victims of poor health due to poor nutrition and hunger. These households often consume staple-based diets low in nutrients. Such staple-based diets can be rectified through household vegetable production (gardening). Gardening can directly increase availability, accessibility and utilisation of nutritious food through provision of a diverse range of fresh food. Household gardening activities can be done in community gardens with virtually no economic resources using locally available planting materials, green manure and indigenous methods of pest control thus making it a sustainable form of agriculture. Community gardening is an age old tradition that has been passed from generation to generation and throughout history gardening has proved to be a reliable source of food for the impoverished.

The results of the study were obtained using Livelihood Based Participatory Tools (LiPA). LiPA involves participatory assessment of interventions and projects with the aim of identifying and analysing the kind of intervention that is necessary to protect and promote food and livelihood security. Participatory methods of data collection were used in the livelihood analysis. These methods were empowering rather than extractive and they helped the researcher to a get a deeper understanding of the participants' perceptions of their household food security situation. A total of 46 household representatives from two community gardens and one homestead gardening project participated in the survey.

The LiPA tool captured the perceived levels of household food security levels as per the participants in terms of the dietary diversity, proportion of expenditure spent on food, increase in economic opportunities and improvement in resilience and risk management. The data collection process took approximately four hours per group to be completed. Inclusion of facilitators and interpreters in the data collection process made it easier for the researcher and the respondents to effectively respond to questions during the activities.

The results showed that all three groups were experiencing an improvement in their dietary diversity through community gardening. This was shown by the vegetable harvesting patterns that they depicted on the seasonal calendars. The Mpompomeni and the Thuthukani gardeners experienced good harvests throughout the year. However, the Umthombo Wempilo respondents experienced seasonal harvests and this was because they usually planted most of their crops towards the end of winter.

A decrease in the food expenditure was experienced by all the three groups. This decrease in was due to an increase in the supply of affordable food through gardening. The decrease in the expenditure spent on food occurred when the gardeners were receiving good harvests from their gardens. However, when the harvests were low, the proportion of expenditure on food would increase. The decrease in expenditure was shown by the difference in the percentage of expenditure on food before gardening and after gardening.

The community gardening activities did not contribute significantly to the improvement in risk management and resilience of the participants. The respondents identified their uncertainties and indicated that they sought external intervention for them to be able to cope with the impact of these uncertainties on their household's food security. Their inability to cope on their own shows that they were still highly vulnerable to events like drought, theft and infestation of insects in their gardens.

Finally the study showed that community gardening has the potential increase in the economic opportunities for the gardeners and the gardeners' have enthusiasm to continue with gardening and develop it into a viable livelihood activity. The gardeners in Masibumbane and Thuthukani desired to expand their gardening activities beyond their current capacity and develop their gardens into reliable and profitable livelihood activities. Furthermore production of vegetables helped them to save money on food and use the money for other household needs.

7.1.1 Conclusions

The study showed that all the respondents, both homestead gardeners and community gardeners were experiencing an improvement in their dietary diversity. This improvement in dietary diversity was limited to when they were receiving good harvests from their gardens making the sustainability of their gardening activities a major contributing factor to the improvement of their dietary diversity.

Gardening helped improve the supply of fresh produce resulting in a reduction in reliance on external sources like the local grocery shop for fresh produce. Both the homestead gardeners and the community gardeners expressed that through producing their own vegetables they were able to purchase other household commodities that they were previously unable to purchase like more quantities of flour, cooking oil. Expenditure previously used for purchasing fresh produce was now being used to purchase other commodities. However, the change was permanent because yields can be adversely affected by unpredictable seasonal patterns.

Both the homestead gardeners and the community gardeners did not experience a significant improvement in their ability to manage risk and improve resilience to shocks and threats. One of the major uncertainties that were identified by the gardeners was drought and all the three groups indicated that they did not have the ability to cope with the impact of drought and they completely relied on external stakeholders and supernatural forces to intervene. The impact of drought was further aggravated by poor supply of water in their gardens.

There was an increase in the availability of economic opportunities through gardening for the participants. Although the community gardeners mostly viewed their personal gardening activities as subsistence agriculture, the Thuthukani gardeners believed that through assistance from external stakeholders they could develop the community garden into a commercial entity like a cooperative through collaboration with external stakeholders. The homestead gardeners also shared the same sentiments and expressed their desire to go beyond homestead gardening and produce on a commercial scale through collaboration with Qedindlala community garden.

In conclusion the participants were benefiting from their gardening activities. Compared to non-gardeners, there was now increased fresh produce supply. The gardeners were experiencing an improvement in their diets through increased dietary diversity and

consumption of fresh food therefore, showing that community gardens contributed significantly to the food security of community gardeners and homestead gardeners.

7.1.2 Recommendations

Gardening is indeed contributing to the food security of the community gardeners; however for the sustainability of gardens to be improved there is need for the community gardeners to adopt a wide range of traditional and commercial vegetables that they can grow throughout the year. Some traditional vegetables like *imbuya* or pumpkin leaves are well accustomed to the seasonal variations and by cultivating these traditional kinds of vegetables they can also increase the availability of vegetables packed with nutrients to their households. The gardeners are recommended to decrease their level of reliance on external stakeholders for job opportunities. They need to embrace projects like community gardens and use them as avenues to other economic opportunities like in the case of Masibumbane gardeners who seek to expand their gardening activities and aspire to have their own farm and production unit in the future. The community gardeners need to go a step further and integrate poultry into their gardening activities so that they can have access to well-balanced diets.

The non-governmental organisations that are involved in these communities gardening project are recommended to promote a relationship with the community gardeners that does not encourage too much reliance of the gardeners on the organisation. This should be done in order to ensure that when the timeframe for the non-governmental organisation's involvement in the community has come to an end the participants will be able to stand on their own and solve their issues with little or no external intervention. Since most of the participants were women it showed that community gardening was viewed predominantly as an activity for women therefore, it is essential that such activities should receive relevant support from women empowerment groups.

The government is recommended to promote community gardening activities by installing water pipes in the gardens or by donating tanks to the gardeners so that yields are not affected by erratic water supplies and by supporting agricultural extension services in the Msunduzi Municipality. The government is also encouraged to consider community gardening as a viable alternative to homestead gardening in order to accommodate those that do not have adequate space for gardening on their homestead and those that are renting the property upon which they are residing and do not have exclusive rights to practice gardening on the property. In addition to gardening, the government is recommended to integrate other projects

like poultry farming into the gardening activities so that the gardeners can enjoy a well-balanced diet and as a result improve food security.

7.1.3 Recommendations for improvement of study

The methodology could have included a survey with key informants like the facilitators from the non-governmental organisations involved in the gardening activities. This could have provided more information and an informed opinion on the contribution of community gardens to the participants.

7.1.4 Recommendations for further study

The study gave an understanding of community gardens and their contribution to food security to gardeners in the Msunduzi Municipality. Further research could be carried out to compare food security situations among households involved in community gardening and those that are not involved.

There is also need to conduct a research on the impact of institutions like non-governmental organisations on the performance of community gardens in the Msunduzi Municipality. A comparative study could be done between community gardens that receive institutional support and those that do not receive institutional support.

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APPENDICES

APPENDIX A

Framework for African Food Security Indicators

FAFS Element	Indicator
Improving risk management and resilience	Resilience score based on assets
Increasing the supply of affordable food	Proportion of expenditure spent on food
Increasing economic opportunities for the vulnerable	Per capita income
Improving dietary diversity	Dietary diversity score

APPENDIX B

LIPA Workshop Process: Sample Agenda for the workshop

Day	What	Responsible person
1	Official welcome and setting the agenda	Facilitators and officials
	Situation analysis	Presenter
	Introductions	Facilitator and all
	Expectations	All
	Ground rules	Facilitator and all
	Understanding Livelihoods and Vulnerability	Facilitator/presenter
	Identifying livelihoods	Groups
	Resource trees	
2	Spheres of influence	Groups
	What we can and cannot change	Groups
	Coping strategies	Groups
	Understanding resilience and food security	Facilitator/presenter
	Lunch	
	Presentation/exploration of policies and programmes versus FAFS principles	Presenter
3	Evaluation of the effectiveness of policies and programmes	Groups
	Developing a plan of action	Groups
	Lunch	
	Closing of workshop	Facilitator/presenter

APPENDIX C
Wholistic World View Analysis