

INVESTIGATING THE POTENTIAL OF THUTHUKANI AS A VIABLE COMMUNITY GARDEN: A SITUATION ANALYSIS

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DECLARATION

I, Nokulunga Ngobese, declare that:

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Nokulunga Ngobese



Albert T Modi (Supervisor)

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ABSTRACT

The concept of community garden has been studied in many parts of the world to understand its role in sustainable land use, food security and cultural cohesiveness. In South Africa, the government is exploring the upliftment of rural communities through landcare programmes. Many agricultural cooperatives have been established in the form of community gardens to galvanise support for the farmers. However, there has not been clear evidence that community gardens can make a significant contribution to food security and rural economic growth. The aim of this study was to investigate the performance of a community garden located in a peri-urban area of Tumbleweed in KwaZulu-Natal with respect to social and crop production activities. The objectives were to determine (i) whether the activities of the community fit the concept of community supported agriculture (ii) is there a food security potential on the site that can be explained in social and agronomic context and (iii) are there future lessons for policy in the context of community gardens, especially in peri-urban areas. The study presents a detailed literature review that analysed the concept of community agriculture compared with intensive agriculture. Key characteristics of the a community assisted agriculture, with which community gardens fit were identified as (a) Talk to your neighbours, (b) Determine the initial focus for the CSA program and its short- and long-term goals, (c) Build partnerships and design the program, (d) Get the word out and (e) Encourage ongoing discussion and adapt accordingly over time. While the Thuthukani garden members were not found practicing all these approaches, there was clear evidence of collaboration from the situation analysis. The situation analysis also identified that the farmers grow more than 10 vegetables all year round without the necessary skills and resources to produce potential yield. However, an analysis of one of the popular and better yielding crops, potato, showed that a farmer with a 50 m² can produce from about 5 (without fertiliser) to 15 t/ha of potatoes and make about R500 to R1500 of gross margin from this crop per production. It is concluded that Thuthukani is a community garden with a potential to be a cooperative, should the necessary skills and resources be available. The success of this community garden could be used for government policy in dealing with peri-urban agriculture

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CHAPTER 1

GENERAL INTRODUCTION

1.1 Challenge of poverty and food production for rural poor

Having adequate food to eat is a basic human right (FAO, 2014). Food security means that all people can obtain healthy, affordable, culturally acceptable, and safe foods regularly without the need to resort to emergency relief. The dynamics of food security can be understood in terms of four interactive factors, namely: availability of food, access to food, stability of food supply, and food utilisation (FAO, 214). Food security is achieved when there is adequate food available in the community and households have the necessary skills and resources to acquire and use that food. Central to this concept, is the idea that people should be able to obtain food in a manner that upholds human dignity, that a person should not need to seek emergency food relief or food via socially unacceptable means such as scavenging. Food security also means that the ways in which food is produced and distributed is environmentally sustainable and equitable and (Burns, 2004; Hara & Backeberg, 2014). In contrast, food insecurity suggests irregular access to safe, nutritionally adequate, culturally acceptable food from non-emergency sources (Barrett, 2010).

The FAO (2014) has proposed a "twin track" approach to fight food insecurity that combines sustainable development and short-term hunger relief. Development approaches include investing in rural markets and rural infrastructure. In general, it is proposed that there be use of public policies and programs that promote long-term economic growth that will benefit the poor (FAO, 2012; Hall & Osorio, 2014). To obtain short-term food security access to basic inputs and services could promote agricultural production. The use of conditional or unconditional food or cash transfers has also been noted (Godfray et al., 2010). Conditional transfers could include school feeding programs, while unconditional transfers could include general food distribution, emergency food aid or cash transfers Godfray et al., 2010). A third approach is the use of subsidies as safety nets to increase the purchasing power of households (Tweeten, 1999). The FAO stated that "approaches should be human rights-based, target the poor, promote gender equality, enhance long-term resilience and allow sustainable graduation out of poverty (Akepora, 2013; Garrett & Ruel, 1999; Hara & Backeberg, 2014).

There are strong, direct relationships between agricultural productivity, hunger, poverty, and sustainability (Davis, 2010; Williams, 2014). Three-quarters of the world's poor live in rural areas and make their living from agriculture (FAO, 2014; Williams, 2014). Hunger and child malnutrition are greater in these areas than in urban areas (Godfray, et al., 2010). Moreover, the higher the proportion of the rural population that obtains its income solely from subsistence farming (without the benefit of pro-poor technologies and access to markets), the higher the incidence of malnutrition (Godfray, et al., 2010). Therefore, improvements in agricultural productivity aimed at small-scale farmers will benefit the rural poor first. Food and feed crop demand is likely to double in the next 50 years, as the global population approaches nine billion (Godfray, et al., 2010; Williams, 2014). Growing sufficient food will require people to make changes such as increasing productivity in areas dependent on rainfed agriculture; improving soil fertility management; expanding cropped areas; investing in irrigation; conducting agricultural trade between countries; and reducing gross food demand by influencing diets and reducing post-harvest losses.

According to the Comprehensive Assessment of Water Management in Agriculture, a major study led by the International Water Management Institute (IWMI), managing rainwater and soil moisture more effectively, and using supplemental and small-scale irrigation, hold the key to helping the greatest number of poor people (Amarasinghe & Smakhtin, 2014). This also a call for a new era of water investments and policies for upgrading rainfed agriculture that would go beyond controlling field-level soil and water to bring new freshwater sources through better local management of rainfall and runoff (Hara & Backeberg, 2014; Molden, 2007). Increased agricultural productivity enables farmers to grow more food, which translates into better diets and, under market conditions that offer a level playing field, into higher farm incomes. With more money, farmers are more likely to diversify production and grow higher-value crops, benefiting not only themselves but the economy as a whole (Von Braun et al., 2003).

Researchers suggest forming an alliance between the emergency food program and community-supported agriculture, as some countries' food stamps cannot be used at farmer's markets and places where food is less processed and grown locally (McCullum et al., 2005). The gathering of wild food plants appears to be an efficient alternative method of subsistence in tropical countries, which may play a role in poverty alleviation (Claudio, 2006; Modi et al, 2006).

1.2 The South African context of food insecurity

For some of world's poorest households, food accounts for a major part of total expenditures and thus the price of food directly affects their food security. According to Food Bank South Africa, more than 20% of the population today is food insecure (Gericke et al., 2011). That means that approximately 11 million South Africans do not know where their next meal will come from. Like in many other parts of the world, the hardest hit people are women and children (Gericke et al., 2011). Moreover, this self-reinforcing poverty trap lies rampant in rural communities (SASAS, 2008). Nonetheless, South Africa remains one of a handful of countries that produces enough food to adequately meet local food consumption needs. In other words, there is enough food to feed everyone (FAO, 2014). Therefore, the problem is distribution and access. In South Africa, food security is generally measured in terms of the price of the country's staple food, which is maize. In broader terms however "food security occurs when people lack secure access to sufficient amounts of safe and nutritious food for normal growth and development, and an active healthy life" (FAO, 2014).

One of the major observations regarding the effect of poverty on rural poor in South Africa is shown by migration patterns of people from one province to another (StatsSA, 2013). Recent data given by StatsSA (2013) show that the South African Agriculture sector has declined in its contribution from about 7% in the 1970s to about 2% to date. The rural population has decreased from about 53% in the 1960s to about 38% to date. The population of South Africa by province is as shown (ranked) in Table 1.1, with migration of people as indicated in Figure 1.1. It is clear that rural provinces are losing people to urban provinces in search of better livelihoods. This largely contributes to peri-urbanisation and may force people to produce food crops in the surrounding spaces.

According to the World Health Organisation, food security in South Africa emerged as an after effect of the 2008 global economic crisis. As Africa's largest economy, South Africa was one of the hardest hit countries in the region (Gericke et al., 2011). The general economic downturn was the result of a slow-down in foreign flows. In addition, South Africa entered the crisis marred with local financial weak points, which included a very large current-account deficit, high interest rates and high inflation. However, almost four years out of the recession, consumers are still feeling the brunt as the general price of food continues to

rise. In 2013 the Food and Price Monitor reported the Inflation on food and non-alcoholic beverages in January 2013 at 6.2% (StatsSA, 2013). Recent reports indicate that inflation has dropped to 5.9%. However, the price of rice (2kg) and maize meal (5kg) were respectively reported to be R3 and R2.20 more expensive in the rural areas compared to the urban areas (StatsSA, 2014). Government's most decisive response to poverty in South Africa is the social allowance that is granted to the poor, the elderly and the disabled. The "social grant" issue has been a longstanding controversial debate among all pockets of society, from the rural elderly to the privileged urban middle-class (Davids, 2011). Although many South Africans rely on this social security for their livelihoods, its direct impact on the eradication of poverty remains unknown. Nonetheless one can easily infer that with the rising cost of living, its beneficiaries are struggling to keep up.

Another concerted effort by the South African government has been the establishment of the Department of Rural Development and Land Reform in 2009 (South Africa Year Book, 2012/2013). The Department of Rural Development and Land Reform deals with land reform; access to land use; management and transformation of land relations; and all other matters related to the hopes and lifestyles of those who live on the land and who depend on the land for their livelihoods. According to the South Africa Year Book (2012/2013) one of the Department's strategic objectives is agrarian transformation strategy which includes *inter alia*:

- establishment of cooperatives and enterprises for economic activities; wealth creation; and productive use of assets;
- non-farm activities for strengthening of rural livelihoods;
- leadership training, social facilitation and familiarity with CRDP objectives; and socioeconomic independence;
- skills development and employment creation for youth, women and people living with disabilities; and
- democratisation of rural development, and participation and ownership of all processes, projects and programmes by rural communities.

Table 1.1: South African population by province (After StatsSA, 2013).

	Population estimate	% of total population (rank)
Eastern Cape	6 620 100	12.5 (3)
Free State	2 753 200	5.2 (8)
Gauteng	12 728 400	24.0 (1)
KwaZulu-Natal	10 456 900	19.7 (2)
Limpopo	5 518 000	10.4 (5)
Mpumalanga	4 128 000	7.8 (6)
Northern Cape	1 162 900	2.2 (9)
North West	3 597 600	6.8 (7)
Western Cape	6 016 900	11.4 (4)
Total	52 982 000	100

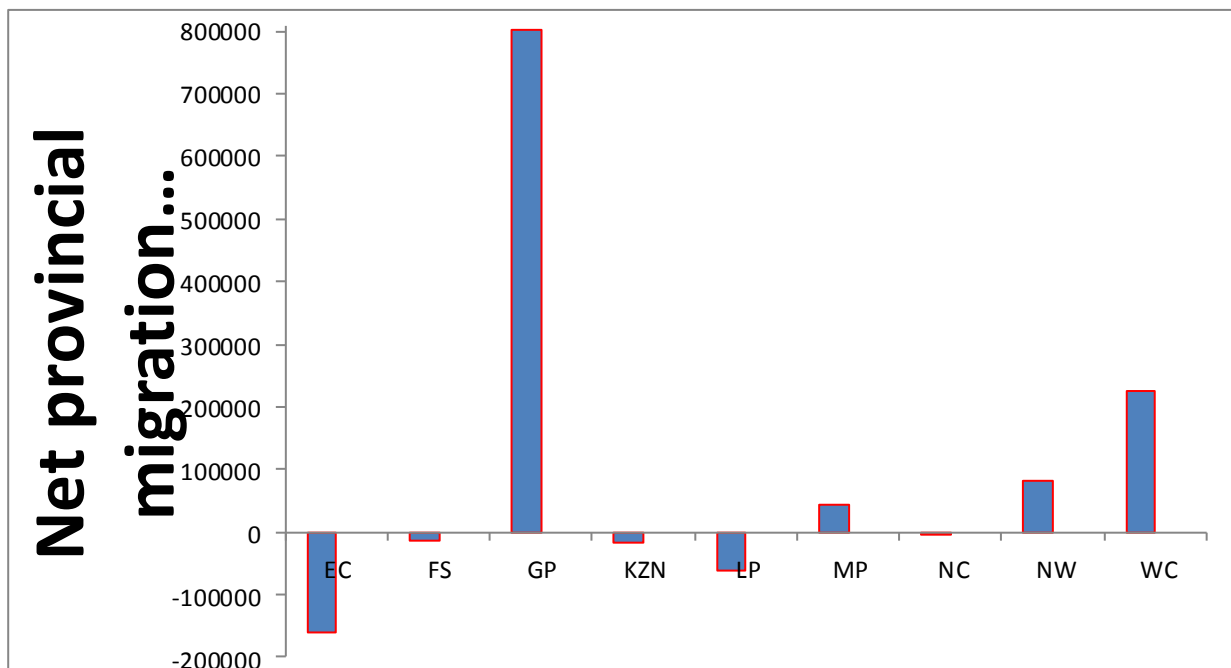


Figure 1.1: Net provincial migration from province to province in South Africa. EC = Eastern Cape; FS = Free State; GP = Gauteng; KZN = KwaZulu-Natal; LP = Limpopo; MP = Mpumalanga; NC = Northern Cape; NW = North West; WC = Western Cape. (After StatsSA, 2013).

The devastating reality is that for the chronically poor, poverty is likely to last for many years, in some cases for entire lifetimes and even transcend through generations (Labadarios, et al., 2008). With this, it is hoped that the country can rethink how it perceives poverty, and truly begin to appreciate the depths of inequality in our communities. Thus, there is a need to investigate different approaches to study and implement food security programmes that are relevant for different communities.

1.3 Justification and study objectives

1.3.1 Justification

Despite the political and economic advances seen in South Africa since 1994, the country is plagued by poverty and unemployment and, following the recent global economic crisis, by steep food and fuel prices, high-energy tariffs and increasing interest rates. These adverse conditions have placed severe pressure on ordinary South Africans already struggling to meet their basic household needs. Many rural people have moved to the urban areas in search of better access to employment opportunities and improved food security. Here, they have expanded the peri-urban areas through settlements and the majority still remain food insecure. Although agriculture is seen as a rural activity, many peri-urban areas show evidence of (mainly) vegetable crop production for short term subsistence. The production varies from individual household type to community activity.

In this study, it is argued that characterisation of peri-urban community gardens has not been done enough to explain their significance in human livelihoods. Further, it is hypothesised that woman, as people who are most affected by food insecurity and inequitable access to employment are the major participants in community gardens. This hypothesis was tested in a peri-urban area of Tumbleweed, near a small town of Hilton, KwaZulu-Natal.

1.3.2 Objectives

Part of the basis for the study objectives is the concept stated at the PLAAS (Institute for Poverty, Land and Agrarian Studies 2014 conference report about the principles for responsible agricultural investment. These principles aim “to address the main issues of what

makes investment in agriculture and food systems responsible; identify the relevant stakeholders, as well as their key roles and responsibilities; and provide a framework to guide the actions of all stakeholders engaged in agriculture and food systems so that investment in agriculture foster food security and poverty reduction and strengthen the livelihood of women and men” (Hall & Osorio, 2014). The focus of this study will be limited to identification of stakeholders as well as their roles, in the context of collaboration by individuals residing in a peri-urban area. It is important to explain and define this collaboration as communal or community gardening in the context of review of literature and then analysing the roles played by stakeholders. Secondly, the study will have a general focus on food security potential of the type of gardening used and attempt to provide a policy direction having identified study limitations. Therefore, the specific objectives of this study are to:

- i. Undertake a situation analysis to determine farmer participation and types of crops used in communal gardening.
- ii. Determine the food security potential of communal gardening.
- iii. Propose a policy direction towards sustainable development in the context of the findings of this study.

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CHAPTER 2

LITERATURE REVIEW

2.1 Farmer participation in agriculture

Decades of scientific research related to agriculture and natural resource management have brought limited benefits to smallholder farmers, including crop farmers, fishers, livestock keepers and other resource users (Chambers, 1993). Therefore, donors, policymakers and civil society organizations (CSOs), such as farmer organizations and nongovernmental organizations (NGOs), are urging the formal research sector to make its work more useful to smallholder farmers (Hara & Backeberg, 2014). Many institutions of agricultural research and development are now seeking ways to engage more closely with smallholders in order to conduct research that is more relevant for and accessible to them, and are seeking examples and good practices as sources of learning (Hara & Backeberg, 2014; IFPRI, 1995). Some examples of research that is focused on smallholders and in which the process is co-managed and driven by smallholders can be found in “informal” research initiatives, specifically, those which are facilitated by CSOs (Leeuwis, 2000). However, information on these initiatives rarely finds its way into the realm of scientific literature and is therefore not readily accessible to formal research institutions CSOs (Leeuwis, 2000).

However, it is evident that there is still a significant divide between the worlds of formal and informal agricultural research and development, despite the fact that they seek common goals in serving smallholder communities (Chigbu, 2012). This divide needs to be bridged in order to support mutual learning and to foster partnerships between actors that would lead to more useful and sustainable outcomes for smallholders. If smallholder farming communities and other, external agricultural research and development actors recognise the value of local knowledge and creativity, they will be better able to appreciate local potential to tackle current and new challenges. This appreciation will stimulate local people’s pride and confidence, and will encourage them to try out new possibilities. The farmers’ own experimentation will also reveal issues of local priority and provide a good starting point for joint experimentation by farmers and other agricultural research and development actors to develop new and better ways of doing things (Chambers, 1993). This experience of co-

learning will strengthen the linkages and mutual understanding between the farmers and other actors and make them better able to continue to interact in adapting to change and in grasping new opportunities and ideas, from whatever source. Increasing farmers' access to other sources and types of knowledge and encouraging their involvement in multi-stakeholder co-learning processes will enhance the capacity of all the people involved to innovate and adapt.

While the focus of research has generally been on smallholder farmers as owners of small lands for crop and animal production and/or fishers. There has not been enough focus on communal farmers working on different types of gardens. The focus of this study was on a group of farmers collaborating, presumably, in a community garden. However, it is important to briefly review different types of crop production systems in order to explain what is meant by a community garden.

2.2 Brief overview of crop production systems

A crop production system can be referred to as an agrarian system, although it is not limited to large scale agronomic crops. It is the system of land tenure (that is, land ownership and labour organisation) and the technological and economic conditions are not independent factors. Their concrete form is interlaced with the natural and social conditions found in each specific area (Myrdal & Morell, 2011)

The natural conditions not only influence the production factors- generally good and poor soil, enough precipitation, and temperatures favourable for growth and working- but also influence what types of ownership are found in an area: large farms are seldom found, for example, in regions where the soil conditions are poor and the topography is mountainous (Samir & Lee, 1986).

Even more important is the relation between the agrarian structure and the existing social conditions in the individual countries and regions. Feudal, capitalistic, and socialistic social orders result in very different conditions of land ownership, systems of labour organisation, and forms of cultivation (Charles, 1984). The social system, in other words, makes up the framework within which agrarian structures can evolve. In this process the state as well as tribes, landlords, communes, and colonial powers can determine the conditions. Within the framework of social conditions, the agricultural sector's economic goals, the function land

fulfils, and the political and social system play significant roles. The economic goal can vary from self sufficiency and satisfying one's needs, maintaining the farm, earning rent or interest on capital, production for the market, maximising profits, or meeting economic plans. In doing so, land can function as a basis for earning one's livelihood, home, means of production, a commodity, an asset, annuity, power basis, or prestige object. Several functions can be combined (Todd, 2008).

The above mentioned factors are not independent, but rather are embedded within a system; that is, a change in any factor results in a change in all of the other factors. The term "agrarian system" has been coined in order to conceptualise this complex system. The "agrarian system" consists of the "institutional, economic, socio-organisational, and ethical patterns found in the agricultural sector and rural areas that are oriented towards the superordinate economic and social system" (Todd, 2008)

As food security has become more important, mostly due to the explosive population growth during the 21st century, the efficiency of agrarian systems has come under greater review. The movement of people to the peri-urban areas is likely to add more complexity to the dynamics of the system (Foley et al., 2005; Schneider et al., 2011).

2.2.1 Intensive commercial farming

Large scale commercial farming is intensive farming or intensive agriculture, also known as industrial agriculture. It is characterized by a low fallow ratio and higher use of inputs such as capital and labour per unit land area (Matson et al., 1997). This is in contrast to traditional agriculture in which the inputs per unit land are lower. Intensive crop agriculture is characterised by innovations designed to increase yield. Techniques include planting multiple crops per year, reducing the frequency of fallow years and improving cultivars. It also involves increased use of fertilizers, plant growth regulators, pesticides and mechanisation, controlled by increased and more detailed analysis of growing conditions, including weather, soil, water, weeds and pests (Matson et al., 1997).

This system is supported by ongoing innovation in agricultural machinery and farming methods, genetic technology, techniques for achieving economies of scale, logistics and data collection and analysis technology (Vidal, 2013). Intensive farms are widespread in

developed nations and increasingly prevalent worldwide. Most of the food products available in supermarkets are produced by such farms. Smaller intensive farms include higher inputs of labour and use intensive methods that are claimed to be more sustainable (Fortier, 2012). The farming practices commonly found on such farms are referred to as appropriate technology. These farms are less widespread in both developed countries and worldwide, but are growing more rapidly (Fortier, 2012). Most of the food available in specialty markets such as farmers' markets is produced by these smallholder farms Gorelick & Norberg-Hodge, 2002; Fortier, 2012).

2.2.2 Communal farming

Community supported agriculture (CSA) consists of a community of individuals who pledge support to a farm operation so that the farmland becomes, either legally or spiritually, the community's farm, with the growers and consumers providing mutual support and sharing the risks and benefits of food production in community gardens (DeMuth, 1993). Typically, members or "share-holders" of the farm or garden pledge in advance to cover the anticipated costs of the farm operation and farmer's salary. In return, they receive shares in the farm's bounty throughout the growing season, as well as satisfaction gained from reconnecting to the land and participating directly in food production. Members also share in the risks of farming, including poor harvests due to unfavourable weather or pests. By direct sales to community members, who have provided the farmer with working capital in advance, growers receive better prices for their crops, gain some financial security, and are relieved of much of the burden of marketing (McFadden, 2004).

Although CSAs take many forms, all have at their centre a shared commitment to building a more local and equitable agricultural system, one that allows growers to focus on land stewardship and still maintain productive and profitable small farms (Wilkinson, 2001). The main goal of these community supported projects is to develop participating farms/farmers to their highest ecologic potential and to develop a network that will encourage and allow other people to become involved. Community supported agriculture farmers typically use organic or biodynamic farming methods, and strive to provide fresh, high-quality foods.

Most CSAs offer a diversity of vegetables, fruits, and herbs in season; some provide a full array of farm produce, including shares in eggs, meat, milk, baked goods, and even firewood (DeMuth, 1993). Some farms offer a single commodity, or team up with others so that members receive goods on a more nearly year-round basis. Some are dedicated to serving particular community needs, such as helping to enfranchise homeless persons. Each CSA is structured to meet the needs of the participants, so many variations exist, including the level of financial commitment and active participation by the shareholders; financing, land ownership, and legal form of the farm operation; and details of payment plans and food distribution systems (McFadden, 2004).

Community supported agriculture is sometimes known as "subscription farming," and the two terms have been used on occasion to convey the same basic principles. In other cases, however, use of the latter term is intended to convey philosophic and practical differences in a given farm operation. Subscription farming (or marketing) arrangements tend to emphasize the economic benefits, for the farmer as well as consumer, of a guaranteed, direct market for farm products, rather than the concept of community-building that is the basis of a true CSA. Growers typically contract directly with customers, who may be called "members," and who have agreed in advance to buy a minimum amount of produce at a fixed price, but who have little or no investment in the farm itself (Wilkinson, 2001).

Wilkinson (2001) suggested the following approaches to establishing successful CSAs:

(a) *Talk to your neighbours*

Are local farmers struggling? Is there an interest in increasing the quality, variety, and value in locally available food products? Talk to local residents and farmers about establishing a CSA program. Surveys and interviews are used to gather information about the produce preferred by potential shareholders and the restrictions of soil and climate variations. CSA can easily adapt and expand to target local issues and address area needs. Grower experience should be considered, because CSA programs can require knowledge sufficient to grow 40 or more crops in succession, daily yielding seven or more different items over the course of a growing season.

(b) Determine the initial focus for the CSA program and its short- and long-term goals

What products are local residents and farmers interested in purchasing and producing in the CSA? Is the community focus more on preservation of agricultural land or on the development of a commercially competitive agricultural base? The scale of production, the potential number of shareholders, and the number of farmers involved are important considerations.

(c) Build partnerships and design the program

With extensive community discussion and the involvement of interested parties, the CSA program can develop a "core group" of members to establish the program's formal parameters. Once the program framework and its core membership are developed, program needs should be reviewed, including capital outlays, delivery networks, communication methods, and publicity.

(d) Get the word out

Marketing is key to a successful CSA program. Fairs, association gatherings, notices in local retail stores, public meetings, and livestock auctions are all excellent methods of establishing the CSA program's visibility within the community. Local newspapers can also provide publicity (in addition to paid advertising) with occasional program coverage. Finally, program members and local farmers may also provide invaluable "word-of-mouth" publicity as well as access to nearby resources.

(e) Encourage ongoing discussion and adapt accordingly over time

Determining what does and doesn't work is partly a matter of planning and experience. Starting small and expanding slowly is one way to reduce program risks while continuing to raise the program's visibility in the community. Shareholder numbers may increase or decrease, product availability may change, or delivery schedules may need updating. The program design should enable both shareholders and farmers to adapt to the changing needs and challenges they face.

2.2.3 Challenges of community gardens

Community gardens face many challenges that limit their production and interaction between members. Lack of irrigation equipment undermined the ability of poor households to raise their agricultural incomes and made them even more vulnerable to frequent droughts. Power relations are an impediment to the success of gardens. These relations determine the controls of gardens (Moyo and Tevera, 2000). There are also illegitimate forms of transferring land or selling of land or expansion of plots which is common in peri-urban gardens.

According to Middleton (2009) community gardens in rural areas face management challenges. Most of the participants in community gardens lack gardening skills. Community gardens attracted members which are politically motivated and they tend to influence decision making. Middleton (2009) also noted that community gardens also face the challenge of water to irrigate fruits and vegetable during summer. Conflicts over control of land, competition between actors over use of scarce resources such as water because of population pressure are also common in community gardens. According to Moyo and Tevera (2000) there are conflicts between national institutions and local people for example national institutions restrict the cultivation of community gardens using national institutions.

2.3 References

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CHAPTER 3

METHODOLOGY

3.1 Introduction

Multiple strategies are required to address the issue of food production and food security. The choice of feasible approaches hinges on the existing social, political, and economic conditions and resources available to design and implement the intervention (Galhena et al., 2013; Wilkionson,). This study was a hybrid food security study in that it was not aimed at evaluating the basic pillars of food security: availability of food, access to food, stability of food supply, and food utilisation. It was also, not a crop production study, in that it did not focus on agronomic aspects. Yet, the study used an approach that allowed determination of participation of peri-urban people in an agricultural activity to sustain their livelihoods. Agriculture is in principle a food security programme (Maroyi, 2009).

This chapter was used to present the general methodology of the study to explain how the situation analysis and data collection with respect to social and environmental aspects were performed. Chapter 4 was used to present the results of the study, from the situation analysis perspective. Crop production aspects are presented in Chapter 5. A summary of the results of both chapters is given in Chapter 6 to contextualise their meaning regarding the study objectives and literature review about the meaning of community garden in relation to food security. Study limitations and future directions are given in Chapter 6.

3.2 Study site

The study was conducted at Thuthukani Club, a community garden in Tumbleweed location which is situated on the southern side of Howick town in Ward 12 of uMngeni municipality in the province of KwaZulu Natal (Figure 3.1). Howick town lies about 20km north of Pietermaritzburg city. Tumbleweed location is a cluster of formal residential housing and could be classified as peri-urban (Figure 3.2) as it is situated close to the main economic hub

of the municipality, services are easily accessible and has good infrastructure in comparison to other areas further from town.

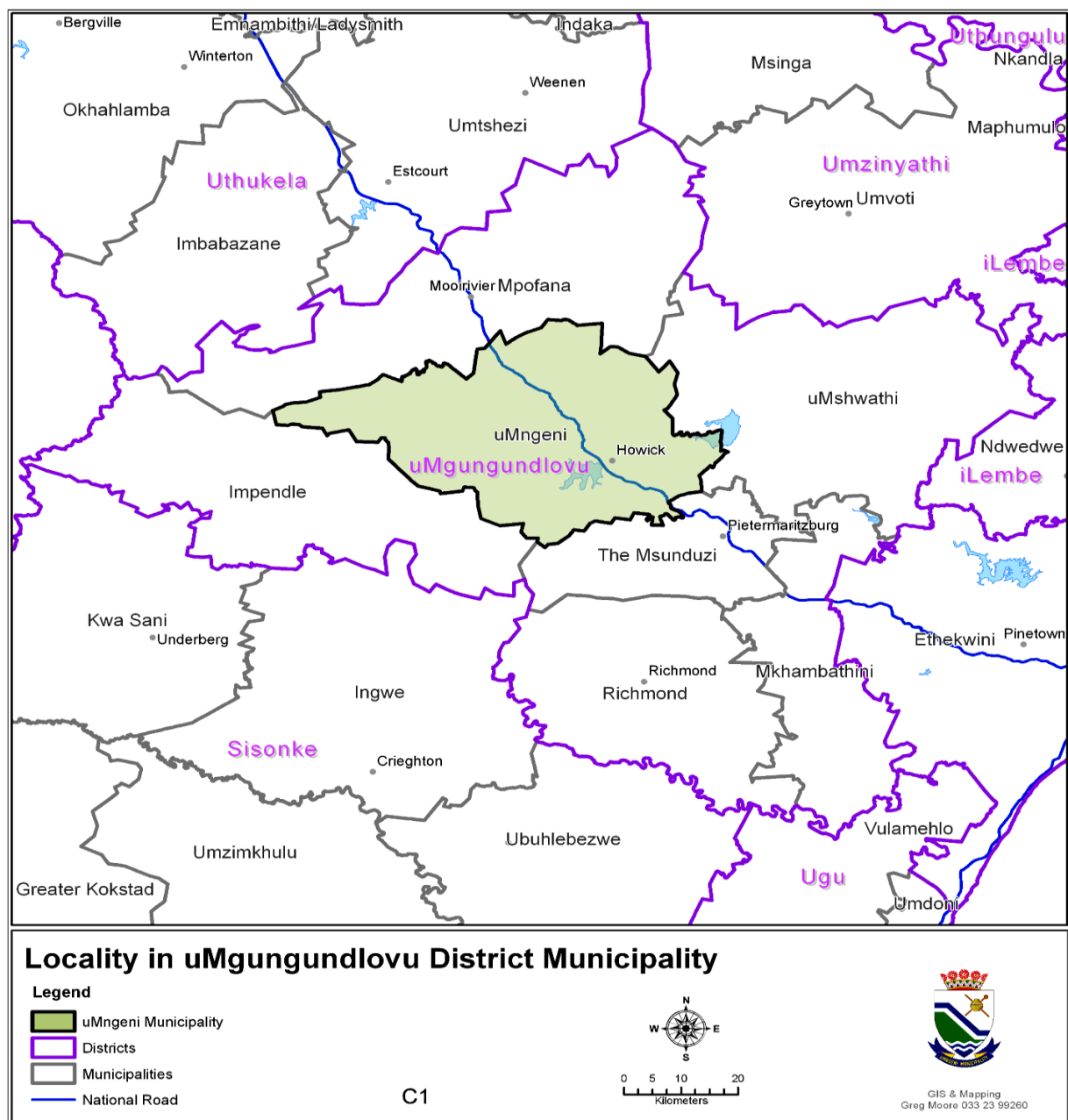
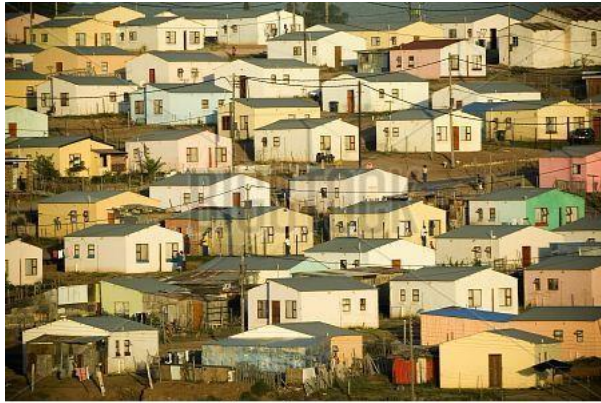


Figure 3.1. Location of the study site near Howick in the uMngeni municipality, uMgungundlovu District.



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Figure 3.2. Typical housing infrastructure of peri-urban location, Tumbleweed, where members of the Thuthukani community garden reside.

The land is owned by the municipality and so the project operates based on the permission to use the land that was issued to them by local leadership. The initial motivation for the establishment of this garden was that, the space was used by the community as a dumping site of household waste, some of which was hazardous. Also because of the overgrown grass, this open space had also begun to serve as a temporal storage area for stolen goods from this location and neighbouring areas. The use of space has however grown from that of crime and hazard prevention to that of food production and community care. The size of the garden was 1 ha with a number of plots that are in different sizes (10 to 50 m²) belonging to each member. What was gathered from members was that plot sizes were allocated according to members' needs. Thuthukani project's operations are based on the constitution that was compiled by the members which is led by a committee that was democratically elected by them. Members of the garden project are representatives of households which allow more households to participate. The Provincial Department of Agriculture has provided infrastructural support, technical support and training through an Extension Officer. Input support is received as and when the department has funds to do so. The location and description of the Thuthukani community garden classifies it as an urban and peri-urban agriculture activity. FAO (2006) defines urban and peri-urban agriculture as an industry located within (intra-urban) or on the fringe (peri-urban) of a town, a city or a metropolis, which grows and raises, processes and distributes a diversity of agriculture products, using largely human, land and water resources, products and services found in and around that urban area. Wilkinson (2001) argued that peri-urban does not name a singularity, but a

multiplicity. Not that much coheres, if you track the occurrence of the term across different disciplines and professional usages. At one extreme you can find the term used in the context of the need for food security for Africa's urban poor, and at another, it may be evoked in the context of preserving landscape views for tourists in France. In affluent nations or regions, peri-urban issues will be those of landscape integrity, heritage, environmental quality and rural residential development supplanting productive farmlands. In less affluent regions, such as cities in Africa, Asia and Latin America, peri-urban concerns are ones such as major pollution of land and waterways, poverty, informal settlements and slum living conditions.

From agricultural/crop production perspective, the site the the garden is located in Bioresource Group 7 (BRG 7), Northern Mistbelt (Barry, 2006). The BRG 7 occurs in an altitude of 900 – 1400 m above sea level. The mean annual rainfall ranges from 980 – 1123 mm, and the mean annual temperature is 16.7 °C. Mist occurs frequently in spring and summer. The soil was identified as Groenkop Bosrug – dark brown with no signs of wetness immediately beneath podzol B (Figure 3.3).



Figure 3.3. Soil profile of the community garden.

3.3 Data collection and analysis

Data were collected from the project members of the community project called Thuthukani Club formed by 38 households that are residents of the Tumbleweed location. The process of engaging the project members and collecting data occurred in the following phases:

Phase 1: Project consultation with project members and extension officers who are external stakeholders that provide support to the project. In this engagement with the project members the aim was to introduce the researchers and formally get members' consent to collect data and their planting material requirements which were to also form part of the research interest when measuring the yield potential of the garden. The main crops were potatoes, brinjal, spinach, and beans. Farmers also expressed the need for fertilizer.

Phase 2: Collection of soil samples and provision of inputs required. The collection of soil samples was undertaken to understand the characteristics of the soil as it is one of the factors that determine productivity. The soil was analyzed and the results were shared with community garden members to allow them to apply fertilizer at recommended rates for each crop (Table 3.1). The farmers identified crop planting material they needed. The planting material was delivered, excepting fertilizer, to the project at the beginning of spring, in September 2012. The researchers did not have any input on how and where the planting materials provided were to be used as part of the study was to see what influenced their production knowledge. A comparison of how much fertilizer was applied with recommended amounts and its effect on crop yield was done on a 25% sample of participants.

Phase 3: Administration of the first structured questionnaire. The first questionnaire (Annexure 1) was designed to capture the situational aspect of the project which covered the social, economic and technical aspects; whether members have homestead gardens and a small section was aimed at capturing information on what types of traditional crops they plant.

Phase 4: Observation of production and collection of field data. This was conducted to follow up on the performance of seedlings that were provided to members and to generally capture the production aspect of the project. Informal interviews were conducted with project members who were found in the garden. The presentation and analysis of data collected in this phase is discussed in Chapter 4.

Phase 5: Administration of the second structured questionnaire (Annexure 2). This questionnaire was administered in March/April 2013, the focus being on the evaluation of knowledge systems and capturing production issues. Although the actual number of project members of Thuthukani Club is 38, questionnaires were administered to 36 members (35 members responded to the first questionnaire and 36 members to the second) who were

willing to participate. Data to determine crop production were collected. In all, the response percentage in relation to the whole membership was good as 92% of members responded

Data from the questionnaires were captured in Excel programme and analyzed using SPSS. Crop production results were analyzed using analysis of variance Gestat®, version 14. Research done with the Thuthukani community garden in 2012 to 2013, was treated as one study with different aspects every year that are joined to lead to one conclusion. In the first season the researcher was monitoring what project members were doing, and in the second season the researcher was looking at what the members were producing. Within this period, the researcher gathered information through structured questionnaires, group interviews, one-on-one interviews with members and by observation.

Table 3.1. Results of soil analysis and recommended applications of key fertilisers.

Nitrogen		Phosphorus		Potassium		Lime	
Yield target (t/ha)	Required (kg/ha)	Soil test (mg/L)	Required (kg/ha)	Soil test (mg/L)	Required (kg/ha)	Acid saturation (%)	Required (t/ha)
40	200	87	40	485	0	1	0

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CHAPTER 4

SITUATION ANALYSIS

4.1 Introduction

To fully understand the project climate and environment, many factors that can affect it must be researched and understood (Steenburgh & Avery, 2010). The types of climate/environment to analyse vary and may include the political, economic, social/cultural, and technological. In this study a focus limited to one community garden and its members was given to some aspects of (i) Social/cultural environment and (ii) technological analysis.

4.1.1 Demographics

The results presented in Figure 4.1 show that all project members were adults. The youngest project member interviewed was 30 years old, and the oldest was 74. The average age of the interviewed members was 50. In this community garden gender imbalance was observed as there were more female participants than male. Figure 4.2 shows that female membership was 78%, whereas male membership was 19% and 3% was not recorded.

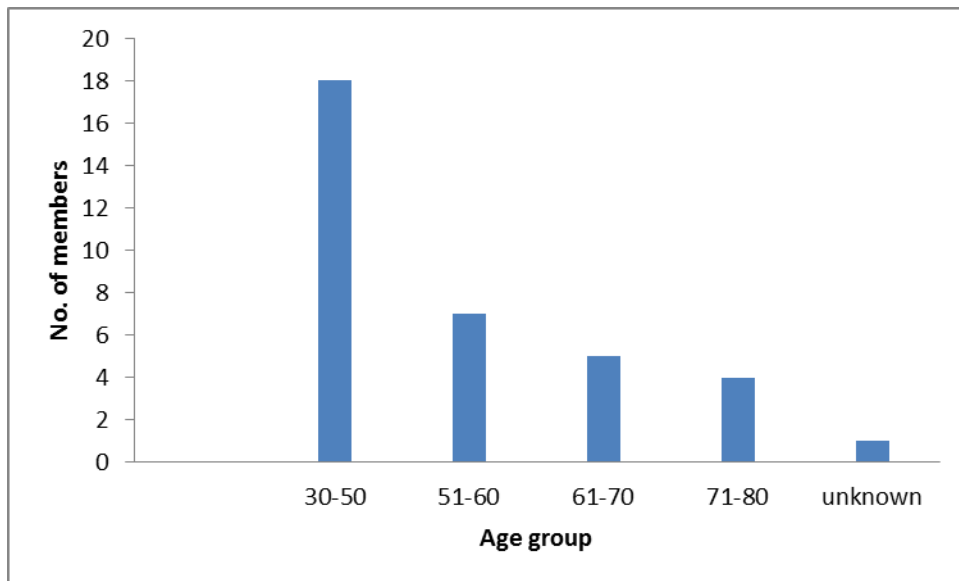


Figure 4.1. Age distribution of members of Thuthukani community garden.

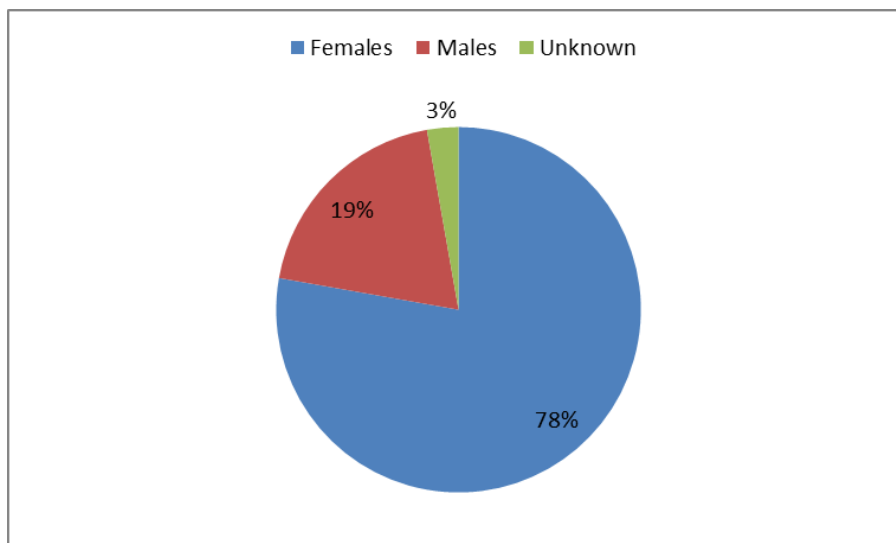


Figure 4.2. Gender distribution at Thuthukani community garden.

From the above figures, it is clear that the age group of people who are under 30 years are not reflected as members of the project. However this does not necessarily translate to that they are not participants in food production in this communal garden. Since project membership is captured per head of household, contributes to the uneven reflection of participation in this

project. During project visitations, it was noted that young people worked in the garden as assistants to actual project members. These young people contribute to the success of community garden projects by bringing back knowledge from schools and sharing this with members involved in community gardens (Mpanza, 2008). Studies conducted in communal gardens in Bergville and Hlanganani districts (Mpanza, 2008) and in Maphephetheni (Chingondole, 2007) also found similar patterns of participation in terms of age range. In both studies the average age range of participants was 57 and 51 years respectively. These results show that people involved in community gardens were older persons.

The gender participation trend seen in this garden project of more female participants in relation to their male counterparts is not far from others that have been witnessed in other studies. Similar results were found in the two studies that were conducted in Maphephetheni (Chingondole, 2007) and Bergville/Hlanganani districts (Mpanza, 2008), where participation of females in community gardens was dominant. According to Brown et al. (2009), women are crucial in the translation of the products of a vibrant agriculture sector into food and nutritional security for their households. They are often the farmers who cultivate food crops and produce commercial crops alongside the men in their households as a source of income. Women are the key to food security for their households and hence the gender trends that have been observed in the mentioned studies.

4.1.2 Social aspects

Community gardens are a place to grow food crops, flowers and herbs in the company of friends and neighbours. It may also be a place to reconnect with nature or get physical exercise. Basing on this definition community gardens have attracted different meanings, uses, and purposes to different societies and communities. As a result some people use community gardens because they lack adequate space at their homes to have a garden and to build a sense of community among neighbours (Middleton, 2009).

The above meaning of a community garden and its uses is reflected by Thuthukani as shown in Figures 4.3 and 4.4 below. The main reasons given by Thuthukani members to join the community garden were that they wanted to have food (20% of the responses) and also save money (21% of the responses) as they would not have to purchase it. These reasons were also

a reflection of many other (83.6%) households, in KwaZulu-Natal, that confirmed that engaging in food production was to have extra source of food (StatsSA, 2013). Similar results from other studies led to the conclusions that 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. Expenditure previously used for purchasing fresh produce was now being used to purchase other household commodities that they were previously unable to purchase like more quantities of flour and cooking oil (Mudzinganyama, 2012). Thuthukani garden members also mentioned passion for growing own food (16% of responses) and having fresh nutritious vegetables (14% of responses) as other motivations for joining a community garden. Some members joined the project because of being poor (10% of the responses) and other reasons given were that of being unemployed. Being members in a communal garden then translated to having benefits of being able to supplement purchased food as food has increasingly become expensive, give food to other people and to either get more money by selling the surplus or by using the money they used to buy food with for other household needs.

The responses given by Thuthukani members give an overall picture that community garden participation is motivated by different reasons hence it impacts their households and community in different ways. Community gardens are therefore for income generation and food producing activities and they are necessary for the contribution to food security and safety (Middleton, 2009).

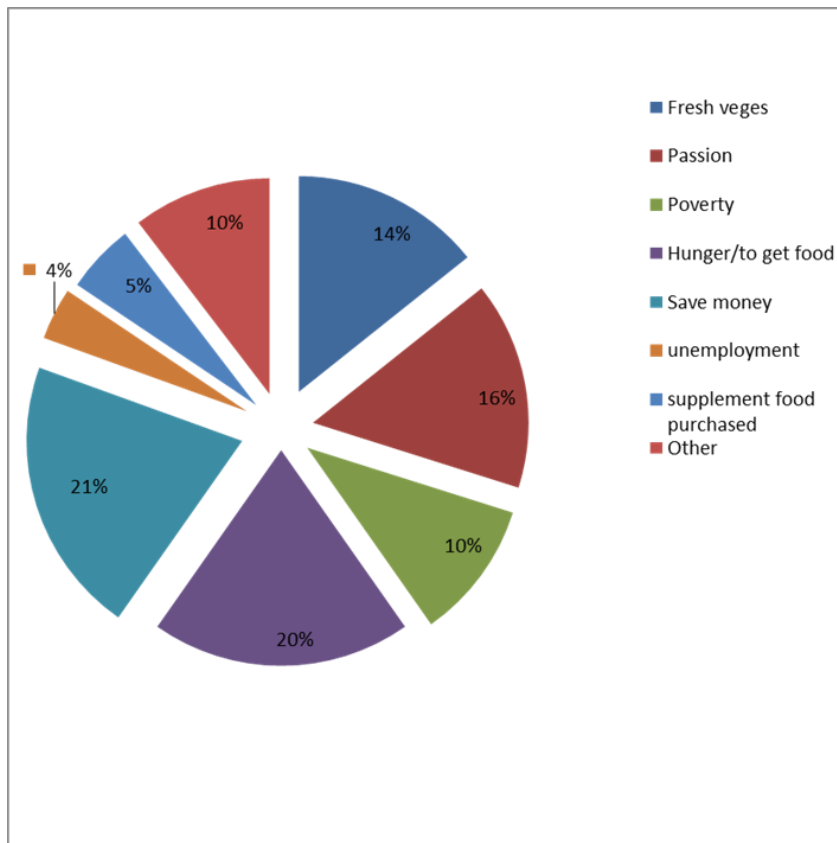


Figure 4.3. Reasons for joining a community garden as cited by Thuthukani members.

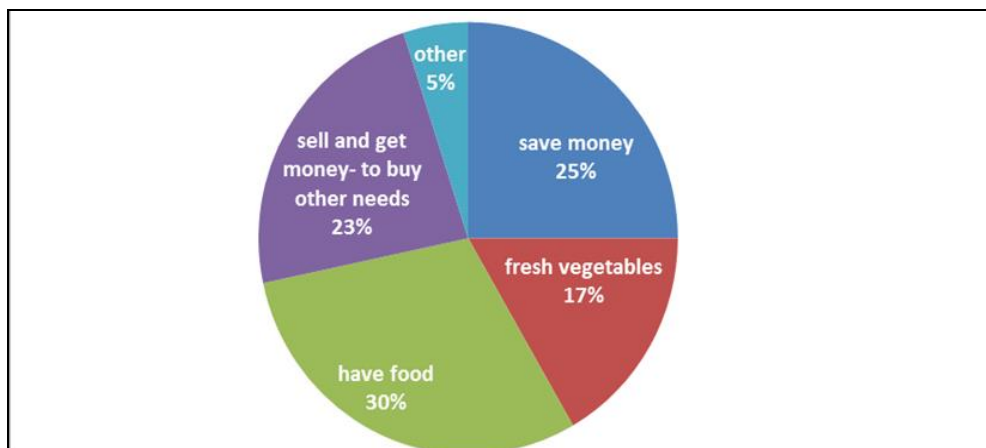


Figure 4.4. Benefits of a community garden as indicated by Thuthukani members.

On investigating further whether perception on individual use of the garden also translated to the overall project functions (Figures 4.5 and 4.6), having food for consumption came out as the main function of the garden (33 respondents) followed by responses that perceived the

garden as that of both growing food and generating income by selling surplus. Few respondents said the garden was to both grow food for consumption and give out to vulnerable households in the community.

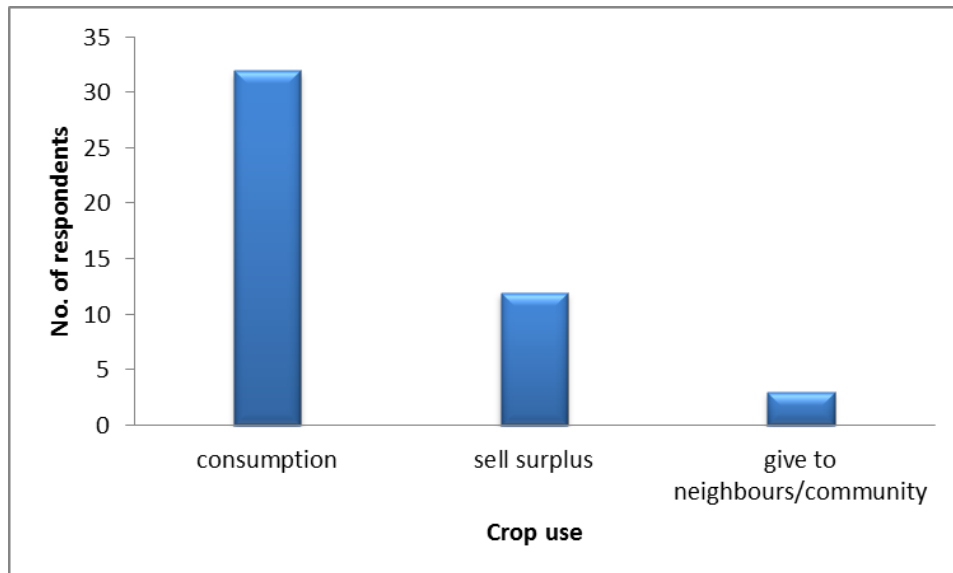


Figure 4.5. Crop use as indicated by Thuthukani members.

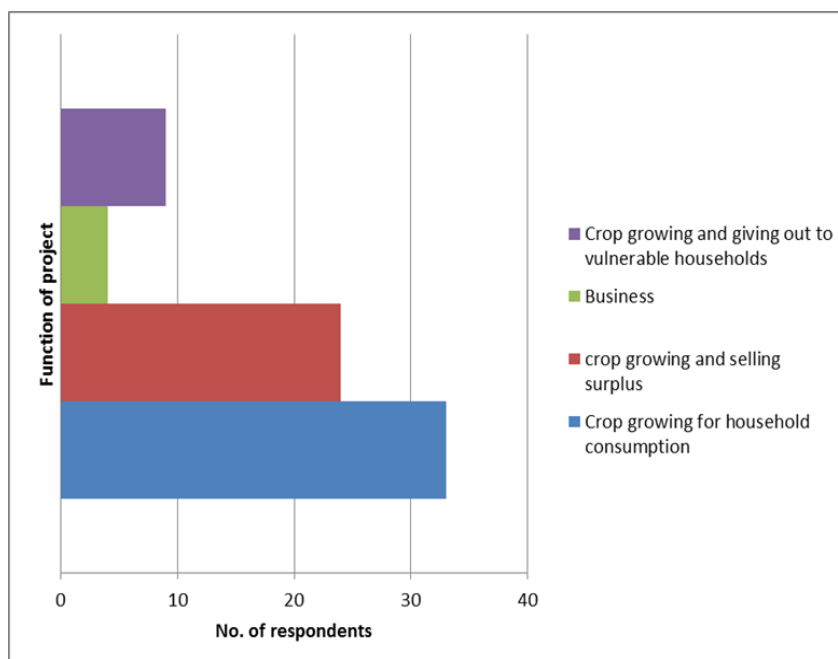


Figure 4.6. The core functions of Thuthukani community garden as viewed by farmers.

The question on the sources of income of Thuthukani members was asked to investigate whether the need to participate in a community garden is influenced by the socio economic factors that affect them. Out of 35 respondents, pension and child support grants (14 respondents each) were the main sources of income (Figure 4.7).

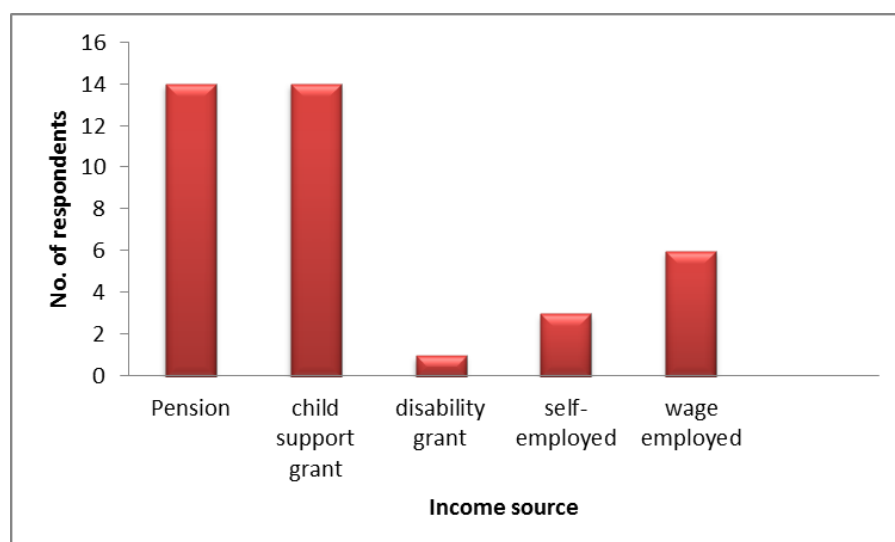


Figure 4.7. Other sources of income for farmers.

Only six members mentioned wage employment as their source of income and two were self-employed. Some of the households responded as having more than two social grants as income in the household or in some cases social grants supplemented the wage income. Government's social grants have become the main source of income for many South African households and from the responses given by Thuthukani members, this also applies. According to Stats SA (2013), 24.0% of households in KwaZulu Natal province reported social grants as their main source of income in comparison to 22.3% that was reported nationally. Taking into account that 71% of Thuthukani members are within working age (30-60), the high reliance on grants, as reflected by the responses, depicts a similar picture of the high unemployment rate in South Africa. According to the Department of Labour's 2011/2012 statistics, the highest age group that was mostly affected by unemployment in South Africa is 25-34 years followed by 15-24 and 35-44 years.

A large and growing body of research shows that direct responsibility for household food provision falls largely on women (Lloyd & Gage-Brandon, 1993). Despite this, women farmers are disadvantaged. When they lack access to land (which is very common), they are

not eligible for credit, membership in farmers' organizations and training and extension services. Women's heavy workloads and lack of the inputs they need to become more productive are the main constraints, and these aggravate food insecurity and malnutrition in millions of households, especially female-headed ones (Doss, 2011).

Women face a number of disadvantages in the labour market (Quisumbing et al., 2001). As well as coping with sexist prejudices, they must reconcile the twin roles of homemaker and money-maker. This often affects their work status, the length and structure of their workday and their salary level. In addition, the employment sector offers less scope and potential for women than for men (Rahji & Falusi, 2005).

4.2 Production aspects

4.2.1 Crops used

Generally, potatoes, spinach and cabbages were reported as the most planted crops in Thuthukani community garden (Table 4.1). According to members; the best season to plant potatoes is spring as they growing well during this time and they are ready for harvesting by Christmas time. Autumn and winter were regarded as best seasons for planting cabbages and according to some members this also contributed to their crisp texture and taste. These indications by farmers agreed with Smith (2006) with respect to the bioresource group location of Thuthukani community garden.

Table 4.1 List of crops that were normally produced in the Thuthukani community garden.

Crop Type	Percentage of farmers growing each crop
Onions	46
Spinach	77
Cabbage	71
Broccoli	11
Amadumbe	17
Sweet potatoes	29
Carrots	57
Potatoes	80
Peas	9
Beans	14
Beetroot	51
Cauliflower	6
Tomatoes	9
Green Pepper	11
Green Beans	3
Chillies	11
Leeks	3
Peanuts	3
Turnip	3
Brinjal	6
Lettuce	11
Spring onion	6
Isinyasa-wild mustard	3

Responses on the best planting season for spinach varied. All seasons were mentioned as good times to plant spinach. Other crops like beetroot, carrot, lettuce and pumpkin were said to be best planted in summer. Sixty seven percent of members regarded summer as generally the best cropping season because it is warm and there is plenty rain, making it a conducive time to plant most crops. The findings on preferred crops and planting season are also confirmed by the findings from the study that was done in the peri-urban area of Mutare in Zimbabwe. According to the researchers, Mrema and Chitiyo (2008), most households (89%) in their study consumed all the wide range of vegetables grown. These include the exotic vegetables (tomato, cabbage, onion, carrot) and traditional ones (rape, tsunga and pumpkin). The survey indicated that most growers grew these vegetables in the early summer as

compared to winter, mainly because of the chilly temperatures that hinder the growth of these vegetables.

As indicated above (Figure 4.6), Thuthukani project members also used the garden to generate income from the surplus produce. Figure 4.8 indicates which crops members have seen as contributing best to income, which then informed members' decisions on which types of crops to plant as also a way of responding to the demand of their immediate market. The immediate market for Thuthukani members is their community. From the interactions with the members, it was also found that one member also supplied produce to a local primary school for its feeding scheme.

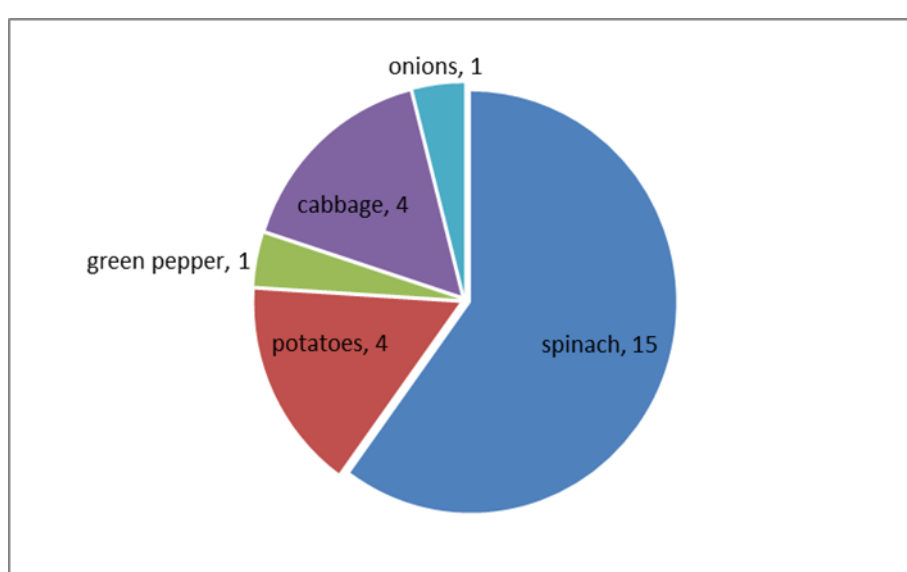


Figure 4.8. Views of farmers about crop contribution to income.

Values are numbers of respondents.

From the members' responses, spinach contributes best to income followed by cabbage and potatoes, although onions and green pepper were also in significant demand. Spinach contributed best to income because it grows well, quickly, has a high yield and its high demand is because people use it as substitute for meat dishes or gravy. Cabbages also sold well because they grow well and they were also in demand because people used them like spinach (KwaZulu-Natal Department of Agriculture and Environmental Affairs, 2001). Potatoes have a high yield and some people use edible leaves (Hemy, 1984). Both onions

and green peppers are sold together with other crops as they are used to enhance taste when preparing main and meat substitute foods (Hemy, 1984).

Since Thuthukani's market is the community, it is easily accessed as the community members either come directly to the garden when they need a specific crop or members go door-to-door selling what they have. The quality of crops for the market is determined by the freshness of the produce i.e. it should not have insects, its size and weight. It was not clear how the quantity of the crops for the market was determined as it depended on how much each member had as surplus and whether the quality is acceptable for the market. On whether members were satisfied with the current market, the responses given were that of being dissatisfied as there were not enough people to sell the crops to, as a result crops get spoilt. With the saturated market (all members selling to the same community), very little profit can be made (see section 5). It therefore came out strongly that having a larger stable market, like a school, would improve their income which will also enable them to purchase more seedlings instead of depending on the extension officer. Improving fertility of the garden soil, getting a bigger planting area and financial support were raised as crucial aspects to improve if they were to get a stable market and improve their prospects to be better farmers. These responses came from both members that are currently selling and those that are not selling. As reflected in the results that were found in a similar study in Mutare, Zimbabwe (Mremra and Chitiyo, 2008), these challenges are not unique to the Thuthukani project. It was recorded that most producers complained that during summer there were excess vegetables hence marketing became a problem and large quantities got spoilt. This was mainly because many planted and harvested at the same time the same type of vegetables, so there was no market for their produce (Mrema and Chitiyo, 2008).

4.2.2 Technical aspects

The focus on the technical aspect was to find out if members had technical knowledge with regards to their garden. This was intended to find out what informs the kind of farming systems they use, how do they use it and whether they have been effective. The following aspects of crop management were explored:

(i) *Size of the garden:* When members were asked if they knew the overall size of their community garden, they all responded as they did not know. However when it came to whether they knew the size of individual plots, a few gave an estimate of twenty five square meters and others did not know or did not answer the question at all. See Chapter 5 for garden description.

(ii) *Soil type:* When asked if they knew what soil type their garden is, members responded as they have not received soil test results and hence they did not know. Not knowing the soil type then resulted in difficulty in responding to the question on what the characteristic of their garden soil was. There were few attempts on responding to the question about how the characteristic of the soil was determined. Responses given were that it is loose and water moves easily, soil gets dry quickly and gets hard after irrigating. See Chapter 3 for soil description.

(iii) *Irrigation:* All members responded that they do irrigate their gardens using watering cans. Since the main source of water for irrigating is tap water, it is regarded as clean and of good quality as they also drink it.

(iv) *Fertilizer:* Out of 35 responses, 33 members responded that they use fertilizer. When it came to the type of fertilizer used, most members (73%) used organic compost and others used synthetic (12%) or no fertilizer (15%) (Figure 4.9). Reasons for using it were to help improve the soil fertility which improves the crop yield, make crops bigger and more nutritious. The application of the fertilizer varied from applying when doing soil preparation before planting, when planting and after planting. Measurement of how much was used also varied as some just used their discretion by applying enough not to kill seedlings; used teaspoon or handful measures per plant used juice cap measure per line and others applied 3 bags for the whole plot. See Chapter 3 for soil analysis results.

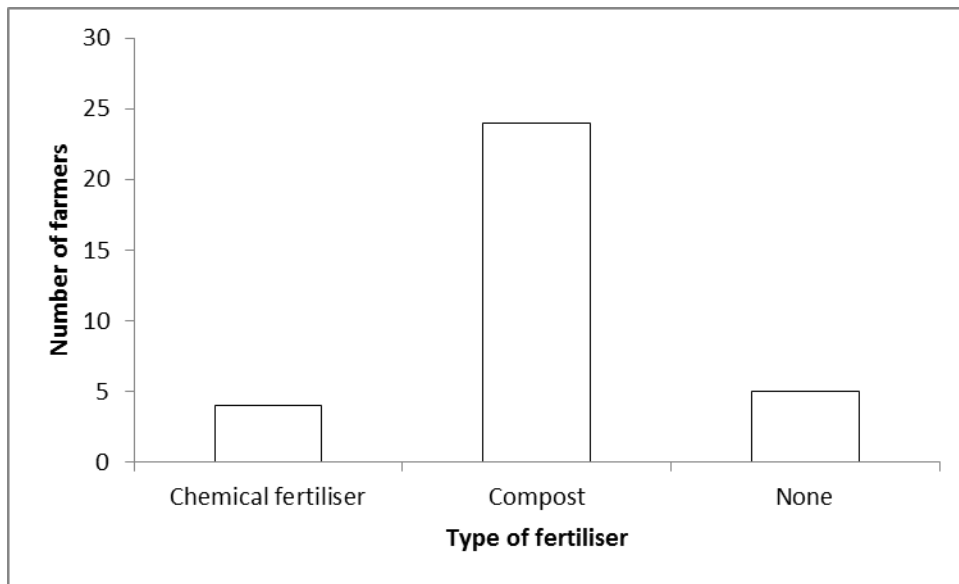


Figure 4.9. Fertiliser use by Thuthukani community garden farmers.

Fertilizers enhance the growth of plants. This goal is met in two broad ways, the traditional one being additives that provide nutrients. The second mode by which some fertilizers act is to enhance the effectiveness of the soil by modifying its water retention and aeration. Fertilizers typically provide, in varying proportions mainly three main macronutrients: nitrogen (N), phosphorus (P), potassium (K) Macronutrients and micronutrients are also supplied in small amounts and they are generally never purchased by farmers as fertilisers. (Stewart et al., 2005). The nutrients required for healthy plant life are classified according to the elements, but the elements are not used as fertilisers. The macronutrients are consumed in larger quantities and are present in plant tissue in quantities from 0.15% to 6.0% on a dry matter (DM) (0% moisture) basis (Mills & Jones, 1996).

(v) *Pesticides*: Out of 35 responses, 32 members responded that they used pesticides. Twenty-six members said they use mainly blue death as a pesticide. Others either use blue death and the organic mixture of soap and chillies or blue death and malasol. Application of pesticide was either through a use of a spray, sprinkle directly to the leaves of the plants which is done to kill insects. According to members, they use pesticides when there are insects which make the leaves turn to a brown colour. One member responded by saying that they use ash as another form of chemical in the farming system.

(vi) *Crop rotation*: All members reported that they use crop rotation. That is, if they have planted crops that grow underground at the start of the season, the following time they plant crops that grow over the ground. The rotation is usually between carrots and spinach, or potatoes and spinach, beetroot and cabbages. The reasons given for doing crop rotation were to prevent plant diseases, keeping the soil fertile and making plants grow well.

(vii) *General farming system*: The farming system used by members was based on a production plan (Table 4.2).

Table 4.2. Production plan for leafy (L) and root/tuber (R) vegetables, indicating planting dates at Thuthukani community garden. Note: different crops may take one to 6 months to harvest maturity

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
L/R	L/R	L	L	L	L	L	L	L/R	L/R	L/R	L/R

Ploughing, making beds, opening lines, applying fertilizer and planting were done on the basis of advice from the extension officer or traditional knowledge (Figure 3.9). The soil test results (see chapter from the samples that were taken by the research team were shared with garden members and to provide assistance in interventions required. See Chapter 3 for an example of crop layout showing intercropping.

4.2.3 Social aspects for coping

Coping strategies are practices that a household takes as a decision to mitigate and escape during shortfall of food availability and access (Guja, 2012). The strategies pursued by households differ in several aspects, that is, within the household and between households (Maxwell, 2008). In the case of this research, the question of coping strategies was asked to determine how members coped with food insecurity in the light of dealing with other struggles of trying to make ends meet in all the aspects of their lives. The question of coping strategies was originally meant to also identify persons that had homestead gardens. In the case of Thuthukani project, what was found however was that only one member had a homestead garden as most members had limited spaces in their residential areas which prevented growing food in their yards (Figure 4.10). The responses were from all members.

Ninety one percent of the members reported that they rely on less preferred or inexpensive food to ensure that the resources they use to purchase food go a long way. This was followed by limiting portion sizes (63%) when serving and adults leaving food for children (51%). Less than 30% of members reported that they went as far as borrowing food, reducing meal number, receiving help from relatives, skipping meals or purchasing food on credit. As cited by Mjonono (2009), due to varying degrees of wealth among households, different coping behaviors are adopted by households at different poverty levels. However, some coping strategies are common to all households although the extent to which such strategies enable a household to remain afloat depend on the assets at their disposal (Devereux, 2001). This has been clearly demonstrated in the Thuthukani project members' responses as the variation could be reflecting differences in poverty levels or socio-economic statuses.

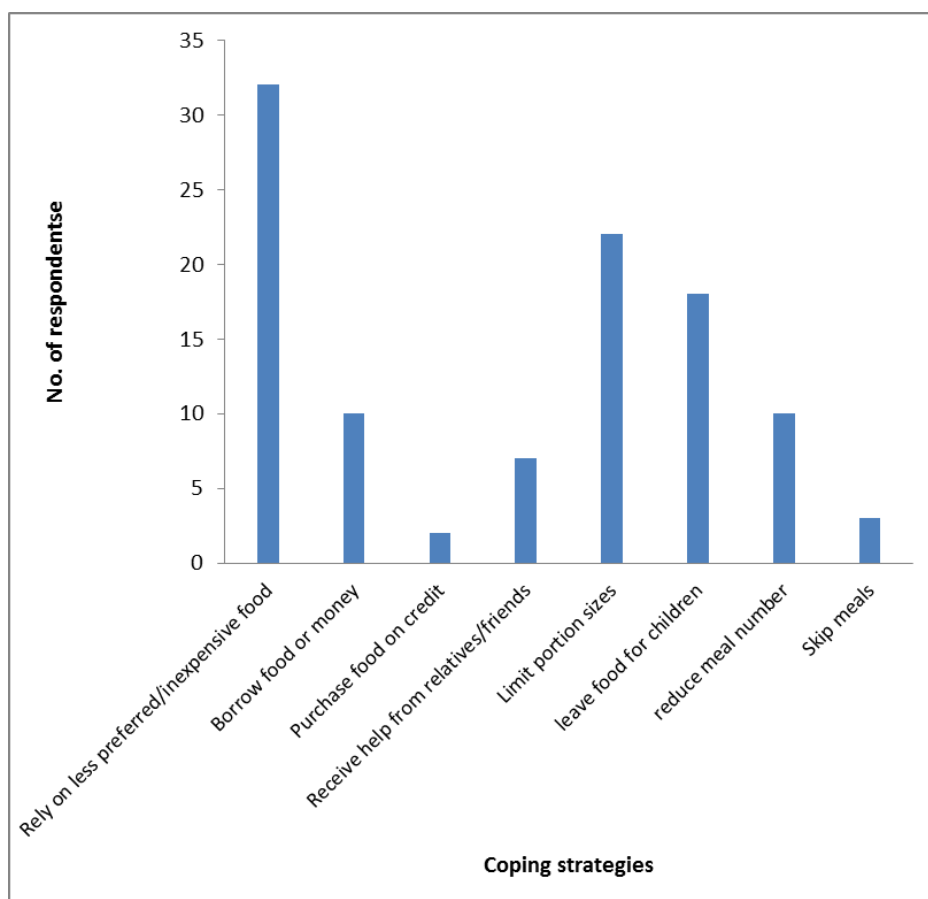


Figure 4.10. Coping strategies used by farmers.

Despite the political and economic advances seen in South Africa since 1994, the country is plagued by poverty and unemployment and, following the recent global economic crisis, by steep food and fuel prices, high-energy tariffs and increasing interest rates. These adverse conditions have placed severe pressure on ordinary South Africans already struggling to meet their basic household needs (Mpanza, 2008). Thuthukani project members were not immune to these conditions and hence participation in the community garden has provided some relief in knowing that their households will be able to survive. This was also deduced from a study that was done by Mrema and Chitiyo (2008), which revealed that the majority of farmers in Zimbabwe, Mutare (66.5%) engaged in vegetable gardening because it ensured household survival and that it was a source of saving money. This finding is also confirmed by Floro & Swain (2010) by saying, the urban household dependence on purchased food may be reduced if it has access to other food sources. This could be in the form of access to a small plot for urban gardening, which is an activity that serves both as a source of income and direct source of food. Taking into consideration that most of the Thuthukani project members rely on government's social grants, food produced from the community garden has complemented their household socio economic wellbeing as there is additional income that they get from selling the surplus produce. Food security is a primary goal of sustainable agricultural development and cornerstone for economic and social development (Brown, 2009). Women being in the forefront in production of food in Thuthukani project is a positive factor as it has been shown, by substantial evidence, that when women have income, it is more likely to be spent on food and children's needs. Maximizing the impact of agricultural development on food security entails enhancing women's roles as agricultural producers as well as the primary care takers of their families.

From the characteristics of the garden as described by project members, the Thuthukani garden contributes to urban and peri-urban agriculture. From the studies that were conducted from four regions covering different cities and towns where urban and peri urban agriculture activities were prevalent, FAO (2006) deduced that while there is a growing awareness about the role of urban agriculture in the context of food security and poverty alleviation for the urban populations, urban and peri-urban agriculture (UPA) still largely remains an informal sector that is not being integrated in agricultural policies or urban planning. This makes it vulnerable and also jeopardizes its sustainability. Urban and peri-urban agriculture contributes to local economic development, poverty alleviation, in recognition of the human

right to food, the social inclusion of the urban poor and women in particular, as well as to the greening of the city and the productive reuse of urban wastes.

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CHAPTER 5

CROP PRODUCTION AND UTILISATION

5.1 Introduction

Community gardens provide rural and urban communities with opportunities to improve their standard of living. This opportunity arises only when the community garden members are able to produce more than their family's consumption needs. This means that if community garden members are unable to produce surplus vegetables, community gardens would not contribute to improved living standards. However, the contribution would be in form of healthy eating habits, since fresh vegetables would be available for the families of the community members (Crosby et al, 2000). Currently about 20.7% of South African households are involved in agriculture production, but over 65 % of these households are only producing for their own consumption (Department of Agriculture, 2012).

The establishment of community gardens in communities means different things to different people. Literature review on community garden research all agree however that their benefits extend beyond food security, as gardens provide fresh vegetables, and the process of gardening involves physical exercise. Family and social relationships can also be strengthened through community gardening, since community members provide advice and support to help overcome challenges and all receive the benefits the gardening project offers (Galhena, 2013).

The results from the previous chapter have shown that Thuthukani project members see the community garden as improving their livelihoods and to some members it is a form of a coping strategy to ensure that they have access to food at all times. This chapter further discusses the production trend of this project and to present an indication of crop production, how crops are utilized, challenges that were encountered when crops were growing and members' crop production knowledge.

5.2 Survey approach

As the first survey was focusing on finding out about the general status of the project and its members, the second survey was about confirming the information provided in the first questionnaire and to assess the production results of the planting material that was provided to project members by the research team. This means, the survey sought to obtain detailed information on the yield performance of each crop, what the crop was going to be used for, the challenges encountered when project members were growing the crops and their crop production knowledge. This survey also contributed to the process of self-evaluation by project members.

Self-evaluation is described as the process of looking at ones progress, development and learning to determine what has improved and what areas still need improvement (Reeve & Paperboy, 2007). Usually involves comparing a "before" situation with a current situation. Since a community garden is work-in-progress, performing an evaluation or self-assessment after the garden has been constructed is very useful to inform future plans, enhance and sustain the entire project, and determine the degree to which it has met the members' goals. Applying this concept in the case of Thuthukani is as follows; in the previous chapter Thuthukani project members described their main goals for joining the garden as to have food for their families all the time and to save money. This chapter then evaluates in terms of the production aspect if these goals, and others as prioritized by members, are actually being met.

Data in this survey were collected using a structured questionnaire. Although the actual number of Thuthukani project members is 38, questionnaires were administered to 36 members who were willing to participate.

The aspect on crop utilization was collected as part of a structured questionnaire as described above. Members were asked to confirm crops that are planted and to indicate for each crop whether they utilize them for subsistence, sales or serve both purposes.

Data from the questionnaires were captured in Excel programme and analyzed using SPSS.

5.3 Farmer self-evaluation of crop production

To be able to compare crops planted in the first season and those planted in the second season, project members were asked to list the crops that were currently growing in the garden. Figure 5.1 shows crops that were listed by project members as planted in the second season.

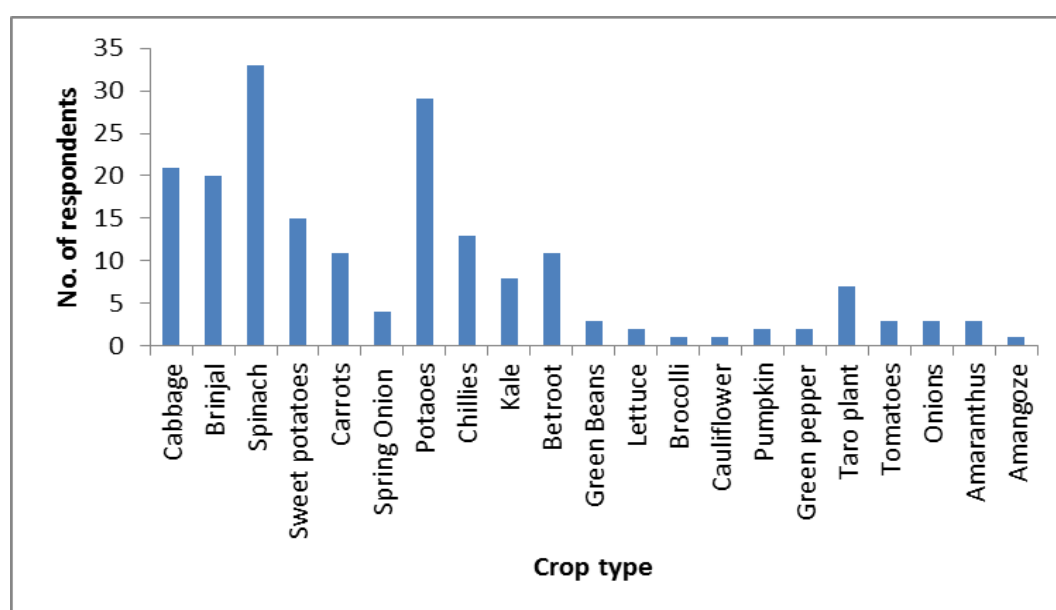


Figure 5.1. Crop production in 2013

Results show that project members planted a variety of crops, noticeably spinach, potatoes and cabbage were planted by more than 50% of members (Figure 5.1). The rest of the crops planted were sweet potatoes, beetroot, amadumbe (taro), brinjal, carrots, spring onions, chillies, kale, green beans, lettuce broccoli, cauliflower, pumpkin, green pepper, tomatoes, onions, amaranthus and amangoze. Literature on studies that look at crop types planted by community gardens confirm that these crops seem to also be their favourites. As an example, the main crops grown in the Maphephetheni uplands by community gardens included: amadumbe (taro), beans, beetroot, cabbage, carrots, green pepper, maize, onion, spinach, sweet potatoes and tomato (Chingondole, 2007). Similar vegetable crops were planted in the community gardens that were studied by Mpanza (2008) in Bergville and Hlanganani

districts. Common to all studies, vegetable crops that were the most planted were cabbage and swiss chard (name used alternatively with spinach). It is noted however that compared to other community gardens, Thuthukani garden did not record maize and dried beans as part of crops that were planted (Figure 5.2). According to the members, this was a decision taken by the project based on the recommendation by the extension support they received from the non-government organization, Lima, that this crop should rather be grown separately to the communal garden as they have limited space. Members who wanted to grow maize were advised to do so in their household gardens; however very few members have household gardens due to a limited space in their yards. Although dried beans were planted, they were reported to have not come out at all from when they were planted, hence they were not recorded. When comparing the above results with trends on crop types/ vegetables (excluding tubers and roots) grown in the province of KwaZulu-Natal and South Africa, a similar pattern is observed as shown statistically in Table 5.1 below.



Figure 5.2. Illustration of vegetable plots during the growing season.

Table 5.1 shows that cabbage and spinach are generally crops that are planted in bigger quantities by farmers and farming operations in South Africa.

Table 5.1. Number of farming operations with selected crops by province. After Stats SA, (2002).

	1 000									
Type of crop	Western Cape	Eastern Cape	Northern Cape	Free State	KwaZulu-Natal	North West	Gauteng	Mpumalanga	Limpopo	Total
Amadumbe	-	3	-	0	41	0	-	1	2	47
Beetroot	-	11	0	6	10	2	-	3	7	38
Cabbage	0	56	0	6	26	1	-	3	14	106
Carrots	0	17	0	6	7	1	-	2	6	39
Cauliflower	0	1	-	0	1	-	0	0	0	2
Flowers	0	0	-	1	2	0	0	0	13	16
Green beans	0	2	0	4	3	1	0	1	2	13
Green peas	-	7	-	0	1	0	0	0	1	9
Herbs	0	0	0	-	2	-	-	-	0	3
Lettuce	0	1	0	0	2	0	-	0	2	7
Onions	1	16	0	4	15	2	-	3	12	53
Other types of morogo	-	0	-	5	8	0	-	3	25	42
Other vegetables	0	0	0	0	0	-	0	1	1	2
Pumpkins and squashes	1	91	0	7	26	1	-	2	10	138
Sisal	-	-	-	-	0	-	-	-	1	1
Spinach	-	44	-	9	20	1	0	8	43	125
Tomatoes	0	7	0	3	11	0	-	2	13	38
Trees for timber/charcoal	0	0	-	-	3	-	-	0	1	5
Turnips	-	6	-	-	0	-	-	0	11	17
At least one type of crop	4	140	1	14	85	4	0	15	87	349

When comparing the types of crops planted at the start of the research with Thuthukani farmers to the crops planted after a year, the results (Figure 5.3) reflected that there was very

little that changed. Spinach (33 respondents), potatoes (29 respondents) and cabbage (21 respondents) were still high on the list of the crops that were planted by members. The new crop in the top list was brinjal with 20 respondents reporting that they had planted in the following season. A few new traditional crops, namely amaranthus, kale and amangoze, were planted in the following season as they were not there in the previous one.

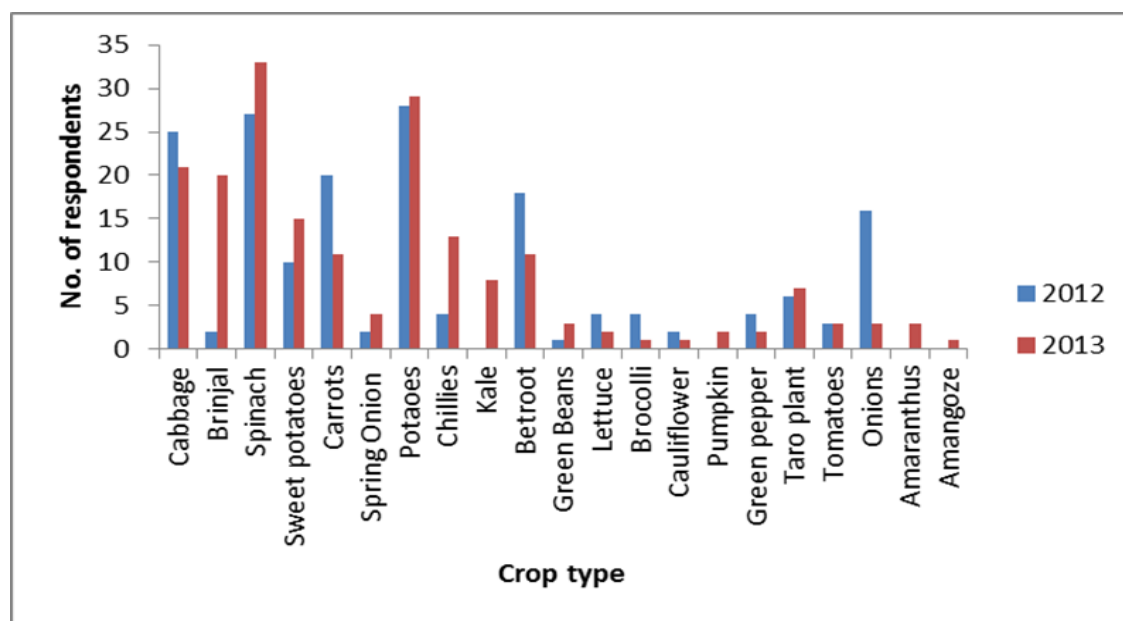


Figure 5.3. Comparison of crop production in terms of species for 2012 and 2013.

The sudden incorporation of traditional crops could be attributed to that project members planted them in anticipation of the off season period. According to the Agriculture Research Council (ARC), indigenous vegetables are tolerant to harsh environmental conditions and adaptable to local conditions. In a study conducted by Mudzinganyana (2012), the planting and use of the indigenous plants increased during the off season period to supplement spinach in project members' diets. African leafy vegetables form part of the daily staple diet of South Africans and are rich in nutrients, e.g. vitamin A and iron (ARC). It can then be argued that indigenous vegetables also contribute to the project members' dietary diversity as found by Mudzinganyana (2012).

5.4 Production

When members were asked to rank the yield performance of crops planted in the garden from most yield (ranked as 1) to least yield (ranked as 10) crop, spinach was the crop that had the best yield as 47% of members ranked it in number 1 (Figure 5.4). Thirty percent (30%) of members ranked potatoes as number 3, still making it one of the crops with the best yield. It must be noted though that most members reported that potatoes did not produce well during this season; suspecting that the time they planted them was not conducive. Brinjal and chillies were ranked by 20% and 23% of members respectively as the crops that gave second best yield.

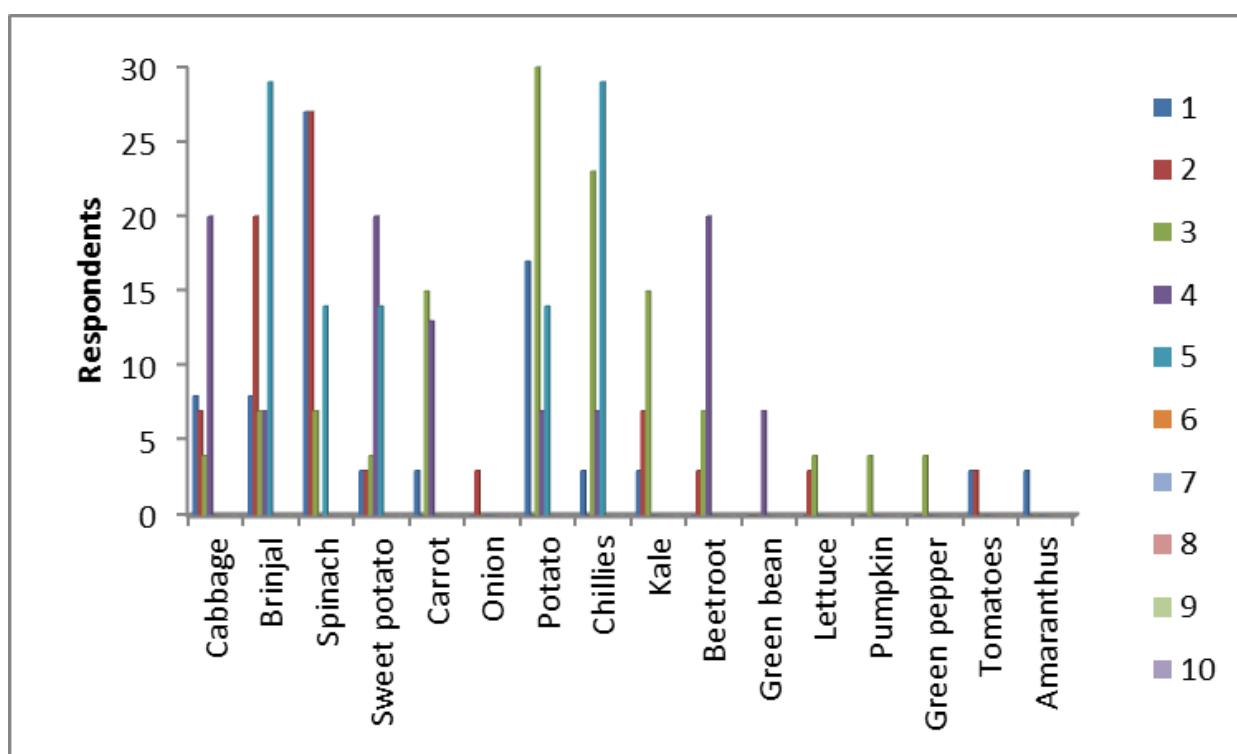


Figure 5.4. Comparison of crops in terms of yield by farmers using a ranking system (1 = highest; 10 = lowest).

Using the soil analysis results (Table 3.1) one of the crops was selected to analyse its yield with respect to fertilizer application by 25% of randomly selected farmers of the community garden. The selected crop was potato, because of it being an energy rich crop, while it provides other essential nutrients (Small, 2009). The United Nations reported that the world

production of potatoes in 2013 was about 368 million tonnes (FAOSTAT, 2015). Just over two thirds of the global production is eaten directly by humans with the rest being fed to animals or used to produce starch. This means that the annual diet of an average global citizen in the first decade of the 21st century included about 33 kg (or 73 lb) of potato (FA, 2009). However, the local importance of potato is extremely variable and rapidly changing. It remains an essential crop in Europe (especially eastern and central Europe), where per capita production is still the highest in the world, but the most rapid expansion over the past few decades has occurred in southern and eastern Asia. As of 2007, China led the world in potato production, and nearly a third of the world's potatoes were harvested in China and India. The geographic shift of potato production has been away from wealthier countries toward lower-income areas of the world, although the degree of this trend is ambiguous (Ames & Spooner, 2008)

In 2008, several international organizations highlighted the potato's role in world food production, in the face of developing economic problems. They cited its potential derived from its status as a cheap and plentiful crop that grows in a wide variety of climates and locales (Wade, 2008). Due to perishability, only about 5% of the world's potato crop is traded internationally; its minimal presence in world financial markets contributed to its stable pricing during the 2007–2008 world food price crisis. Thus, the United Nations officially declared 2008 as the *International Year of the Potato*,^[35] to raise its profile in developing nations, calling the crop a "hidden treasure" (Ferretti, 2011).

The potato is best known for its carbohydrate content (approximately 26 grams in a medium potato). The predominant form of this carbohydrate is starch. A small but significant portion of this starch is resistant to digestion by enzymes in the stomach and small intestine, and so reaches the large intestine essentially intact. This resistant starch is considered to have similar physiological effects and health benefits as fiber: It provides bulk, offers protection against colon cancer, improves glucose tolerance and insulin sensitivity, lowers plasma cholesterol and triglyceride concentrations, increases satiety, and possibly even reduces fat storage (Cummings, et al., 1996; Hylla, et al., 1998; Raben et al., 1994). The nutrient value of potato is presented in Table 5.2.

Table 5.2. Nutrient content of potato. After USDA (2014).

Component (per 100g portion)	Amount
Water (g)	79
Energy (kJ)	322
Protein (g)	2.0
Fat (g)	0.09
Carbohydrates (g)	17
Fiber (g)	2.2
Sugar (g)	0.78
Calcium (mg)	12
Iron (mg)	0.78
Magnesium (mg)	23
Phosphorus (mg)	57
Potassium (mg)	421
Sodium (mg)	6
Zinc (mg)	0.29
Copper (mg)	0.11
Manganese (mg)	0.15
Selenium (µg)	0.3
Vitamin C (mg)	1.97
Thiamin (mg)	0.08
Riboflavin (mg)	0.03
Niacin (mg)	1.05
Pantothenic acid (mg)	0.3
Vitamin B6 (mg)	0.3
Folate Total (µg)	16
Vitamin A (IU)	2
Vitamin E, alpha-tocopherol (mg)	0.01
Vitamin K1 (µg)	1.9
Beta-carotene (µg)	1
Lutein+zeaxanthin (µg)	8
Saturated fatty acids (g)	0.03
Monounsaturated fatty acids (g)	0.00
Polyunsaturated fatty acids (g)	0.04

From Figure 5.5, it is clear that there were significant differences in potato yield with respect to fertiliser application by the farmers. The farmers who used chemical fertilisers got the highest yield, followed by those who used compost and lastly by those who applied no fertiliser. Lack of funds was given as the reason to not use fertiliser according to soil analysis recommendations. What was interesting was the reasonable yield from organic production, including no application of compost.

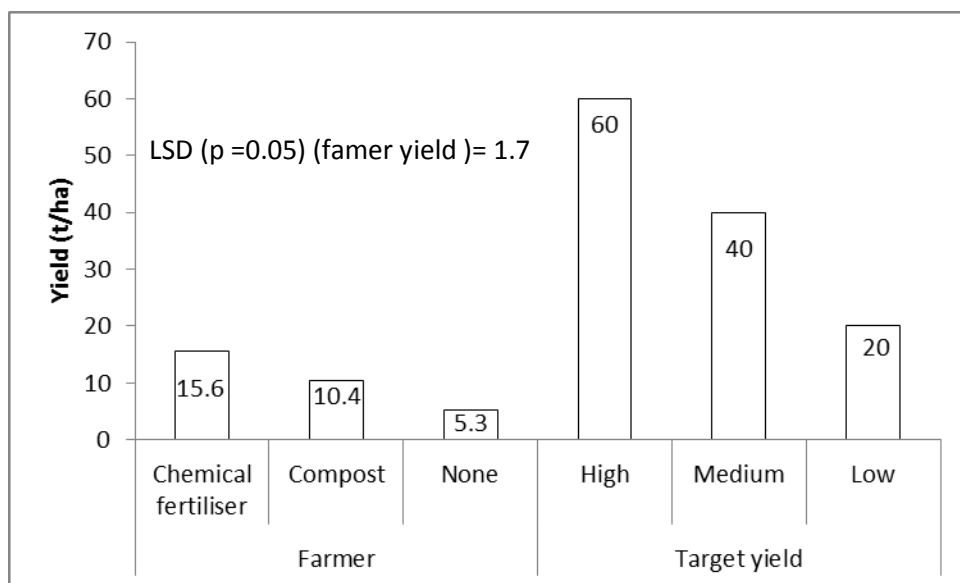


Figure 5.5. Potato yield from plots of some farmers who used chemical fertiliser, compost or no fertiliser compared with target yield at high, medium and low recommended levels of fertiliser per soil analysis.

5.5 Crop utilization

One way to assess the role of subsistence agriculture or community gardening in improving rural livelihoods is to look at its contribution to household income (Chingondole, 2007). In a previous study that was conducted by Mudzinganyana (2012) on contribution of community gardens to food security in community gardens, members believed that through assistance from external stakeholders they could develop the community garden into a commercial entity like a co-operative.

The scope of the project did not go as far as quantifying how much of each crop was used for consumption, sales or both, but looked at the general usage of each crop by the project. In terms of the use of produce by Thuthukani project members, results showed that a large amount (about 80%) of crops planted in the garden were primarily used by project members for household consumption (Figure 5.6). A small amount of the crops is utilized for both marketing (Figure 5.5). When comparing this finding to the survey done for the situational analysis (Chapter 4) in Thuthukani project, comparable results were found.

Crops like spinach, potatoes, cabbage and brinjal were reported to be at the top of the list of crops that are used for both consumption and selling to the market. The inclusion of brinjal in

this list was said to be because it can also be used to substitute meat in food. Other crops mentioned were sweet potatoes, carrots, spring onion, chillies, kale and tomatoes. Five percent (5%) of project members reported to have used brinjal, chillies, pumpkin and green pepper for sales only. Traditional crops (sweet potatoes, kale, taro (amadumbe) and amaranthus) were more for subsistence use when compared to conventional crops.

Table 5.2, which is based on the survey that was done by Statistics SA (2014), illustrates the overall utilization of various vegetable crops in South Africa. This table shows that spinach and cabbage are some of the vegetable crops that are largely utilized for sales when compared to consumption. These findings correspond to the results that were found from the Thuthukani project. In a study that looked at crops planted in urban and peri-urban agricultural activities, results also showed that leafy vegetables provide a quick return to meet a family's daily cash requirements for purchasing food (FAO, 2012). Bringing this to the Thuthukani project context, it shows that the popularity of these leafy vegetables (particularly spinach) is due to their high yield which allows members to be able to consume and sell them. Secondly, they seem to be a demand in their immediate market making them easy to sell and as a result project member households can then use the money from the sales to purchase other food items.

Table 5.2 also shows a similar result that traditional crops (reflected in the table as 'other types of morogo' and amadumbe) are mostly utilized for home consumption when compared to sales.

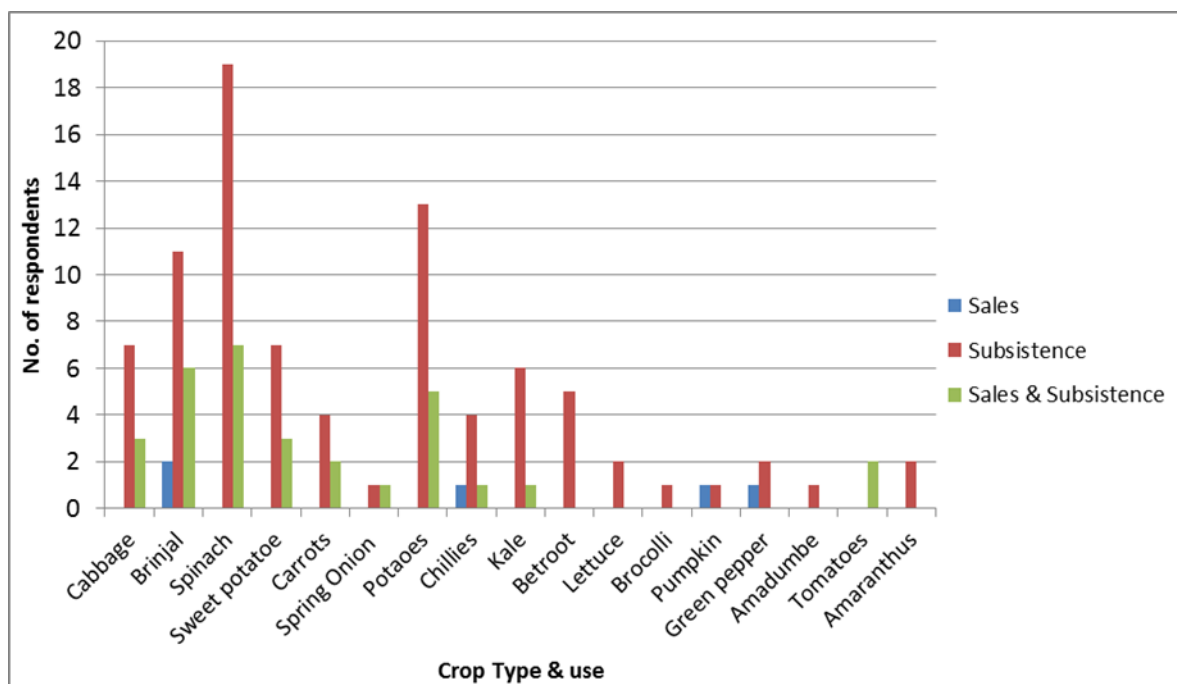


Figure 5.6. Crop utilization

Table 5.2. Quantity harvested of selected crops by utilization in South Africa. After Stats SA, 2002).

Type of crop	Utilisation of crop						Total production
	For sale	Home consumption	Seed	Feed	Payment of share rent	Used to reward farm or household labourers	
	tons	tons	tons	tons	tons	tons	tons
Amadumbe	2 046	2 826	539	12	-	-	5 423
Beetroot	1 408	1 179	-	-	-	220	2 806
Cabbage	44 136	14 770	99	1 282	73	54	60 414
Carrots	13 863	633	-	-	-	43	14 539
Cauliflower	553	2	-	-	-	-	555
Flowers	114 117	1	-	-	-	-	114 118
Green beans	38 615	1 254	9	-	-	1 452	41 331
Green peas	299	408	24	-	-	2	734
Herbs	1 652	-	-	-	-	-	1 652
Lettuce	185	650	-	-	-	-	835
Onions	2 762 418	4 644	34	3 182	-	4 725	2 775 004
Other types of morogo	96	1 115	-	1	-	-	1 212
Other vegetables	1 356	4 366	-	-	-	-	1 726
Pumpkins and squashes	26 162	54 414	264	70	14	73	80 997
Sisal	-	-	-	-	-	-	-
Spinach	8 178	9 467	9	7	119	65	17 844
Tomatoes	64 769	1 920	14	-	-	22	66 725
Trees for timber/charcoal	12 285	670	-	43	-	478	12 286 191
Turnips	1	48	-	1	--	-	50

As noted in the survey that was done previously in KwaZulu-Natal by Mudzinganyana (2012), the project members expressed a vision of being a cooperative in the long run. Although this project is not yet at that stage, one project member is already using her plot to grow vegetables that she supplies to the nearby school for their feeding scheme. Other project members who have been keeping records on the sales they do from their gardens, Table 3.3 shows income made from sales. If the yield made by the farmers (Figure 5.5) is used to determine the potential of one of the most popular and best performing crops, potato, with respect to income, the results are shown in Figure 5.7.

Table 5.3. Income made from crops.

Type of crop	Income made in Rands
Pumpkin	R 235 (each head sold at R50)
Spinach	R 70 (sold in bunches)
Brinjal	R 20
Potatoes	R60 (3 x 10kg bags sold at R20 each)

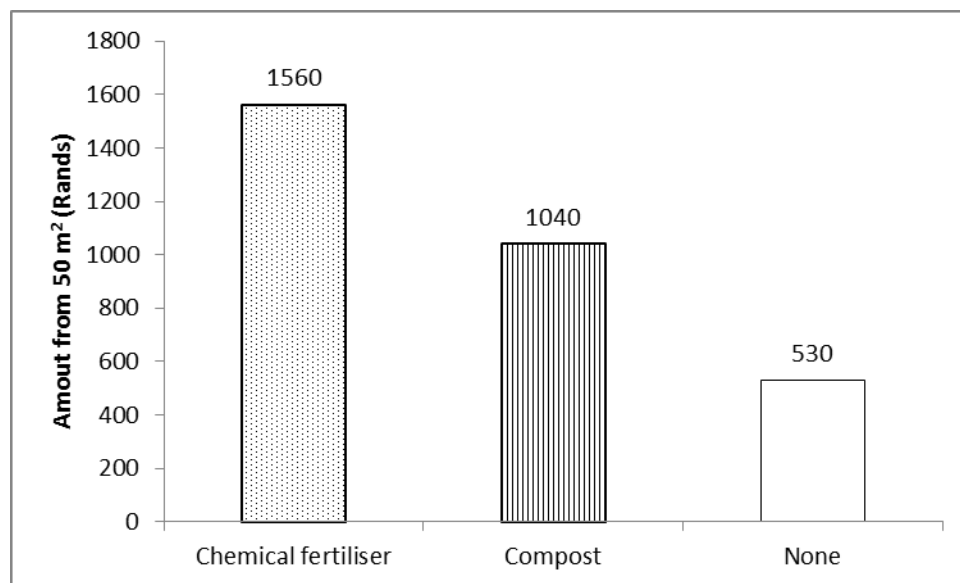


Figure 5.7. Estimated gross income from a 50 m² plot of potatoes grown using chemical fertiliser, compost or no fertiliser (none) at Thuthukani community garden.

The results shown in Table 5.3 and Figure 5.7 reflect the potential of the transition from this community garden being used primarily for household consumption to selling the produce.

Observing the general socio economic status of the project members who most of them (77%) are unemployed and rely on government social grants, the transition of this garden to become a cooperative that is more commercial could be of benefit as it is already shown that incomes from the garden and social grants currently supplement each other. As found by a study conducted by Ngidi (2007), income from sale of produce is supplemented with income from non-farm activities such as wages, social grants, household commercial enterprise and remittances. This suggests that although income from agricultural production is comparatively modest, agriculture production assisted a significant proportion of households to remain above the poverty line (Chingondole, 2007).

5.6 Knowledge about crop production

Indigenous knowledge refers to the knowledge that grows within a social group or community incorporating learning from own experience over generations but also knowledge gained from other sources and fully internalized within local ways of thinking and doing (Wava et al. in Smit and Masoga, 2012).

The question on what kind of knowledge Thuthukani project members apply when growing crops was asked to understand what influences their productivity. Figure 5.7 shows that, the knowledge applied by members when producing crops is influenced by the information that is shared with them by the extension officer and other stakeholders that provide technical support to the garden. What is also significant is that, traditional knowledge is not discarded on the basis of having new conventional knowledge, however combining the two is what works best as reflected in the responses given by 50% of Thuthukani members. On following up with project members that were found in the garden during observation, it was found out that project members who were growing traditional vegetables did so because of their own preference and not necessarily because of the influence by the extension officers. These project members tended to be old women who grew up in rural areas before they moved to the peri-urban area of Howick. Fox and Norwood- Young (1982) findings were that biodiversity, indigenous knowledge and taste preferences of farmers in an area determine the percentage inclusion of a specific traditional leafy vegetable in the daily diet of a rural household. This finding could also apply to Thuthukani project members as mentioned earlier. What was also observed was older project members' knowledge on traditional vegetables is also shared with the rest of the members as they were also growing traditional vegetables, although not in significant quantities when compared with older women.

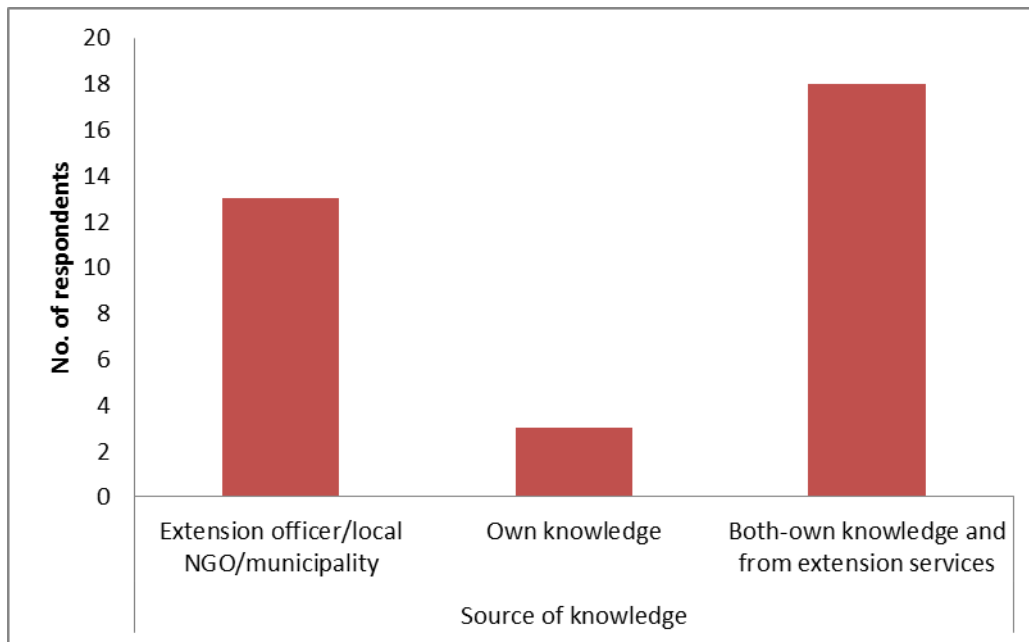


Figure 5.7. Knowledge about crop production

Agricultural extension (also known as agricultural advisory services) plays a crucial role in promoting agricultural productivity, increasing food security, improving rural livelihoods, and promoting agriculture as an engine of pro-poor economic growth (IFPRI, 2006). According to Ndoro (2011), there are different models which extension workers can use to pass on any agricultural knowledge to the farmers. From his findings it was clear that the extension workers are all using the linear model and the farmers confirmed the use of linear model. The linear model uses one-way transfer of knowledge from the extension workers to the farmers; there is no sharing of farmer's knowledge with extension workers. In the same study he however also found out that, extension workers are aware of the importance of the farmers' knowledge. Farmers are known to have indigenous knowledge which they have gathered over time and which is concerned with aspects that may relate to farming or the environment. Although the extension workers view the farmers' knowledge as important, their organization (DAEA) does not consider the knowledge that the farmers share with the extension workers.

Vorster et al. (2008) suggests that, the integration of science with indigenous knowledge could help research, extension and farmers to effectively improve cropping systems together, within the reality of household possibilities and potential. This would also address some of

Agenda 21's recommendations on lessening the impact on the environment. As an example, he argues that the important role of traditional leafy vegetables in addressing food and nutrient household food security is not fully recognized by extension and research hence the consumption of these vegetables declined in favour of exotic vegetables promoted by research and extension, and exposure through increased urbanization. He then recommends that through close collaboration with research and effective communication with the farmer, extension can impact on the food security strategies of communities by recognizing traditional leafy vegetables and the role they play in household livelihoods, and incorporating this knowledge into their extension strategies.

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CHAPTER 6

SUMMARY AND CONCLUSIONS

6.1 The status of Thuthukani

It is important to remind the reader that the justification for this study was the argument that many rural people have moved to the urban areas in search of better access to employment opportunities and improved food security. Here, they have expanded the peri-urban areas through settlements and the majority still remain food insecure. Although agriculture is seen as a rural activity, many peri-urban areas show evidence of (mainly) vegetable crop production for short term subsistence. The production varies from individual household type to community activity. In this study, it was argued that characterisation of peri-urban community gardens has not been done enough to explain their significance in human livelihoods. Further, it was hypothesised that women, as people who are most affected by food insecurity and inequitable access to employment are the major participants in community gardens.

The review of literature in Chapter 2 assisted in explaining the types of agricultural activities and specifically focussed on the concept of community supported agriculture (CSA), which consists of a community of individuals who pledge support to a farm operation so that the farmland becomes, either legally or spiritually, the community's farm, with the growers and consumers providing mutual support and sharing the risks and benefits of food production in community gardens. The situation analysis presented in Chapter 4 provided sufficient evidence that Thuthukani is a CSA. However, it is limited by access to land and perhaps lack of skills and resources. Nevertheless the farmers were clear about the direction they wish to take and are willing to take advice.

6.2 Crop production potential

Chapter 5 showed that, production of crops does ensure sustainable food security from diverse crops and this is not only informed by the needs of the project members but is a response to the needs of their immediate market. Although the primary use of the garden was initially for consumption and to supplement the minimum income members received from government social support, by stretching it to enable them to use it for other food items, the results show that this is slowly shifting to using the garden for income generation. The project members feel that with proper guidance and support, they could end up selling at a larger scale as a cooperative.

This chapter also intended to find out whether types of crops planted by members is influenced by their preference based on the kinds of foods they would like to eat e.g. traditional foods; or is driven by the need to grow food that will be available for the most part of the season; or is driven by the demand of their market. What was found was that through Thuthukani project members' incorporation of both the knowledge they received from the extension officer and their own indigenous knowledge to choose the types of crops to produce and farming systems to use resulted in the diverse crops that were produced in the garden which are both traditional and conventional crops. This then allows them to respond to the needs of their market by planting crops that are in demand e.g. cabbage, potatoes and spinach at the same time accommodating their own tastes by producing traditional vegetables that are for their own consumption.

6.3. The key findings of the study

Thuthukani community garden members primarily use the garden to produce food for household consumption and in the process save money which affords the members' households to use it for other household needs or use it for other food items. This responds to their initial reason of establishing the garden which was to ensure that members' households have food.

Similar to any community, Thuthukani garden members' socio-economic status varies within the garden participants. Although the drive to participate in the garden is found to be similar

for all participants, which was to have food and save money at the same time; it had greater impact to those that come from poor households. These are households that have no one who is employed and rely solely on government grants for their survival. Literature has shown that, poverty and food security are related phenomena. While food security is the first and foremost necessity for a healthy and productive life and hence a non-negotiable requirement for human development, but it is not sufficient by itself. People need income and employment in addition to food to fulfil their other needs, such as education, family and social obligations, health care and saving for future contingencies (Raman, 2006). What was found in this garden was that, selling surplus produce played a significant role to the survival of the members' households as income generated supplements the little income that they get from social grants.

Garden members coming from economically challenged households over and above producing food from the garden, also apply some coping strategies when there is a need. These households either rely on less preferred food because they are inexpensive; limit portion sizes when serving meals or adults leave food for children. This suggests that, although there is income from the garden's surplus produce, it is somewhat modest but it still gives that required boost to garden members' households to remain above the poverty line.

Selling the surplus produce is a benefit to the garden members. This however has its own challenge as there is no available market since the immediate one, the community, has high competition as all members rely on it to sell produce.

The readiness of community garden members to utilise the garden for income generation differs between them. This was evidenced in one member who is already producing to an extent that she is able to supply vegetables to the school's feeding scheme; demonstrating her readiness to shift the utilization of the garden from being only for consumption to income generation. On the other hand however other project members, whose economic position determines for them that participation in the garden is about being food self-reliant, do not demonstrate the same readiness. Food self-reliance is not self-sufficiency but it can go a long way towards reducing the food insecurity of this group of people. At the household level, self-produced food can cover a considerable share of a household's total food intake and can

save or release an even larger share of the household's cash income to cover non-food expenses.

Crop production in the Thuthukani community garden is based on both members' food preference and the demand of the market. Traditional crops are produced as part of diversification and dietary diversity and are mainly used for household consumption. Also, the production of leafy vegetables is in response to the market demand as they have a high yield and provide quick return to meet project members' household cash requirements for purchasing food. Leafy vegetables allow community garden members' households to satisfy their consumption and also sell.

To produce crops, Thuthukani garden members use both their indigenous knowledge and knowledge they receive from the Agriculture extension officer. This therefore suggests that, garden members do not discard the knowledge they have on how to produce food; however they incorporate this to conventional methods that are imparted by extension officers supporting them.

6.4 Policy implications

The Thuthukani community garden has a potential to contribute lessons to the District's urban and peri-urban agriculture plan. Urban and peri-urban agriculture contributes to local economic development, poverty alleviation, in recognition of the human right to food, the social inclusion of the urban poor and women in particular, as well as to the greening of the city and the productive reuse of urban wastes.

Participation of Thuthukani members in food garden production has met their food security needs. The World Health Organisation (WHO) defines the concept of food security as including both physical and economic access to food that meets people's dietary needs as well as their food preferences. This study has shown that Thuthukani members have physical access to food as they produce it themselves and from that, they are able to produce food that

is diverse and is based on what they prefer to consume in their households. This however still does not fully satisfy the aspect of economic access as this is not solely achievable just by agricultural production. Other non-agricultural activities are also important to improve the economic status of the household which will elevate it to a better level of being able to economically access food that the household prefers to consume in sufficient portions at all times.

For the preservation of indigenous knowledge that is possessed by some of the project members, extension support from government and non-governmental organisations should be receptive to production methods that are applied using this kind of knowledge especially in the production of nutritious traditional vegetables that may not be known in the peri-urban area of Tumbleweed.

Since Thuthukani community garden contributes to urban and peri-urban agriculture, it has a potential plays a significant role in food security and poverty alleviation for the urban population of Tumbleweed. However literature has shown that urban and peri-urban agriculture still largely remain an informal sector that is not being integrated in agricultural policies or urban planning. This makes it vulnerable and also jeopardizes its sustainability. In contrast, where urban and peri-urban agriculture are recognised as a legitimate activity by city authorities, they can be inserted into formal development policies and strategies and more easily benefit from the required assistance and monitoring. The local authorities, uMngeni municipality have recognized Thuthukani community garden as one of the community initiatives contributing to poverty alleviation and food security by mentioning them in their Integrated Development Plan (IDP); however it is not clear what support and monitoring the municipality intends to provide to this community garden. At local level, the Thuthukani community garden members would benefit from the municipality's support of linking them to a stable market.

One of the five strategic objectives of the food security policy states that national food security would be attained through 'improved market participation of the emerging agricultural sector through the implementation of the Agri-BEE Charter which requires agri-industry, through preferential procurement practices, to prioritize and broaden its supply base for the benefit of the emerging agricultural sector, and procuring 10% of their products from the emerging agricultural sector'. The Department of Agriculture working with other

government departments is the lead agency in the area of improving national food production trade and distribution. Together with the Department of Health and other departments, the Department of Agriculture is also responsible for the programme of improving food nutrition and food safety which resulted in the National School Nutrition Programme. The identification of community gardens producing food in communities around schools where the nutrition programme is implemented, could result in a mutual benefit where the communal garden does not only result in ensuring the household food security but also extends it to the school by supplying the school with fresh and nutritious vegetables. In return income they receive from the school will improve their household income status as they also grow as a project in becoming suppliers to a bigger market.

6.2 Study limitations and future directions

6.2.1 Study limitations

The limitation of this study is that a single site area was used, hence the results are project and area specific. The results however can be used to predict what could be expected in peri-urban areas. The other limitation is that the Thuthuka community garden was small with few participants. This had a potential to skew the data when a few individuals did not respond to questionnaires. The evaluation analysis could have looked into the skills of the farmers, especially education levels, to test their potential for further development. Yields determination could have been done for a leafy vegetable and a root/tuber crop to compare the potential impacts of these different crops on food security and the economic development of the farmers.

4.2.2 Future directions and policy implications

There is a potential for a study that would look at how best government support can respond to a garden that demonstrates characteristics similar to Thuthukani community garden. It has been observed that a garden like Thuthukani requires a close relationship between the agriculture extension officer and the garden participants. The Thuthukani project is in a stage where consultation with the project members is required to determine the direction the project

is to take. Thuthukani has clearly moved from just being a garden that tidies up an area that was used by the community to dump rubbish to production of food which some of the members have demonstrated that they can produce enough to sell to the market. One member of the garden has produced to a point where she is able to supply to a bigger and more sustainable market like a school; whereas other garden counterparts are not yet at that stage. This suggests a need for the Department of Agriculture, Forestry and Fisheries (DAFF) to comprehensively provide support in a way that will recognise and respond to individual needs within the project. This community garden is not yet developed to being a cooperative, which operates as an entity. However potentials within the garden members cannot be ignored as this would stifle their efforts. Assessing the garden members in terms of their readiness, perhaps basing it on their household readiness, could be used to open a dialogue between DAFF extension support and the project members in determining the direction the project would prefer to take based on these dynamics. These discussions could assist the extension officer to know how her assistance will be directed to the garden members. As an example; this could be about mentoring this one person, who has demonstrated her readiness, to achieve production that will satisfy her market while allowing other garden members to grow in their own pace and means. Or it could be about providing support and advice to the project to work as an entity that produces food as a group and not as individuals as it is currently happening. This entity would then work towards not only producing for consumption but also have a clear plan and direction on how surplus is sold to improve the income that is currently being generated. This support would extend to assessing aspects around the garden's suitability in terms of its size whether it will make it possible to produce for consumption and larger scale selling, available infrastructure, farming systems used, post-harvest storage of produce and the market. This study would be done to investigate further how best to implement one of the guiding principles of the food security that: 'food security interventions and programmes should be consulted on and designed to meet the needs of the targeted groups'.

A multidisciplinary study involving production scientists, nutritionists and social scientists and extension specialist is necessary to fully answer the question of the role of community gardens in alleviation of food security in future.

7. ANNEXURES

7.1 SITUATION ANALYSIS QUESTIONNAIRE

A. COMMUNITY GARDEN

Name of the group: Membership (no.) Date.....

Local Municipality: Area: Ward No:

GPS Coordinates:..... Gender: Females: ____ Males: ____

Age group: between and..... DAEA Local office.....

Name of Extension Officer:

Do you have a committee?:

List names of committee members, their designation and responsibilities:

Name of a member	Designation	Responsibility
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Do you have a mentor?: ____

How often does a mentor visit?:

B. SOCIAL ASPECT

(a) What made you join a community garden?

List reasons: (i) _____ (ii) _____ (iii) _____

(iv) _____ (v) _____

(b) What are the benefits of being a community garden member?

List reasons: (i) _____ (ii) _____ (iii) _____

(iv) _____ (v) _____

C. PRODUCTION ASPECT

(a) List crops that are produced in this garden: (i) _____ (ii) _____

(iii) _____ (iv) _____ (v) _____ (vi) _____

(vii) _____ (viii) _____ (ix) _____ (x) _____

(b) Seasons for each crop:

Name of the crop	Spring	Summer	Autumn	Winter

(c) Why do you plant these crops? _____

(d) What are the reasons for particular crops in the particular season?

Spring: _____

Summer: _____

Autumn: _____

Winter: _____

(e) Which is the best cropping season? _____

- Why? _____
- (f) What do you use the crop for? _____
- (g) What are different kinds of markets you use for your crops? _____
- (h) Which crop is contributing best to your income? _____
- Why? _____
- (i) How do you access markets? _____
- (j) How do you determine the quality of your crops for the market? _____
- _____
- (k) How do you determine the quantity of your crops for the market? _____
- _____
- (l) Are you satisfied with the current market? _____
- Why? _____
- (m) What could be the solutions for the problems of the market? _____
- _____
- _____
- (n) What type of farmer do you think you are? _____
- Why? _____
- (o) Do you believe you have a potential to change your status to a better one? _____
- Why? _____

D. TECHNICAL ASPECT

- (a) What is the size of your community garden? _____.
- (b) What is the size of your plot? _____.
- (c) What is the soil type in the garden? _____.
- (d) How do you determine soil type? _____.
- (e) What are the characteristics of your soil? _____.
- (f) How do you determine these characteristics? _____.
- (g) Do you irrigate your crops? _____.
- (h) How do you irrigate your crops? _____.
- (i) What is your source of water? _____.
- (j) What is the quality of water? _____.
- (k) How do you determine the quality of your water? _____.
- (l) Describe your irrigation system _____.

- (m) Do you use fertiliser? _____.
- (n) What fertiliser do you use? _____.
- (o) Why? _____.
- (p) When do you apply fertiliser? _____.
- (q) How do you determine how much fertiliser to use? _____.
- (r) Do you use pesticides? _____.
- (s) Which pesticides do you use? _____.
- (t) How do you use them? _____.
- (u) Why do you use pesticides? _____.
- (v) How do you apply pesticide? _____.
- (w) When do you apply pesticides? _____.
- (x) What other chemicals do you use in your farming system? _____.
- (y) Do you use crop rotation? _____.
- (z) Why? _____.
- (aa) Describe your farming system in few words? _____.
- (bb) Would you say your farming systems are influenced by mentorship or they are your own? _____.

E. HOMESTEAD GARDEND

Name and Surname: Designation..... Date.....

Local Municipality: Area: Ward No:

Name of the Garden: GPS Coordinates:.....

Gender: Females: ___ Males: ___ Age group: between and.....

DAEA Local office.....

Do you produce crops? _____.

List crops:

- (i) _____ (ii) _____ (iii) _____ (iv) _____
- (v) _____ (vi) _____
- (vii) _____ (viii) _____ (ix) _____ (x) _____.

What do you use your crops for? _____.

Do you use the same method of production? _____.

Do you get advise? _____.

Why do you have a homestead and community garden? _____.

What is the role of traditional knowledge in agriculture? _____.

_____.

Do you use traditional crops? _____.

What types of traditional crops do you use? _____.

_____.

Why? _____.

How do you use traditional crops? _____.

7.2 CROP PRODUCTION QUESTIONNAIRE

Date of interview: _____

Name _____ of _____ the _____ respondent (Optional):

a) List Crops planted in the past season:

1. _____ 2. _____ 3. _____
_____ 4. _____
5. _____ 6. _____ 7. _____
_____ 8. _____
9. _____ 10. _____

b) Rank the above crops according to their yield performance -from most (1) to least yield (10):

1. _____ 2. _____ 3. _____
_____ 4. _____
5. _____ 6. _____ 7. _____
_____ 8. _____
9. _____ 10. _____

c) What were the crops used for? (tick what is applicable)

Crop Name	Sales	Subsistence
1		
2		
3		

4		
5		
6		
7		
8		
9		
10		

d) What challenges did you have producing these crops?

Crop Name	Challenges	Response/ Resolution
1		
2		
3		

4		
5		
6		
7		
8		
9		
10		

e) Where did you get advice regarding crop production?

f) List things that the extension officer advised you with:

g) What crop production practices that you believe were derived from your own local/indigenous knowledge?

1.

2.

3.

4.

h) How did each one of the practices assist you in succeeding to produce your crops?
