Towards a sustainable approach to alleviate food insecurity through communal gardens: a case of Zimiseleni and Ifalesizwe, KwaZulu–Natal

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DECLARATION

I, Zanele Zinhle Faith Nzimande, declare that:

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ABSTRACT

Food insecurity is a multidimensional challenge of society. It requires an understanding of how the people who are affected by lack of access to adequate amounts of nutritious food can be taken out of poverty and hunger. In the context of food production in South Africa, it is a fact that commercial farmers produce the majority of food and contribute to the economy. The potential of food producers outside the sector of commercial farming has been studied. However, more is still needed to explain why rural people suffer from food insecurity when there is land that can be used for communal gardens and homestead farming. The aim of this study was to understand the potential of two community gardens in the uMgungundlovu District of KwaZulu-Natal, Ifalesizwe and Zimiseleni, with respect to food security from the perspective of crop production and utilisation. The study was a theoretical situation analysis over two seasons (2012/2013). A survey questionnaire and was walk were used to determine participants in community gardens and homesteads. The same approach was used to determine crop production and utilisation by farmers. The study is presented in four chapters. Chapter 1 is a general review of literature. Chapter 2 is a situation analysis of the community to understand their activities with respect to food security and crop production. Chapter 3 is a general analysis of crop production and utilisation. Chapter 4 is a general discussion and future directions. The study showed that people who participate in community gardens and homestead farming are mainly women in the Middle Ages or older. Community gardens are used more effectively than homestead lands due to better access to land and extension services. Farmers produced mainly exotic vegetables which they used mainly for subsistence. The major limitation of the study was that the sample size in terms of participants was small and it did not quantify the impact of produce on household food security in terms of alleviation of poverty and hunger. However, using two community gardens and two seasons helped to produce valid data and a good basis for a future has been set.

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CHAPTER 1

LITERATURE REVIEW

1.1 Introduction

Agricultural sustainability was not a major issue in the 1960s and1970s because food production resources did not appear threatened by overuse (Brady, 1990). Conservation was a concern for the future whereas the burning issue of that era was how to grow enough food for the current year (Brady, 1990). Since the 1960s the world food system had food insecurity responding to a doubling of the world population from three to six billion; providing more food per capita at progressively higher prices has been a major challenge. Within the same time frame, world per capita agricultural production has increased by 25%. However, aggregate figures mask significant regional variations. In Asia and Latin America, per capita food production has increased by 76% and 28%, respectively. In contrast, Africa has fared badly, with food production at 10% less per person today than in 1960 (FAO, 2014). This relative success in increasing agricultural productivity has, however, brought with it substantial environmental challenges. Agriculture is the most important users of environmental resources, including water, forests, pastures and nutrients, and its sustainability depends upon their availability (Bellarby et al., 2008; Wenhold et al., 2012).

Food insecurity is one of the most important social issues faced today, with 840 million individuals enduring chronic hunger and three billion individuals suffering from nutrient deficiencies (FAO, 2014). Most of these individuals are poverty-stricken and live in developing countries (Christou and Leeh, 2004). It is estimated that 1.2 billion of the poorest people living on less than one dollar a day live in rural areas (FAO, 2014). Millions of poor people living in rural areas remain trapped in poverty owing to disadvantages stemming from remoteness, lack of education, and insecure and unproductive jobs, among other reasons. Agriculture to rural people is often the main source of income. One of the ways of alleviating food insecurity and achieving the first Millennium Development Goal of halving poverty by 2015, is to produce more food for the rural people in a manner that does not negatively impact the environment.

1.2 The concept of community gardens

1.2.1 An overview

Community gardens were initiated back from the eighteenth and nineteenth centuries where tropical vegetable culture survived in remote areas and mixed gardens in south East Asia (Grigg, 1974). According to Taylor and Francis (2009) community gardens in Africa involved irrigation in home gardens since prehistoric time with the provision of vegetables for household consumption. The goal of community gardens was to increase household and intra household food security throughout the year (Chazovachii and Mutami, 2013). Community gardens provide marketing opportunities to rural people and built a base for food production for the vulnerable. Recently mass establishment of community gardens was done by non-governmental organisations in a bid to maintain sustainable rural livelihoods among the rural households. Communities have been upgrading communal gardens by selling the surplus production to obtain household income. Auret (1990) revealed that NGOs assist in establishing small irrigated vegetable gardens as they are a major component for the daily food consumption. Community gardens promoted food security as children and elderly participate in this field agriculture, (World Bank, 2007). Despite this intervention, in many southern African states, there is persistent food insecurity derailing sustainability of other livelihood activities. The goal of sustainable rural livelihoods remained elusive due to inherent factors challenging community gardens as a rural livelihood strategy (World Bank, 2007).

According to Middleton (2009), 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 meaning, uses, and purposes to different societies and communities. As a result some 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). In rural areas, community gardens takes different shapes, forms and sizes and purposes that make them differ from each other and from place to place. Community gardens have important resources with socio-economic reproduction roles for the communal people (Moyo and Tevera, 2000).Some villagers have resorted to gardening while waiting for the rain season and they make profits using them for accessing inputs during the main season of farming (New farmer, 2004).

Neighbourhood community gardens as eluded by Middleton (2009) are located on land that is divided into different plots for individuals or families. These gardens sometimes have leaders, committee for management and can be found at churches. In South Africa and other developing countries they are found outside homestead gardens in communal lands (Leach, 1990). Crops such as maize, sorghum, vegetables and bananas are found in these gardens. Youth and School gardens are found in schools for educational purposes to young people. Species such as vegetables, groundnuts, beans, maize, and tomatoes are found in these gardens. Some gardens are funded by NGOs through the Department of Agriculture and green vegetables, onion and carrots are mainly found, but generally no medicinal plants (Moyo and Tevera, 2000).

Scoones (2010) postulated that gardens have benefited women through specialization and they obtained vegetables, groundnuts and Bambara nuts for the household food consumption. Community have benefited from participation in those gardens where they derive their income. .Community run schemes have performed better than government managed schemes because of their flexibility, lower cost of operation and participation of women (Rukuni et al., 2006). Community gardens in rural areas utilized wetlands as source of water to irrigate their crops and vegetables. These wetlands existed together with community gardens for many years and proved to be highly productive as they contribute to social and economic welfare of many rural families, (Rukuni et al 2006).The use of wetlands to vegetable gardening is increasing in small holder farmers. More so, community gardens contribute to the affected and vulnerable household's food security. Implementing organizations are helping promoting vegetable gardens to help vulnerable groups and affected households get access to vegetables to ensure food and nutrition security (FAO, 2002). These nutritional gardens have benefited households and chronically ill people with herbs and vegetables as they improve their nutrition throughout the year. These are also activities for women where income generation becomes easy for them. Gardens are for income generation and food producing activities (Biru, 2010)

Home gardens take different size and activities. They are called small gardens or kitchen gardens located near the homestead specifically for vegetables and water for irrigation can be obtained from dish washing and bathing. They are mostly found in arid and semi-arid areas in sub Saharan Africa (Taylor and Francis, 2009). Home gardens can take a form of nurseries to provide seedlings, floriculture with ornamental plant located in peri-urban for market and

they can also be home market gardens. According to Rangasamy et al. (2002) these may be called forest gardens found in the humid tropics integrating poultry, vegetables and fruit trees, hence mixed gardens.

Communal gardens are located in a communal centre, organized and managed by a community group to share work and rewards. They own the land collectively and share the proceeds among members. They can donate to food pantry what they harvest at their pleasure. Communal gardens can accommodate less than 10 up to more than 200 people. Different types of crops are grown such as cereals that are maize, sorghum, cash crops, timber, forage, fruit trees and different types of vegetables.

Demonstration gardens located at working community gardens managed and maintained by the public while led by extension master gardeners. Community members are trained as volunteers to educate the public about gardening. Different crops of interests may be chosen for example a cereal, vegetable, fish, fruit tree or horticultural products on how it is cultivated.

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 (Biru, 2010; Moyo and Tevera, 2000). There are also illegitimate forms of transferring land or selling of land or expansion of plots which is common in dambo gardens. According to Moyo and Tevera (2000) this was as a result of usurpation of powers of traditional leaders to manage land and other natural resources lead to protest against rules.

According to Middleton (2009) community gardens in rural areas face management challenges. Most of the participants in community gardens lack gardening skills. Community gardens can attract members which are political 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 crop cultivation using national resources of water supply (Scoones, 2010).

1.3 Food Security

Food insecurity is a global challenge affecting over 1 billion people to the extent of poverty and hunger. Campbell (1991) stated, "Risk factors for food insecurity include any factors that affect household resources and the proportion of those resources available for food acquisition. Potential consequences of food insecurity include hunger, malnutrition and (either directly or indirectly) negative effects on health and quality of life. The precise relationships between food insecurity and its risk factors and potential consequences need much more research now that there is an emerging consensus on the definition and measurement of food insecurity. Indicators of food security or insecurity are proposed as a necessary component of the core measures of the nutritional state of individuals, communities or nations". Despite that this statement is as true now as it was two decades ago, the approaches to address food production by poor communities have not reached the level of research suggested by Campbell (1991). A working model for rural development has got to be one that relies on both agricultural science and indigenous or traditional knowledge. The potential influence of such a model on a policy to address the new challenge of food insecurity is profound. Evidence of this can be cited in early studies about the origins of agriculture: "The inventors of agriculture had previously acquired special skills in other directions that predisposed them to agricultural experiments", stated (Harlan, 1975).

The World Food Summit of 1996 (WHO, 1996) defined food security as existing "when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life". Commonly, the concept of food security is defined as including both physical and economic access to food that meets people's dietary needs as well as their food preferences (Mtshali, 2002; Muthoni and Nyamongo, 2010).

This definition consists of four distinct but interrelated components (DoA, 2005; WHO, 1996):

Food availability: effective or continuous supply of food at both national and household levels. It is affected by input and output market conditions as well as production capabilities of the agricultural sector. In certain countries in Southern Africa, food availability has been affected by high costs of transport and/or inappropriateness of road infrastructure. Therefore, the issue of transport (which is closely linked to markets) is worthy of consideration when designing and implementing food security interventions in the rural households of South Africa.

Food access: ability of a nation and its households to acquire sufficient food on sustainable basis. It addresses issues of entitlement to food, purchasing power and consumption behaviour. Therefore, increasing food production nationally will not increase food security for people and groups without affective entitlements to that food. Research shows that the cause of hunger and malnutrition in South Africa is not overall shortage of food but access to food by certain groups of the population, particularly the poor. It is argued that food insecurity in South Africa is not an exceptional short-term event in the lives of the majority of South Africans, but a continuous threat for more than a third of the population. The vast majority of South Africa is to a large extent dependent on direct or indirect access to cash in order to buy food from the commercial suppliers rather than growing food for themselves. The main sources of income are usually (a) insecure piece jobs, (b) government social welfare safety nets of old age pensions, (c) disability and child support grants and (d) remittances from working relatives and neighbours. In addition to cash income, the individual and household access to food is influenced by access to land (especially in rural areas) for supplementary food production as well as access to family community networks for sharing available food (HSRC 2005). Within the concept of "access to food" one also needs to take cultural issues into account, where women usually are the last ones served.

Reliability of food: utilization and consumption of safe and nutritious food. Quality control (e.g. via disease free crops) is quite an issue in rural South Africa.

Food use and distribution: equitable provision of food to points of demand at the right time and place. This spatial/time aspect of food security relates to the fact that a country may be food secure at the national level, but still have regional pockets of food insecurity at various periods of the agricultural cycle. This is especially true in the case of South Africa where food distribution is very uneven. Important to note is also the manner in which food is prepared and distributed between individuals within the household and the individual capacity to absorb and utilize nutrients in the food consumed. One of the objectives of the formulation of the KZN food security strategy is capacity building at the household level, especially training of mothers and adult caregivers in appropriate and improved means of food preparation, storage and preservation for enhanced enjoyment and nutritional value. This could cover what, when and how to prepare nutritionally higher value or fortified food and the means for this. This is considered a wise thinking given that there is much less written and discussed about food use and utilization issues in Southern Africa, compared to the literature on food availability and access.

South Africa produces enough food to feed its population, but experiences rapidly increasing rates of household food insecurity (van der Berg, 2006). According to Abdu-Raheem and Worth (2013), as a nation, according to National Food Security indicators, South Africa is food secure. In fact, South Africa has been food secured nationally for more than twenty years and is even an exporter of some foods. It excels in the production of some varieties of agricultural food products like maize and potatoes and it imports products which it lacks or produces inadequately; all contributing to meeting its national food requirements (Abdul-Raheem and Worth., 2013.).

In South Africa, food security can be viewed in two levels: 'national food security' and 'household food security' (Abdul-Raheem and Worth, 2013). As a nation, according to National Food Security indicators, South Africa is food secure. In fact, South Africa has been food secured nationally for more than twenty years and is even an exporter of some foods. It excels in the production of some varieties of agricultural food products like maize and potatoes and it imports products which it lacks or produces inadequately; all contributing to meeting its national food requirements (Abdu-Raheem and Worth, 2013).

At the household level however, South Africa is not universally food secure; with some 14.3 million South Africans (about 35% of the total population) experiencing food insecurity (Abdu-Raheem and Worth, 2013). Many of these people are largely dependent on the natural resources available to them for their livelihoods (Wenhold et al., 2012). These resources are often used unsustainably. Due to the above mentioned reason, South African government has expressed its desire to ensure that food security is achieved at the household level (Abdu-Raheem and Worth, 2013; IFPRI, 2010).

The socio-economic conditions play a more important role in food security or insecurity. National food self-sufficiency should not be used as a proxy for household food security or as an index of national welfare. While South Africa produces sufficient food, this in no way ensures food security at individual household level. This is because ensuring access to food at the household level depends not only on secure food supplies, but also on stable demand or purchasing power. If families are unable to grow or purchase enough food, and social welfare nets are absent or ineffective, there may be hunger. This is the case in many South African societies. It is estimated that 39% of the South African population is vulnerable to food insecurity (Carney et al., 2012).

Development economics is concerned with efficient allocation of existing scarce productive resources and their sustained growth over time, and its political content of economic decisions. It is concerned with the economic social and institutional mechanisms, both public and private, necessary for bringing about rapid (at least by historical standards) and large-scale improvements in levels of living for the masses of poverty stricken, malnourished and illiterate peoples of Africa, Asia and Latin America (Pretty, 1995; Pretty and Hine, 2001; Pretty et al., 2006).

The socio-economic conditions play a more important role in food security or insecurity. National food self-sufficiency should not be used as a proxy for household food security or as an index of national welfare. While South Africa produces sufficient food, this in no way ensures food security at individual household level. This is because ensuring access to food at the household level depends not only on secure food supplies, but also on stable demand or purchasing power. If families are unable to grow or purchase enough food, and social welfare nets are absent or ineffective, there may be hunger.

Fostering development and achieving food security will require economic growth and diversification that generates jobs for the majority of people, breaking the strong vulnerability to international fuel and food price volatility, managing depleting water resources and climate change adaptation effectively, transforming social policies to target the poor, and empowering women to play a more active role in the economy and society (IFPRI, 2010).

Improving food security by investing in agricultural productivity, infrastructure, social protection and the opening of markets is one of the ten development objectives for the aid program (FAO, 2001; 2002; 2008). Food security underpins all other development, as without it food insecure populations prioritise food and sustaining their own lives and those of their families over everything else. Australia's approach to food security is centred on increasing the availability of food through production and improving trade, while also increasing the poor's ability to access food.

Australia has prioritised three pillars to improve outcomes in food security:

1. Lifting agricultural productivity through agricultural research and development,
2. Improving rural livelihoods by strengthening markets and market access and

3. Building community resilience by supporting the establishment and improvement of social protection programs.

These three pillars aim to increase the food available in markets and poor households and increase the incomes and employment opportunities of poor men and women. Food security expenditure is expected to grow strongly over the next few years, particularly in Africa, the Middle East, South Asia, and Indonesia. Results in achieving better food security outcomes include reducing the number of people living on less than USD 1.25/ day, reducing the number of people suffering from hunger and achieving opportunities for full and productive employment (IFPRI, 2010).

1.4 Poverty

Poverty is defined by the World Bank as 'the inability to attain a minimal standard of living' in terms of basic consumption needs (like food), or income, (Meth, 2006). Poverty is the underlying cause of hunger and malnutrition in developing countries and it is inextricably linked with food insufficiency resources required to satisfy those needs (May et al., 2000). The most obvious factor behind food insecurity is poverty (Borron, 2006). Poverty is also political, because it relates to the allocation or distribution of resources, and reflects the impact of past and present policy choices (Meth, 2006).

Poverty can be construed in a narrow or broad sense. In the narrowest sense it means lack of income. In a broader sense poverty can be seen as multidimensional, encompassing other issues such as housing, health, education, access to services and to other avenues of accessing resources, and what is somewhat controversially referred to as 'social capital', and access to social power relations. Poverty can be construed in a minimalist or more expansive way: the most minimalist way is to consider people who are poor as being those who are unable to survive even in the short term, i.e. people who are utterly without the means of survival. A more expansive understanding of poverty is that people are poor if they are unable to participate in society as full citizens (Department of Treasury, 2004; Mgijima, 1999).

In South Africa as a whole and in KZN in particular, the phenomena on of poverty is increasing and becoming profound and lasting. Without effective and strategic intervention, the processes of unemployment and impoverishment may lead to durable structural division

of society and the marginalisation of the majority of the citizens of the province. Economic growth alone, even when sustained, will not solve this structural problem. The risk of developing two societies with impenetrable boundaries is increasing. Experience has shown that economic growth alone does not solve the problem of uneven distribution of poverty and the continued marginalisation of a significant segment of the population. This is evidenced by the fact that South Africa's first ten years of democracy have been largely marked by jobless growth and disillusionment of people at grassroots levels as a result of poor service delivery by government (Department of Treasury, 2004; Smit and Masoga, 2012).

1.5 Role of agricultural extension

It was stated by IFPRI (2010) that to lift up agricultural productivity through agricultural research and development, objectives of extension programmes should be clearly understood, whether extension officers should influence farmers to behave the way extension officers think is desirable, or whether they should increase capabilities of farmer so that farmers will decide themselves for themselves the best ways of that will lead them to achieve their goals. Farmers can use information from extension officers as well as from other sources which may include information from elderly and their traditional knowledge. According to van den Ban and Hawkins (1996), the meaning of extension is well known and accepted by people who work in extension organizations and services, but it is not well understood in the wilder community. However, the most common meaning for the term is that extension involves the conscious use of communication of information to help people for sound opinions and make good decisions (van de Ban and Hawkins, 1996).

Van de Ban and Hawkins (1996) further elaborates that agricultural extension agents supply information about agricultural policies and the reasons for them and endeavour to stimulate certain developments considered to be desirable. For example, they encourage farmers to avoid activities which pollute the environment, and help them to develop into modern and efficient producers (van de Ban and Hawkins, 1996). However, the extension agent's main task is to help farmers with their decision making (Scoones and Thompson, 1994).

As South Africa sets out to eradicate food insecurity at household level, without compromising its natural resources, agricultural extension surface a potentially influential tool to achieve this. This is evidenced through the skills and approaches that extension

possesses, and which it can use to create and facilitate necessary instruments of change as may be required by sustainable agricultural practices (Abdul-Raheem and Worth, 2013). Swanson (2009) identifies four categories or models of agricultural extension: technology transfer; advisory services; non-formal education; and facilitation extension.

1.6 Productivity of sustainable agriculture

One criticism of sustainable agriculture, especially organic agriculture, is that it cannot meet the world's food demands, primarily because of low yields and insufficient organic fertiliser. However, there is ample evidence to refute this argument. In general, organic yields can be broadly comparable to conventional yields in developed countries. In developing countries, organic practices can greatly increase productivity, particularly if the existing system is low-input (IFPRI, 2010).

A recent study has found that organic methods could produce enough food on a global per capita basis to sustain the current human population, and potentially an even larger population, without putting more farmland into production (Anon., 2010). The researchers examined a global dataset of 293 examples, and found that on average, in developed countries, organic systems produce 92% of the yield produced by conventional agriculture. In developing countries, however, organic systems produce 80% more than conventional farms. Moreover, contrary to fears that there are insufficient quantities of organically acceptable fertilisers, the data suggest that leguminous cover crops could fix enough nitrogen to replace the amount of synthetic fertiliser currently in use.

In a review of in 286 projects in 57 countries, farmers were found to have increased agricultural productivity by an average of 79%, by adopting "resource-conserving" or sustainable agriculture (Pretty et al., 2006). A variety of resource conserving technologies and practices were used, including integrated pest management, integrated nutrient management, conservation tillage, agroforestry, water harvesting in dry land areas, and livestock and aquaculture integration into farming systems. These practices not only increased yields, but also reduced adverse effects on the environment and contributed to important environmental goods and services (e.g., climate change mitigation), as evidenced by increased water use efficiency and carbon sequestration, and reduced pesticide use.

The work built on earlier research, which assessed 208 sustainable agriculture projects. The earlier research found that for 89 projects for which there was reliable yield data, farmers had, by adopting sustainable agriculture practices, achieved substantial increases in per hectare food production - the yield increases were 50-100% for rain-fed crops, though considerably greater in a number of cases, and 5-10% for irrigated crops (Pretty and Hine, 2001). Disaggregated data show:

- Average food production per household rose by 1.7 tonnes per year (up by 73%) for 4.42 million small farmers growing cereals and roots on 3.6 million hectares.
- Increase in food production was 17 tonnes per year (up 150%) for 146,000 farmers on 542,000 hectares cultivating roots (potato, sweet potato, cassava).
- Total production rose by 150 tonnes per household (up by 46%) for the larger farms in Latin America (average size 90 hectares).

There are many other specific examples of increased yields following the application of sustainable agricultural practices, which are summarized here (Pretty and Hine 2001):

- Soil and water conservation in the drylands of Burkina Faso and Niger have transformed formerly degraded lands. The average family has shifted from being in cereal deficit of 644 kg per year (equivalent to 6.5 months of food shortage) to producing an annual surplus of 153 kg.
- In Ethiopia, some 12,500 households have adopted sustainable agriculture, resulting in a 60% increase in crop yields.
- Participatory irrigation management in Philippines has increased rice yields by about 20%.
- 45,000 families in Honduras and Guatemala have increased crop yields from 400-600 kg/ha to 2000-2500 kg/ha using green manures, cover crops, contour grass strips in-row tillage, rock bunds and animal manures.
- The states of Santa Caterina, Paraná and Rio Grande do Sol in southern Brazil have focused on soil and water conservation using contour grass barriers, contour ploughing and green manures. Maize yields have risen from 3 to 5 tonnes/ha and soybeans from 2.8 to 4.7 tonnes/ha.

- The high mountain regions of Peru, Bolivia and Ecuador are some of the most difficult areas in the world for growing crops. Despite this, farmers have increased potato yields by three fold, particularly by using green manures to enrich the soil.
- In Brazil, use of green manures and cover crops increased maize yields by between 20-250%.
- In Tigray, Ethiopia, yields of crops from composted plots were 3-5 times higher than those treated only with chemicals.
- Yield increases of 175% were reported from farms in Nepal adopting agro-ecological practices.
- In Peru, restoration of traditional Incan terracing led to increases of 150% for upland crops.
- Projects in Senegal promoted stall-fed livestock, composting systems, green manures, water harvesting systems and rock phosphate. Yields of millet and peanuts increased dram
- Practically by 75-195% and 75-165% respectively.
- In Honduras, soil conservation practices and organic fertilisers have tripled or quadrupled yields.

1.7 Effect of sustainable agriculture on income

The productivity of sustainable agriculture often translates to increased incomes for farmers, who at the same time are also able to reduce or eliminate the costs of purchasing chemical inputs (Pretty 1995). Sustainable agriculture also often adds new productive elements to the system, and by maintaining or improving on- and off-farm biodiversity, allows farmers to market non-cultivated crops and animals (Breen, 2013; Pimbert, 1999).

Moreover, if organic produce is sold, these carry a premium price on the market. For example, a comprehensive review of the many comparison studies of grain and soybean production conducted by six US Midwestern universities since 1978 found that the organic cropping systems were always more profitable than the most common conventional systems if organic price premiums were factored in (Welsh, 1999). When the higher premiums were not factored in, the organic systems were still more productive and profitable in half the studies. This was attributed to lower production costs and the ability of organic systems to

out-perform the conventional systems in drier areas, or during drier periods. Fifteen-year results from the Rodale Institute in the US showed that after a transition period with lower yields, the organic systems were competitive financially compared with the conventional system (Petersen et al., 1999). While the costs of the transition are likely to affect a farm's overall financial picture for some years, projected profits ranged from slightly below to substantially above those of the conventional system, even though economic analyses did not assume any organic price premium. The higher profits for the organic farms came largely from higher yields (of maize, in this case), which nearly doubled after the transition period. When prices or yields were low, organic farms suffered less than the conventional and had fewer income fluctuations, as they had a diversity of crops to sell. Expenses on the organic farms were significantly lower than on the conventional - the latter spent 95% more on fertilisers and pesticides. Overall production costs on the organic farms were 26% lower.

In developing countries, evidence from hundreds of grassroots development projects show that increasing agricultural productivity with agro-ecological practices not only increases food supplies, but also increases incomes, thus reducing poverty, increasing food access, reducing malnutrition and improving the livelihoods of the poor. Agro-ecological systems lead to more stable levels of total production per unit area than high-input systems; they give more economically favourable rates of return, and provide a return to labour and other inputs for an acceptable livelihood (Pretty, 1995).

1.8 Sustainable agriculture and climate change

Climate change, coincident with increasing demand for food, feed, fibre and fuel, has the potential to irreversibly damage the natural resource base on which agriculture depends, with significant consequences for food insecurity (IAASTD, 2008). The relationship between climate change and agriculture is two-way; agriculture contributes to climate change in several major ways and climate change in general adversely affects agriculture. A solution to food insecurity seems to be adherence to sustainable agriculture and provision of access to food (Newton, 2007).

Importantly, sustainable agriculture practices can also mitigate climate change. Organic agriculture, for example, uses less fossil fuel based inputs and has a better carbon footprint than standard agricultural practices. This is because conventional agriculture production utilises more overall energy than organic systems due to heavy reliance on energy-intensive

fertilisers, chemicals, and concentrated feed, which organic farmers forego (Zeisemer, 2007). Organic agriculture performs better than conventional agriculture on a per hectare scale, both

With respect to direct energy consumption (fuel and oil) and indirect consumption (synthetic fertilisers and pesticides), with high efficiency of energy use (Scialabba and Hattam, 2002).

Agriculture has the potential to change from being one of the largest GHG emitters to a net carbon sink, while offering options for mitigation. The solutions call for a shift to sustainable farming practices that build up carbon in the soil and use less fertiliser (Bellarby et al. 2008). There are a variety of sustainable farming practices that can reduce agriculture's contribution to climate change, which are easy to implement. These include crop rotations and improved farming design, improved cropland management (such as avoiding leaving land bare, using an appropriate amount of fertiliser, no burning of crop residues in the field, reducing tillage), nutrient and manure management, grazing-land and livestock management, maintaining fertile soils and restoration of degraded land, improved water and rice management, and set-asides, land use change and agroforestry (Bellarby et al., 2008; Niggli et al., 2008).

Reports by Ellis (1998) and Khor (2008) provided a detailed assessment of the benefits of organic farming regarding climate change. The benefits were summarized as follows:

- Organic agriculture has considerable potential for reducing emissions.
- In general it requires less fossil fuel per hectare and kg of produce due to the avoidance of synthetic fertilisers. Organic agriculture aims to improve soil fertility and nitrogen supply by using leguminous crops, crop residues and cover crops.
- The enhanced soil fertility leads to a stabilisation of soil organic matter and in many cases to a sequestration of carbon dioxide into the soils.
- This in turn increases the soil's water retention capacity, thus contributing to better adaptation of organic agriculture under unpredictable climatic conditions with higher temperatures and uncertain precipitation levels. Organic production methods emphasizing soil carbon retention are most likely to withstand climatic challenges particularly in those countries most vulnerable to increased climate change. Soil erosion, an important source of carbon dioxide losses, is effectively reduced by organic agriculture.
- Organic agriculture can contribute substantially to agro forestry production systems.

- Organic systems are highly adaptive to climate change due to the application of traditional skills and farmers' knowledge, soil fertility-building techniques and a high degree of diversity.

1.9 Increasing food production

In many countries the demand for food production is increasing because of a growing population, and often because of increasing prosperity (van den Ban 1997). The government of South Africa encourages the increased production through establishment of community gardens and homestead gardens. Sustainable agriculture is a viable option for meeting food security needs and addressing climate change challenges. It provides evidence for these claims, showing that sustainable agriculture is productive, mitigates climate change and has climate adaptation potential.

Sustainable agriculture can contribute significantly to increased food production, as well as make a significant impact on rural people's welfare and livelihoods. However, without appropriate policy support at a range of levels, these improvements will remain at best localised in extent, or worse, will wither away. A thriving and sustainable agricultural sector requires both integrated action by farmers and communities, and integrated action by policy makers and planners. It is also vital for farmer-to-farmer learning and sharing of experiences to be encouraged and facilitated.

1.10 Hypothesis and objectives

Five key environmental challenges can be identified that potentially threaten the future viability of agricultural systems, particularly at regional and local levels (DFID, 2002):

- Land degradation,
- Limits to water availability,
- Loss of biodiversity,
- Declining agricultural genetic diversity and
- Climate change.

For the majority of poor rural people it is important to have sustainable food production systems. Research shows that different forms of gardens have been and continue to be used

by small-scale subsistence farmers in the developing world, including South Africa. While there is some evidence of the role of these gardens in other parts of the world, there have not been many studies to show their role in alleviation of food insecurity and economic development in South Africa. In this study, it is hypothesised that there is a role for community gardens in agriculture for measurable alleviation of household food insecurity Hence, the primary objective of this study was to underrate a situation analysis of two existing community gardens in the rural area of Vulindlela (near Pietermaritzburg, KwaZulu-Natal), namely Ifalesizwe and Zimiseleni. The situation analysis was performed in the context of the farmers also having access to homestead gardens. The secondary objective was to analyse the contribution of community gardens and homestead gardens to food security with respect to crop preference and their potential contribution to household income. An attempt is made to propose a future direction for a broader and long term study that can contribute to policy in the context of the South African situation.

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CHAPTER 2

SITUATION ANALYSIS

2.1 Introduction

This study generally followed the approach used by Cohen (2002), which report provided a toolkit of standardized measurement tools for assessing various aspects of community food security. It includes a general guide to community assessment and focused materials for examining six basic assessment components related to community food security. These include guides for profiling general community characteristics and community food resources as well as materials for assessing household food security, food resource accessibility, food availability and affordability, and community food production resources.

Data collection tools include secondary data sources, focus group guides, and a food store survey instrument. The toolkit was developed through a collaborative process that was initiated at the community Food Security Assessment Conference sponsored by ERS (Economic Resource Service (Andrews and Kantor, 1999). It was designed for use by community-based non-profit organizations and business groups, local government officials, private citizens, and community planners.

A situation analysis is a key foundation for any sound intervention. Situation analysis is a new approach to qualitative data analysis with deep roots in the grounded theory methods, symbolic interactionism, feminism, the post structural work of Michele Foucalt, and Anselm Strauss social worlds theory (Clarke, 2005) The key analytical goal is to understand the situation and relations of action and interaction in the phenomenon of interest-the case being studied (Clarke 2005). This approach helps to ensure a programme's relevance and to find out the best course of action (e.g. strategies, entry points, partnerships) by learning about community attitudes and practices to address community development, identifying what has already been done to better the situation, and the results and lessons that were obtained, as well as the main stakeholders that have been as well as the key stakeholders that might need to be engaged.

Clarke (2007), further explains that Situational analysis involves making three kinds of maps: (1) situational maps, which lay out the major human, nonhuman, symbolic, discursive, and other elements in the situation, provoking analyses of relations among them; (2) social worlds/arenas maps, which lay out the collective actors and their arena(s) of commitment; and (3) positional maps, which lay out major positions taken and not taken in the discursive data. This method can be used across many disciplines in a wide array of research projects drawing on interview, ethnographic, historical, visual, and/or other discursive materials, including documents.

The objective of the situation analysis was to determine the reasons for participation of two rural communities in food security related activities that inform their crop production in community gardens (Chapter 4).

2.2 Usefulness of situation analysis

The advantage of using this approach is to build a foundation for good decision making on program priorities and the use of limited resources on a local or country wide basis. Clarke (2005), this method can be used across many disciplines in a wide array of research projects drawing on interview, ethnographic, historical, visual, and/or other discursive materials, including documents. It allows researchers to draw together studies of discourses and agencies, actions and structures, images, texts and contexts, histories and the present moment to analyse complex cases in depth. It is especially useful in multi-site research (Clarke 2007).

According to RHCR (2004) and Vann (2002) a as quoted by Virtual Knowledge Centre (2012), the situation analysis is a comprehensive review of the situation at hand, providing an understanding of many contextual factors, such as the: types and extent of violence against women and girls; needs within the population; strengths and weaknesses of the services available; laws, policies and plans that exist to address the issue; resources available to address the issue; knowledge, attitudes and practices of key actors within different sectors and within the community; formal and informal systems of justice, conflict resolution and leadership; capacity and training opportunities for key officials in the security/police, justice and health sectors (duty-bearers); civil society and government actors/stakeholders working on the issue; existence and functioning of coordinated responses or referrals; perpetuating factors that contribute to the prevalence and incidents of violence against women and girls; and prevention activities underway.

2.3 Materials and methods

There were five phases in which the study was conducted. The first phase included meetings with community gardens members and extension officers, meetings with community garden members only and meetings with extension officers only. The second phase was semi structured interviews that were conducted with the two groups of community garden members, the third phase was interviews with individual in their households, the fourth phase was observations, and the fifth phase was the yield estimation exercise. The first phase of the study was conducted in October and November 2012, and February 2013; the second phase was conducted in February 2013, during the interviews, and during the yield estimation exercise. The third phase was done in May 2013. The fourth phase was done during interviews, meetings and yield estimate exercise. The fifth phase was done in May and June 2013.

The comprehensiveness review of the situation at hand provides information from this study that can be used to make inferences about performance of Zimiseleni and Ifalesizwe community gardens members from the social perspective and agricultural perspective as well as policies and advising both people on the ground and policy makers.

This section discusses the materials and methods that the researcher used to collect data. The researcher used structured questionnaires to collect data from the community gardens and households of the Respondents. The researcher also used observations during the field visits and field notes were taken by the researcher during the visit in the community gardens.

2.3.1 Study participants

The researcher chose participants of the study using purposeful sampling Laws *et.al* (2003). Purposeful sampling allows a researcher to select a sample based on his/her judgement, provided the chosen sample suits the needs of the study. The total number of community garden members in Ifalesizwe was 11, and out of the eleven, nine respondents participated in the survey. The percentage of respondents was 81%. This is a useful percentage in a survey. In surveys, 40% response is considered as a very good response if a researcher is trying to find out something. Silverman (2010), purposive sampling is also known as judgemental or selective sampling. It allows the researcher to select a case since it demonstrates some characteristic like that which enables the researcher to answer the research questions. The

logic and strength of the purposive sampling method rest in the selection of information-rich cases that have the necessary characteristics identified by the researcher (Silverman 2010).

2.4 Data collection

2.4.1 Evaluation of social systems

Two questionnaires were designed to gather information from the respondents and data were summarised using Excel and subjected to SPSS analysis. The first questionnaire was designed to gather the community garden's social, production and technical aspects the community garden and community garden members. A questionnaire was written in both English and Zulu, which is the vernacular/local language in the Vulindlela area. The second questionnaire was designed to gather household/ homestead garden information. Using questionnaire is a useful method of gathering information that is used in research. It has a list of questions that are asked from individuals to obtain information during the survey. They are one of the enabling factors for a researcher to get information that might be missed. According to Leedy (2005), questionnaires can be very limiting as the researcher is often not afforded the opportunity to follow up on answers recorded in a questionnaire. A questionnaire in this survey was the second method used amongst the five methods that are mentioned under the usefulness of situation analysis.

2.4.2 Structured interviews

In addition to the questionnaire, structured interviews were also conducted, where the researcher spoke to the respondents in addition to the questionnaire while doing a survey. A structured interview is an interview in which the questions the interviewers are to ask and, in many cases, the answer categories the respondents are to use have been fully developed and put in an interview schedule before the interview begins, (Lewis-beck, Bryman & Liao, 2004). The researcher spoke to the respondents in addition to the questionnaire while doing the survey.

The two community gardens and the households of the respondents were visited by the researcher. The researcher was a complete observer. According to Creswell (2009), being a complete observer implies that the researcher observes the participants without actively participating in their activities. Observations were made on the type of crops that the

respondents grow and the plot sizes of the individual respondents. Plots of the respondents were measured in the community garden as well as in their households. Interviews were conducted with the community gardens at the community garden. This was done while other community garden members were continuing with their work in the field. This made it easy for a researcher to observer to become familiar with the daily routine of the community garden members in the community garden. The researcher took field note during the observation.

2.5 Research design

Kellehaer (1993) suggests that qualitative research offers the opportunity to study human interaction, historical processes and social reality in an in-depth way, to obtain valid and detailed data beyond the scope of traditional research inquiry. Wainwright (1997), also states that Qualitative research can be characterised as the attempt to obtain an in-depth understanding of the meanings and definitions of the situation presented by the informants, rather than the production of quantitative measurement of their characteristics or behaviour. He further states that Qualitative research designs are associated with interpretative approaches, from the informants' point of view, rather that measuring discrete, observable behaviour.

2.5.1 Study site

The study was conducted in Msunduzi local Municipality that is in uMgungundlovu District Municipality of KwaZulu Natal Province (Figure 2.1). Zimiseleni and Ifalesizwe community gardens are situated at MaSwazini and Khokhwane areas respectively. MaSwazini and Khokhwane areas are in the Msunduzi local Municipality, approximately 56 and 53 kilometres; respectively in the outskirts of Pietermaritzburg towards Underberg. MaSwazini and Khokhwane are in the Vulindlela greater initiative and are both rural areas.

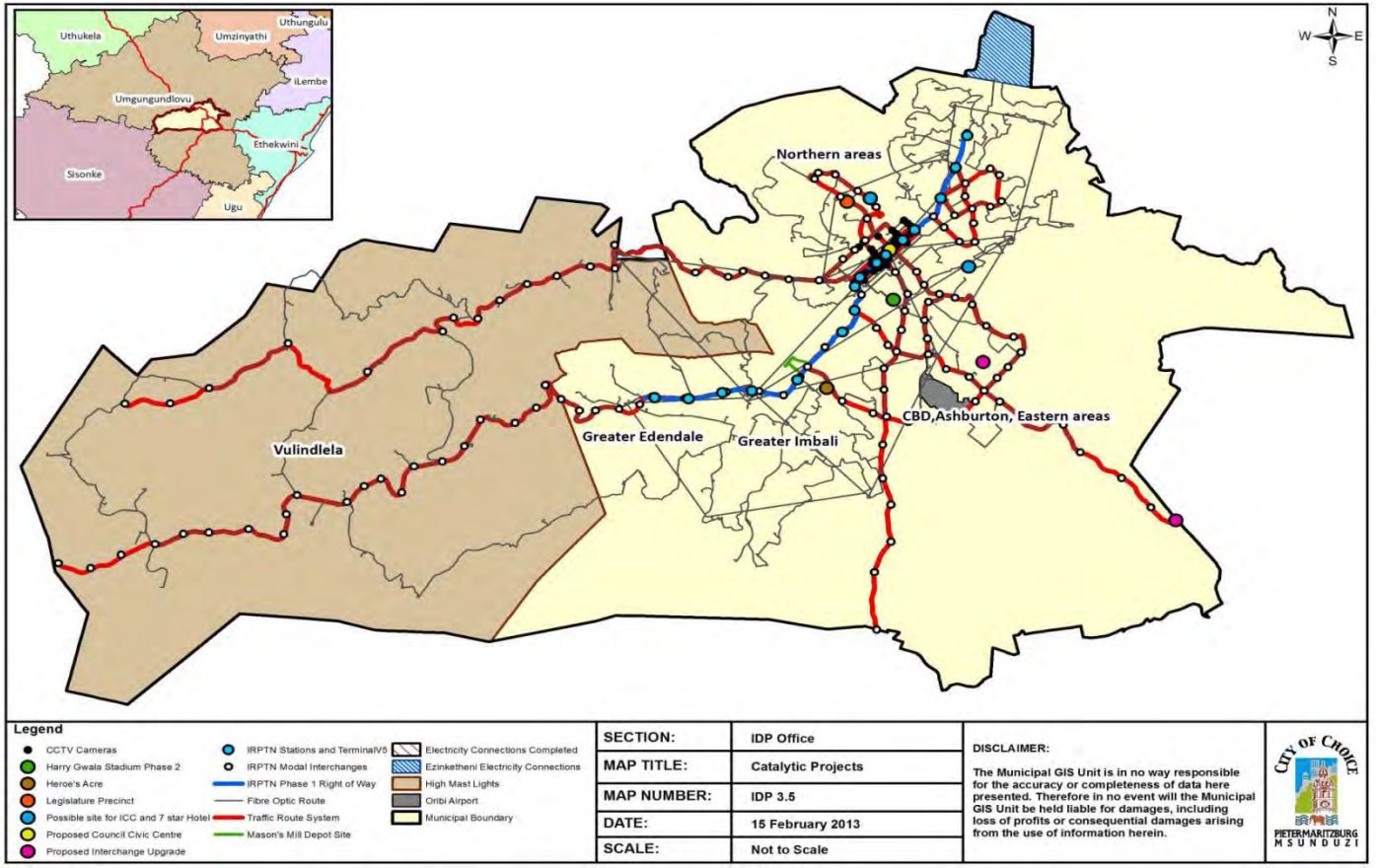

Figure 2.1. Msunduzi Municipality map: showing Vulindlela area where Ifalesizwe and Zimiseleni community gardens are situated, Msunduzi Municipality IDP (2013).

2.6 Data analysis

Data analysis is the process of bringing order, structure and meaning to the mass of collected data (de Vos 2008). Analysis of data collected from structured interviews in this study was captured through Microsoft Excel spreadsheet programme and SPSS. For example, to determine the types of crops that are produced by respondents in the community gardens and in their households respondents were asked to list crops that they grow in the community gardens and in the households. To analyse the data, if a respondent was growing that particular crop in the community garden, the crop will be scored 1 and if a crop was not grown in a community garden, it will scored 0. The same applied to crops that are grown in the household, when the researcher was analysing data of crops that are grown in the household.

2.7 Results and discussion

2.7.1 Membership and gender

This section describes the profile of the members of Ifalesizwe and Zimiseleni Community gardens. Figure 2.2 demonstrates the number and percentage gender of the membership in the community gardens. The total number of membership at Ifalesizwe is eight and all members are women. The projects membership at Zimiseleni is 100% female and at Ifalesizwe is 4 members out of the total membership of 11 are male (63%) members are female. Both community gardens are dominated by women, this confirms what Mmbengeni & Makoka 2002 say that the normal pattern in South Africa with the majority of persons involved in rural agriculture being female. As a rule women are mostly involved with community gardens, dry land and poultry production which allow them to attend to other chores such as taking care of children, preparation of food and the general maintenance of the households. De Villiers 2005 also confirms that, the concept of community gardens in the rural areas of KwaZulu Natal is usually associated with women. Although both community gardens are dominated by women, there are some men who are still involved in the community gardens. The state of Zimiseleni community garden shows that men are no longer involved in the community gardens. This confirms what Aliber, de Swardt, du Toit, Mbhele & Mthethwa, (2005) suggest that Men are not involved in community gardens as they regard such small-scale agriculture as the domain of the women. Aliber et al. (2005) further explained that community gardens are merely good for subsistence and whatever women manage to sell

bring only a minimal wage. Man have also seem to have lost interest in agriculture altogether, they see it as an activity that is associated with women and they prefer to seek formal employment (Aliber, 2005). Although there are still some men involved in Ifalesizwe community garden but they are less than 50% compared to women. Ifalesizwe still has men involved in the community garden but Zimiseleni has 100% women and no men.

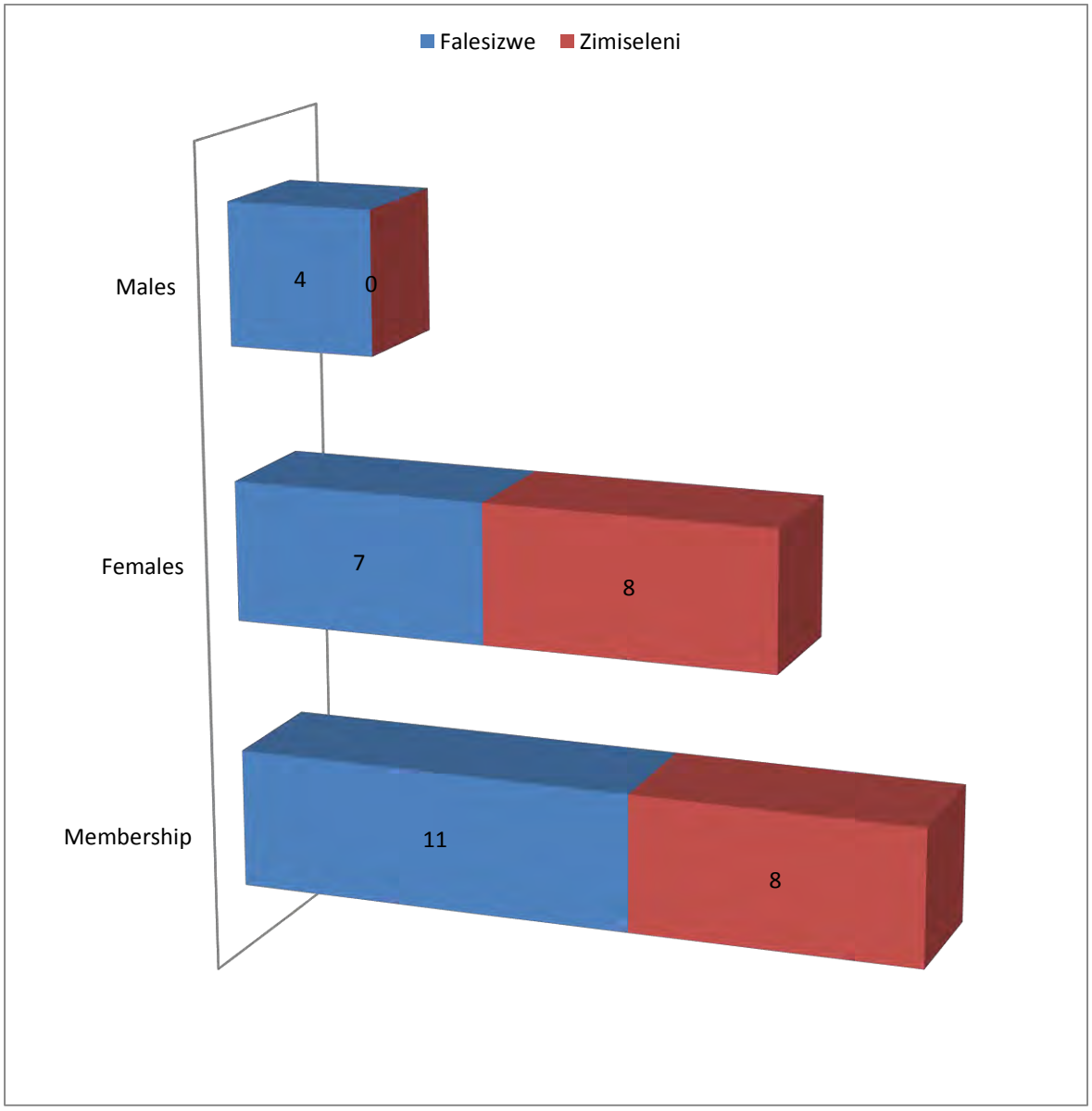

Figure 2. 2. Membership and gender distribution of Ifalesizwe and Zimiseleni community gardens.

Women do not have equal access to tribal land as men (Mtshali, 2002). Women are responsible for reproductive, productive and community' household management tasks and their household domestic tasks (Mtshali 2002). Women are twice as likely as men to be involved in agriculture related activities (Odame et al.; Boto 2002). Women make crucial contributions in agriculture and rural enterprises in all developing country regions, as farmers, workers and entrepreneurs (FAO, 2010). Their roles vary across regions but, everywhere, women face gender-specific constraints that reduce their productivity and limit their contributions to agricultural production, economic growth and the well-being of their families, communities and countries (FAO, 2010).

2.7.2 Age distribution

Out of the 19 respondents from the community gardens, 17 of them are between the age of 46 to 60 and 2 are above the age of 60 (Figure 2.3). All Zimiseleni community garden members are between the age of 46 and 60 and in Ifalesizwe, the majority of members are also between 46 and 60. Only two community members from Ifalesizwe are above 60 years old, the membership of community gardens is dominated by adult female members, who are between the age of 46 and 60 and some are at the age of 60 and above. Youth is not involved in the community gardens, yet they are the majority in the households. This raises a concern in that people who are involved in agriculture are getting old and the agricultural skills are not being transferred to the young people. There is a need for the agricultural sector to find ways to attract youth to be involved in agriculture.

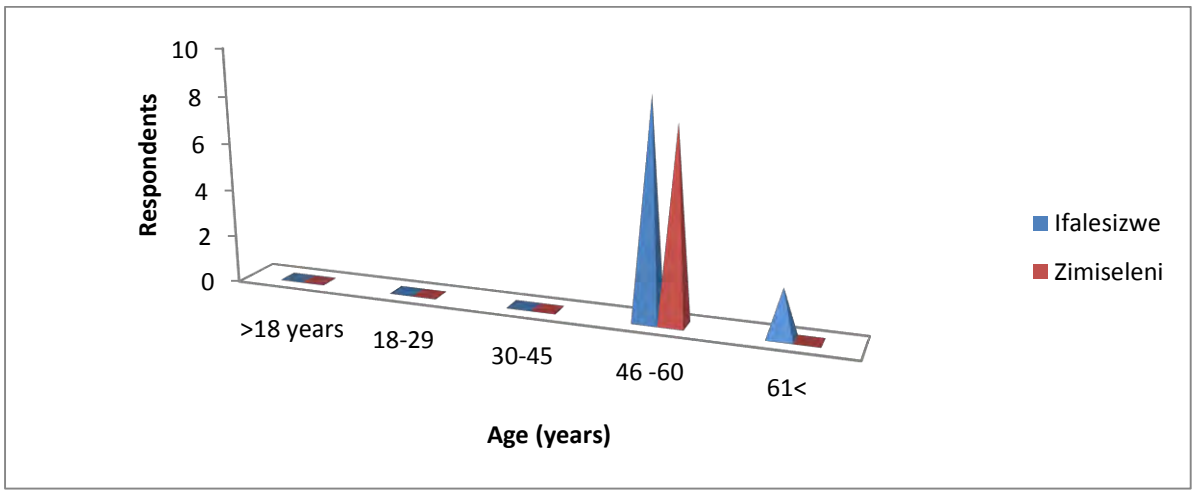

Figure 2. 3. Age distribution of Ifalesizwe and Zimiseleni community garden members in Msunduzi local Municipality.

2.7.3 Household beneficiaries

Figure 2.4 shows the total number of family members that benefit from community gardens. The total number of family members is 161. The total number of Zimiseleni community garden family members is 60 and the total number of family members for Ifalesizwe respondents is 101. The number of people who benefit from Ifalesizwe community garden is larger than that of Ifalesizwe, yet Ifalesizwe has more community garden members than Zimiseleni community garden. The total number of household members for the respondents ranges from 4 to 15. The rural areas household structure is difficult to define because in rural areas, family can be composed of the number of wives, and the family head may still allow the sisters children to live with them as part of the family. This is what called '*ubuntu'* in the Zulu culture. A household is a co-residential unit, usually family based in some way, which takes care of resources, management and primary needs of its members (Rudie, 1995). All family members share the resources that are available in the family, regardless of whether they are enough or not. Households also share the resources amongst the neighbours. The produce that is received from these community gardens is therefore shared amongst the 161 household members.

17% of household members for Ifalesizwe family members are youth and 6% of Zimiseleni community garden family members is youth. The total percentage of youth in these households is 23%. Mtshali (2002), the demographic dependency ratio compares the number of persons in the non-economically active ages (15 and 65 and above) relative to the number of persons in the potentially economically active ages (15 to 64).

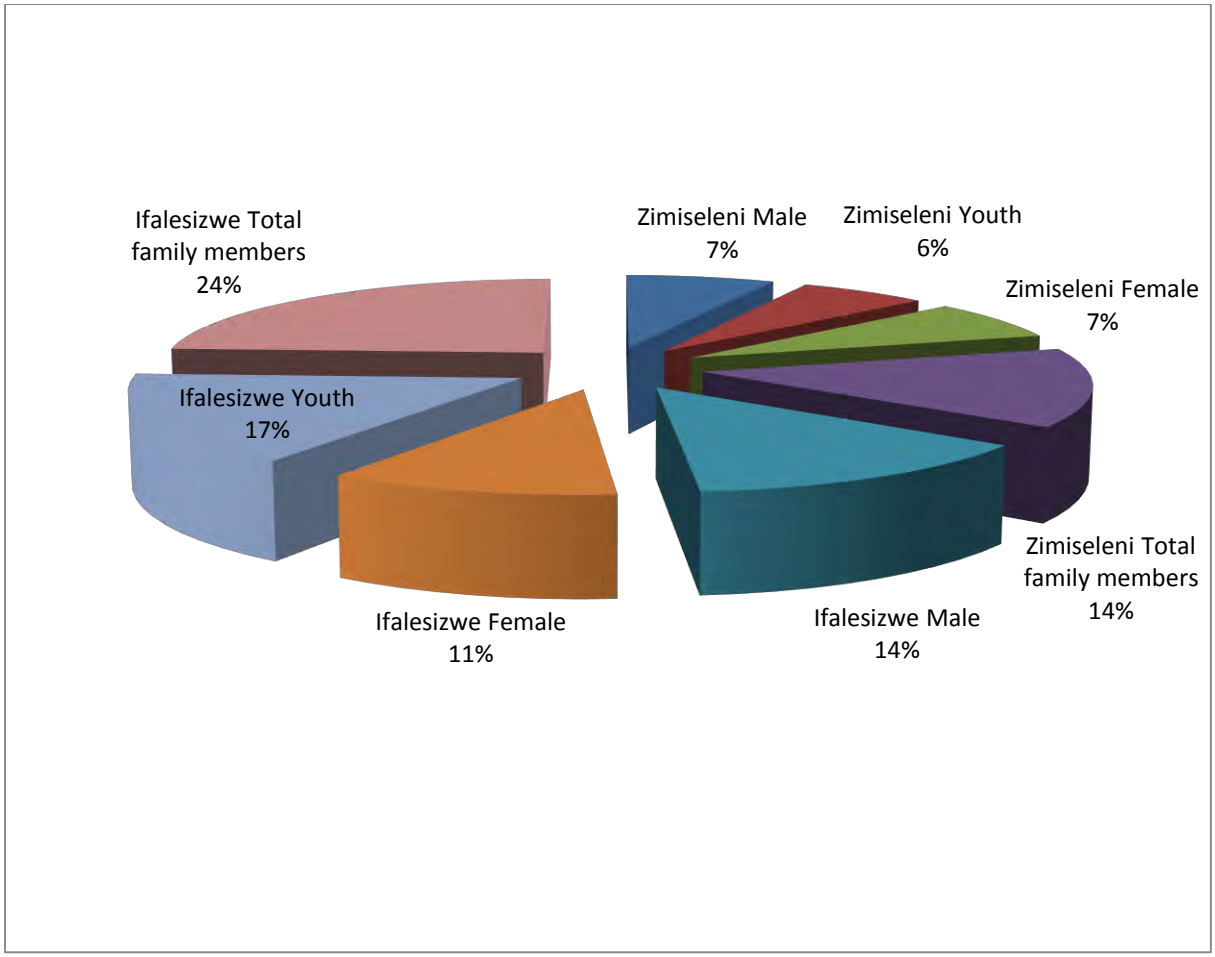

Figure 2. 4. Household beneficiaries at the study sites.

2.7.4 Source of income

Most respondents from the community gardens receive their income from social grants (Figure 2.5). All (100%) of Ifalesizwe community garden members receive their income from social grants and 90% of Zimiseleni community garden members depend on social grants as a source of income for their families. Only one community garden member depend on wage employment from another family sibling. This shows that most of the people who participate in the community gardens are those who are unemployed and most of them live on social grants. In Zimiseleni community garden where community garden members are 100% women, there is one family that get their income from other source except from social grants, whereas all Ifalesizwe community garden members only depend on social grants.

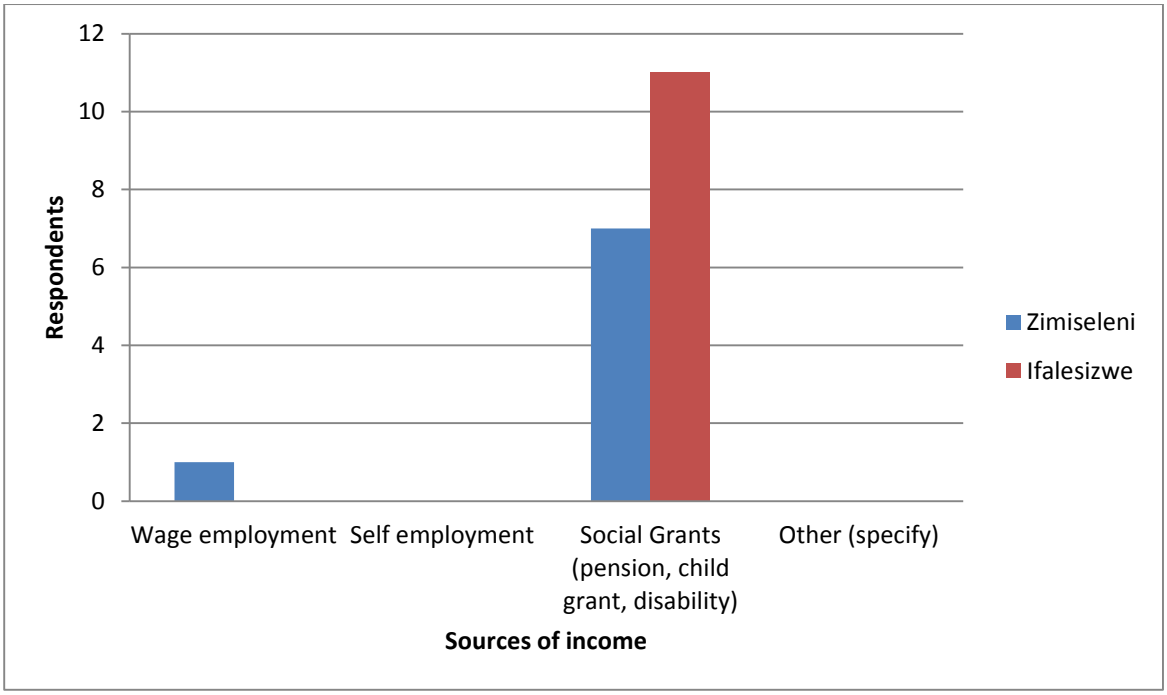

Figure 2. 5. Source of income for Ifalesizwe and Zimiseleni community garden members.

2.8 Reasons for joining community gardens

There are different reasons why people join community gardens. This section deliberates the reasons why the project members of Zimiseleni and Ifalesizwe joined the community gardens. Respondents state different reasons why they joined community gardens. Figure 2.6 demonstrates the reasons given by respondents. Both community gardens respondents gave three main reasons why they joined community gardens. The three reasons that were given by both community garden members are that they joined community gardens for selling, to get rid of poverty and to get food. All three reasons relate to improving food security. Six respondents from Ifalesizwe and five respondents from Zimiseleni indicated that they joined the community gardens because they wanted to sell the produce. Furthermore, six respondents from Ifalesizwe and three also stated that their reason for joining community gardens that it is to get rid of poverty. Four respondents from Ifalesizwe indicated that they joined community garden in order to get money, and also four from the same community garden indicated that they joined community garden because they wanted to help the community. The respondents indicated that they wanted to help the community members who could not help themselves. They indicated that they wanted to help household which are needy, especially the orphans. One main reason that was given by most Ifalesizwe community garden members, that does not relate to improving food insecurity is that they

joined the community garden in order to gain crop production knowledge. Respondents gave different reasons of why they joined the community gardens. 82% respondents of Ifalesizwe said they joined the community garden in order to increase their production knowledge. Three (3) respondents from Ifalesizwe community garden and one (1) respondent from Zimiseleni community garden indicated that they joined community garden to become better farmers and improve their knowledge of farming. This shows that the farming knowledge and farming is still significant in the rural areas. Two respondents from Zimiseleni responded by saying that they joined community garden because it is well fenced and livestock will not come to their garden. One respondent from Ifalesizwe and one other respondent from Zimiseleni indicated that they joined community garden to support their families. One respondent from Ifalesizwe indicated that keeping busy was the reason why they joined community garden and one last respondent said they joined community because of passion.

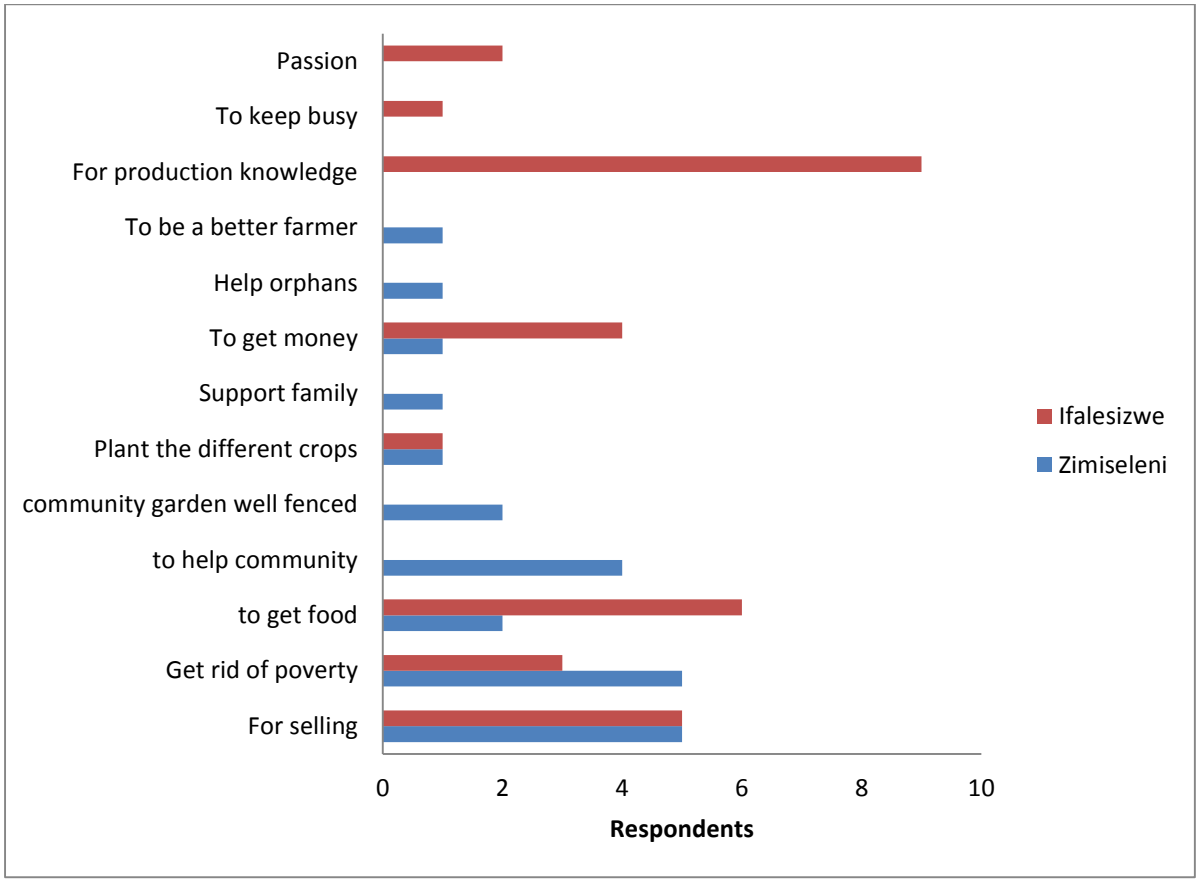

Figure 2. 6. Reasons for joining the community gardens.

Respondents from both Zimiseleni and Ifalesizwe community gardens gave a range of their benefits for being community garden members (Figure 2.7). All Ifalesizwe community garden members mentioned two main benefits of being community garden members. The first benefit was to get food and the other benefit was to get money, and 6 out of 11 respondents said their benefit of being community garden members are that their crop production knowledge is increased. Zimiseleni did not mention getting knowledge of production as a benefit of being community garden members. Most of Zimiseleni community garden respondents mentioned that they benefit from being community garden members in that poverty is reduced. Three out of eleven community members said that they benefit by selling the produce to the community and 2 said they get money for their families. Only one community garden member mentioned having more crops as a benefit of being a community garden member.

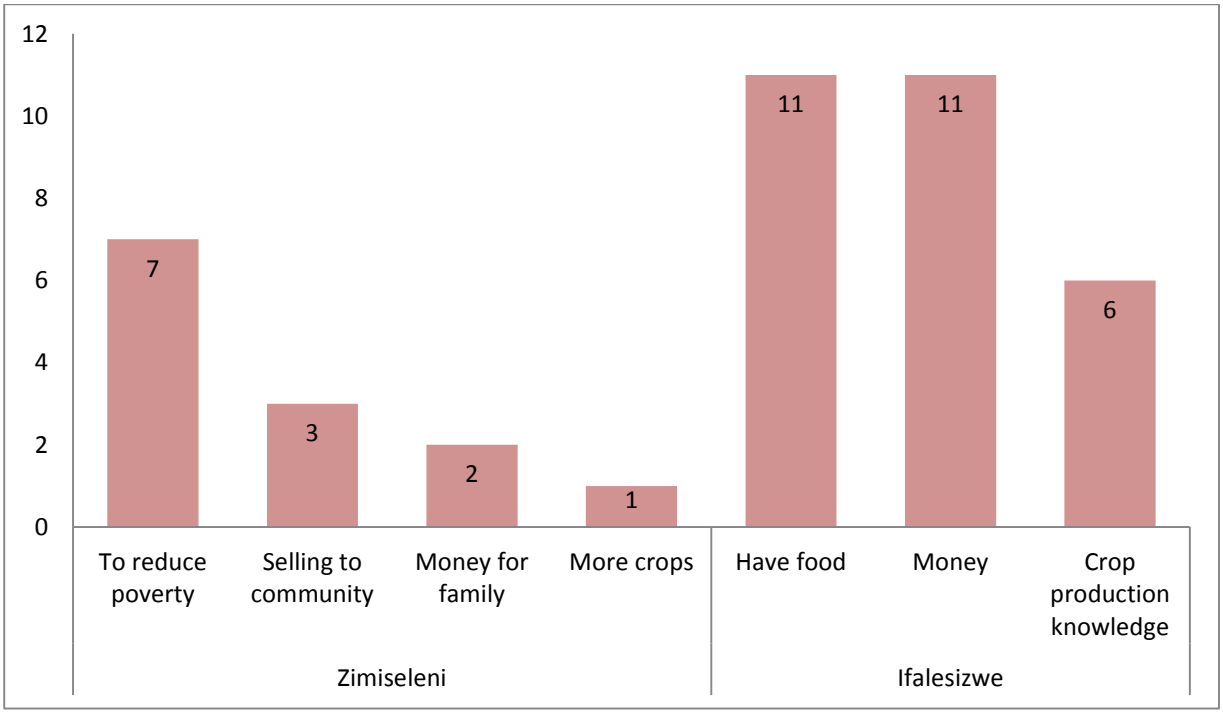

Figure 2. 7. Benefits of being a community garden member.

2.9 Household food security coping strategies

Respondents were given a list of coping strategies and they were asked to respond with a yes or no to the coping strategies. The majority of respondents indicated that in order to cope with the stress of household food insecurity, they limit their portion of food or leave food for their children (Figure 2.8). According to DAFF, 2013, a widely accepted definition of food security as provided by FAO as having access by all people at all times to enough food for an active, healthy life, which the World Bank describes in an expanded form as the physical, social; and economic access to sufficient, safe and nutritious food by all, at all times, to meet their dietary and food preferences.. To deal with the stress of food insecurity, Snel and Staring (2002), define the broad notion of coping strategies as the all strategically selected acts that individuals and households in a poor socio-economic position use to restrict their expenses or earn some extra income to enable them to pay for the basic necessities (food, clothing, shelter) and not fall too far below their society's level of welfare. According to Devereux (2002), coping strategies are a response to adverse events or shock. Devereux 2002 as quoted by Hendriks (2009) suggested that this definition implies that coping strategies involve a conscious assessment of alternative plans of action. The definition is based on the assumption that despite limited resources, the household are asset managers with freedom of choice in relation to their actions.

Even though community garden participants of Zimiseleni and Ifalesizwe somewhat produce crops for consumption and sales, in their homesteads and in the community gardens, a certain percentage of food insecurity still exists. The project participants are able to sell some of the produce to the community but this does not totally solve the problem of food insecurity as they were found to be prone to food insecurity, given their responses to the coping strategies. Community and homestead gardens provide food for household members but they did not provide adequate quantities and diversity of crops to meet their annual consumption requirement. The data shown in Figure 2.8 indicate that even though they were producing their own crops, but it did not certify their household food security need.

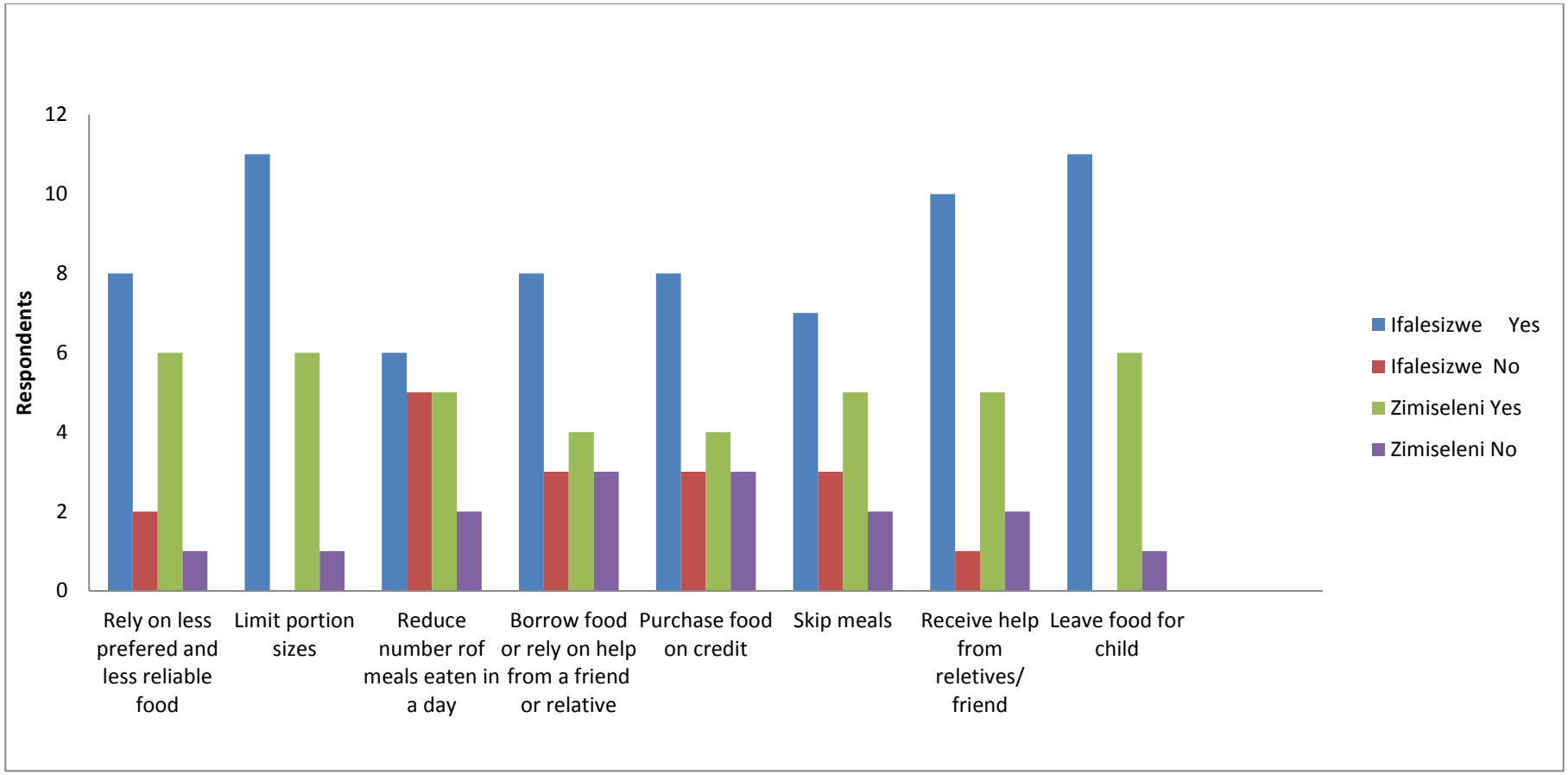

Figure 2. 8. Food insecurity coping strategies for members of Ifalesizwe and Zimiseleni community gardens.

2.10 Role of extension officers in community gardens

All Ifalesizwe respondents said that they receive knowledge of crop production from the extension officer whilst Ifalesizwe community garden respondents listed some crop production management practiced as their knowledge that they get from the extension officer Figure 2.9). Four (4) Zimiseleni community garden respondents mentioned that they receive knowledge of fertilizer application; six responded that they received advice on how to plant potatoes and four said that they were advised on how to apply manure in the garden. This shows that the advice that they receive from Extension Officers is that of producing crops. It is clear that respondents have the knowledge of crop production and management thereof. . The types of advice that the respondents get from the extension officers is that of technical support in terms of crop production and its management, There was no mention of business management and /or marketing that is provided by Extension Officers or any assistance towards that. Although some respondents mentioned that the extension officers would advise them on the types of pest control that they can use when they are facing pest challenges in their community gardens but there was no formal training provided regarding this.

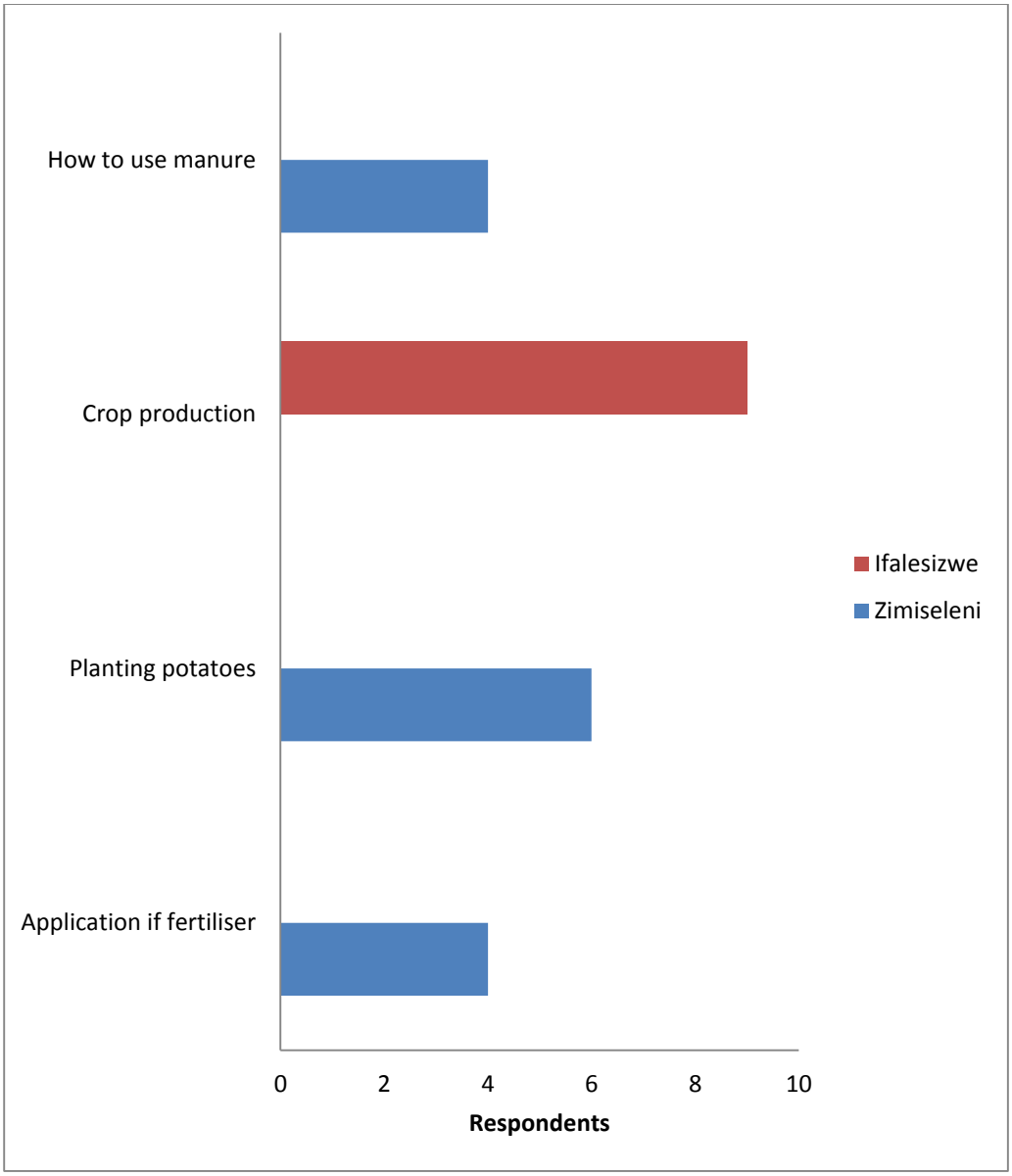

Figure 2. 9. Advice that is given by Extension Officers to Ifalesizwe and Zimiseleni communities.

2.11 Conclusion

The results of the study showed that rural community gardens are dominated by women. If government, development organisations and international funders invest in women, it might significantly enhance the food security status. The age distribution of community garden members also showed that people who are interested in farming are older people. This shows that elderly women dominate the community gardens in these rural areas. Youth does not seem to be actively involved in agriculture. This suggests that there is a need for strategies to try and draw the interest of youth towards agriculture.

The study also revealed that although the respondents are involved in the community gardens and homestead garden as a strategy to reduce their food insecurity but they are still food insecure because they still apply other coping strategies to get enough food for their families. Supplementary to that which is produced in the food gardens, there is a need for more food and income for other necessary needs to be purchased for the families to survive. This suggests that there has been no significant shift from food insecurity since they produce their own crops.

Findings of the study also revealed that the source of income for rural community garden members is social grants. The study also found that Extension officers provide advice in terms of technical support and/or crop production and management, and ignore the importance of agricultural markets and business management. There is therefore a need for extension officers to be redirected towards putting the emphasis of training in business management and the importance of agricultural markets.

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CHAPTER 3

GENERAL ANALYSIS OF CROP PRODUCTION AND UTILISATION

3.1 Introduction

Crop production management is defined by Ejim (2013) as various processes applied towards the effective cultivation and harvesting of crops. Ejim (2013) further explain that crop production management system usually includes considerations regarding the selection of the crop to plant, the preparation of the land where the crop will be planted, the application of fertilizers and pesticides, and other practices aimed at improving crop yields. Crop production is the practise of producing or cultivating crops. Crop production is usually practiced on a large scale of land. Crop production and management practices are describe by Ecol (2009) as practices that normally include among other things land or soil preparation, planting, weeding, application of herbicides, manure and/ or fertilizers, harvesting, storage, and pest management, soil management, water management practices, harvesting, food processing and preparation.

Following a determination of the use of community gardens as food security strategies, the objective of this study was to undertake an analysis of crop production and crop utilization by the farmers.

3.2 Materials and methods

3.2.1 Survey of self -evaluation of crop production

According to (Big Lottery Fund, 2010), self-evaluation has many benefits for the project and it highlights the achievements as well as areas of development in the project and helps progress towards project outcome. Big Lottery Fund (2010) further outlines that it gives an implementer useful information to report to current or potential funders, and it helps to improve the way services are run. Self- evaluation allows one to explore the reasons why things are or are not going well; to gather information that will help to write the report to funders of the project about how the project is performing and how one adapts to changing circumstances. Big Lottery Fund (2010), continues to elaborate self- evaluation that it also

allows one to identify good practices and help other projects to improve the way they work by publishing the evaluation findings.

Furthermore, Big Lottery Fund 2010, explain the compulsoriness of self-evaluation that in some cases within the programme it helps project workers develop their skills, learn from their experience and make changes and improvements. It can also help to identify new approaches and to help projects have a long term impact through identifying what works and what does not work (Big Lottery Fund 2010). Evaluation addresses questions such as whether route followed was the best one, whether it might have been better by train and whether the journey would worth undertaking in the first place (Big Lottery Fund, 2010).

In this context, self-evaluation of crop production by Zimiseleni and Ifalesizwe community gardens and homestead gardens was done by garden members as respondents. The researcher used two questionnaires which were evaluating the project members' knowledge, practice as well as advise that they receive from the advisors. This is the self-evaluation of the respondents or community garden members. Community garden members give their comparison of crop production in terms of the species. A comparison of two sites, namely Zimiseleni and Ifalesizwe community garden was used in this study. The study was also done at the homestead gardens. A comparison of types of crops that are planted in the community gardens and those that are planted at a community garden, their use was done. The study was also done over two seasons. Firstly, it was done in the summer season of 2012 and secondly it was done in the autumn season of 2013. In the first season, the researcher was monitoring what the community garden members were doing in their community garden plots and in the second season, the researcher was monitoring what the community garden members were producing. The production practices that community garden members were using were thoroughly observed by the researcher.

3.2.2 Crop yield determination

DAEA argues that there can be very marked differences between yields of different plantings of a vegetable crop, depending on the cultivar selected, and on the environmental conditions prevailing during the growth of the crop. DAEA further explains that even larger differences in yield between crops can be ascribed to the cultural practices applied, and to the relative expertise of the individual growers. Plants were also observed. The researcher would go and observe crops in the community gardens as well as in the households of the community

garden members. Measurements were taken from the community garden plots and samples of crops that we ready to be harvested were taken. A plot was measures and the number of crops that were planted in that particular plot was counted. In other instances, a plot was measured and the random spacing in between the crops as well as the spacing within crops were measured. This exercise was done in order to calculate the yield of the different crops that were planted in the field. The same exercise was done in the homestead gardens.

3.2.3 Crop utilisation

To find out what community garden member use their crops for, whether produced at a community garden or at a homestead, the researcher also used the questionnaires. Questions that were asked to address this were, what were the produced crops used for, whether for sale, subsistence or sales and subsistence; and what do you use home produced crops for?

3.3 Results and discussion

3.3.1 Self- evaluation

Zimiseleni and Ifalesizwe community garden members are planting crops that are popular in the list of popular crops that are produced in South Africa. In relation to the situation in South Africa, vegetables that are produced by Zimiseleni and Ifalesizwe community garden members actually appear in a list of popular crops of South Africa. Crops that were produced in the spring/ summer season are crops that are suitable for that season. This is supported by the responses that were given by Responded when they were asked about advice that they receive from Extension Officers. Crops that are planted in the community gardens include field crops and vegetables.

3.3.2 Production

Figure 3.1 below shows that most crops that were planted at Zimiseleni community garden were also planted at Ifalesizwe community garden in the same season. This indicates that the respondents have knowledge of what to plant and in what season. All crops that are listed in the below graph are crops that are suitable to be planted in summer season.

These crops are also amongst the crops that contribute to the industry of the country. For instance, potatoes in 2009 contributed 1.8 million of the total vegetables and Zimiseleni and Ifalesizwe community garden members also produce more potatoes ITC, 2010. Zimiseleni and Ifalesizwe community gardens are following the trend of vegetable market in South Africa.

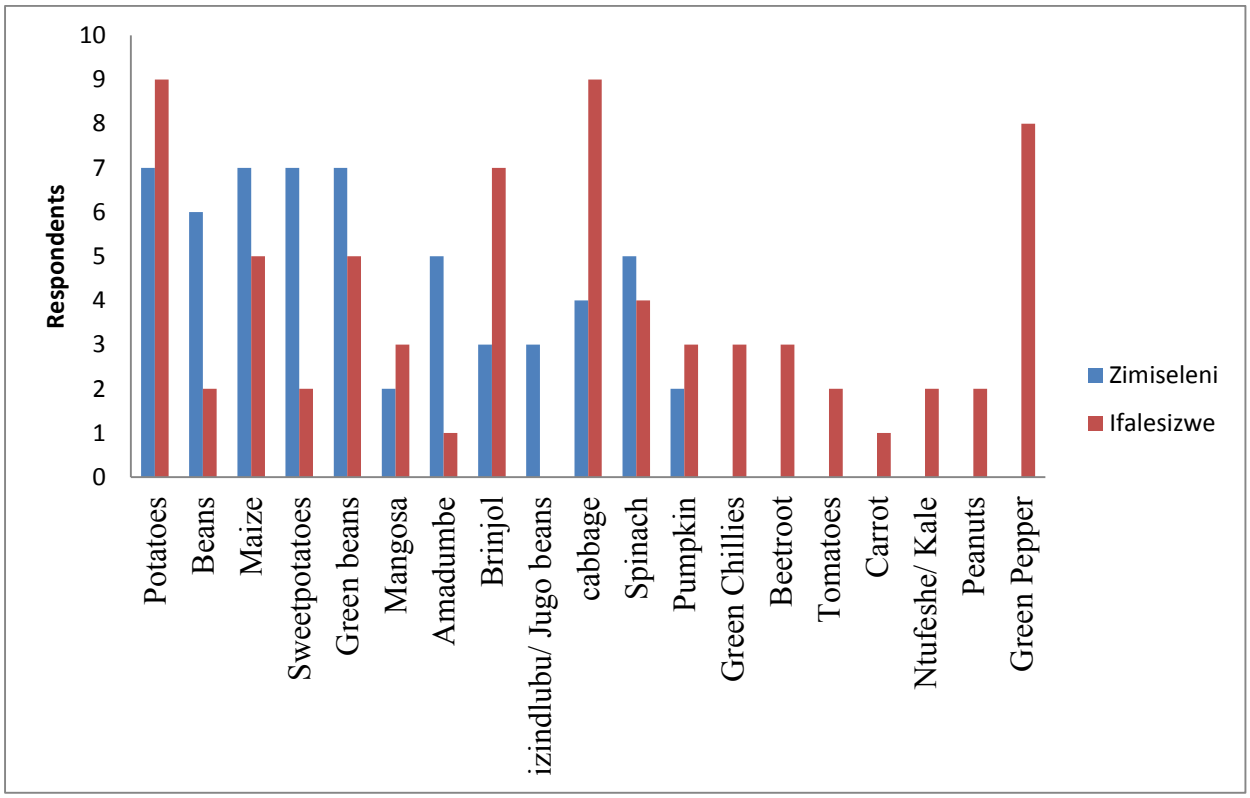

Figure 3. 1. Zimiseleni and Ifalesizwe Community garden: Crops planted in 2012/2013 season.

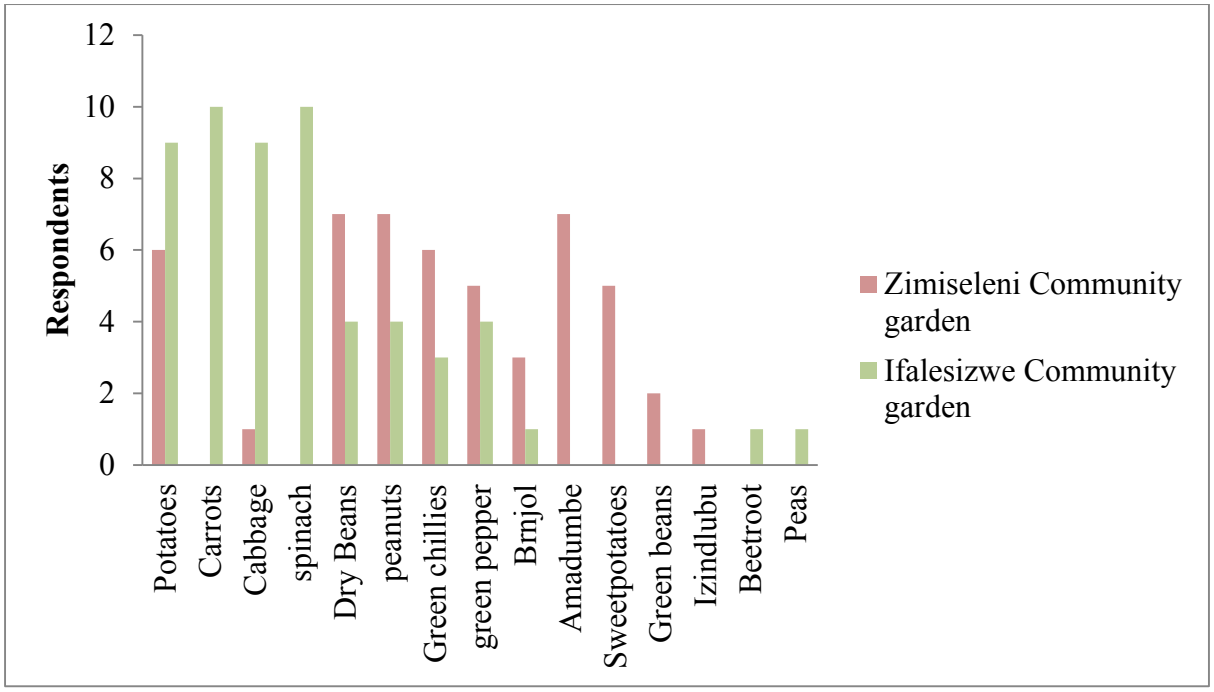

Figure 3. 2. Zimiseleni and Ifalesizwe Community garden: Crops planted in 2013/2014 season.

SA comparison of Figures 3.1 and 3.2 shows that the farmers generally produced the same crops over the two seasons. It appears that the farmers have been producing these crops for many years. Also, these are the crops that they have been exposed to by extension officers and in the case of indigenous/traditional ones (amadumbe, sweet potatoes and jugo beans), the crops are part of their culture.

One of the main practices that is required in terms of crop production is soil preparation. Soil preparation is one of the steps that are taken before planting of crops is done. Land preparation as a practice that involves turning and loosening the soil in order for the soil to allow roots to penetrate deep into the soil and to breathe one the crops are planted. Loosening the soil is also important so that it helps the earthworms and microbes which also helps in with nutrients and humus content. It is therefore important for farmers to know and understand the type of soil in which they farm. An investigation in this study showed that community garden members know the type of soil in which the produce their crops (Figure 3.3). These results were confirmed by soil analysis (data not shown). This makes it easy for them to know all the precautions and the types of crops that can be grown in their community garden. All Ifalesizwe community garden members have the same knowledge of their community garden soil type as they all responded by saying that the type of soil in their

community garden is clay. Whereas Zimiseleni community garden members have different ideas regarding their community garden soil type. This can be a challenge in terms of preparation and management of land, deciding on the types of crops that can be planted as well as other crop production management that need to be applied given the soil type. Community garden members from both community gardens use hand hoes to plough their land. Sometimes community garden members get a tractor from the Department of Agriculture and Environmental Affairs to plough for them.

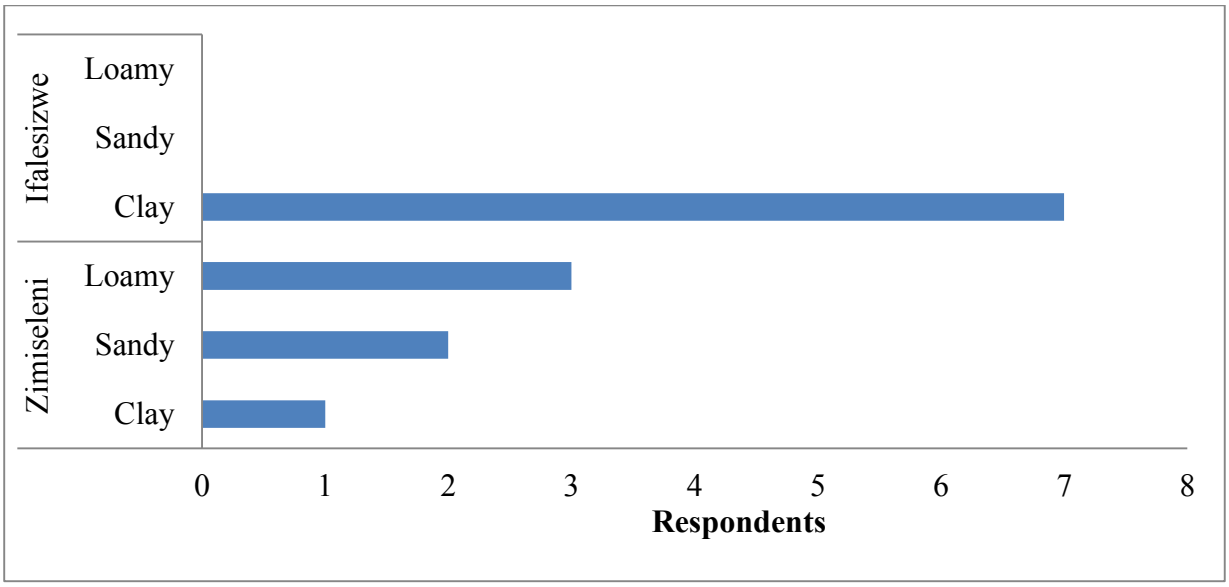

Figure 3. 3. Zimiseleni and Ifalesizwe soil types

Continuous growing of crops makes the soil poorer in nutrients. To yield a good crop regularly, we need to artificially replenish the soil with nutrients. The substances which are added to the soil in the form of nutrients for the healthy growth of plants are called Manure & Fertilizers and the process is called manuring. Manure is an organic way of managing soils and fertiliser is an inorganic way of managing soils. Manure is an organic substance that is found from plants and animal waste decomposition, whereas fertiliser is an inorganic substance, rich in specific nutrients (More than marks, undated). Zimiseleni and Ifalesizwe community garden members use both manure and fertiliser to produce the crops.

Crop rotation is another natural way to replenish the soil nutrients back to the soil. This is a practice of growing different crops alternatively. Crops are rotated by planting different crops

than those that were planted in the previous season. Leafy crops are usually interchanged with tubers. Both Zimiseleni and Ifalesizwe community garden members practice crop rotation in their gardens.

Irrigation is one of the practices that are crucial in crop production (More than marks, (undated). Water is necessary for the germination of seeds since it is absorbed by the roots of plants and along with water, minerals and fertilizers are also absorbed and nutrients get dissolved in water and then get transported to all parts of the plants and it protects the crop from frost and hot air currents. Community garden members irrigate their crops.

The source of water for Zimiseleni community garden irrigation is a river. Water is drawn from a river to a reservoir and the community garden member fetch water from a reservoir using bucket and they use watering cans to water the plants. All respondents responded by saying that the quality of water they use to irrigate is unclean and of poor quality. While Ifalesizwe community garden members draw water from the spring. The quality of water that Ifalesizwe community garden use to irrigate their crops is of good quality. They draw water from a spring to a reservoir and from a reservoir; water goes to the irrigation pipes. This makes it easy for the community garden members to irrigate their crops.

The choice of crops (figures 3.1 and 3.2) is linked to the national story since 2009. According to International Trade Centre (2010), South Africa has a strong agricultural sector. Although the industry accounts for only 2.5% of the gross domestic product (GDP), it has strong forward and backward linkages to the economy and its overall contribution is considerably higher than the GDP figure indicates. In 2009, potatoes, carrots, cabbage, beetroot and sweet potatoes are in the top list of fresh vegetables that are consumed in South Africa. The major fruit and vegetable crops grown in South Africa and annual production volumes are detailed in table 1, (ITC 2010).

The major markets that are involved in the fruit and vegetable production in South Africa are Woolworths, PICK'n PAY, SHOPRITE HOLDINGS LTD, SPAR AND FRUIT & VEG CITY. The food retail sector in South Africa is concentrated in a handful of large groups that account for over 60% of retail sales in the formal sector. These large retailers have dedicated fresh fruit and vegetable store sections and sell a wide range of processed fruit and vegetable products and nuts, (ITC, 2010). According to ITC (2010), the key retailers contract local growers directly and have procurement and distribution divisions that are responsible for

sourcing all their requirements for fresh fruits and vegetables. They sometimes make use of independent importers to handle imports of fresh produce.

ITC (2010) further discuss the market share of the major markets, product range, best practices and consume demographics. Most of goods and all fruits and vegetables of Woolworths are marketed under Woolworths brand. They sell a limited range of high quality specialty products supplied by both local and international suppliers. Consumer demographics of Woolworths are up-market (ITC 2010). ITC, (2010) found that the market share of Spar is 26.9%. Spar targets middle to lower consumers. Spar depends on the location but generally offers for the more affluent consumers by opening stores in rural areas.

Zimiseleni and Ifalesizwe community garden members choose to produce either for both sale and subsistence or for, subsistence. Zimiseleni and Ifalesizwe community garden members produce vegetables that farmers who are major producers of vegetables also produce, vegetables that are required by the market. The reason why other crops are not popular yet is because the major markets do not require them in large numbers or they do not require them at all, for example *amadumbe* (taro) are not listed and there are other vegetables which are listed under others at the bottom of the list. These vegetables could be vegetables that are either used by people who belong to a certain culture or people who are up-market in range. Woolworths as one of the major market players, its best practices are to procure from local and international suppliers (ITC, 2010). For example, (ITC 2010), also suggest that all Woolworths fruits and vegetables are marketed under the Woolworths brand, though their consumer demographics are up-market but their products are supplied by both local and international suppliers and are all labeled with the Woolworths brand.

3.4 Contribution of homestead gardens to food security

Homestead gardens are gardens that are found in the homesteads or within the household yard. The KwaZulu Natal Department of Agriculture and Environmental Affairs implement the (100m²) homestead gardens in the home yards. Nell et al. (2002) as quoted by Ndlovu 2007 suggests that food gardens are a piece of land behind a house that is used for the production of food; these foods also include vegetable products. Homestead farms are almost similar to home gardens in that they are both found in the home yards. Homestead gardens in the rural areas differ in size from those in the rural areas. The size of the homestead garden in the rural areas is determined by the size of the home yard that the family uses for crop

production and the energy and love for farming that the household members have. Homestead gardens in rural areas significantly contribute to the household food security due to the size of the land that is available for crop production in the yard. Depending on the size of land that is used for crop production, people plant crops that can adequately contribute to their income. For example Ifalesizwe community garden members prefer to plant potatoes in their homesteads because they have enough space to produce as much potatoes as they can compared to when they plant them in a community garden where space is limited. However Zimiseleni community garden members prefer to plant their potatoes in the community garden because there is more space and the garden is secured. Both Ifalesizwe and Zimiseleni community garden members realize the potential market of potatoes. This confirms what (Akosa, 2011) says that home gardening has contributed to food security in ways, such as direct access to a diversity of nutritionally rich foods; increased purchasing power from savings on food bills and income from sales of garden products, and fall-back food provision during seasonal lean periods.

Most respondents from Ifalesizwe community garden indicated that the crops that are commonly produced at homestead level are potatoes, maize and pumpkin. These crops are considered as indigenous and/or indigenised crops. Zimiseleni community garden members indicated that most crops that are produced at homestead level are pumpkin and maize. Both community gardens members mentioned crops that (Modi & Mabhaudhi, 2013) consider as indigenised crops. According to (Modi & Mabhaudhi, 2013) traditional crops, which include the crops that are indigenized and vegetables are grown in the homestead gardens. Indigenous and traditional crops can be defined as crops that have either originated in South Africa or those that have become 'indigenised' over many years of cultivation as well as natural and farm selection within South Africa. Modi et al. (2013), suggests that historically, such crops have played an important role in ensuring community and household food security through providing healthy alternatives when the main crops failed or during periods in-between subsequent harvests. The indigenised crops may include potatoes, maize, jugo beans (*izindlubu*) and dry beans among those which are produced by the respondents. The indigenous crops that are produce by the respondents include Amaranth (*Amaranthus* spp*),* sweet potatoes, and taro *(amadumbe)*. These crops are mainly produced at homestead level. The respondents from both community gardens do not plant Amaranth either at community or homestead garden but they leave enough space for it to grow naturally in their homesteads. Food that is produced from the homestead gardens is mostly used for home consumption,

except for those crops that contribute to income and requires enough land to be produced and where community gardens have a limited space. Field crops that are considered as indigenous or the indigenized crops are crops that rural people normally do not sell. They usually give to the needy families, neighbours and relatives for free. One respondent from Zimiseleni community garden mentioned that neighbours refuse to buy maize and taro (*amadumbe).*

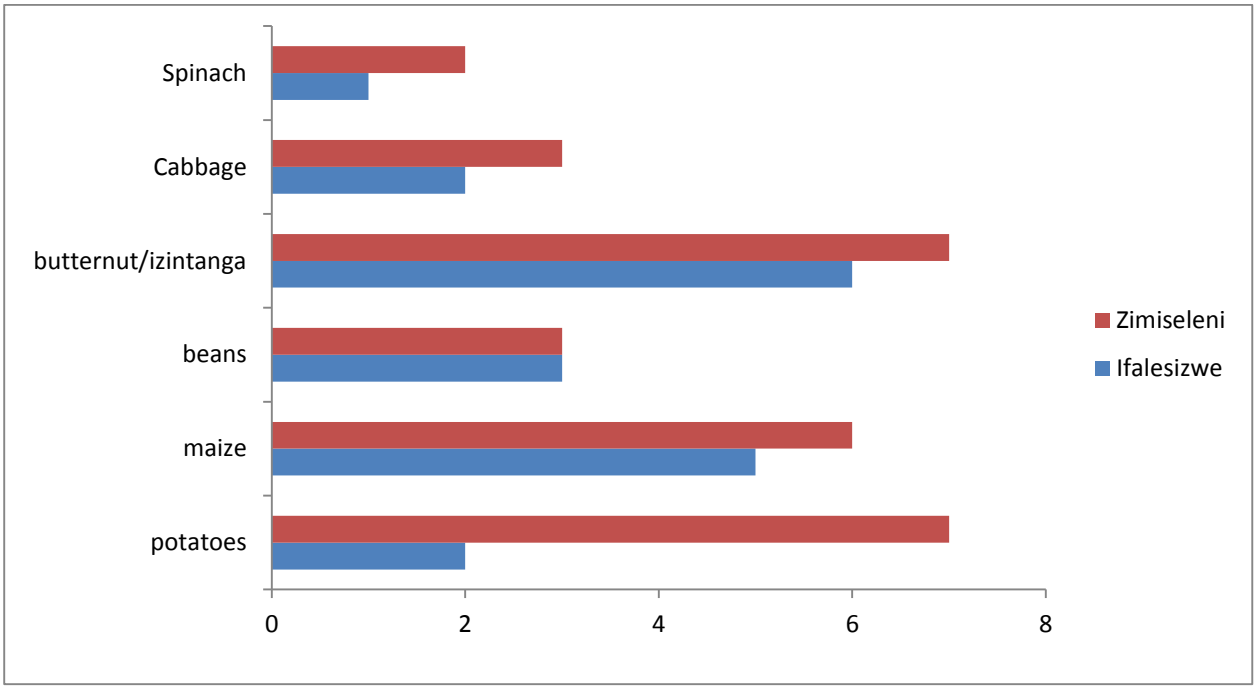

Figure 3. 4. Crops that are produced at homestead level at Zimiseleni and Ifalesizwe.

3.5 Contribution of community gardens to food security

Community gardens contribute towards household food security in that participants use the produce for both consumption and selling. Community gardens were initiated back from the eighteenth and nineteenth centuries where tropical vegetable culture survived in remote areas and mixed gardens in south East Asia, (Grigg, 1974). According to Trauger (2004), community gardens in Africa involved irrigation in home gardens since prehistoric time with the provision of vegetables for household consumption. The goal of community gardens was to increase household and intra household food security throughout the year (Trauger, 2004).

Trauger, 2004 further suggests that community gardens provide marketing opportunities to rural people and built a base for food production for the vulnerable. Chazovachii *et al* (2012)

also indicate that communities have upgraded gardens and individuals from these gardens sell surplus produce to obtain household incomes which in turn cater for household food security, basic and other emergencies. This confirms what (Chazovachii & Mutami, 2012 say that community gardens contribute to the affected and vulnerable household's food security. People get involved in the community gardens for income generation and food producing purposes. Ngidi (2007) also confirms that community gardens are for income generation and food producing activities.

Most crops that are produced at Ifalesizwe and Zimiseleni community gardens are vegetables (Figures 3.1 and 3.2). When the farmers were asked to present their crop production plan for 2014/2015, the results were similar to what was found in 2012/2013 (Figure 3.5). Ifalesizwe community garden members plant most of their vegetables at the community garden (Figure 3.4). This also confirms what (Chazovachii & Mutami, 2012) say that most of the crops that are produced from the community gardens are vegetables and they are used more for selling... Contrary to that, Zimiseleni community garden members plant those crops that are considered as indiginised crop at a community garden. These are crops that Modi *et al* suggests that they are planted at homestead level. These are necessary for the contribution to food security and well-being. All Zimiseleni community garden respondents produce potatoes at a community garden level yet Ifalesizwe community garden members prefer to plant their potatoes at their home yards. Both community gardens plant different types of crops, ranging from vegetables to field crops. Zimiseleni community garden member produce more types of crops in their community garden than Ifalesizwe community garden members.

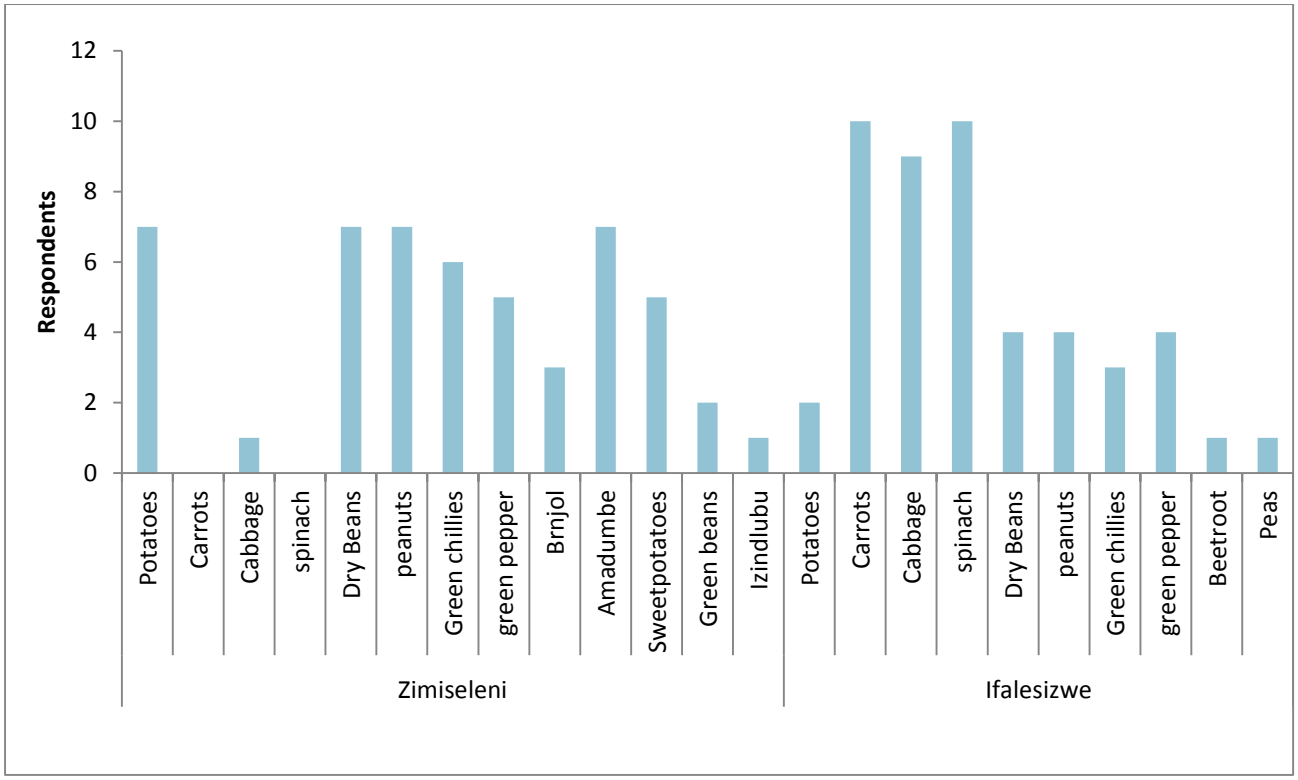

Figure 3. 5. Predicted crop production for 2014/2015 season at Zimiseleni and Ifalesiawe.

3.6 Utilisation of crops

In Chapter 2 the number of household members that benefit from the community gardens were discussed. The total number of Zimiseleni family members is 60 and the total number of family members for Ifalesizwe respondents is 101.This figures exclude the number of community members who also benefit from these community gardens Zimiseleni and Ifalesizwe community gardens contribute towards household food security in that the produce is used for subsistence as well as for sales. This confirms what (Chazovachii *et al* 2012) say that community gardens have important resources with socio-economic reproduction roles for the communal people (Moyo and Tevera, 2000) as quoted by Chazovachii et al. (2012) indicate that some villagers have resorted to gardening while waiting for the rain season and they make profits using them for accessing inputs during the main season of farming (New Farmer, 2004). Figure 3.6 displays that crops which are produced at homestead level are mostly used for household consumption. However, a significant amount of community garden produce is marketed to local communities (Figure 3.7). As discussed above, most of the crops that are produced in the homestead are used for household consumption and not for sale. The reason why respondents plant potatoes in their homesteads is because they require

more space to produce them and where there is not enough space they plant potatoes where there is enough space since potatoes contribute more than other crops to income.

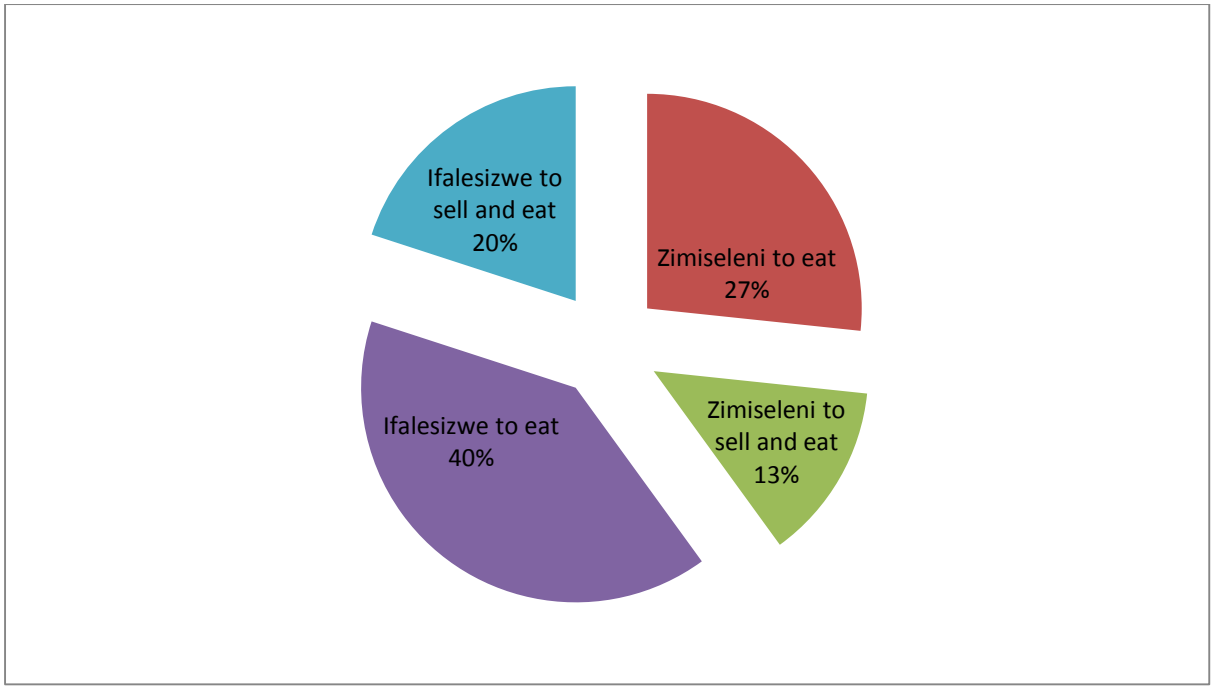

Figure 3. 6. Utilisation of home produced crops

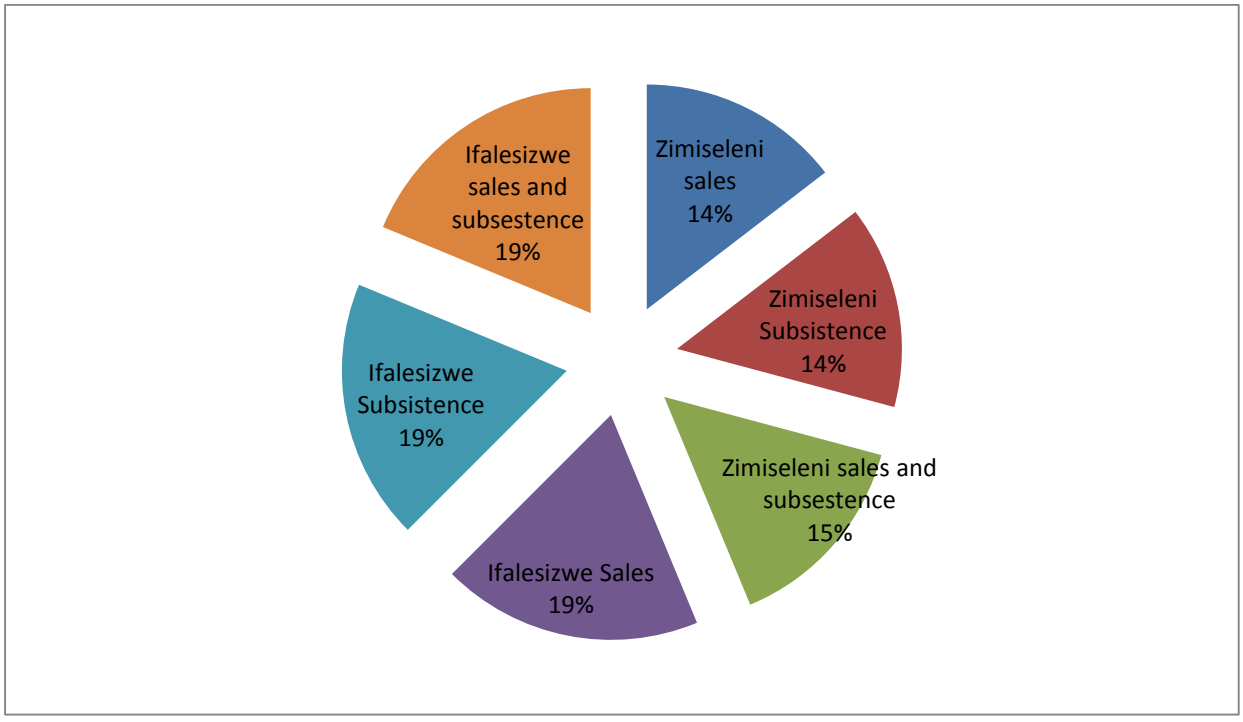

Figure 3. 7. Crops use (sales or subsistence).

Potatoes and cabbage contribute best to the income of most respondents for both Ifalesizwe and Zimiseleni community gardens (Figure 3.8). According to (ITC 2010), South Africa produced more than 1.8 million tons of potatoes in 2009. Four respondents from Ifalesizwe community garden indicated that cabbage and dry beans contribute most to income whereas only one responded from Ifalesizwe indicated cabbage as a crop that contributes most to income. ITC, (2010) suggests that cabbage and dry beans also are some of the popular crops that produced a high tonnage in 2009, and they contribute to the gross development product of the country. This shows that crops that are popular are produced by major producers in South Africa and the community projects also follow the trends of the major producers in South Africa (ITC, 2010). ITC (2010), also shows that these crops are required by major markets in the country. The product range of major markets in South Africa includes that of fresh vegetables. ITC (2010), and their buying practices are that of having contracts with the selected suppliers/ growers of fresh fruits and vegetables. For example Spar regards buying from local dealing with local agents as an easier alternative, Pick 'n Pay on the other hand prefers has contracts with a number of selected suppliers and growers and those growers have the responsibility of entering into subcontracts with smaller growers or to import fruits and vegetables when necessary (ITC 2010). Two respondents from Ifalesizwe community garden and one from Zimiseleni community garden say that green pepper and spinach also contribute more to income.

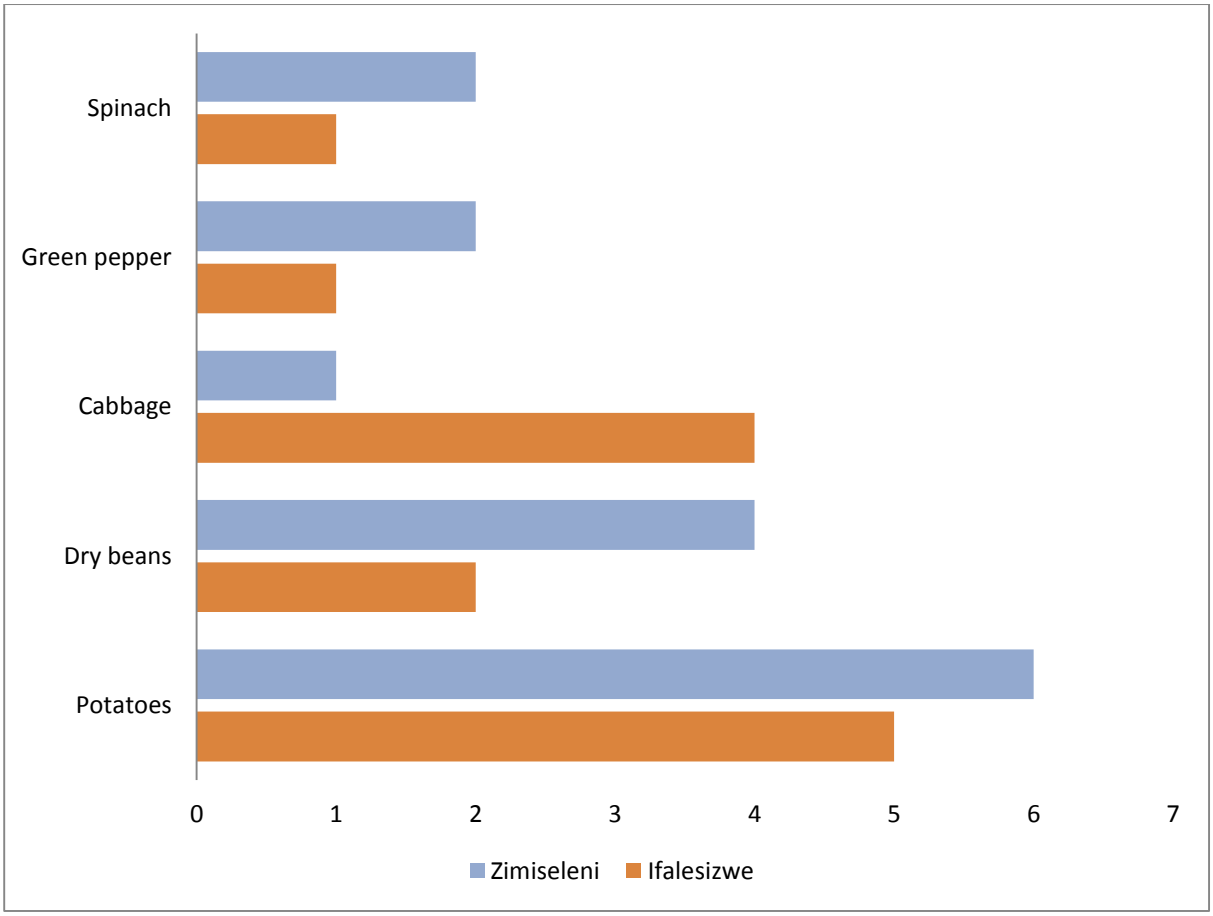

Figure 3. 8. Crops that contribute best to income at Zimiseleni and Ifalesizwe.

3.7 Conclusion

The results of the study showed that, the community gardens and homestead gardens produce enough food to meet their consumption when the produce is in season. The results also showed that the participants are following the trends of the main producers and they are producing food that is required by the market. There is therefore a need for the extension officers to incorporate the training on the marketing of produce in their extension advice. ITC (2009), point out that the major South African retailers and importers are simply unaware of the potential of African developing countries as sources of supply. They have no knowledge of the products on offer, the companies that are exporting them or the volumes available. These community garden members would benefit if there were to be a government policy that encourage the community gardens to be expanded and work together to produce for nearby supermarkets. For example, stores like Spar are moving closer to the rural areas and these community gardens can be of great contribution as producers for Spar Supermarkets. In addition to a national marketing effort, there is a need for individual exporters to engage with

buyers on a personal basis to let them know what products are available at what price points, and what the product specifications are. Where possible, samples of products should be shown to key buyers ITC (2010). There is a great need for scientifically rigorous socio-economic studies of vegetable systems in order to improve the understanding of vegetable producers' decisions and behaviour, and for the design of effective and efficient incentive conditions for the promotion of sustainable vegetable supply chain (ITC, 2010).

Woolworths subcontracts the procurement of fruits and vegetables to a handful of suppliers and importers, who source fresh fruit from a variety of domestic and international origins, (ITC, 2010). Since these respondents produce the same kind of vegetables as required by major retailers, it is clear that these respondents can benefit from South African agricultural food markets had the change been endorsed. Farmers who are major producers of vegetable are producing what is required by the market. They do not just produce anything, and the food that is required by the market is the same food that the respondents produce. Zimiseleni and Ifalesizwe community garden members are making sensible choices. The impact of these choices is that people are benefiting from the food security point of view and they are saving money which can be used for other needs and can also contribute to food diversification in order to improve nutrition security and provide for other household needs, namely clothing, food for diversification and shelter. Considering that the major markets are buying from local markets and their product range as well as the best practices links with that of vegetables that these community gardens are producing, there may be an opportunity for community garden members to have contracts, even if they are subcontracted by producers for these supermarkets. In many respect, vegetables represent a challenging subject of research, mainly due to the large number of crop species with different production and marketing conditions (Mithoff r, 2011). Mithoff r (2011) further explains that this is especially true for socio-economic issues where researchers have focused on cereal crops.

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CHAPTER 4

GENERAL DISCUSSION AND CONCLUSION

4.1 Food security implications

The aim of the study was to determine the impact of community and household gardens production and income and how this income assisted in meeting the household food security needs. This study has addressed household food insecurity in that community and homestead gardens contribute to the increase in production of crops; hence more people are being fed, at a household level from these gardens. Furthermore, given the fact that the spirit of *ubuntu* still exist in the rural areas, the produce from these gardens are also used to support the needy neighbours and orphans. The contribution of the community and homestead gardens in rural areas is therefore remarkable. The numbers of people who benefit from these gardens excludes the number of those people who buy form these gardens and those who are given for free, in the spirit of *ubuntu* as neighbours and relatives. .There is therefore a large number of people who benefit from these gardens.

The key findings of the study were that community gardens contribute to the household food security in that the garden members are able to use their crops for consumption and to sell the surplus to the community. There is however a gap in terms of marketing of the produce by community garden members. The study also found that without being part of the community gardens and producing at homestead level, households would have been food insecure and experiencing hunger. Though community garden members get some money from selling, this income led to household food security being improved.

This study also showed that community garden members produce crops that are required by the market. However, the communities participating in the present study were limited to local markets – selling "over the fence". These people are following the trends of the major producers of the crops. However there is still a gap in terms of marketing of their produce by these community gardens. The major markets of these crops that they produce require these crops in large numbers and there is therefore a need for the contracts of the markets to of buy these crops from local producers to be reexamined.

This study also revealed that even though community gardens and homestead gardens contribute in improving the household food security, it does not address the issue of safety/wellbeing. There is therefore a need of proper and constant local agricultural markets in rural areas. This suggests that food security can be achieved if government takes priority in bettering local agricultural markets value chain for small scale farmers.

The study also revealed that the people have requisite technical know-how in terms of producing crops. This was evidenced by the ability to produce exotic vegetables that require good knowledge about soils and crop management. The study also revealed that people are only indirectly exposed to crop management though limited interaction with extension officers, but taking care of the environment may not be prioritized. There is therefore a need to improve and extend skills development for agricultural extension wherein marketing and entrepreneurship should be included. Extension officers should be trained in order to assist small scale farmers' contribution to integration into value chain. One other aspect that seemed to be ignored by Agricultural institutions and extension is the aspect of sustainable agriculture.

Given this situation in world, (WHO, undated) argues that there is enough food in the world to feed everyone, adequately but the problem is distribution. NDP (2011) also suggests that South Africa produce enough food for its citizens. This suggests that implications for food security are the agricultural markets value chain, its parameters and rules set by governments which affect the basis on which nations trade with each other.

4.2 Future directions

The results of the study showed that community gardens had positive impacts on household food security in that people were able to get something to eat and also give and sell to their neighbours. The study was duplicated at more than one site over two seasons. The question of whether these people think getting a stable and proper market to sell their produce would be satisfactory should has not been answered by the study. Furthermore, the question of what the money that is made from sale of the produce is used for, whether it is used to buy food in order to improve food diversification in the household or for other livelihood needs to be investigated.

4.2.1 Policy implications

In terms of the food security policy, the future direction for the study will be that it can be used to develop a policy on establishing agricultural markets for rural communities .It can also be used to develop strategies in which the agricultural institutions and the extension capacity can be improved.

The proposed intervention in order to improve household food security in KwaZulu Natal is to develop infrastructure for local markets (NGDP, 2011). This requires the province to have a clear plan focusing specifically on local agricultural markets in rural areas (including niche markets), and a strategy for penetration of new markets, which entails securing local, national and international markets for locally produced agricultural commodities.

Amongst the challenges that are mentioned in the South African food and nutrition policy, limited access to processing facilities or markets for small-scale primary producers, including farmers, fishers and foresters is listed (DAFF, 2011). A 2011 report by the United Nations (UN) Special Rapporteur on the Right to Food identified several concerns and challenges, with recommendations on each, and steps to improve access to markets for smallholder farmers was amongst many of which need to be addressed.

Notwithstanding the above issues, the study revealed that community gardens had a positive impact on household food security. This suggests that there is a need for an action to be taken by government in terms of improving the issues that are facing community gardens in rural areas. If an action can be taken to resolve these issues that are facing the establishment of community gardens in rural areas, the impact of community and homestead gardens to food security would be improved. The issues in which action should be taken are related to support (funding, extension services, training and infrastructure, involvement of the youth). Development of programs that will include activities which will address all these issues is crucial.

One of the Provincial Growth and Development strategic goals is human and community development and it include among its objectives to safe guard sustainable livelihood and food security, promote youth, gender and disability advocacy and advancement of women. It is therefore recommended that government take an active role in issues facing community gardens, not just to ensure that they produce enough for consumption but also from a livelihood perspective and adopt a reliable policy approach to dealing with local markets in order to improve food security.

In light of the above positive contribution that community gardens in Vulindlela area can play to improve household food security, the following recommendations are suggested:

- Government must invest in improving agricultural small production
- Sustainable agriculture practices must be encouraged
- Government must keep the trade unlocked
- Small scale farmers must be linked to institutional and private markets
- Men must be encouraged to join community gardens
- Strategies that will draw the interest of youth into agriculture must be developed
- Community garden members must be given financial and business management skills training
- Community garden members must be given marketing and entrepreneurship skills
- Extension services should be alienated and focus
- Strategic partnerships to local markets must be established
- Enabling policies to support local agricultural markets must be developed

The major limitation of this study was a small sample size in terms of participants. However it is believed that the study can be used to respond to the question raised by World Health Organisation, whether national food security is paramount or no longer necessary because of global trade. The National Development plan (NDP 2011) states that agriculture has the potential to create jobs in the rural areas since it is the primary economic activity and one of the ways in which this would be achieved is by developing strategies that give new entrants access to product value chains and support from better resourced players. The assumption made in the (NDP 2011) is that these farmers can employ themselves and the two others. This can be achieved if an active interest and action can be taken by government. The question of whether South Africa is doing enough to address the issue of agricultural markets for subsistence farmers in order to improve food security still needs to be address. In terms of the Millennium Development Goal, the first MDG is to eradicate poverty and hunger by 2015.

This can be achieved if government can take priority on development of agricultural local markets for crop products.

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