

A HOME GARDENING TRAINING PROGRAMME TO ALLEVIATE HOUSEHOLD FOOD INSECURITY FOR LOW INCOME HOUSEHOLD DWELLERS



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B Tech (Food Service Management)

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DECLARATION

This dissertation is the result of my own independent work, except where otherwise stated. All sources used are acknowledged by giving explicit references. A bibliography is appended.

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Date: 19 February 2009

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ABSTRACT

INTRODUCTION: Urban agriculture (UA) is increasingly being seen as an important component of urban development and urban environmental management. Urban agriculture is an alternative source of employment, household income, food and nutrition security among many low-income urban dwellers. Investments in Urban agriculture in South Africa are negatively influenced by a paucity of information on available land and farming opportunities and lack of policy. A situation analysis in Eatonside concluded that high unemployment rates, income-poverty, chronic household food insecurity and a high prevalence of malnutrition existed. Efforts to increase food availability will bring overall benefits to the community.

OBJECTIVES: The main objective of this project was to conduct an empirical study to assess food insecurity training needs in order to develop an appropriate home gardening training programme for gardeners in the informal settlements.

METHODS: A random selection of 143 households was made from the informal settlement (refer baseline), but only 91 dwellers successfully completed the questionnaires that were administered by four trained fieldworkers. The results were analysed using the SPSS®12.0 program.

MAJOR FINDINGS AND IMPLICATIONS: The results showed that 72.5 percent had some knowledge of home gardening, whereas 29.7 percent had skills at all in home gardening; 69.2 percent responded that they had some knowledge of soil management, while 69.2 percent had no knowledge regarding planting management and only 13.2 percent had any knowledge regarding storage after harvesting and preparation of vegetables. Out of all the 91 participants, only 29.7 percent had ever worked in a garden.

The researcher and fieldworkers were the first group to be trained so that they could conduct the training of the participants with the assistance of the farmers. Since the participants were both male and female, no problems were encountered with digging the

ground, as every day after training the males made a point of preparing the ground for the next day.

Training was conducted over two days for each group; there were four groups including the fieldworkers. Groups 2 and 3 had 25 participants each while group 4 had 41 participants (n = 91). On day one, the trainers provided all the theory that the participants would need to work in a garden. On day two, the trainers incorporated theory with practical training which involved the participants.

CONCLUSION

It was found that most of the householders who participated in this project owned a vegetable garden. Most of the participants felt that they had benefited greatly from the training given in the gardening project, both because they were now able to have year-round access to fresh vegetables, and because of the money-saving aspect.

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GLOSSARY OF ABBREVIATIONS

ANC	African National Congress
CFP	Cities Feeding People
CRC	Central Research Committee
ENDA	Environmental and Development Activities
ENDA-ZW	Environmental and Development Activities of Zimbabwe
FAO	Food Agriculture Organisation
FSIS	Food Safety and Inspection Service
GDP	Gross Domestic Profit
GNU	Government of National Unity
GOs	Governmental Organisations
IARC	International Agricultural Research Centres
IDRC	International Development Research Centres
IFPRI	International Food Policy Research Institution
IIRR	International Institution for Rural Reconstruction
IUAP	International Urban Agriculture Perspectives
NEP	Nutrition Education Programme
NGOs/ NGO	Non-Governmental Organisation/s
NRF	National Research Foundation
PI	Program Initiative
R&D	Research & Development
RDP	Reconstruction & Development Programme
RUAF	Resource Centre on Urban Agriculture and Forestry
SCSA	Sustainable Cities in South Africa
TUAN	The Urban Agriculture Network
UA	Urban Agriculture
UANESA	Urban Agriculture Network for East & Southern Africa
UATP	Urban Agriculture Theory and Practice
UNCED	United Nations Centre for Environmental Development
UNCHS	United Nations Centre for Human Settlements

UNDP United Nations Development Programme
UPA Urban and Peri-urban Agriculture

CHAPTER 1

INTRODUCTION AND PURPOSE OF THE STUDY

1.1 INTRODUCTION

Urban Agriculture (UA) contributes to urban food security through increased food availability, stability, and, to some extent, accessibility. The production of staple foods in urban areas is seen as a coping mechanism in situations of severe food insecurity and is geared to improve household consumption in most regions of the world. In a case study done in Soweto, UA was found to be a successful strategy for the immediate relief of hunger and malnutrition (FAO, 2001a:12). The contribution of vegetables grown in urban and peri-urban areas of Southern Africa ranges from 20 percent in Windhoek and Gaborone, 30 % in Lilongwe and Blantyre, to 50 % in Nampula and 50 – 90 percent (according to the type of vegetable) in Dar es Salaam (FAO, 2001a:20).

1.2 PROBLEM AND ITS SETTING

UA has increasingly been seen as an important component of urban development and urban environmental management. According to May and Rogerson (1995:165) and Rogerson (1998:171), UA is an alternative source of employment, household income, food and nutrition security among many low-income urban dwellers. Other experiences have shown that UA can benefit the urban environment through recycling wastes, stabilising drainage, and making productive use of green spaces (Gabel, 2004:2).

Dima, Ogumokun and Nantanga (2002:52) gave detailed information about the scope and extent of UA, such as home gardening, in a number of areas in Africa. This finding agrees with AGROPOLIS (2003:13) in reporting that millions of people are now farming in cities in developing countries. They are growing crops on unused land along the roadside, raising animals in abandoned buildings and recycling organic waste into compost.

The preliminary literature review suggests that there is limited information on UA, no matter which country one chooses to examine. Data on the extent and value of output generated by UA are even more difficult to find and South Africa is no exception (Garrett & Ruel, 1999:4; ENDA-Zimbabwe, 1996:56).

Studies by Environmental and Development Activities of Zimbabwe (ENDA-ZW), show that between 1990 and 1994 land under open-space cultivation in Harare increased by 92.6 percent. Thus, a total of 9288 hectares were cultivated. Many other studies have shown that the practice of home gardening is evident in all income groups. Both the poor and the rich are involved in this activity (ENDA-Zimbabwe, 1996:25).

According to Spies (1998:7), investments in UA in South Africa are negatively influenced by a paucity of information on available opportunities and by lack of policy. For example, little or no consideration has been given to the contribution that could be made, through innovations in UA that are commercially viable, to urban sanitation, public space maintenance and general beautification of the cities, or to generating employment for the unemployed drawn from the poorest households. In South Africa, the *apartheid* political legacy has left the majority of the population living in peri-urban and urban communities characterised by extremely poor socio-economic and environmental conditions. UA activities in disadvantaged peri-urban and urban communities are still very limited in South Africa (Spies, 1998:7).

1.3 RATIONALE AND MOTIVATION

Between April and June 2002, a team of researchers from the Department of Hospitality and Tourism, in collaboration with key government departments and the Emfuleni local authority, undertook a situation-analysis survey in Eatonside informal settlement. Data on demographic and health profiles of informal settlement dwellers (n=340) were collected and statistically analysed. The findings of the survey showed that 44 percent of dwellers received less than R500.00 per month for their basic needs. The implication of

this important finding was that 66 percent of sample households had to live on R500.00 per month to feed an average of four to six people. Most kitchens in the visited households were unused during the daytime, and neither children nor caregivers could eat three meals a day. Furthermore, the dietary intake patterns showed that only a few vegetables are consumed by this community. The top 20 food items consumed included only two vegetables, namely potatoes and spinach, ranked twelfth and twentieth respectively. The portion sizes consumed were also small, namely 47 grams potatoes and 126 grams for spinach, these was for both children and caregivers (Oldewage-Theron, Dicks, Napier & Rutengwe, 2005:23).

The basic survey concluded that high unemployment rates, income-poverty, chronic household food insecurity and high prevalence of malnutrition, resulting in stunting, were issues of public concern (Oldewage-Theron, Dicks, Napier & Rutengwe, 2005:23).

The researchers recommended UA, particularly home gardening as one of the strategic interventions to be initiated in order to alleviate both household food insecurity as well as malnutrition. Therefore, the larger Thibela Tlala study was initiated and approved by all key stakeholders on 8 May 2003. The Thibela Tlala study falls within the scope of the current National Research Foundation's (NRF) accredited Research and Development (R&D) focus area entitled 'Sustainable livelihoods: the eradication of poverty'.

The Thibela Tlala study was the first large-scale investigation into agricultural intervention in an urban informal settlement in the Vaal Triangle, South Africa. Among poor urban dwellers there is a reservoir of indigenous agricultural knowledge and skills that is seriously under-utilised. An agricultural education-training programme is often identified as a major need in implementing a successful home gardening project. Therefore, this argument justifies the need to develop an intensive home gardening education-training programme for urban dwellers, especially in informal settlements; hence it falls within the context of the present study.

According to Sadik (2003:140), by defining real training needs, the trainer determines what specific knowledge, skills and attitudes to develop or improve in order to bring

trainees' performance up to standard. Training needs define specific activities and justify the investment made.

Therefore, the present Master's research project forms part of this larger Thibela Tlala study, investigating the following research question:

- 'What are the agricultural education/training needs of informal settlement dwellers in terms of existing indigenous knowledge, understanding, information, attitudes, behaviour, values, and skills (technological transfer)?'

The developed home gardening education/training programme will be empirically comparable to existing home gardening education-training programmes already developed by the Food Agriculture Organisation (FAO) in Africa (2001a:2).

1.4 PURPOSE OF THE STUDY

The purposes of this study were:

- to conduct a desk study in order to determine the available scientific evidence on different home gardening training programmes for the alleviation of household food insecurity in low-income households in developing countries; and
- to conduct an empirical study in order to assess training needs in terms of existing indigenous knowledge, information, attitudes, behaviour, values and skills, so as to develop an appropriate home gardening training programme for gardeners in Eatonside informal settlement, with the purpose of addressing food insecurity.

1.5 STUDY OBJECTIVES

In order to achieve the purposes of this study and to answer the research question, objectives were to:

- assess the training needs of Eatonside informal settlement dwellers in terms of existing indigenous knowledge, understanding, attitudes, behaviour, values and skills as far as home gardening is concerned;
- design and develop a home gardening training programme in order to promote sustainable production and consumption of vegetables for better livelihoods, food and nutrition security and healthful outcomes particularly in children and women;
- evaluate the home gardening training programme by means of observation and to give recommendations; and
- write a Master's dissertation for qualification.

1.6 VARIABLES

The following variables were investigated:

- Socio-demographic information: age, marital status, social and economic profile and employment status.
- Indigenous agricultural knowledge and skills, food consumption, attitudes, behaviour and values.
- Drawing up of a training programme.
- Testing the training programme.

1.7 RELEVANCE OF THE STUDY

Agriculture is associated with rural areas because under usual circumstances it is practised in these areas. Because large numbers of people live in crowded cities and are not involved in food production, but buy their food from the local market, it seems unthinkable that farming is possible in crowded urban areas. UA is the primary activity of the urban poor or is practised by individual households to meet only their daily need of food (Pradeepmani & Ram, 2003:59).

Urban Agriculture has played a critical role in the sustainable development of urban environments and makes a significant contribution to many cities with regards to self-

reliance in food. The amount of land available for UA continues to shrink but the need for food in the cities is becoming more pressing owing to large-scale migration from rural areas into urban and peri-urban areas. This is not only creating environmental problems but also threatening the ecological balance. Although the importance of UA is increasingly being recognised by international organisations like UNCED (Agenda 21), United Nations Centre for Human Settlements (UNCHS), FAO, International Agricultural Research Centres (IARC) and the International Development Research Centre (IDRC) of Canada, Urban and Peri-urban Agriculture (UPA) has received the lowest priority in government and development planning in developing countries like Nepal. There is an urgent need to explore in detail the benefits and constraints of UPA for sustainable development of urban environments (Pradeepmani & Ram, 2003:57).

Research studies have shown that the practice of UA cuts across all income groups. Both the poor and the rich are involved in the activity. The main difference is expressed in terms of access to resources and the driving force behind the activity. Most urban farmers point out the importance of UA in meeting household food requirements as well as the income generation and savings derived from consumption of self-produced food. A household socio-economic monitoring survey conducted by Environmental and Development Activities (ENDA) for the 1996-97 seasons confirms the nutritional significance and the economic benefits of UA. Farming households are better off in most respects than non-farming households. Even after subtracting direct input costs, the farmers have a positive net benefit, although it is a marginal one (Mawoneke & King, 1998:6).

The importance of UA is now being increasingly recognised in the international development arena. Recent initiatives and programmes such as

- the establishment of the Resource Centre on Urban Agriculture and Forest (RUAF);
- international conferences and symposia in Havana, Berlin and Germany;
- Urban Agriculture and Horticulture; and
- the International Development Research Centre (IDRC) 'Cities Feeding People' programme (CFP) (Gündel & Butterworth, 2000:1)

All the above initiatives reflect recognition of the important role played by UA in the lives of people across the globe and, in particular, the lives of the urban poor in developing countries. UA has tremendous potential for improving the livelihoods of the urban poor and for making an important contribution to food security in developing countries, and there are many good examples of this (Gündel & Butterworth, 2000:2).

The role of knowledge and information in UA is crucial. Training needs have to be addressed in order to realise the full potential of UA. The UA sector and in particular, training, have generally been neglected. The educational and extension service remains a critical gap.

1.8 OUTLINE OF THE DISSERTATION

In chapter one the problem and its setting are discussed. Chapter two follows with the literature synthesis of UA and training. In chapter three the methodology employed in this study is described. The discussion of the results of the empirical study is given in chapter four. Chapter 5 includes discussions of the major findings, as well as recommendations for implementation at levels of policy, programme and research. Finally, this chapter draws several conclusions following the dissertation.

1.9 CONCEPTUAL FRAMEWORK

The conceptual framework shown in Table 1 indicates the four different phases of this study. Phase one was the baseline survey where the researcher was assisted by the fieldworkers. Phase two was the responsibility of the researcher with the assistance of the qualified farmers recruited in the area. Phase three and four was the responsibility of the researcher only.

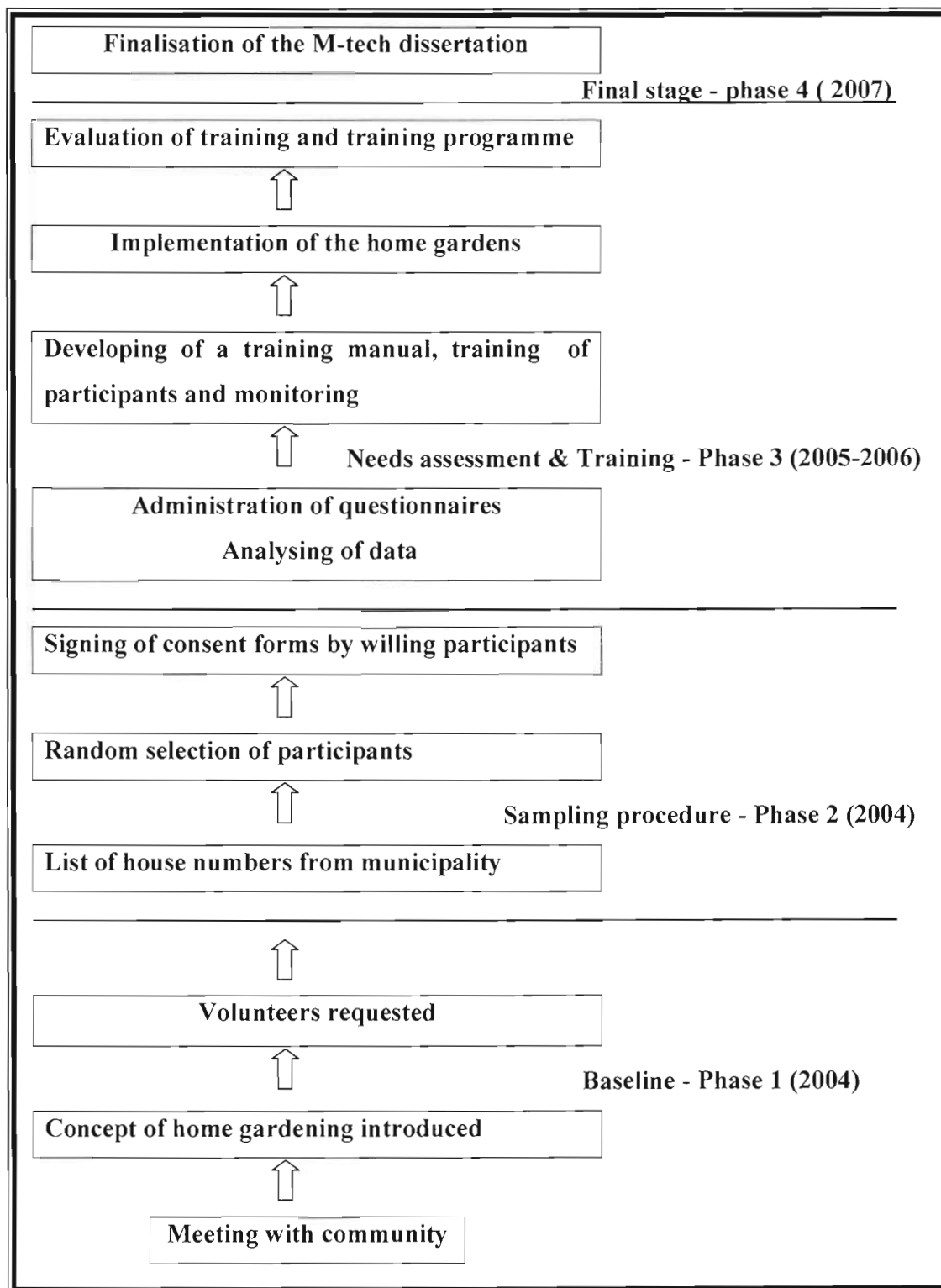


Figure 1. Conceptual Framework of the study

CHAPTER 2

LITERATURE STUDY

2.1 INTRODUCTION

UA has contributed greatly to improving the livelihoods of the urban poor and has made a considerable contribution to food security in developing countries. Consequently, UA is spreading globally and the role of knowledge and information will be crucial to its development. Up to now, the UA sector, and training in particular, has generally been neglected. Educational and extension services remain a critical gap (Gündel & Butterworth, 2000:1). In the developing countries of Africa and Latin America, food insecurity is attracting more people to the practice of UA (IDRC, Mbiba, Dankleman & Davidson quoted by Musiimenta, 2002:5).

The self-production of food ensures its availability, affordability and accessibility to food resulting in improved nutrition. It also releases for other needs for cash which would otherwise have been spent on purchasing food (Department of Agriculture, 2001:15). For the Sub-Saharan region, affected as it is by lack of food, rapid population growth, civil strife, refugee crises, environmental deterioration and unstable economic and political conditions, UA is another source of household income, employment, nutrition and food security among many low-income urban dwellers (Sawio & Spies, 1999:2).

The noticeable growth in UA throughout the world casts a spotlight upon some existing issues in agriculture and food security, and raises new ones. The immediate needs are observable and have long been commented upon even as conditions intensify. These include a need for effective ways to deal with urban food insecurity, basic infrastructure in urban areas to protect public health and environment and integrated resources management and land use planning. These issues all arise in the context of urban and peri-urban agriculture (UPA). New perspective stimulated by the growth of UPA present opportunities to address these issues in innovative ways (Grubinger, 2001:15).

2.2 URBAN AGRICULTURE IN SOUTH AFRICA

South Africa's political legacy has left the greater part of its population living in urban and peri-urban communities which are characterised by extremely poor environmental conditions; as a result, the concept of UA offers great advantages to these communities (Spies, 1998:5). South African urban areas, in particular, were affected by apartheid, with separate standards for white and non-white areas. The 'white' areas were provided with the municipal parks and recreation services, with trees and flowers planted along the streets and in parks and other public places. In contrast, 'black' urban areas were poorly equipped and financed; the municipal services provided no more than the absolute minimum (Spies, 1998:6). The Government of National Unity (GNU) is committed itself to an integrated rural development strategy which aimed to eliminate poverty and create full employment by the year 2020. Rural people must be at the heart of this strategy (Department of Agriculture, 2001:5).

Within the context of rural development, the role of agriculture is clearly pivotal. As this research illustrates, considerable problems confront the agricultural sector. It requires a vibrant and expanded programme, incorporating measures to enhance the existing base and, more importantly, to encourage the participation of those long denied access to the primary means of production (Belete, Maringa & Goqwana, 2005:26). Such a policy position calls for concerted action to address problems of access to land and, by extension support, support and training for people traditionally denied land.

If South Africa is to succeed in developing a successful rural development strategy, it is advisable to examine what has been happening elsewhere in the continent. Unfortunately, much is negative. Between 1970 and 1990 the world food per capita index rose from 100 to 112, whereas in Africa it fell from 100 to 84, while in Asia it increased to almost 120. FAO has forecast that by 2000, Africa south of the Sahara will be producing only 83 percent of its food requirements whilst in East and North Africa the figure falls to 61 percent. This is despite the fact that for most African countries, more than 30 percent of Gross Domestic Product (GDP) comes from agriculture and more than 60 percent of the

population depends upon agriculture for its livelihood (World Bank, 2000:8).

Agricultural production in South Africa constitutes just over 5 percent of the country's GDP growth (Johnson, Ostry & Subramaniam, 2007:29), down from the 20 percent it enjoyed in the 1930s. Key activities undertaken are maize farming, wheat, deciduous and subtropical fruit, sugar cane, vegetables, poultry, sheep and goats (for wool and meat) and the rearing of cattle. Environmental constraints are a serious obstacle; 'Farming conditions are not ideal, rainfall is unreliable and drought a recurring problem' (Spies, 1998:8). As a result, although 80 percent of the country's surface area is used for agriculture, only about 15 percent is arable. This naturally poses serious challenges to plans for land resettlement for previously disadvantaged black rural communities on small units.

Most of the South African NGOs and welfare organisations have discovered the importance of farming on a small scale in terms of food security and social function. They have promoted gardening activities through extension, training and supplying of seeds and fertiliser; however, town planners and policy makers in South Africa tend to view UA as a way of promoting economic development, thus favouring highly organised intensive production systems (Martin, Oudwater & Meadows, 2000:15). This limited view of UA has contributed to a lack of adequate policy, of legal and institutional support and other public services for the type of agriculture practised by most urban farmers, who at present rely mainly on the non-governmental sector for assistance (Maswikaneng, Van Averbeke & Böhringer, 2002:265; Meadows, 2000:18).

2.2.1 Historical background of urban agriculture in South Africa

In government terms, the growing interest in urban agriculture must be regarded as one new element for managing poverty in South Africa's cities. The political poverty and Sustainable Cities in South Africa (SCSA) lists 169 transformations that have occurred in South Africa which are a necessary condition for improving the lives of the urban poor. Nevertheless, the shifts to democracy are by no means sufficient; what is required is the

development and vigorous implementation of coherent programmes, such as those suggested in the Reconstruction & Development Programme (RDP), to 'spearhead a war against poverty' in the cities (Dewar, 1993:33). It is against this backdrop of 'redefining the urban game' and of new policy thinking towards poverty in cities that the first calls have been sounded for permitting or even encouraging urban agriculture in South Africa (Dewar, 1993:35).

Until the late 1980s, little information was available concerning the actual extent, workings or significance of urban or peri-urban agriculture in South Africa. Food issues have, however, particularly since 1989, attracted growing concern alongside surging food prices, which reached an annual increase of over 30 percent increase in 1992 (Rogerson, 2001:26).

For the urban poor, the consequences of these escalations in food costs have been devastating. Surveys of household expenditure among Africans in South Africa's economic heartland, the Pretoria-Witwatersrand-Vereeniging area, consistently reveal that food represents the highest single item of household expenditure, constituting roughly 30 percent of monthly expenditure (Martin *et al.*, 2000:16). In informal settlements of the Witwatersrand, studies record a pattern of expenditure profiles showing between 33 and 40 percent of monthly income devoted to food provision (FOOD, 2000:14).

Research from other metropolitan areas of South Africa suggests that an even greater proportion of household expenditure may be conjoined to food provisioning. For example, in Cape Town it was shown that poor urban households spend an estimated 40-50 percent of their income on food, and in the peri-urban areas of KwaZulu Natal, close to metropolitan Durban, up to 52 percent of total household expenditures have been allocated to food (May, 1996:23; Mbuli, 1998:10; Maxwell, 1999:39). In light of the high proportion of food expenditure by poor urban households, a number of initiatives were launched in the 1980s and early 1990s by government agencies and a variety of NGOs, designed to foster home food gardens as a means of subsistence urban food production,

particularly for such vulnerable groups as the elderly (Rogerson, 1993: 21-28).

The practice of subsistence food production in home gardens is evident in many of the formal African townships and especially in the informal settlements that have burgeoned in and around South Africa's major metropolitan areas over the past two decades. Typically, at Zonk'lizwe, a shack settlement of some 7,000 households located 35 km south of Johannesburg, 16 food gardens were initiated by community representatives in order to 'create jobs locally and provide goods and services locally' (May & Rogerson, 1995:169).

A study conducted by Walker in 2002:10 in Durban indicated that between 0 and 50 percent of the informal settlement dwellers were engaged in some form of cultivation, although 30 percent of the total sample were farming vegetable or kitchen gardens. This finding was supported by a large sample survey of urban areas of Kwa-Zulu Natal; it was found that 25 percent of households on the urban fringe owned a garden, of which 10 percent sold the vegetables from their garden as a form of income. On average, the money received from such sales accounted for 10 percent of household income. Up to 20 percent of household income and food supply came from agriculture (De Zeeuw 2002:3).

Beyond these fragmentary pieces of research, little substantive work has been conducted on the condition of informal cultivation and of peri-urban agriculture in South Africa. Rapid growth occurs, especially in and around idle lands on the fringes of metropolitan areas (Maswikaneng, Van Averbeké & Böhringer 2002: 265). One small study conducted by Matlala in Mamelodi (Martin *et al.*, 2000: 17) reported that elderly and unemployed women 'have planted the township's vacant and unused land with maize, wild spinach and groundnuts'.

The practice of informal cultivation in Mamelodi is creating conflict, with harassment by the town council as property-developers are occupying land and destroying crops to make way for houses and town houses. Plots are frequently destroyed without consultation with the women farmers who often wake up one morning to find that their crops are gone. As

urban development proceeds at an expanding rate, access to vacant land for cultivation by poor households becomes more difficult and ‘only those who are on land not suitable for housing stand a chance of being left alone’ (May & Rogerson, 1995:170). With the high price increase in food prices and low incomes, the loss of these crops has great implications for the women and their households, threatening an already threatened survival in the city and raising the spectre of urban malnutrition.

The development of informal farming is underpinned by motives for economic survival and therefore enables poor households to secure food for their own consumption as well as to produce small amounts for income purposes (May & Rogerson, 1995: 170).

2.2.2 The South African Policy and Practice on urban agriculture

According to Belete *et al.* (2005:27), the growing local interest in urban agriculture reflects the view that urban agriculture could be a new element for managing poverty in South Africa’s cities. The changes taking place in the political climate of South Africa specify the necessary conditions for enhancing the lives of the urban poor, but they are by no means adequate in improving the lives of people living in poverty. Belete *et al.* (2005:27) maintain that development and vigorous implementation of new programmes to spearhead a war against poverty in cities are needed with immediate effect.

The promotion of urban agriculture is therefore seen as significant in South Africa, especially in light of scenarios that show that, due to a lack of alternative forms of income generation, many people will have no option but to seek, either in a primary or supplementary way, sustenance from the soil. In short, the case for encouraging urban agriculture in South Africa rests on four main factors (Dewar & Uytendogaardt, 1992:34, Belete *et al.*, 2005: 27). These factors are that:

- it helps in the reunification of migrant families in that newly arrived migrants (especially women) would have access to land for the purposes of cultivation in urban areas, as they formerly did in rural areas,.

- for communities without formal education and no other skills to sell in the urban job markets, urban agriculture is the one means they have to secure a livelihood in the city.
- urban and peri-urban agriculture benefits both the petty and large-scale capitalist sectors, not merely by keeping down the cost of urban subsistence and hence the wages of the unskilled urban work force, but also by enabling a large pool of reserve labour to remain indefinitely in the city, without any costs being borne by the formal sector.
- as most poor urban dwellers cannot afford to buy all their food on a regular basis, there is no danger of the mainly subsistence-orientated urban agriculture displacing or damaging the small-farming sector in rural areas. However, owing to sales of seed and planting material, rural areas may actually gain from UA programmes (Dewar & Uytendboogaardt, 1992:34; Belete *et al.*, 2005:27).

Therefore, there are far more solid grounds for efforts to increase the prospects for both urban and peri-urban cultivation in the South African context. As a result of these, there is a strong argument for the planning of urban and peri-urban agriculture as an important part of the policy agenda for South African agriculture (Belete *et al.*, 2005:27).

2.3 URBAN AGRICULTURE AND FOOD INSECURITY

The impact of urban agriculture on food security in terms of the overall availability and supply of food for urban markets is well documented (Rogerson, 2003:133). It has been argued that urban agriculture contributes to ‘increased food availability, stability and, to some extent, accessibility’ (Egal, Valstar & Meershoek, 2001:149). For urban households, even if the proportion of total access to food from household production is small, its importance is heightened at critical times such as when the household’s income for food purchases is insufficient. As De Zeeuw, Guendel and Waibel (2002:3) have pointed out, urban agriculture functions in the South as a significant strategy for poverty alleviation and for the social integration of the urban poor, especially during periods of structural adjustment (Drescher, 2001:159). Illustratively, Nugent (2002: 86-87) asserts

that urban agriculture provides 'a particularly good buffer against sectoral shocks' or temporary emergencies from civil, climatic or macro-economic upheaval. Nevertheless, as situations of 'economic crisis' become almost a permanent condition for households in many parts of the developing world, 'farming may constitute an important means to survive by providing a substantial part of a family's food, and possibly some income' (De Zeeuw, 2002:1). The UNDP (1996:4) considers urban agriculture 'an easy-in, easy-out entrepreneurial activity for people at different levels of income'. More specifically, it states that: 'For the poorest of the poor, it provides good access to food. For the stable poor, it provides a source of income and good-quality food at low cost. For middle-income families, it offers the possibility of savings and a return on their investment in urban property. For small and large entrepreneurs, it is a profitable business.'

According to De Zeeuw (2002:1), for disadvantaged groups such as households headed by women, young people without jobs, recent immigrants, the elderly, the disabled, and so on, another advantage of urban agriculture is to integrate them more strongly into the urban network and provide them with a decent chance of a livelihood. 'Community building' is thus a positive outcome of urban agricultural developments. In addition, the nutritional benefits of urban agriculture for such vulnerable groups may be considerable. It can make available cheap fresh vegetables and other perishable crops, lowering their cost and increasing their availability, in addition to improving the micro-content of the diets of the poor. In some research urban agriculture is viewed as significantly correlated with higher child nutritional status (Maxwell *cited in* Rogerson, 2003:134).

For the increasing numbers of the urban poor and the informally employed in cities of South Africa, urban agriculture is an important means of earning an income or meeting basic needs (Nugent, 2002:87). The UNDP's (1996:170) international survey disclosed that 'urban farming provides secure jobs to many in the city' and that in some cities of the South Africa 'as many as one-fifth to one-third of all families are involved in agriculture and the majority have no other source of income'.

Mougeot's (2002:26) international cross-sectional investigation concurred that for several

cities in South Africa, UA 'makes an important contribution to employment and income generation'. From household-level studies of its impact, it is evident that urban agriculture can make a difference to those who use it. It is one strategy among many for alleviating poverty (Nugent, 2002:87). The benefits of urban farming to farmers and their families are interpreted as a springboard for its benefits to society in terms of improving the health and productivity of poorer populations and providing them with an opportunity to earn additional income (UNDP 1996:165).

Deelstra and Girardet (2002:19) state that the importance of urban agriculture for city ecology is a major component in creating a 'green' city environment. Other contributions in this respect include its potential for recycling; the re-use of urban organic wastes and waste water; the reduction of energy use by providing fresh food close to the city; increasing biodiversity; and reducing the 'ecological footprint' of a city (UNDP, 1996:165). A significant means by which urban agriculture can contribute to the environmental sustainability of cities, as well as lower the cost of waste disposal is to provide nutrient recycling of organic wastes from numerous urban sources (Nugent, 2002:85). Further environmental benefits that can be derived from urban agriculture relate to indirect improvements in urban water management, as green spaces have permeable land surfaces which allow rainwater and run-off to drain through the soil (Deelstra & Girardet 2002:52). The conservation of urban soils may be an additional outcome in circumstances of best practice, where the activities of urban agriculture have been shown to stabilise soil against water and wind erosion (Deelstra & Girardet 2002: 49). Finally, in terms of city ecology, urban agriculture can enhance environmental awareness, for example by re-educating people about the ecological base of food and about the linkages of food production to natural food chains.

Gender is an important consideration in discussions concerning urban agriculture in general, and its benefits are clearly stated. It is clear that across most of Africa, women are the predominant urban farmers, particularly in Kenya, Mozambique, Uganda, Tanzania, Zambia and Zimbabwe (Rogerson, 2003:135).

Women engage in urban agriculture partly in order to enhance their ability to feed their families ‘independently of the unreliability of their menfolk, as has been observed in several cities’ (Ellis & Sumberg, 1998:217). International research documents the particular benefits of urban agriculture for women who are responsible for family food provision. Women with low incomes benefit from urban agricultural activities that allow them to combine their multiple roles successfully in subsistence, production and environmental management (Hovorka, 2002:4). Recent studies disclose that urban agriculture is an adaptive strategy of women to protect household food security either through direct provision of a supplemental food source, as a food reserve, or as a means of stretching other sources of income (Hovorka, 2002: 4).

Urban agriculture is considered a primary strategy used by women in order to maintain livelihoods and protect subsistence production. Beyond the provision of yields for some quantity of household sustenance, urban agriculture has a further advantage of giving women the opportunity to work close to their homes, a factor which is significant in view of women’s domestic and child-care responsibilities (Mougeot, 2002:15).

The accessibility of urban agriculture is influenced by making use of many indigenous practices and low-cost inputs which are affordable for poor women. In some cases, women do not limit their involvement in urban agriculture to the sphere of subsistence and thus urban food enterprises often represent an avenue via which unskilled, uneducated women can potentially gain entry to the business milieu (Hovorka, 2002:3; Mougeot, 2002:15). Finally, in terms of women’s role as environmental resource managers, several linkages that facilitate both enhanced household food security and local environmental sustainability have been identified between waste management and women’s participation in urban agriculture (Hovorka 2002:3).

Maxwell (2002:1) observes that urban agriculture in Africa ‘is the largest strategy adopted by households whose monetary incomes are not enough to purchase sufficient food’. The impacts of urban agriculture are clearly greatest for the households of the urban poor. Recent surveys of African research confirm that urban cultivation provided

poor producers with much-needed food and income (Binns & Lynch, 1998:777; Lynch, Binns & Olofin, 2001:159). Mougeot (2002:22) documents the positive effects of urban cultivation on community welfare in many African cities. Subsistence food production represents a crucial survival niche adopted by the most vulnerable households in the majority of the urban areas of sub-Saharan Africa (Lee-Smith, 1999:20). Self-production can represent up to 60 percent of total food consumption in low-income households, with the highest levels having been recorded for Kampala (Mougeot, 2002:22). Undoubtedly, the proliferation of agriculture across urban Africa must be interpreted in part as a consequence of globalisation processes and structural adjustment programmes, which had negative consequences for household food security (Rogerson, 1997:337).

Self-provisioning, or the production of one's own food, became a strategy by means of which families try to cope with the impact of structural adjustment measures, thereby releasing pressure on the family food budget (Rogerson, 2003:136). As is confirmed by several research investigations in Harare, the dominant push factor encouraging the practice of urban agriculture 'is increasing economic hardship, particularly that which results from the implementation of economic structural adjustment' (Bowyer-Bower, 1997:53). For the majority of urban households, rising insecurity regarding access to food is an economic issue rather than a matter of the unavailability of food in urban areas (Thorgren, 1998:12).

The message is clear: urban impoverishment occasioned by structural adjustment and globalisation pressures has forced an increasing segment of the urban population to grow food in the face of escalating costs and reduced incomes (Byerley, 1996:307). Indeed, urban agriculture has been recognised as a coping mechanism enabling urban households in general and the poorer households in particular to deal with worsening urban food insecurity, especially since the 1990s (Smith & Tevera, 1997:25). Accordingly, urban agriculture has therefore emerged as a crucial economic activity within the economies of most contemporary African cities (Chivinge, Machakaire & Mudimu, 2001:84; Binns & Lynch, 1998:778).

2.4 THE CONCEPT OF HOME GARDENING (URBAN AGRICULTURE)

The home garden is an integrated system, which is comprised of different things in its small area: the family house, a living/playing area, a kitchen garden, and a mixed garden. It produces a variety of foods and agricultural products, including staple crops, vegetables, fruits, medicinal plants and livestock for home consumption or use and for income (FAO, 1999:2).

The home garden compound has different areas and functions. There are three main areas within the typical home garden. Each of these provides a different aspect for the family that lives there (FAO, 1999:2). The first area will be by the roadside: in this case people will use land on the side of the road to plant their crops and vegetables. The social area will be in the front of the house, incorporating the clean-swept courtyard. This area will mostly be used as a place for social activities. The utility area will normally be around the house. This area can be divided into two parts, which are the production area and the activity area. The production area is mostly a place for growing food and cash crops and for raising animals. The activity area will be mostly used for washing, storage, animal shelter and latrine, but also for a kitchen garden (FAO, 1999:3).

The literature on UA reveals that the practice has been expanding since the late 1970s in many parts of the developing countries. This is due to rapid urbanisation, ineffective agricultural policies and crippled food distribution systems, withdrawal of subsidies, and reduction of wages, inflation, civil strife, unemployment, tax, urban regulations and drought (Musiimenta, 2002:5). In this era, more advanced UA is typically found in Asian cities, which sometimes accept and promote food production as a critical urban function. In the developing countries of Africa and Latin America, food insecurity is drawing more people into the burgeoning practice of UA (Musiimenta, 2002:5).

Presently, some families in Western cities have garden allotments, mainly for vegetables, poultry and small ruminants such as rabbits and guinea pigs (Food, 2000:19). In New York City, gardens grow where urban wastelands existed few years ago, while the

apartment block of St. Petersburg are countering the collapse of food systems in Russia by growing vegetables on rooftop gardens (Musiimenta, 2002:5).

It is believed that urban cultivation in Zimbabwe dates back to the formation of the first colonial cities (Gabel, 2004:1). Within the last decade, the practice has gained greater importance within Harare due to increasing urban food insecurity, concerns over environmental degradation of land and water, competition from other land uses and its popularity as a long-standing practice among residents. According to Drakkakis-Smith (1996:26), few attempts have been made to contextualise or explain the practice of space cultivation, which had been largely dominated by women before the 1990s. As of 2002, there were no policies that specifically addressed the needs of black women who produce food on any open space. In addition, there were no specific strategies to incorporate them into the decision-making processes or policy circles that were underway to legalise the practice (Gabel, 2004:2).

The academic study of UA and UPA's subsequent uptake into the agendas of the international development industry can be traced to research undertaken in the 1950s by Vennetier in the Congo (Gabel, 2004:4).

Writings and research under the umbrella of UPA are extensive, in terms of focus and volume. As food is being considered no longer a basic need but a luxury for the urban poor, it is no surprise that low-income groups and the poor are engaged in UA, and in most cases are over-represented in proportion to other income groups. This is particularly noted in an UA paper focused on African cities (Foeken & Mwangi, 2000:312 and Jacobi, Amend & Kiango, 2000:260) suggested that some segments of the population engage in UA because they have no other means available to them, and are considered marginalised or distinct groups in the literature. These groups are often categorised as very low-income, the poorest female-headed households, widows, families abandoned by the primary wage earners, the land-insecure, or simply as 'women' (Foeken & Mwangi 2000:315; Kreinecker, 2000:391).

Gabel (2004:4) argues that Urban Agriculture is often considered as part of the informal economy, although some critics maintain that it does not belong to the informal sector because of its mainly subsistence nature (at least in Sub-Saharan Africa). What is relevant, according to Rogerson (2003:132), is that for some urban groups, agricultural activities are extremely important, in the sense that they are part of a strategy of income generation necessary to maintain a certain level of living or even to survive. From this point of view, agriculture by urban dwellers is related to declining purchasing power and to urban poverty, which in its turn is partly the result of the economic crisis prevalent in most African countries (De Zeeuw *et al.*, 2002:163). Because of their combined productive and reproductive responsibilities, the role of urban women is crucial in this respect.

It is increasingly being recognised that UA is an element of the wider urban environment (and, hence, an aspect of urban management and urban development). Households engaged in farming activities within the town or city boundaries make use of urban resources such as land and water, but often in a detrimental way. Moreover, access to the resources is limited and hence highly competitive and can easily lead to conflict, not only between the producers but also between producers and local authorities. By standardising and giving advice on urban agricultural practices, it is believed that not only the producers but also the urban environment as a whole will benefit, thus making urban development 'sustainable' (Foeken & Owuor, 2000:9).

2.4.1 Benefits of urban agriculture

Rogerson (2003:132), Foeken and Owuor (2000:7) and Binns and Fereday (1996:380) state that urban and peri-urban agriculture assists in addressing poverty in that it lifts hundreds of millions of people out of extreme poverty. It also improves the health and nutrition of city-dwellers. An estimated 800 million people practise urban agriculture, according to a UNDP report (1996:4). It takes place in all regions of the world – in developing and developed countries alike. Urban and peri-urban agriculture ranges from growing crops on rooftops to raising livestock in backyards and raising fish in ponds, streams and lagoons. For the poorest of the poor, urban and peri-urban agriculture

provides access to food and helps stamp out malnutrition (De Zeeuw, 2002:1). For the stable poor, it provides a source of income and high-quality food at a low cost. For middle-income families, it offers the possibility of savings and a return on investment in urban property.

For the world's poorest urban households, urban and peri-urban agriculture offers an opportunity for a better diet and a chance to shift household spending towards other needs, such as health care, education and housing (Binns & Lynch, 1998:7). Urban and peri-urban agriculture provides scarce jobs to many in the city. It provides income-generating opportunities for people with low skills and little capital as well as for people with limited mobility, including women and aged persons (Sawio & Spies, 1999:3). Environmental benefits are equally significant. Urban and peri-urban agriculture turns waste from a problem into a resource, reduces the public cost of waste management and provides a better living environment. In Khartoum in Sudan, for example, about a quarter of the city's garbage is consumed by farm animals (Sawio & Spies, 1999:3-4).

Despite these benefits, the downside of urban and peri-urban agriculture should not be overlooked. When untreated human waste is used as fertiliser, for instance, consumers risk contracting diseases such as cholera and hepatitis. Indiscriminate use of pesticides and chemical fertilisers can contaminate local water supplies, while cultivation in waterways causes erosion and siltation of water bodies (Pradeepmani & Ram, 2003:35). Very often, governments have confronted these problems by attempting to ban urban agriculture, in the process denying their cities an important source of food and economic power (May & Rogerson, 1995:169).

A better solution is to devise policies that encourage urban farmers to keep producing food but aim to prevent health and environmental hazards. For example, a model has been devised for the roles and responsibilities of central government, regional governments and local authorities in future urban agriculture policy development in South Africa. Therefore, by putting homogenous laws and regulations into effect, urban agriculture's potential can be unleashed and the sector can become a formidable

economic force (Belete *et al.*, 2005:27).

The following benefits are also echoed by the provincial poverty-alleviation strategy and visibly supported through, *inter alia*, a gardening programme (Visser, 2004:4-7).

- **Household food security:** the self-production of food insures the availability, affordability and accessibility of food, with improved nutrition. This releases for other needs like cash which would otherwise have been spent on purchasing food. Food security has been defined by the Department of Agriculture (2001:15), as ‘physical, social and economic access to sufficient, safe and nutritious food by all South Africans at all times to meet their dietary and food preferences for an active and healthy life’.
- **Economic benefits:** surplus production can be sold or traded for other much-needed items. UA activities can serve to supplement income or can become a primary source of income depending on the scale of activities. These benefits include, among other things, production of food for home consumption and sale, source of fuel (firewood), source of building materials, source of raw materials for handicrafts, and production of medicinal plants. Such activities, however, need regulation by the local authority.
- **Affordability of food to the poorest of the poor:** these micro-farmers can produce food at the doorstep of their communities and, through low input costs and the elimination of intermediaries, they can subsequently deliver products at a price lower than the formal market price.
- **General well-being:** general well-being is realised from people undertaking agriculture and gardening as a form of recreation. It can also be realised from the use of greenery to create a more pleasing urban environment (Slater, 2001:5).
- **Human resource development:** the execution of urban agricultural activities can coincide with technical, business and social skills development through training and practice. These include the acquisition of competencies relating to organisation of community groups, leadership and project management.
- **Increased social status and dignity:** Slater (2001:5) concluded that a garden is

symbolic of the women's important role in society as wives and as mothers. Food gardens, although small, are important because they contribute to the well-being of the family. Women gain pride and a sense of self-worth when their families consume their produce.

- **Community development through environmental education:** These benefits include hands-on experience with biological systems, recycling of selected waste materials and active participation in the use, planning and management of land.
- **Nature conservation:** because the yield from urban agricultural activities impacts positively on their survival, people recognise the real value of land and are prepared to maintain it. Furthermore, urban agricultural activities could be directly combined with nature conservation, e.g., where indigenous flora is used as windbreakers or to demarcate boundaries.

Other benefits suggested by FAO (2001b:28) include:

- access to the consumer market. In this market vegetables from the household could be sold to the neighbours and local super markets;
- reduction in post-harvest losses. This means that households will harvest only vegetables needed at the time while the rest can be left in the garden;
- less need for packaging, storage and transportation of food. Because there is no need to harvest all the vegetables at once and they can be harvested only when needed, there will not be any need for packaging material and storage. Even when the vegetables are sold to the local markets and neighbours, they will be picked only as needed; and
- proximity to services, including waste water treatment facilities. Usually the vegetable gardens are situated in the backyards of the households, where watering would not be a problem; also, most people make a compost heap in the backyard.

The FAO (2000:7) indicates the requirements for planning, implementation and improvement of urban and peri-urban agriculture as:

- Creation of governmental and municipal awareness.

- Identification of stakeholders and institutional framework.
- Site survey - identification of current and potential sites for UPA.
- Identification of potential for cultivation practices.
- Identification of main constraints to agriculture and greening.

2.4.2 Challenges of urban agriculture

According to Visser (2004:8), the various factors that will influence the development of UA range from negative health and competing land use to access to production inputs.

- **Health risks**

Urban Agriculture has indisputable negative impacts. Often reviews of urban agricultural activities tended to put the negative aspects in the spotlight, especially the health risks. This has served to reinforce perceptions of many governments and local authorities that UA is a marginal activity with substantial health risks that should not be supported (Lock & Van Veenhuizen, 2001:1).

The following are some of the main health risks associated with urban agricultural activities (Schiere, Tegene & Van Veenhuizen, 2002:5):

- ✓ Contamination of crops with pathogenic organisms (e.g. bacteria, protozoa, viruses or helminthes) due to irrigation by water from polluted streams or inadequately treated waste water or organic solid waste.
- ✓ Human diseases transferred from disease vectors.
- ✓ Contamination of crops and / or drinking water by residues of agrochemicals.
- ✓ Contamination of crops by uptake of heavy metals from contaminated soils, air or water.
- ✓ Human diseases associated with unsanitary post-harvest processing, marketing and preparation of locally produced food.

Negative effects on the natural environment relate to air and water pollution, soil erosion,

degradation, and insufficient waste management.

Visser (2004:9) states, 'Most concerns about agricultural activities are potential rather than inherent problems. If not practised properly, urban agricultural activities could be unhygienic and polluting to which authorities usually respond to by prohibiting the activities rather than mitigating the negative aspects'. Therefore, it is important to understand the problems, how and why they occur, and what effects they could have, because that will enable authorities to manage the activity appropriately.

- **Access to land**

Participants in UA face a wide range of constraints and problems and are less able (because they are poor) to address these problems on their own. UA has to compete for resources such as land, water, energy, finances and labour. Below are the constraints and limitations that Visser (2004:10) identified.

Land, especially in the urban context, is scarce and is subjected to pressure from a wide range of land uses such as housing, industries, public facilities, power lines and conservation. The perception exists amongst some planners and policy makers that agriculture is not a traditional and recognised urban land use and, therefore, makes competition for land by urban farmers even more difficult (Visser, 2004:10; Nel & Davies, 1999:256).

Another critical aspect with regard to access to land is the insecurity of land tenure. This relates mainly to UA on commonage land or other state-owned land where UA is viewed as a secondary land use and temporary in nature. Urban farmers cannot obtain a longer-term lease (10 years or more) to make a firm commitment or to solicit grants or borrowed funding (Gündel & Butterworth, 2000:4).

- **Access to finance**

The vast majority of participants in UA are very poor. They do not possess any real assets

that could be offered as security, neither do they have a proven track record that could demonstrate their ability and commitment. Even if they do have access to state-owned land, tenure of the land is not secure, and as a result they cannot acquire finances because financial institutions and donor agencies require long-term lease agreements (10 years and longer) before they will render substantial assistance (Visser, 2004:10)

- **Knowledge and skill**

A certain level of knowledge and skill is necessary for urban farmers or food growers to be successful. Though some participants who originate from the rural areas do have some knowledge and skills, these are not always appropriate in the urban context. Consequently there is a serious lack of agricultural knowledge, production and technical skills as well as entrepreneurship and business administration skills (Visser, 2004:10; Garnett, 1999:7).

Participants lack the capacity to bring together their needs, knowledge and activities in such a manner that UA becomes a sustainable venture which contributes to their livelihoods. In many instances urban agricultural practitioners are also ignorant of the negative impacts (especially health and environmental) of their activities (Garnett, 1999:11).

- **Access to water**

Like any form of life, UA is ultimately dependent on water, i.e. a water supply of the right quality and quantity is indispensable for plant production. There are various constraints regarding the supply of water for UA, namely:

- ✓ The impact of the principles and regulations of the water acts.
- ✓ Cost of the potable (municipal) water.
- ✓ Cost of the provision of water supply in terms of pipelines, reservoirs, etc.
- ✓ Cost of electricity for water pumps at well points/ boreholes.
- ✓ Quality of water where pollution occurs or where ground water is brackish

(Visser, 2004:11).

- **Security / theft**

Theft is a big impediment of UA. Crops, animals, fencing and equipment are stolen if not properly guarded. The provision of security incurs extra costs for the participants (Hassan, 2002:6).

- **Access to markets**

The production of a surplus can be sold for a survival or additional income but it is often not easy to find a suitable market (Slater, 2001:9). In the very poor communities there is a demand for this produce but people do not have the cash or purchasing power to buy it (Rogerson, 1998:28). Sales on credit do not work in such an impoverished community. When produce has to be transported to other market places (formal and informal), additional costs are incurred which could make them uncompetitive (Slater, 2001:10).

- **Commitment of urban agricultural practitioners**

In some instances, UA initiatives are not successful or come to a halt because the participants are not prepared to take personal risk or take up the management responsibility of the project. Usually this lack of commitment is aggravated by lack of leadership and interpersonal conflict (Hassan, 2002:6).

2.5 URBAN AGRICULTURE TRAINING INITIATIVES

There is a growing recognition of the importance and significance of UA worldwide (Dubbeling, 1998:34). This is becoming even more significant because globally, by 2020, given current trends, food production could fail to keep pace with increases in demand for food by the growing populations in the developing countries (Sawio & Spies, 1999:1).

While research on UA is increasing and there is a growing global interest in the potential of UA as a component in urban development, planning, and management, ‘a gap is fast developing between the demand of governments and organisations for guidance on UA and the supply of UA professional expertise and institutional capacities. This is critical in the developing countries. It is perhaps expanding more rapidly than urban populations and associated economies in many developing countries’ (Smith & Olaloku, 1998:7).

The vehicle for the realisation of these objectives is the development of practical models, training and/or demonstration projects in Urban Agriculture. It is perceived that once the basics of the UA practical models are dealt with, they can be used for research in technology development (Sawio & Spies, 1999:8). The UA practical models can serve as a blueprint to demonstrate how to carry out appropriate UA project planning, taking into consideration the socio-economic, political and environmental conditions of East and Southern Africa.

According to Sawio and Spies (1999:10), in the course of time the UA Network for East and Southern Africa (UANESA) will develop an Urban Agriculture and Peri-urban Agriculture Curriculum. As a tentative proposition, the anticipated curriculum could cover the following study areas, among others:

- Urban Agriculture Theory and Practice (UATP): The participants will receive theoretical and practical training on urban agriculture.
- International Urban Agriculture Perspectives (IUAP): The participants will receive training on different aspects of agriculture that will benefit both local and international urban farmers.
- Urban Agriculture, Public Health, Nutrition and Policy Frameworks in Development and Developing Countries: They will be trained on the policies, health and nutrition aspects.
- Urban Environment, Ecology, Health, Shelter and Food Systems.
- UA Management, Economics, Gender Relationships.
- Urban and Rural Household Linkages and UA development.

The list is long and varied. A curriculum cannot be that broad. The UANESA founding team will soon deliberate, review documents and agree on the formal set-up of the network itself. It is the perception of the UANESA members that the UA Practical Model for development, research and training can contribute significantly towards the financial and managerial consequences for municipalities in developing countries (Sawio & Spies, 1999:10).

These municipalities are too often inclined to follow the complex model of the highly capitalised industrialised countries, which, more often than not, have resulted in negative impacts. With regard to the UA Models, their development and establishment within UANESA will emphasise the ability to sustain the urban system, through monitoring of positive and negative environmental impacts. In time, these models will generate opportunities for urban residents in terms of food production, food supply and affordability, nutrition improvement, employment generation, training options, UA project management opportunities, and the creation of windows for research, development and urban planning capacity building (Sawio & Spies, 1999:11).

With regard to numbers of people involved in UA worldwide, estimates produced by The Urban Agriculture Network (TUAN), an NGO, show that there are about 800 million people practising UA worldwide. Of these, 200 million are producing for the market, and 150 million practises UA full-time. UA will continue to expand in the decades ahead (Sawio & Spies, 1999:4). It was estimated that between 1993 and 2005, UA could increase its share of world food from 15 percent to 33 percent (FAO, 1999:30).

Through the International Development Research Centre's (IDRC's) Cities Feeding People (CFP) Program Initiative (PI), a capacity is being built to support development research, to remove constraints and to enhance the potential for UA interventions to improve household food security, income generation, public health and waste and land management (Sawio, 1998:10). The CFP and PI have specific objectives, which are the foundations for the establishment of UA Research and Development / Training Networks,

intended to:

- strengthen local research capacity and generate information on UA at the household and community level so that cities can formulate and implement policy and technology options primarily for the benefit of the urban poor;
- mobilise and enhance regional capacities to share experiences in UA, identify common policy and technology obstacles, and share and adapt solutions through training and networking; and
- influence governments, policy-makers, and international agencies to effectively incorporate UA in their development programmes (FAO, 1998:18).

In order to realise these objectives and to tackle critical UA problems, the CFP strategies focus, *inter alia*, on:

- Formalising partnerships between individuals and organisations with UA knowledge. Ensuring that UA initiatives, including development research, must be promoted not as ends but as means.
- Ensuring that policy and technology interventions in UA are seen as components of larger development strategies aimed at urban food security, poverty, income generation, environmental improvement, and gender and ethnic dynamics.
- Ensuring that UA initiatives, including development research, must consult appropriate stakeholders when designing, monitoring, and evaluating policy and technology interventions. These stakeholders include community-based organisations, NGOs, professional associations, municipal and national governments, research institutes and external support agencies (Sawio & Spies, 1999:5).

2.6 NEED FOR TRAINING IN URBAN AGRICULTURE

Urban and Peri-urban Agriculture is seen more and more as an important component of

urban development and urban environmental management. It can be used as a good source of income, employment and food supply for the urban poor (Sawio & Spies, 1999:2).

In South Africa for example, UA is seen at the national level in the policy context of Agenda 21 and the Reconstruction and Development Program (RDP). According to Sawio and Spies (1999:4) there is irrefutable evidence that national strategy for sustainable development would be developed by 2002.

Correspondence with the International Institute for Rural Reconstruction (IIRR) has highlighted the importance and interest of Non Governmental Organisations (NGOs) and other stakeholders in acquiring knowledge on topics in UA. Many projects supported this view. For example, in Cagayan de Oro (Philippines), limited knowledge of appropriate input, and attack from pests were amongst the constraints identified for low vegetable production (Potutan, Schnitzler, Arnado, Janubas & Holmer, 2000:416). In Jakarta (Indonesia), limited knowledge, including on marketing systems, was identified as a constraint, and improved provision by local government of basic technical information and scientific data for all stakeholders ranging from updated maps to practical guidelines was recommended (Purnomohadi, 2000:457).

2.6.1 Importance of knowledge in Urban Agriculture

Training is often acknowledged as a major need to which there is restricted access in UA projects; however, uptake of lessons learnt is often rather limited, for various reasons. There are many constraints other than level of knowledge that hinder the development of UA, for instance unfavourable political circumstances and land use policies. It can be argued that in some contexts, UA requires a thorough approach. This can be because cities are particularly dynamic (Gündel & Butterworth, 2000:2).

According to Gündel & Butterworth (2000:2), changes in available space, resources and assets are often rapid. Economic change results in substantial variation in the numbers of

unemployed or underpaid people who need to supplement their food sources or incomes through UA. Migrants may bring extensive agriculture skills to the city, but these are not automatically well adapted to the urban environment. Modern and improved knowledge is required to facilitate the safe and successful practice of UA by urban farmers, and to support the needs of these dynamic urban farming systems.

2.6.2 Importance of acquiring skills and experience in Urban Agriculture

Farming the home garden is not a simple task. Plants, animals and insects act differently in different seasons and sometimes they become a crisis when a farmer least expects it. A farmer needs to familiarise himself or herself with the climate and conditions of an area before he or she can be confident enough to develop a home garden successfully (FAO, 1999:11).

- **The observation skill**

Each day, the farmer should take a walk around the vegetable garden and look closely at the plants and insects. Changes in plant growth, such as the development of new seedlings, flowers or fruits, often require the farmer to take action in order to shield plants from pests, weeds, too much sunlight or heavy rains. The farmer will learn by observation and experience what happens to the plants as it grows and when the changes occur. One of the best ways to gain knowledge is to watch how experienced farmers work and develop their vegetable gardens (FAO, 1999:11).

- **The planning skill**

The effective use of the planning skill depends on the application of knowledge gained from observing plants in the home garden. All food plants must be allowed enough time to grow to the right size or stage before they are ready to be harvested. From observation and experience a farmer will know how long the growing time will be and exactly what the plant or fruit looks like when it is ready to be harvested. The farmer can then plan

what needs to be done after the crop is harvested and can select which crops to be planted next after the first harvested of vegetables. In this way the farmer makes sure that the land, equipment and the family's resources are always employed in the production of food (FAO, 1999:11).

2.7 PROCEDURE FOR A TRAINING PROGRAMME

There are different types of training methods, namely individual training, group training, adult training and on-the-job training (Palacio & Theis, 1997: 402-403). The group training method is the one that is used in this research. Training can often be given efficiently and economically through group instruction. This type of teaching saves time for the instructor and trainees, and has the advantage of affording the stimulus that comes as a result of group participation. The most important psychological principle of group training is the use of a well-prepared trainer instead of fellow trainees who may have had successful experience in a limited area only (Palacio & Theis, 1997: 402-403). Often the stimulation and the inspiration given to the trainee by an able instructor are highly motivating and more important in the development of individuals than the immediate mastery of routine skills. Audiovisual aids are useful tools in such an instructional programme. Film, television and illustrative materials such as posters, charts, and cartoons, as well as demonstrations in which both the instructor and the trainees participate, usually have a good impact. However, merely showing films or videos in group training classes is wasteful unless the trainees have been alerted to the points of emphasis, time is allowed for discussion after the presentation and follow-up occurs through application on the job (Palacio & Theis, 1997: 402-403).

2.7.1 Conceptualisation of training

Before discussing training principles, the term training must be defined. Many individuals have defined training in many ways. Training is 'learning, provided by employers to employees, that is related to their present jobs.' It can also be defined as a 'change in skills' (Rothwell & Sredl, 2002:23). To understand the principles of training,

identifying why training fails is beneficial. Phillips and Phillips (2002:79) have identified eleven reasons why training and development fails within an organisation. These are as follows:

- Lack of alignment with business needs. If a training programme is not aligned or connected to a business measure, no improvement can be linked to the programme.
- Failure to recognise a non-training solution. Training is perceived as a solution for a variety of performance problems when training may not be the issue at all.
- Lack of objectives to provide direction and focus. Training should be a focused process that concentrates on the desired results. It should be developed at the higher Kirkpatrick level rather than according to traditional learning objectives.
- Regarding training as an event. When training is considered a single event, the odds of changing behaviour are slim. Without behaviour change, training fails to generate business results.
- Participants are not held accountable for results. Participants do not see changing their behaviour as their responsibility. Participants can succeed if they are properly motivated and held accountable for their results.
- Failure to prepare the job environment for transfer. Regardless of what participants learn from a training programme, if it is not transferred to the job, performance will not change and the training programme will fail.
- Lack of management reinforcement and support. Without management support, rarely will new skills and knowledge be implemented.
- Failure to isolate the effects of training. The challenge is to isolate the improvement directly due to training. Failure to do so might cause some training programmes to be discarded as irrelevant.
- Failure to provide feedback and use information about results. All stakeholders need feedback. Trainees need feedback on their progress, developers or designers need feedback on programme design, facilitators need feedback to see if adjustments should be made, and management or clients need feedback on the programme's success. Without feedback, a programme may not fulfil reach expectations.

By identifying the failure and barriers to training, organisations can increase their capacities in their training programmes. Training and education are critically increasing competitiveness, but meeting the educational challenge is just part of the answer. An effective human resources system needs an outstanding learning system, but it requires more: it requires a focus on performance. To improve human performance, the performance improvement must be managed (FSIS, 2001a:15).

2.7.2 Key questions on training in UA

The following are the five key questions that Gündel and Butterworth (2000:2) identified:

2.7.2.1 Who needs training?

The field of stakeholders in UA is broad. Target groups requiring training and improvement of knowledge vary from part-time farmers to policy makers. (Gündel & Butterworth, (2000:2) and Rothwell & Sredl, (2002:44) suggested that target groups for improved knowledge may include:

- urban farmers;
- associated enterprises e.g. in input supply, processing and marketing;
- support-providing institutions e.g. Governmental Organisations (GOs), NGOs, donors and financial institutions;
- policy makers and decision makers and institutions with legal functions; and
- planning authorities.

Farmers in urban areas range from farmers producing for self-consumption to those motivated to supply the large and at-hand commercial markets. They range from resource-poor farmers, to part-time farmers with other sources of income and the ability to invest considerable resources in agricultural production. Ethnicity, gender, and age issues are all important (FSIS, 2001b:26; Gündel & Butterworth, 2000:3).

Urban farmers may have been born and bred in the city or relocated from different areas, at different times and for different reasons. There are also huge variations in educational background and literacy among farmers. They might have limited agricultural skills or considerable knowledge of farming. Migrants for example, often bring skills from rural areas. Different individuals and groups of urban farmers clearly have different training needs. For example, in this study, training was needed on planting management (Data collected during needs analysis phase in 2004 August). In Dar es Salaam, it was identified that market-orientated farmers require more knowledge on marketing, legal matters, bookkeeping and credit management (Jacobi *et al.*, 2000:257). Amongst migrant women in La Paz, a lack of appropriate agricultural knowledge and illiteracy were identified as constraints (Kreinecker, 2000:392).

Associated enterprises that may be targeted by training programmes in UA range from small- to large-scale enterprises, and may be in the formal (e.g. fertiliser producer) or informal sectors (e.g. people involved in the recycling of organic materials). They include businesses concerned with input supply such as compost production, plant nurseries, local seed production, or fodder suppliers for livestock. Processing and marketing sector enterprises include the processing and packaging of urban agricultural production, the development of markets including street vending, local markets, niche markets, and accessing of distribution channels for output (Gündel & Butterworth, 2000:3).

Support-providing institutions include government organisations, NGOs, donors and financial institutions. They include organisations and individuals who do, or could, play a positive role in urban agricultural development such as in promoting food security and safety. Staff working in UA development projects was also included. Unfortunately, with few exceptions, such as Cuba, additional services have largely ignored UA and currently are in crisis. NGOs can fill this gap. Many donors remain unaware of the importance and potential of urban agriculture, which often does not fit neatly into existing institutional homes in these organisations (Gündel & Butterworth, 2000:3; Pradeepmani & Ram, 2003:8).

Policy, decision-makers and legislation play a vital role in issues such as land and resource (e.g. water) allocation. The need for improved information on UA and UPA exchange includes private stakeholders, and policy makers have been identified in Dakar (Mbaye & Moustier, 2000:235).

2.7.2.2 In which key areas is training required?

Gündel and Butterworth (2000: 4), Novo and Murphy (2000: 330) and Pradeepmani and Ram (2003:15) state that the key areas of constraints and knowledge required for development of urban agriculture include:

Land use and tenure issues

- how to gain access to available land
- understanding of tenure arrangements and other legal issues
- suitability of different farming systems (e.g. mixed-farming, crops, livestock, intensive mono-cultures) in order to optimise production, income and sustainability.

Food safety and health issues

- nutritional issues, e.g. choice of crops
- minimising health risks associated with the use of waste and polluted water for irrigation, and organic wastes as fertilisers, e.g. to minimise heavy metal contamination of crops.

Agronomic issues

- how to make best use of confined spaces e.g. small plots, containers, roof etc.
- making best use of limited water supplies, including the treatment and use of poor quality or 'grey' water, water harvesting, and efficient irrigation techniques. The need to use water more efficiently is an issue in many cities including Havana, Cuba (Novo & Murphy, 2000: 330)
- improving and maintaining soil fertility to increase productivity and minimise

health risks by making best use of organic wastes

- How to safely and affordably protect crops from pests

Food processing and storage

- How to eradicate contamination of foodstuffs and minimise associated health risks

Marketing issues (Nugent, 2002:68)

- increasing knowledge of market and outlets
- improving the quality of products
- improving packaging.

2.7.3.3 What types of training are needed?

There are many possible ways to deliver training, from self-learning to formal courses at a wide range of levels. Types of training that Gündel and Butterworth (2000:5) suggested are:

- Formal courses, e.g. full or part-time, distance or attendance-based courses.
- Training through schools, churches and other community forums
- Workshops and seminars.
- The use of different extension models: training and visiting, farmer-to-farmer, and perhaps urban agriculture farmer-field schools modelled upon successful approaches.
- Training through rehabilitation and occupational therapy
- Training of trainers
- Adapting of existing training materials: many training materials that are not developed specifically for urban agriculture can be adapted

2.7.3.4 Who will deliver the training?

Since formal extension is recognised as being in crisis in most countries, innovative or

alternative institutions or trainers have to be identified or considered. Even as training materials and resources improve, the development of capacity to deliver training is a major issue. Access of urban farmers to formal agricultural extension services tends to be very restricted (De Zeeuw *et al.*, 2002:163). Poor farmers producing for subsistence or local markets are consequently reliant upon NGOs. Potential training agents could include farmers from rural or urban areas, promoters in the community e.g. churches, schools, women's groups, etc., and NGOs with different agendas and entry points (Gündel & Butterworth, 2000:5).

2.7.3.5 What are the current key constraints in meeting training needs?

These vary from a lack of training materials and resources to underestimation of the importance of training. Gündel and Butterworth (2000:6) and Jarvis (2004:23) indicated the following key constraints in delivering appropriate training:

- Underestimation of the importance of training and skills development in urban agriculture, especially in knowledge-intensive areas.
- The lack of readily available training materials. These need to be easily accessible, systematised and available in appropriate languages at affordable cost.
- Insufficient adaptation of the available materials and knowledge to local problems and circumstances.
- Given that urban agriculture often suffers from a lack of an 'institutional home' training development tends to be project- and initiative-based rather than organisation-based, and achieving sustainability is therefore often problematic.

2.8 DESIGNING A TRAINING PROGRAMME

When developing training materials and programmes, the following principles should be addressed (Rothwell & Benkowski, 2002:21):

- Adults learn in digestible pieces. According to Rothwell and Benkowski (2002:25), information should be clustered together into no more than seven facts

at a time. Regardless of how much information is grouped together, it must be manageable for the learner.

- Adults learn when information is consistent. A consistent format should be followed in presenting procedures so that adults do not need to learn a new format before learning a procedure.
- Adults learn visually. The old say that ‘a picture is worth a thousand words truly is correct’ when it comes to an adult learner. Pictures help stimulate the memory sensors (Jarvis, 2004:33).
- Adults learn when detailed information is easy to understand. Complex, detailed information can confuse learners and making this information easier can strengthen the learning process.

2.8.1 Important information when formulating a training programme

Nilson (1998:10) discussed the following points when formulating a training package.

- **The content of a training package**

Improving food production requires both technical and managerial solutions to problems encountered in the home garden. A training package should have three components namely:

- ✓ course materials and technical notes for trainers and fieldworkers;
- ✓ information sheets for trainers and fieldworkers; and
- ✓ home garden technology leaflets for fieldworkers and literate farmers or household members.

- **The purpose of the training package**

The materials contained in the training package assist trainers in showing how and why a home garden can make a significant contribution to meeting daily household food needs

for better nutrition and health (Jarvis, 2004:28).

- **Participation in the training programme**

Agricultural extension workers are the main targets of the training package and may therefore constitute the majority of those in the training course. Other fieldworkers, such as home economists, community development and health workers, teachers and those concerned with nutrition improvement through community development, including the staff of NGOs and mission stations, should be included (Pradeepmani & Ram, 2003:15). Teamwork and interaction by all development agents working at the community level create a good understanding and foster appreciation of the role that each sector can play in raising nutritional standards. The ability of fieldworkers to involve community members in a genuine dialogue about their food and nutrition concern, and to coordinate nutrition and home gardening activities among the different sectors, is crucial for the programme's success (FAO, 1995:3).

- **The trainers**

Two trainers should lead the training programme: one with experience in agriculture and one with a background in community nutrition. Trainers should have experience with participatory rural appraisal and extension techniques, and they should be familiar with the problems and needs of the community. Training should focus on practical experience and applications, to enable the fieldworkers to 'learn by doing' (Phillips & Phillips, 2002:82).

- **The fieldworkers' training needs**

The trainers should encourage participants to build on their own knowledge and experience as much as possible. Before deciding on the details of the course design, the trainers must assess the training needs of the fieldworkers. This can be done by personal interview or administering a questionnaire (Faber & Benadé, 2002:2).

- **Venue for training**

Training should be conducted in the rural area or near a village where fieldworkers can conveniently visit home gardens and work directly with community groups and households. Examples of suitable venues include local schools, mission schoolrooms, community and farmers' training centres (FSIS, 2001a:24).

- **Materials needed**

The trainers need sufficient copies of the training package, as well as flip charts with large sheets of paper, pens, markers and cards for visualisation (Kraiger, 2002:364).

- **Technical notes for trainers**

When preparing the training programme, the two trainers must decide how to divide the work. This should be based on each trainer's technical expertise as well as practical experience and training skills (Lim & Johnson, 2002:37).

- **Notes on field visits**

For household and field visits, the trainers are advised to identify households with different types of gardens, using those with well-developed and those with not well-developed home gardens as a basis for comparison. It is obviously an advantage when fieldworkers and trainers can speak the local language and thus facilitate communication (Kontoghiorghes, 2001:248).

2.8.2 Training needs analysis

Analysis of training needs is the initial step in a cyclical process which contributes to the overall training and educational strategy of staff in an organisation or a professional group. The cycle commences with a systematic consultation to identify the learning needs

of the population considered, followed by course planning, delivery and evaluation (Gould, Kelly, White & Chidgey, 2004:43).

All managers should conduct an analysis of training needs to:

- determine what development is relevant to staff needs;
- determine what development will improve performance;
- determine if training will make a difference;
- distinguish training needs from organisational problems; and
- link improved job performance with the organisation's goals (Laidlaw, 2006:28).

2.8.3 Evaluation of a training programme

The primary purpose of evaluation is to defend training expenditure. Evaluation may be done for either formative or summative purposes (Kraiger, 2002:364). Formative evaluation is conducted to modify a programme or redesign presentations or training content. Summative evaluation results are used to make judgments about a programme's effectiveness (Jarvis, 2004:30). Evaluating training helps all managers and trainers make wiser decisions. Kraiger (2002:364) listed three specific reasons on why training should be evaluated. These include:

- to justify the existence of a training department by showing how it contributes to the UA's objectives and goals;
- to decide whether to continue or discontinue training programmes; and
- to gain information on how to improve future training programmes.

2.9 SUMMARY

The first two chapters have provided the theoretical background to this project. It can be concluded from the literature that knowledge in UA and food insecurity continues to be of concern in the informal settlement areas both globally and in South Africa. Strategies such as Nutrition Education Programmes (NEP), training in urban agriculture and addressing food insecurity are some of the ways to approach urban agriculture. Growth in urban agriculture could benefit from closer involvement of government and the public sector. The purpose of this study was to develop a home gardening training programme to alleviate household food insecurity for low-income household dwellers. The following chapters will describe the methods followed, discuss the results and make recommendations.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

There is growing global interest in using UA to influence policy makers on urban development, urban planning and environmental management to improve food security build healthy and safe urban systems and strengthen poverty alleviation, as well as to formulate and implement other policies for sustainable urban development (Spies & Sawio, 1999:3).

Training needs have to be addressed in order to realise the full potential of UA. To date the UA sector, and training in particular, has generally been neglected. Educational and extension services remain a critical gap (Gündel & Butterworth, 2000:2). Attention to UA has increased markedly during the last couple of decades. The number of activities to promote UA at national and local level has grown, but urban farmers in many cities in the world still struggle to get their main survival strategy recognised by city authorities. Therefore, there is a growing demand on policy makers and local practitioners for inspiring examples of successful policies and actions in cities. UA contributes to a wide variety of urban issues and is increasingly being accepted and used as a tool in sustainable city development.

This chapter presents the methodology used throughout the empirical study. The research project or the structure of the dissertation consisted of three phases that were systematically implemented. These phases will be discussed at a later stage.

3.2 ACCREDITATION OF THE STUDY

The Central Research Committee (CRC) and the National Research Foundation (NRF) approved and accredited the larger Thibela Tlala Study in 2003, stipulating that all willing participants and data would be treated with respect and confidentiality. The Eatonside community was informed about the Thibela Tlala project. A public meeting

was held with all interested participants and out of that meeting, 143 volunteers emerged. All participants who agreed to participate in the study were requested to sign consent forms (Appendix 1). Mr Charles Manyande visited the area to conduct a formal field study and assessed the home gardening area, the available space and interest of the people in the project, with the purpose of identifying variables and methods. These are tabulated in Table 1 below.

Table 1. Variables and methods used in the baseline study.

Variable	Methods
Socio-demographic information: age, marital status, social and economic profile, and employment status.	<ul style="list-style-type: none"> ▪ Short semi-structured questionnaire.
Indigenous agricultural knowledge and skills, food consumption, attitudes, behaviour and values.	<ul style="list-style-type: none"> ▪ Individual interviews with informal settlement dwellers ▪ Discussion with key informants such as Department of Agriculture, community leaders. ▪ Direct observation in the study area. ▪ Documenting from available records and reports.
Training needs.	<ul style="list-style-type: none"> ▪ A questionnaire to identify the training needs was formulated by the researcher and then administered to the participants by means of an interview. ▪ A workshop with the key stakeholders was held and a review of the existing training policy guidelines and accreditations was done. ▪ A training programme easily understood by the dwellers was drawn up.
Assessment of the effectiveness of the training programme.	<ul style="list-style-type: none"> ▪ An evaluation was done in the form of interviews and observations of the home gardens in Eatonside of the same home-gardeners who participated in the study (For interview schedule, see Appendix 5).

3.3 STUDY AREA AND POPULATION

The study was conducted in the urban informal settlement of Eatonside, in the Vaal Triangle. The area has a population of approximately 6,000 people. It is one of the poorest and oldest informal settlements in Gauteng province, South Africa. Eatonside, ward 39, is located to the Northeast of Vereeniging, with Vlakfontein on the East, Ironside on the North, Evaton Township on the West and the Waterval agricultural holding on the South. Eatonside was originally known as Evaton Estate, with a settlement of approximately 300 Whites. Evaton Estate was established in 1904, the same year as Evaton Township, which is situated next to the freehold farm, Wildebeesfontein, in the district of Potchefstroom.

3.4 PHASES OF THE STUDY

This project was undertaken in the following phases: a baseline survey, development of the training programme, the training of the willing participants in home gardening, and data analysis and evaluation of the home gardens after training.

3.4.1 PHASE 1

3.4.1.1 Pilot study

The researcher developed a needs assessment questionnaire in English and the fieldworkers were trained in how to administer the questionnaire and ask questions in the correct way. The questions were kept simple and easy to read, as most of the participants were semi-literate, according to the demographic questionnaire developed and conducted in 2004 (Selepe 2004:1). In addition, a study conducted in this community by Oldewage-Theron *et al.* (2005:17) indicated that the education level was low and that only 28 percent of the respondents had attended high school or college. The needs assessment questionnaire was piloted to educators of Setlabotsha Primary School and fieldworkers (N=10). After piloting, the researcher had to make some adjustments especially with regard to the way the questions were structured.

3.4.1.2 Meetings with community

In order to ensure that the project was well publicised, a list of all the house numbers of people residing in Eatonside was obtained from the Municipality. Mr. C. Manyande, with the help of fieldworkers, went from house to house informing the residents of the project that would be taking place in Eatonside and also that there would be an information meeting on the 15 June 2004, which all interested residents should attend. On 15 June 2004, coordinators of the Thibela Tlala project held a meeting with Eatonside residents in order to inform them about the home gardening project and the criteria for participation in the study. On 13 August 2004, another meeting was held at the stadium and it was at this meeting that, 143 participants who were willing to take part in the study came forward and were asked to sign consent forms. It was decided that representatives should be elected amongst the participants. These representatives helped the researcher when she needed to communicate with the participants at short notice and formed part of the fieldwork team. As this is an informal settlement, it was difficult for the researcher to find the house numbers of the participants. The researcher had to ensure that the representatives met the criteria for all participants (see sampling method below).

In the meeting, the following points were dealt with:

- objectives of the home gardening project;
- administering of questionnaires and setting of training dates; and
- allocation of areas for the gardens in the participants' yards.

3.4.1.3 Sampling method

Participants were randomly selected from among those who met the following criteria:

- Households had to include children between two and six years of age.
- Participants had to be residents of the informal settlement.
- At least one person in each household should be able to read and write.
- The household had to have enough space for home gardening.

In this study, households with children below two and older than six years were excluded.

A total of one hundred and forty three (143) households met the inclusion criteria and agreed to be participants in this study. Of the 143 participants, only 91 finally took part in the actual study; the remaining 52 could not participate for various reasons. Some participants had relocated to other areas, some became employed and were therefore not available during the day, death in the family of the particular person that would have been involved in the training and questionnaires of some household dwellers were incomplete and as a result could not be utilised.

3.4.2 PHASE 2

In this section, the development of the training programme/manual and the different questionnaires are described.

3.4.2.1 Questionnaires

The researcher and fieldworkers went from house to house with a set of questionnaires and interviewed each household dweller. Several questionnaires were used in this study.

3.4.2.2 The socio-demographic questionnaire

The socio-demographic questionnaire (Appendix 3) included questions to determine age, marital status, social and economic profile, and the employment status of the sample population. The researcher used a questionnaire that had been administered to the participants in this study by another researcher.

3.4.2.3 Needs assessment questionnaire

A needs assessment questionnaire was drawn up to identify in which area of gardening the household dwellers required training (Appendix 3). The purpose of this questionnaire was to elicit information on the gardening needs of the participants in Eatonside. The questions focused on the following:

- home gardening knowledge and the skills required when working in the garden;
- plant management;
- harvesting, storage and preparation; and
- attitude towards home gardens.

All the information gathered from the different questionnaires was used to compile the training programme.

3.4.2.4 Development of the training manual

The project coordinators appointed experienced farmers to assist the researcher in the training of the participants and the development of the training manual. A meeting to orientate trainers was held, and the information to be included in the training programme was discussed. A training manual was drawn up and translated into SeSotho by a qualified language expert. The data obtained from the needs assessment questionnaires informed the compilation of the training manual.

The training manual was scrutinised by the supervisor, and pre-tested on a group of 10 people consisting of BTech students of the Vaal University of Technology, representatives of the Eatonside dwellers and teachers of Setlabotsha Primary School, to ensure that the manual could be understood by all participants.

3.4.2.5 Interview questions after training

The researcher will formulate questions to be asked of the participants after the training programme, to identify whether the training was effective and helpful to the participants.

3.4.2.6 Data analysis

After completion of the fieldwork, questionnaires were sorted and checked for completeness, accuracy and usability by the researcher; n=91 were usable. The data on the completed questionnaires were captured by the researcher on Microsoft Excel® spreadsheets and analysed by SPSS® version 14.1 computer software with the assistance of a statistician. The demographic questionnaires were analysed for descriptive statistics with the assistance of a statistician. Tables were drawn up with the percentages of the different variables included on the questionnaire. Standardised methods were used. Data were presented in terms of frequency, percentage and graphs.

3.4.3 PHASE 3

3.4.3.1 Criteria for the development of the training programme

The results of the needs assessment questionnaire revealed that the participants lacked basic knowledge in home gardening. The training programme that was developed was based on the needs identified after the data were collected. The training programme deals with the basics of home gardening, which are:

- planting management, including soil management, water management and plant nutrition;
- use of insecticides;
- crop rotation;
- harvesting and storage; and
- attitude towards the training programme (see Chapter 4 Table 5).

Experienced farmers assisted the researcher in the development of the training programme.

Figure 2 below depicts the trainers i.e., the researcher, supervisor, farmers and fieldworkers.



Figure 2. Supervisors, researchers, trainers and fieldworkers on the site

3.4.3.2 Training of fieldworkers

BTech students from the department of Food and Beverage management, Setlabetsha Primary School teachers responsible for environmental health, and representatives of the sample population who met the criteria, attended the training of fieldworkers run by two farmers from plots in Vanderbijlpark. The teachers were not fieldworkers; they attended the training because they were responsible for environmental health at the school. The fieldworkers were Sotho-speaking people. Fieldworkers (BTech students and representatives) were trained in completion of needs assessment questionnaires and in

translation of the questions in the questionnaire (which were in English) to Sotho. Emphasis was placed on ensuring that the fieldworkers were aware of the objectives and importance of the project.

3.4.3.3 Training of participants

After meeting with training officers, the researcher decided on the training dates. The researcher, supervisor, educators of Setlabotsha Primary School and fieldworkers (referred to as Group 1) were the first group to be trained by the farmers. This first training was done so that during the actual training of the participants the researcher and the fieldworkers would be the ones to conduct the training of the participants with the assistance of the farmers. Since the participants were both male and female, no problems were encountered with digging the ground, as every day after training the males made a point of preparing the ground for the next day.

Training was conducted over two days for each group; there were four groups including the fieldworkers. Groups 2 and 3 had 25 participants each while group 4 had 41 participants ($n = 91$). On day one the trainers provided all the theory that the participants would need to work in a garden. On day two the trainers incorporated theory with practical training which involved the participants.

Training was conducted on the following dates:

- 8 and 9 October 2004 - training of the fieldworkers, researcher, supervisor and teachers of Setlabotsha Primary School
- 15 and 16 October 2004 – training of the first group of participants from the households
- 22 and 23 October 2004 – training of the second group of participants from the households
- 29 and 30 October 2004 – training of the third group of participants from the households (see Appendix 7 for the training schedule).

Figure 3 below depicts fieldworkers, farmers, the supervisor and the researcher on the second day of the training, when seeds were planted.



Figure 3. Supervisor, researcher, farmers and fieldworkers on day two of the training, when seeds were planted

3.4.3.4 Provision of seeds and gardening tools

The seeds and gardening tools that were used in this project were purchased with NRF funding. Two types of seeds were purchased: summer and winter seeds. This was done to ensure that a supply of vegetables was possible throughout the year. These items were delivered to the University by the supplier and were transported to the school where the training was conducted. The researcher took only the seeds that were to be used during training, which were those to be planted in summer. On the second day, participants were issued with seeds and were instructed to plant these as soon as possible. Winter seeds were given to the participants in April during the monitoring phase. Not all participants

received garden tools, as these were used as incentives for the best gardens. Planting was done twice a year, summer seeds being planted in October and winter seeds in April.

3.4.3.5 Implementation and monitoring

After day two of each training session, the participants were provided with packages of seed, which they had to start planting in their yards as soon as possible. The packages contained seeds for beetroot, spinach, cabbage, green beans and carrots, and included a garden tape measure, a piece of string and two types of fertiliser. The seeds provided could last the participants for two seasons per year over a period of three years if used economically. After the initial training, visits to the participants in the home gardening project were conducted three times per week for the first four weeks; thereafter, they took place fortnightly for a season.

3.4.4 PHASE 4

This was the monitoring phase, a description of which follows, detailing how the gardens were monitored and how often monitoring was conducted.

3.4.4.1 Monitoring

This section of the study did not form part of the researcher's main objectives and was conducted as part of a mini-dissertation by another MTech student. However, the researcher included a few questions on evaluation of the programme and the trainer, which will be reported here briefly.

The home gardening training programme was implemented with the aim of improving the skills, knowledge and attitudes of the household dwellers in the informal settlement area. It was evaluated by means of observation and interviews. After the home gardens had been established, the researcher and fieldworkers went from house to house to assess the condition of the gardens. The main objective of the evaluation of these home gardens was

to find out if the participants were able to implement the knowledge and skills gained during the training phase, on their own without the assistance of the researcher. The responses to the interviews were analysed by means of themes. The observation, carried out fortnightly, was conducted during the second season. During the evaluation phase, the following methods were used;

- Interviews were conducted with the participants to obtain feedback regarding their views on the value of the training programme.
- Observation of the home gardens of the twenty-five randomly selected participants was conducted.

The following were evaluated:

- planting management, including soil management, water management and plant nutrition;
- use of insecticides;
- crop rotation;
- harvesting and storage; and
- attitude.

3.5 SUMMARY

In this chapter, the researcher described the phases of the training programme. The researcher also explained the sampling procedures that followed. In the next chapter, the researcher deals with the analysis and interpretation of the results.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 INTRODUCTION

The aim of this study was to assess training needs in home gardening in terms of existing indigenous knowledge, information, attitude, behaviour, values and skills, in order to develop an appropriate training programme. The results and findings will be discussed in this chapter.

4.2 SOCIO-DEMOGRAPHIC QUESTIONNAIRE

In this section, the socio-demographic questionnaire, which was distributed and correctly completed by 79 participants, is analysed and interpreted.

4.2.1 Analysis and interpretation of gender, educational level and marital status

The demographic results are depicted in Table 2. These results show that majority of the participants in this study were female (91.1 percent).

Of these participants, 35.4 percent had a primary school education, 32.9 percent had reached a level of between Std 6 and 8, 16.5 percent had studied up to Std 9 or 10, 11.4 percent had no education, and 2.5 percent had reached tertiary level.

The majority (30.4 percent) was married, while those who were unmarried made up the second largest group, at 29.1 percent.

Table 2. Gender, educational level and marital status of the participants

Variable		Responses	
		<i>Frequency</i>	<i>%</i>
Gender	Males	7	8.9
	Females	72	91.1
	Total	79	100
Education level	No education	8	11.4
	Primary school	28	35.4
	Std 6-8	26	32.9
	Std 9-10	13	16.5
	Tertiary education	2	2.5
	No response	1	1.3
	Total	79	100
Marital status	Unmarried	23	29.1
	Married	24	30.4
	Divorced	5	6.3
	Separated	3	3.8
	Widowed	4	5.1
	Living together	5	6.3
	Traditional marriage	9	11.4
	No response	6	7.6
	Total	79	100

4.2.2 Results regarding employment status, household income and expenditure, and the number of people sharing one bedroom.

Table 3 shows that majority of participants (68.4 percent) was self-employed, 10.1 percent were unemployed, 8.9 percent were social grant beneficiaries, 7.6 percent were retired and only 5.1 percent were wage earners.

The results in Table 3 indicate that a weekly food expenditure of R57.36 was recorded by 53.2 percent of the participants, 22.8 percent spent between R57.36 and R114.72, 13.9 percent spent between R114.72 and R172.08, 5.1 percent spent from R172.08 to R229.44 and another 5.1 percent spent between R229.44 and R286.80 on food per week.

The results with regard to household income indicate that 48.1 percent received from R100.00 to R500.00 per month, 24.1 percent received R500.00 to R1000.00 monthly, 15.2 percent received R1000.00 to R3000.00, and 12.7 percent of the participants received no monthly income at all.

The results further reveal that 41.8 percent of the participants had 3 to 4 people sharing a bedroom, 39.2 percent had between 0 and 2 people per bedroom and 19 percent had more than 4 people sharing one bedroom.

Table 3. Employment, household income and the number of people sharing one bedroom

Variables		Responses	
		<i>Frequency</i>	<i>%</i>
Employment status	Unemployed	8	10.1
	Self-employed	54	68.4
	Wage earner	4	5.1
	Retired	6	7.6
	Social grant beneficiaries	7	8.9

	Total	79	100
Money spent on food per week	R57.36	42	53.2
	R57.36-R114.72	18	22.8
	R114.72-R172.08	11	13.9
	R172.08-R229.44	4	5.1
	R229.44-R286.80	4	5.1
	Total	79	100
Household income per month	No income	13	12.7
	100-500	38	48.1
	500-1000	19	24.1
	1000-3000	12	15.2
	Total	79	100
Number of people sleeping in one bedroom	0-2 persons	31	39.2
	3-4 persons	33	41.8
	More than 4	15	19.0
	Total	79	100

4.3 NEEDS ASSESSMENT QUESTIONNAIRE

In this section, the training needs assessment questionnaires are analysed and interpreted. Only 91 of the 143 questionnaires initially distributed could be used.

4.3.1 Analysis and interpretation

4.3.1.1 Responses to whether participants knew anything about home gardening

Table 4 indicates that 72.5 percent of the respondents had some knowledge about home gardening, while only 27.5 percent said they had none.

4.3.1.2 Responses to whether participants had received formal agricultural training skills

A majority of 69.2 percent of the participants indicated that they had not received formal agricultural training skills in home gardening, while only 29.7 percent had received such training.

4.3.1.3 Responses to whether participants had received training on soil management, plant management or harvesting and storage of harvested vegetables.

The majority of the participants (61.5 percent) had never been trained in soil management while only 37.4 percent had received such training; 1.1 percent did not respond to this question. In the area of plant management, 69.2 percent of the participants had never been trained, while 30.8 percent had. With reference to harvesting, only 25.3 percent of the participants had been trained, whereas 74.7 percent had never received any form of training. Only 13.2 percent of the participants had been trained in the storage of harvested vegetables, whereas 86.8 percent of them had never received training.

4.3.1.4 Responses to whether participants had ever worked in a garden

The results indicate that 69.2 percent of the participants had previously worked in a garden, while 29.7 percent had never done so and 1.1 percent did not respond to the question.

Table 4 Profile of training needs of home gardeners

Variable				Response	
				<i>Frequency</i>	<i>%</i>
Knowledge regarding home gardening	Yes			66	72.5
				25	27.5

	Total	91	100
Training in formal agricultural skills	Yes	27	29.7
	No	63	69.2
	No response	1	1.1
	Total	91	100
Knowledge of ...soil management	Yes	34	37.4
	No	56	61.5
	No response	1	1.1
	Total	91	100
...plant management	Yes	28	30.8
	No	63	69.2
	Total	91	100
...harvesting of vegetables	Yes	23	25.3
	No	68	74.7
	Total	91	100
Have you worked in a garden before?	Yes	27	29.7
	No	63	69.2
	No response	1	1.1
	Total	91	100

4.3.1.5 Responses to how often a person should work in a garden

Figure 4 indicates that 36.3 percent of the participants responded that one should work in a garden every day, 23.0 percent did not know, 22.0 percent thought one should work in a garden twice a week, 13.2 percent thought once a week was sufficient, while 5.5 percent chose at least three times a week.

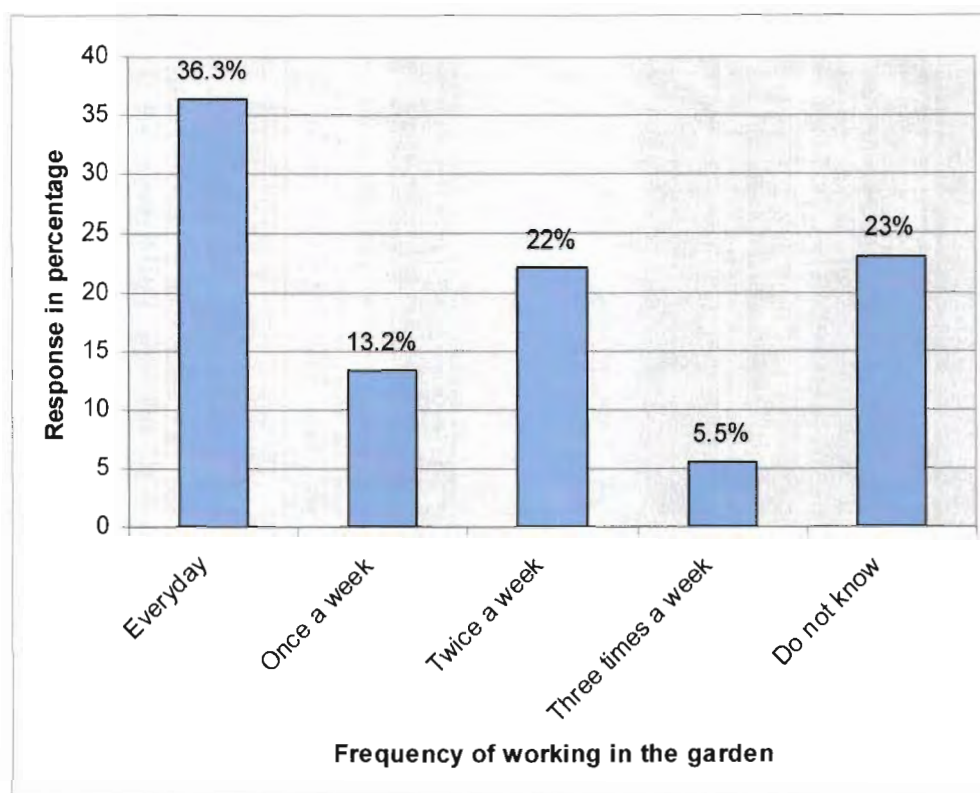


Figure 4. Frequency of working in the garden per week

4.3.1.6 Responses to whether participants had knowledge of sowing, transplanting, weeding, pest control, harvesting, storage, food processing and merchandising

As indicated in figure 5 a higher percentage of the participants indicated that they did not have knowledge on food processing while 19.2 percent had. Regarding the transplanting of vegetables, 65.9 percent had no knowledge. On the subject of weeding, 64.8 percent did not have knowledge, whereas 35.2 percent did. A majority of the participants 61.4 percent had some knowledge about storage. In the area of harvesting 58.2 percent of the participants did not have any knowledge. Most of them 54.9 percent had no knowledge about sowing although 45.1 percent had. Finally, 53.8 percent of the participants had no knowledge on pest control while 46.2 percent had.

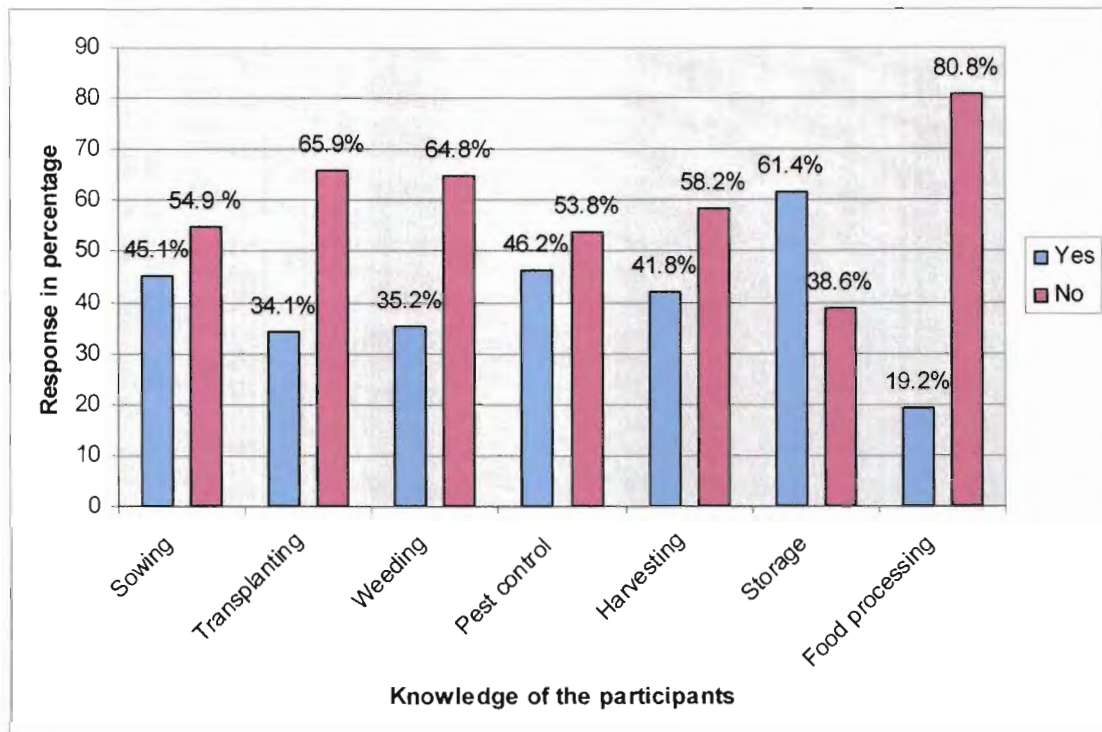


Figure 5. Different areas of knowledge of the participants

4.3.1.7 Responses to whether participants knew what a raised bed was

Figure 6 and 7 shows that when participants were asked if they knew what a raised bed was, 70 percent had no idea while 30 percent said they knew. Because the respondents indicated that they did not really understand the importance of a raised bed, the researcher used this information when conducting the training, thoroughly explaining its importance.

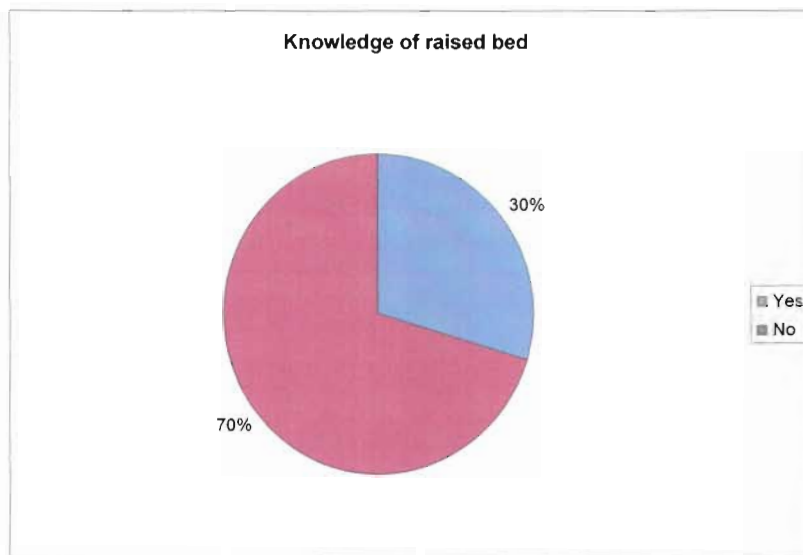


Figure 6. Participants' knowledge of a raised bed

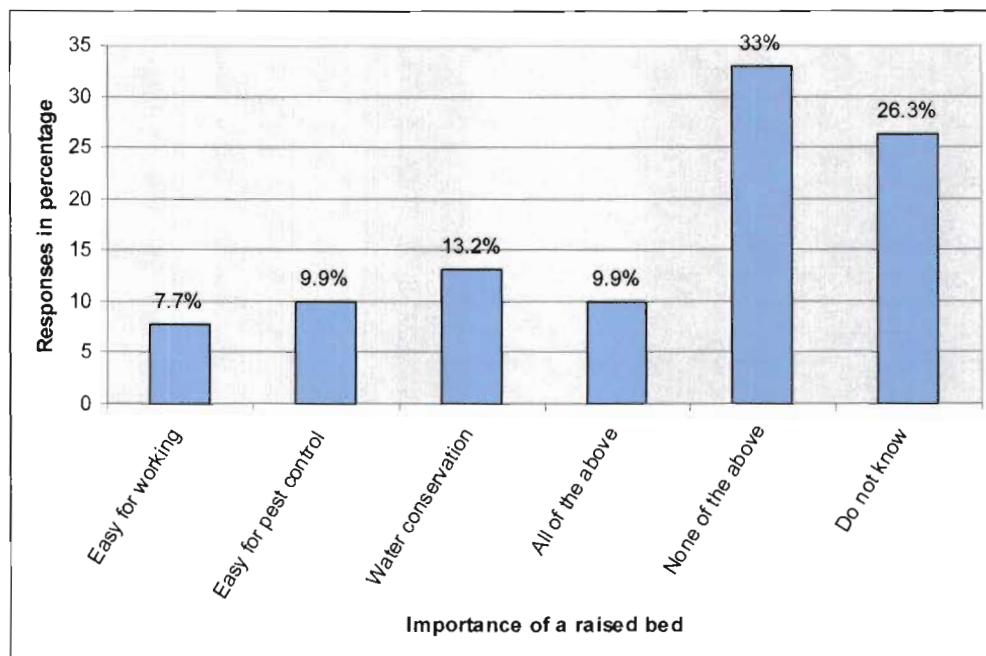


Figure 7. Importance of a raised bed

4.3.1.8 Responses on the most convenient time for participants to plant vegetables

Figure 8 indicates that 64 percent of the participants preferred to plant in summer. Spring, autumn and winter were each indicated by 7 percent of the group as the most convenient time for them to plant.

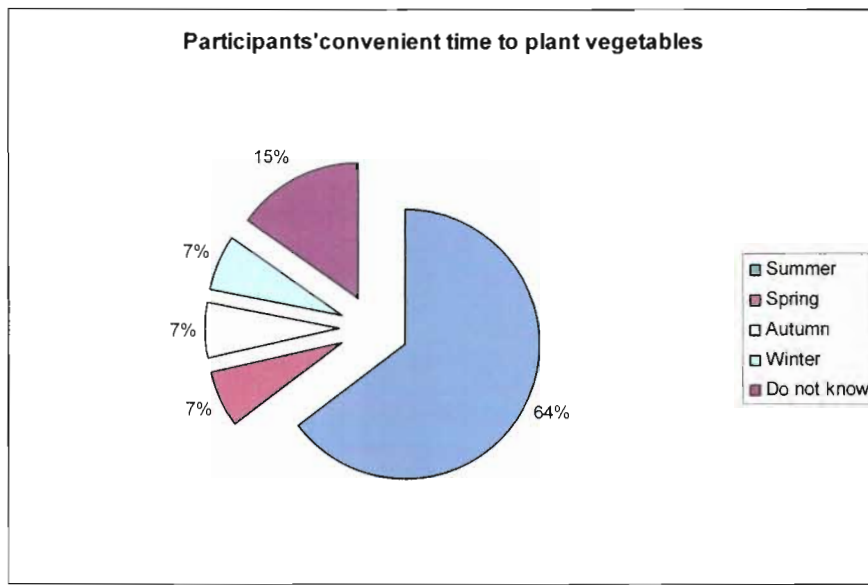


Figure 8. Convenient time for participants to plant vegetables

4.3.1.9 Responses on how far apart vegetables should be planted

The majority of 52.7 percent of the participants indicated that vegetables should be 20 cm apart, 18.7 percent thought 30 cm was the best distance, while 9.9 percent chose 40 cm. No response was received from 6.6 percent.

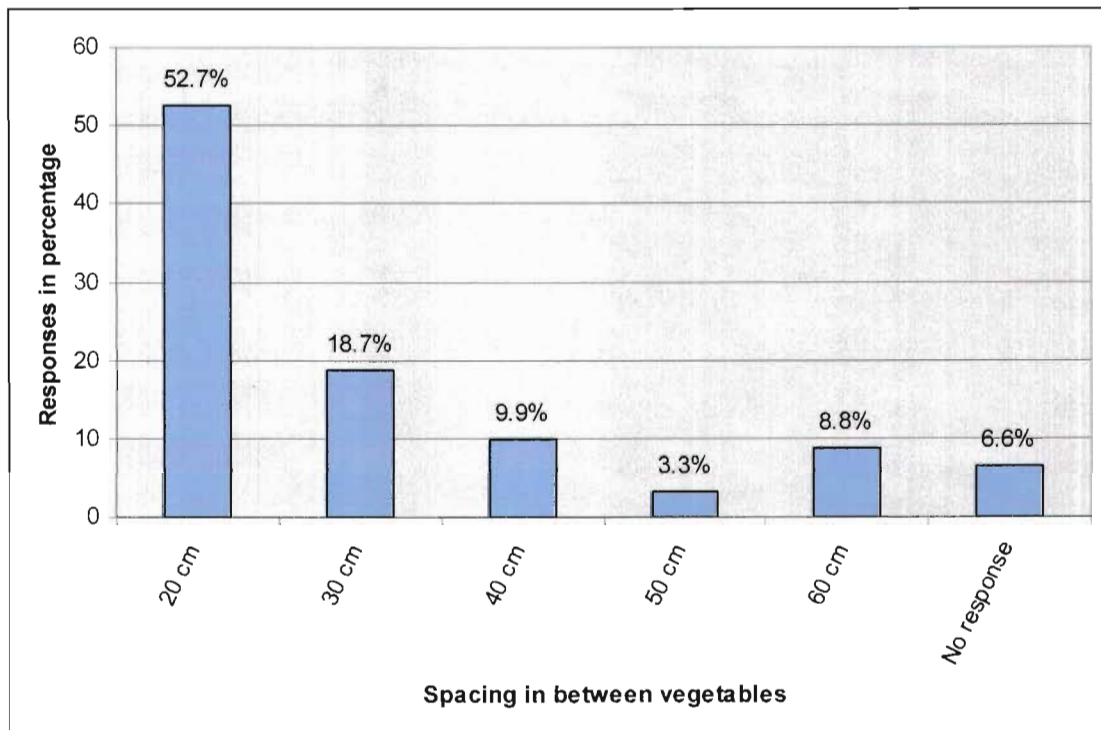


Figure 9. Spacing between vegetables

4.3.1.10 Responses on how often plants should be watered

The findings in Figure 10 show that 52.7 percent of the participants indicated that plants should be watered twice a day, 29.7 percent thought once a day, 7.7 percent believed plants should be watered as needed and 6.6 percent thought watering could be done at any time.

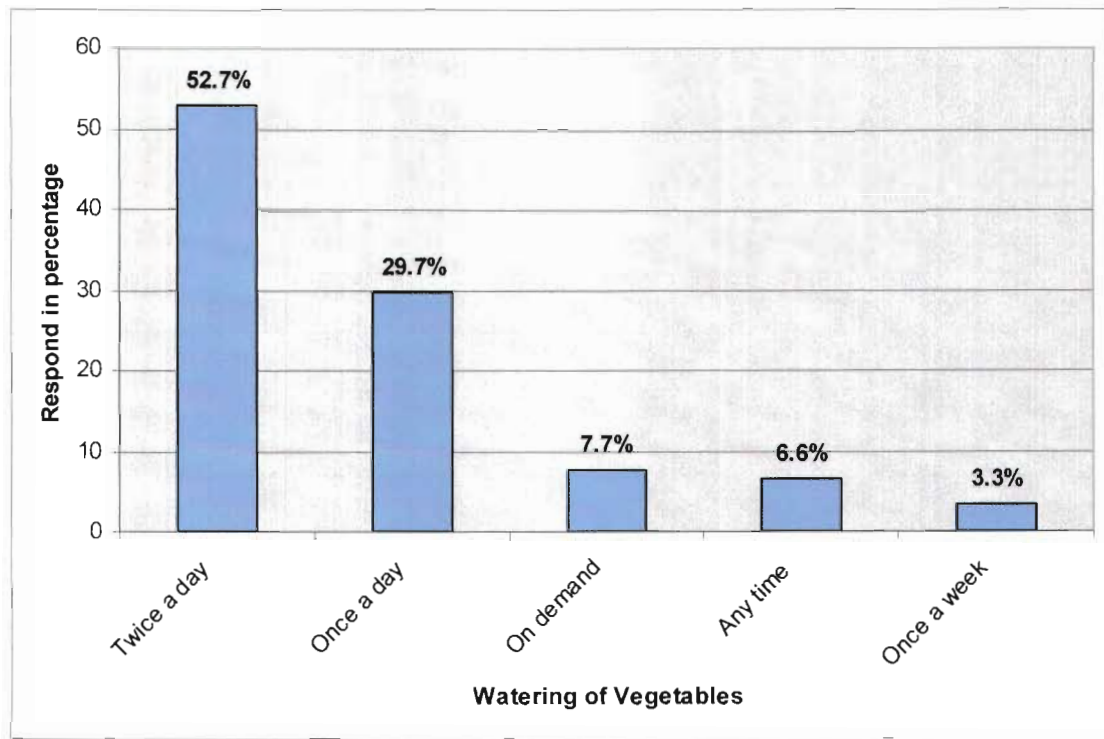


Figure 10. How often should vegetables be watered?

4.3.1.11 Responses on pest control

Results in figure 12 show that 30 percent of the participants use all methods mentioned, whereas 19 percent do not use any of the listed methods. Only 11 percent use insecticides and another 11.0 percent use the indigenous knowledge (such as using soapy water or laundry water to water the vegetables) to control pests.

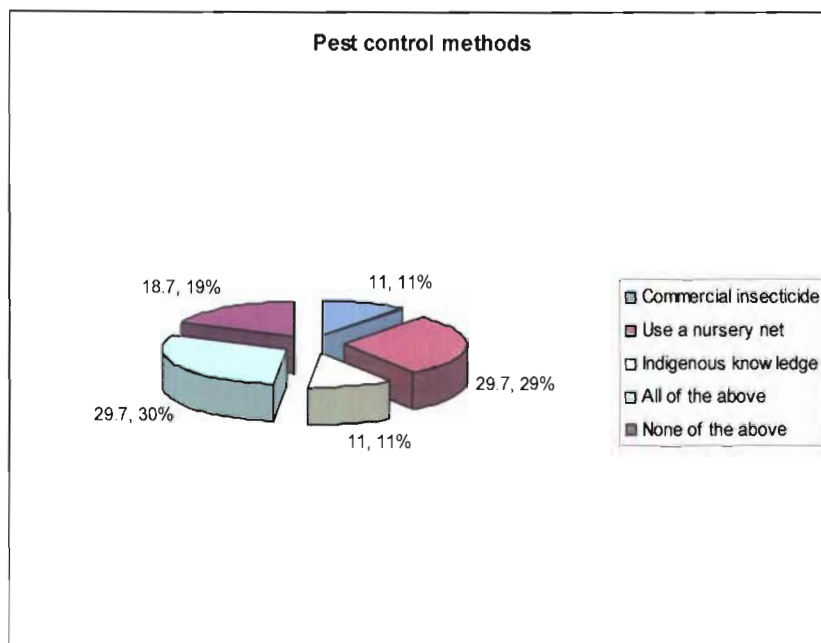


Figure 11. Method used for pest control

4.3.1.12 Responses on when it is safe to harvest vegetables after using insecticides

The results in Figure 13 indicate that majority of the participants thought that it would be safe to harvest vegetables immediately after applying insecticides, 37.4 percent said 12 hours later, while 2.2 percent indicated a week later. An equal number (1.1 percent) chose 24 hours later and 2 weeks and more after applying insecticides.

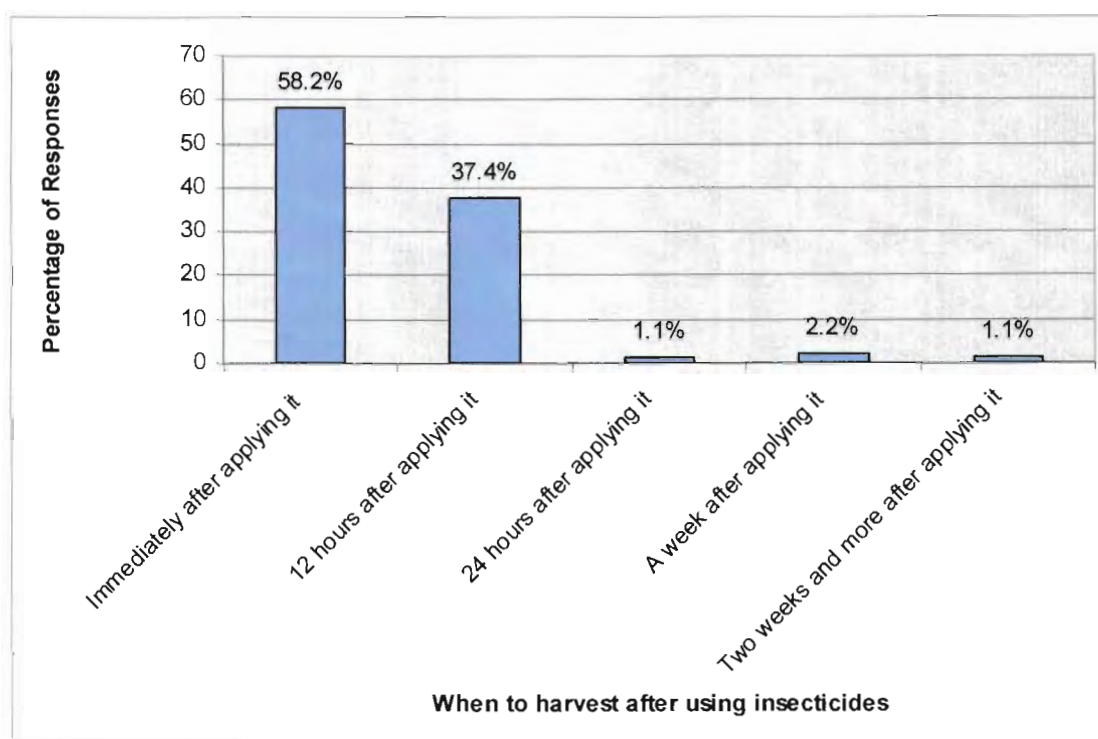


Figure 12. Safe time to harvest vegetables after using insecticides

4.3.1.13 Responses on what to do with vegetables after harvesting

Figure 14 indicates that the lowest percentage of the participants use vegetables for their own consumption after harvesting.

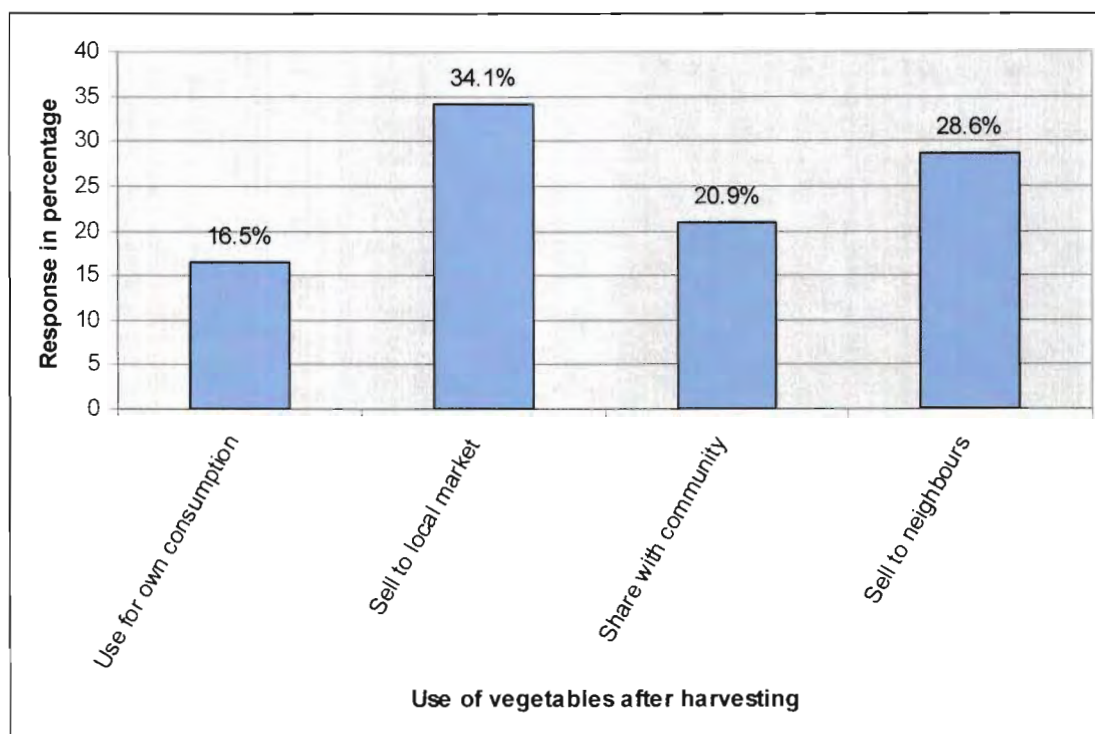


Figure 13. Use for vegetables after harvesting

4.3.1.14 Responses to why vegetables are consumed

The data in Figure 15 indicate that 71.4 percent of participants eat vegetables for health purposes, 18.7 percent to still hunger, 6.6 percent for status and that only 3.3 percent do not know why they eat vegetables.

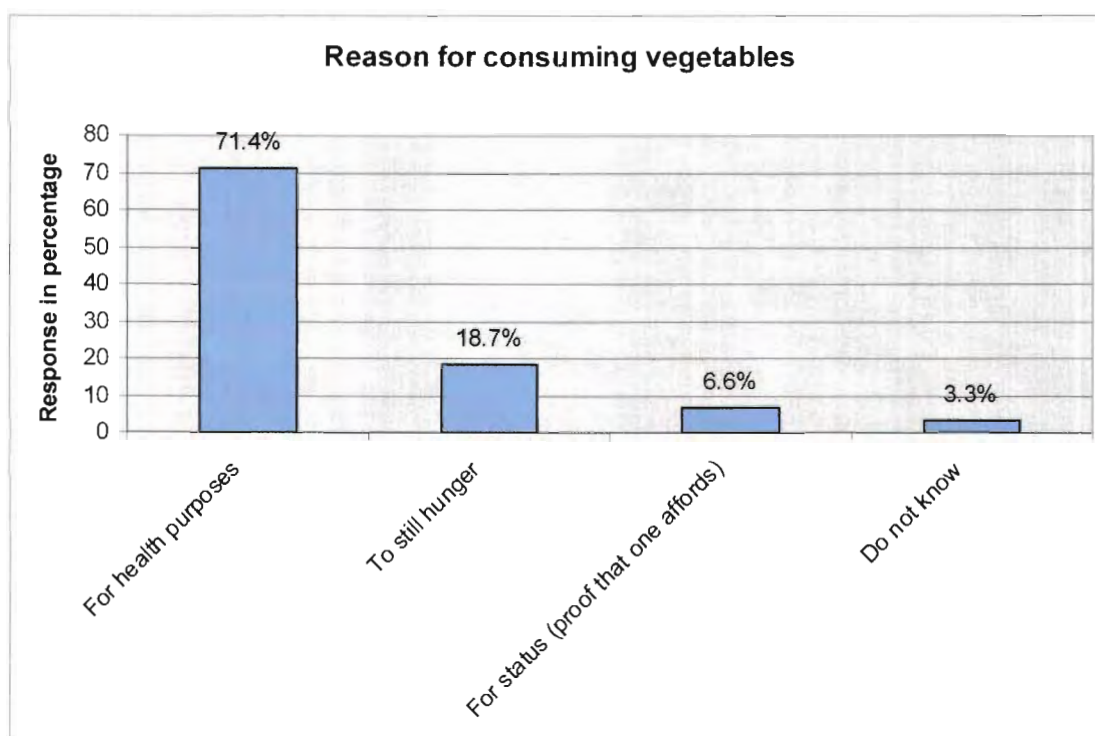


Figure 14. Why do people consume vegetables

4.4 QUESTIONNAIRE ON THE ATTITUDE OF THE PARTICIPANTS TOWARDS HOME GARDENING

In this section, the results of questions on the attitude of the participants towards home gardening are analysed and interpreted.

4.4.1 PARTICIPANTS' INTEREST IN HOME GARDENING

4.4.1.1 Responses on whether participants like home gardening

A majority of 90 percent of the participants indicated that they did enjoy gardening. Only 10 percent said they did not.

4.4.1.2 Responses to how interested participants were in gardening

Data in table 5 show that 77 percent of the participants were very interested, 12 percent interested, while 8 percent were not very interested and only 3 percent were unsure of how they felt about it.

4.4.1.3 Responses to whether they thought gardening was of value

Data in table 5 indicate that 86 percent of the respondents agreed that it was of value, 12 percent did not, and only 2 percent had no idea.

4.4.1.4 Response to who would take care of the garden

Table 5 shows that 36 percent indicated that the mother would take care of the garden, while 24 percent said the father would.

Table 5. Attitude of the participants towards home gardening

Variables		Response	
		<i>Frequency</i>	<i>%</i>
Whether participants like gardening	Yes	82	90
	No	9	10
	Total	91	100
Interest in home gardening	Very interested	70	77
	Interested	11	12
	Not so interested	7	8
	Not interested at all	3	3
	Total	91	100
Whether a vegetable garden will be of value	Yes	78	86
	No	11	12
	No idea	2	2
	Total	91	100
The person responsible for the vegetable garden	Children	4	4
	Mother	33	36
	Father	22	24
	Helper	16	18
	Any other person	16	18
	Total	91	100

4.5 MONITORING OF THE HOME GARDENING PROGRAMME

As mentioned in 3.4.1.1 a baseline survey had already conducted in 2005 (Oldewage-Theron *et al.*, 17), which reported that the residents of this area were semi-literate;

therefore, the researcher decided to conduct a practical training programme in order to overcome the knowledge gap.

The following methods were used

- Gardening methods were demonstrated by qualified farmers from Vanderbjilpark. These farmers assisted throughout the entire training programme and were available to assist participants on site.
- The researcher also assisted in this demonstration. However, her main function was to draw up the training programme.

The training programme consisted of notes, which explained the methods of planting different vegetables. These notes, written in English suitable for low educational levels, were distributed during the first day of training to all the participants. The researcher clearly explained the contents before the actual training took place.

In the first year of the project, the researcher assisted the participants in planting the vegetables, but in the second year the participants planted the vegetables on their own, and it was during this phase that the researcher used observation and interviews as methods of evaluation. It was found that most of the householders who participated in this project owned a vegetable garden. When the participants were asked about how they had benefited from the training in home gardening, most of them responded that the gardens helped them a great deal, because they were able to have vegetables all year round and they could spend the money they had saved on other essentials.

All topics that participants had been trained in were evaluated. These included planting management, use of insecticides, crop rotation, harvesting and storage, and their attitude.



Figure 15. Home garden of one of the participants (evaluation phase)

4.5.1 Planting management

The researcher wanted to find out if the participants had managed to plant vegetables in their garden. The following results were obtained.

- Spinach, green beans and beetroot were successfully planted by most of the participants.
- Carrots could not grow well as most of the participants did not dig the ground sufficiently.
- Only a few of the participants managed to harvest cabbage. Those who had no harvest had a problem with the insects, and others failed to follow the correct method of watering.

4.5.2 Use of insecticide

Most of the participants used ash, as they said they could not afford to use the cigarette mixture which the trainers suggested, since cigarettes were too expensive. With regard to how often they used ash, most did so only when they had made a fire. Some of the participants used only soapy water, while a few used the cigarette mixture. The vegetables of these two groups were noticeable healthy-looking. As to how often they used this insecticide, some applied it for about three consecutive days as soon as they saw that insects were eating their vegetables and then waited at least one week before consuming the vegetables; other applied it only when they did laundry for their family. It was clear, from the healthy appearance of their vegetables, which participants had used insecticides consistently.

4.5.3 Crop rotation

Most of the participants practiced crop rotation in order to combat the insects in the garden. They had some success with this, but one reason for lack of success was that when, for example, they rotated beans with carrots, the area was too rocky for carrots to grow well. The majority of the participants said that crop rotation was a good thing for the garden because before they had been trained they had had a problem with the soil. They believed that the soil had lost its strength so that even applying manure did not help; but since they had started crop rotation, they noticed that the soil was looking much better.

4.5.4 Harvesting and storage

During observation it was found that most of the participants picked vegetables only when they wanted them; otherwise they would leave them in the garden where the vegetables would be damaged by the sun. Most of the participants had a good harvest of green beans but they were too lazy to pick them and as a result, the beans dried out in the garden. The researcher explained to them that the dry beans should still be picked

because they had turned into seeds but only a few of the participants did so. The researcher also explained to the participants that instead of leaving vegetables to burn in the garden, they should pick them and store them in the refrigerator or even share with their neighbours. Few of the participants did this.

4.5.5 Attitude

During the first year of the project, when the researcher was helping the participants, they showed a lot of interest and willingness but the following year, when they did it on their own, a few of the participants no longer seemed to be interested or perhaps had become lazy. Most still had seeds and those who did not want to carry on with the gardens gave the seeds to neighbours who still had an interest in the home garden. A few of the participants said that as they were now working they did not have the time to do gardening, even though it had been a great help to them. Nevertheless, those who planted received good rewards from their gardens.

4.6 RATING THE TRAINER AND THE TRAINING PROGRAMME

The participants were asked to rate their trainer and the training programme used. This rating scale was distributed to the participants during the interviews conducted in the monitoring and observation period.

The results on the rating scale indicated that most of the participants were very happy with the training programme, followed by the participants who were both satisfied with both the trainer and the training manual.

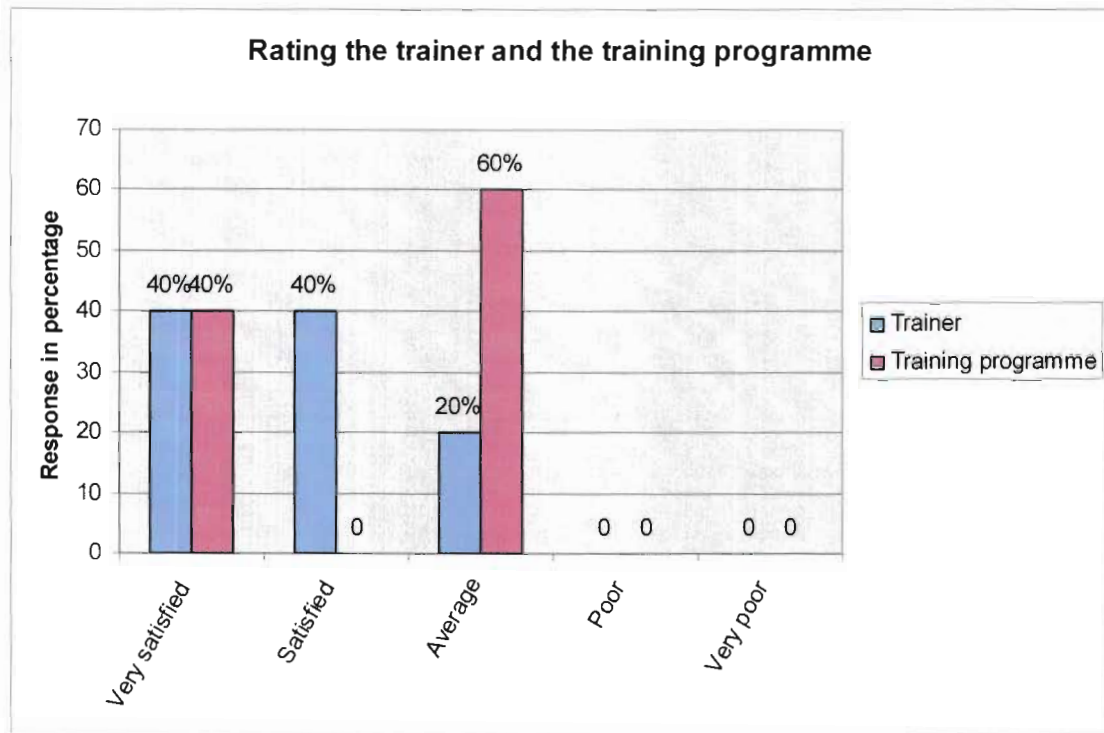


Figure 16. Rating scale for the trainer and the training programme

4.7 SUMMARY

The crops from the garden were used for consumption by the household dwellers. The subjects participating in the study were pleased with the gardens because they provided vegetables for their families, who could harvest vegetables in their own backyard for about six months. The self-production of food ensured the availability, affordability and accessibility of food, and also a much-improved knowledge of gardening. The money that they had could be used to buy other things that the families needed, instead of vegetables. The vegetables also supplied some micronutrients for the family. The home gardens not only provided food, but also ensured that households received nutritious food at little expenses.

CHAPTER 5

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

The aims of this study were to assess the training needs of Eatonside informal settlement dwellers in terms of their existing indigenous knowledge, understanding, attitudes, behaviour, values and skills with regard to home gardening; to design and develop a home gardening training programme in order to promote sustainable production and consumption of vegetables for better livelihoods, food and nutrition security and healthful outcomes, particularly for children and women; and lastly, to evaluate the home gardening training programme by means of observation, and make recommendations based on this evaluation.

In this chapter the limitations, major findings and recommendations are presented.

5.2 LIMITATIONS OF THIS STUDY

Language could have been a possible limitation in this study, but the researcher decided beforehand to avoid this problem by translating all English training programme into Sotho. A major limitation could have been the retirement of the school principal with whom all the arrangements had been made as the new principal, who was not part of the initial planning group, did not support the home gardening project. Therefore, the second phase of training was conducted at a different venue, where the premises were much smaller.

5.2.1 Empirical study

All participants were residing in an informal settlement where they were waiting for RDP houses to be built. In the initial stages of the study, there was a large group of interested

people, but during the process of the empirical research, some could not participate owing to re-allocation to new areas. Hence, the number of participants continually decreased, resulting in a final of only 91 participants.

5.2.2 Study areas

The researcher could engage only residents of Eatonside in the Vaal Triangle, as this area formed part of the Thibela Tlala Project. Other areas could not be included and therefore could not benefit.

Participants had limited space for home gardens, especially after the RDP houses had been built, a situation which led to some of them dropping out.

5.3 MAJOR FINDINGS

The salient findings of the theoretical and empirical studies are summarized in the following paragraphs.

5.3.1 Literature study

Urban Agriculture has great potential for improving the livelihoods of the poor by contributing to household food security, and providing households with direct access to food that can be harvested, prepared and consumed by household members, often on a daily basis.

It is argued that urban agriculture requires a general, knowledge-intensive approach. It is not a simple task, as plants and insects behave differently in different seasons; consequently farmers need to experience the climate and conditions of an area before they can be confident about developing a home garden successfully. It is through projects such as this one and involvement in home gardening training programmes that they are empowered with the skills and knowledge which are essential for their success.

It is crucial that training not only deliver knowledge but also provide a forum for participants to share the knowledge, experience and problems that specifically reflect local conditions, needs and interests.

5.4 THE MAIN FINDINGS OF THIS STUDY

5.4.1 Socio-demographic data – The group of participants was made up of more females than males and most of the participants were semi-literate and married. The majority was self-employed but still lived below the poverty line.

5.4.2 Needs assessment data – Participants had indigenous knowledge of home gardening but had never been formally trained and as a result had no knowledge of soil management, plant management, sowing, transplanting, weeding, pest control, raised beds, harvesting after using insecticides and food processing: However, they had some knowledge of how to store vegetables after harvesting. This information was used to design the home gardening training programme.

Summer was indicated by the participants as the most convenient season for them to plant vegetables; this could be attributed to the fact that because it rains in summer, there are days when they do not have to water plants. As it is also warm, it is easy to work in the garden for a longer time.

It is laudable that the majority saw their vegetables as a source of income, as they indicated that they wanted to sell their vegetables after harvesting. They also understood that vegetables are good for the health.

5.4.3 Attitude towards home gardening – The attitude of participants towards home gardening was positive and indicated that the training itself was of great value to them. Vegetable gardens in this area are mostly cared for by females.

5.4.4 Monitoring and evaluation – A qualitative research approach was used where observations and interviews were regarded as the main instruments for the collection of data. It was noted that some of the participants could not obtain good harvests of certain vegetables because of the type of soil and pests. Although they received training on insecticides, they felt that the cigarette method which they had been advised to use was too expensive. Their method of using soapy water was effective if used consistently, but it seemed that most were not consistent.

It is gratifying to note that most of them rotated their crops as they had been taught, thereby improving their produce. Since they were happy with the results and had clearly benefited from the training, they were willing to motivate other community members to take part in the project.

5.5 DISCUSSIONS AS FEEDBACK FROM THE PARTICIPANTS.

The participants were asked a number of questions (See appendix 6) in relation to the gardening experience. By means of these interview questions, the researcher was able to obtain the information she required to identify whether the gardens were necessary or helpful to the participants in any way.

During the interviews it was mentioned that spinach and beetroot were the vegetables most successfully planted and harvested; green beans were the second most popular, while cabbage and carrots were also harvested but not in the same quantity as the spinach, beetroot and green beans.

The respondents mentioned various reasons for failure of crops. Problems regarding the soil included hard and rocky soil which made it difficult to dig; cutworm was also mentioned as a problem in growing some of the vegetables.

The participants reported that they used fire ash, soapy water and cigarette mixture as insecticide. This indicated that the training provided was definitely used, as specific

methods for preparing homemade insecticides were demonstrated during the training period.

During training, participants were told that vegetables could be consumed 24 hours after applying insecticides. Most of the participants said they consumed their vegetables three to seven days after application insecticides. The participants also mentioned that the crop rotation helped them to raise better crops, and reported fewer problems with bugs.

When participants were asked about the success of their harvest, the majority reported good harvests of spinach, beetroot and green beans. Because they had good harvests, they were able to share with their neighbours. However, the harvest of carrots was not as successful. The vegetables harvested from their gardens lasted them until April.

According to the participants, the home gardening project helped them to save money by enabling them to grow their own vegetables, and kept them occupied working in their gardens.

5.6 RECOMMENDATIONS

5.6.1 Recommendations for practical implementation of findings

The project could be expanded to other areas, especially other informal settlements and poverty-stricken areas where most residents live below the poverty line.

In order to improve knowledge and skills, implementation of the home gardening projects should start at pre-school level, where learners should be informed of the importance of home gardening in health and nutrition. This should form part of the curriculum.

The involvement of all stakeholders in the community, including prominent business people, councillors, politicians, school governing bodies and health institutions, will foster and promote the initiative of home gardening for the community in the informal

settlements. These stakeholders should work together for the improvement of the health of, and provision of food security to, all community members.

Local institutions and government structures in the form of human, land and financial resources should sustain the home gardening projects. Closer involvement of the government and public sectors in urban agriculture would benefit the growth of urban farming.

5.6.2 Recommendations for further research

Research is needed on:

- how schools can be involved in urban agriculture.
- the effectiveness of community gardens and how to sustain them.
- what can be done to motivate Black communities to develop a positive attitude towards urban agriculture.

5.7 CONCLUSION

It is increasingly clear that the current global food system is unsustainable (Drimie & Mini: 2003, 19). It is also evident that increasing production is likely to change the face of global food security. Food security exists when all people at all times have both physical and economic access to enough safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. Home gardening can contribute to household food security by providing households with direct access to food that can be harvested, prepared and consumed by household members.

Home gardening can also provide income-generating opportunities for people with limited mobility.

Agricultural production in rural as well as urban and peri-urban areas must be linked to the input, supply and marketing infrastructures that are already developed, if the resultant production is to be sustainable.

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APPENDICES

APPENDIX 1: CONSENT FORM

PROJECT INFORMATION AND INFORMED CONSENT: THIBELA TLALA PROJECT

Good day

My name is Lebogang (Makhado) Lekotoko and I work at the Vaal University of Technology. I am doing a project on ‘A home gardening training programme to alleviate household food insecurity for low-income house dwellers’ in Eatonside and need your assistance in getting the information for this project. I will explain the project to you so that you will understand exactly what I will be doing. The reason why this community has been chosen and what will be expected of you will also be explained to you, so that you can decide if you want to participate in this project. Participation is voluntary and should you decide not to participate, you may withdraw at any stage during this project.

WHAT ARE THE BENEFITS FOR YOU?

You will receive formal training in home gardening and will be given seeds after the training. You will be helped to start your own garden in your own home and the vegetables harvested from your garden will be all yours.

The information collected will be analysed and the results will be made available to the participant on request, will be used for publication in scientific journals and will also be presented at scientific conferences. No results will be published in magazines or local newspapers.

WHAT DO WE EXPECT FROM YOU?

- Please bring your ID and proof of address so that we can check the house number.

DECLARATION BY OR ON BEHALF OF THE PARTICIPANT

I, the undersigned,.....

[ID.....] participate in this project in my capacity

Address

A. I confirm that:

1. I/the participant have/has been asked to participate in the above-mentioned research of the Thibela Tlala Project carried out by the Vaal University of Technology.
2. The purpose of this study is to identify the available knowledge on home gardening and provide training in order to alleviate household food insecurity in low-income households.
3. The information collected will be used to determine what information should be included in a training programme.

It has been explained to me that:

- ✓ this research survey will benefit the people at Eatonside, especially those taking part in this study.
- ✓ it will take approximately 30 minutes to an hour for all questions to be answered.
- ✓ by participating in the research I will be helping other community members in Eatonside and later in the country as a whole, as the project gets bigger.
- ✓ information I will give will be kept confidential but that it will be used anonymously for making known the findings to other scientists.
- ✓ I/the participant can have no direct access to the results of the survey but I/the participant can contact the researcher who will inform me/the participant of the findings
- ✓ I/the participant can refuse to participate in this research or can stop answering the questions at any time during the interview. If this should happen, I/the

participant will not be disadvantaged in any way and it will not be held against me/the participant.

- ✓ participation in this research will incur no cost for me/ the participant.
- ✓ I/the participant will receive a seed starter pack to start my own garden
- ✓ During training the participants will receive a snack meal.

1. The information in this consent form was explained to me by..... (name of the interviewer) in.....(language) and I confirm that I have a good command of this language and understood the explanations. I was also given the opportunity to ask questions on things I did not understand clearly.

B I/the participant hereby agree voluntarily to take part in this research.

Signed/confirmed at.....on.....200...

.....

Participant's signature

.....

Witness

DECLARATION BY OR ON BEHALF OF RESEARCHER

I,..... declare that:

1. I have explained the information in this document to.....(name of participant)
 2. I asked the participant to ask questions for clarification if something was not clear to him/her.
 3. this interview was conducted in English/ Xhosa/ Sotho/ Zulu (preferred language).
 4. Dr/Ms/Mr
- Signed at.....on.....200...

.....

Researcher or his/her representative

.....

Witness

DECLARATION BY FIELDWORKER

I, confirm that

1. I have translated the content of this document from English into..... (language) for (name of participant/representative).
2. the information that I have so translated was a correct interpretation of what I was asked to translate.

Signed at On.....200...

.....

Fieldworker's signature

.....

Witness

APPENDIX 2

MINUTES OF A MEETING WITH THE COORDINATORS ON 6 AUGUST 2004

1. Everybody was welcomed to the meeting by Mrs B.M. Selepe and no apologies were made.
2. Mrs B.M Selepe and Ms L. Makhado explained their main objectives for this project to Mr J. Moolman.
3. 27 September 2004 to 11 October 2004 will be used to collect data and analyze it before training takes place.
4. Training will take place at Setlabotsha Primary School.
5. It was also decided that the training should be divided into two parts, the theory and the practical.
6. The training dates were selected as follows:
 - 15 and 16 October 2004: first group of the caregivers from the households to be trained.
 - 22 and 23 October 2004: second group of the caregivers from the households to be trained.
 - 29 and 30 October 2004: the third group of the caregivers to be trained.
7. Mr. J Moolman suggested that he would appoint Mr. Gert Rautenbach, who owns a plot, to help him with training at Eatonside.
8. Mr. Moolman said the training notes would be developed by Mr. G Rautenbach and the researcher; these would be compiled in English and then the researcher would give the notes to a qualified person to translate them into South Sotho.
9. A follow-up meeting will be held on 13 August 2004 with Mr. J Moolman and Mr. G Rauntenbach.

APPENDIX 3
THIBELA TLALA PROJECT

SOCIO-DEMOGRAPHIC QUESTIONNAIRE

This questionnaire covers certain aspects of your life and your child/children's life, including work and personal details, health and illness, anthropometric information, lifestyle and social life that is relevant to health.

Personal information:

Education level of mother (Tick one only)	1 None	2 Primary school	3 Std 6-8	4 Std 9-10	5 Tertiary education	6 Don't know	
Mother's employment status (Tick one only)	1 Housewife by choice	2 Unemployed	3 Self-employed	4 Wage earner	5 Other, specify:	6 Don't know	
Education level of caregiver (Tick one only)	1 None	2 Primary school	3 Std 6-8	4 Std 9-10	5 Tertiary education	6 Don't know	
Father's employment status (Tick one only)	1 Unemployed	2 Self-employed	3 Wage earner	4 Retired by choice	5 Other, specify:	6 Not applicable e.g dead	
How many people contribute to total household income? (Tick one only)	1 1 person	2 2 persons	3 3-4 persons	4 5-6 persons	5 More than 6		
Household income per month (including wages, rent, sales of veges, etc, state grant) (Tick one only)	1 None	2 R100-R500	3 R500-R1000	4 R1000-R3000	5 R3000-R5000	6 Over R5000	7 Don't know
Is this the usual income of the household? (Tick one only)	1 Yes	2 No	If no, what other income is available? Specify				
Is this more or less the	1	2					

income that you had over the past six months? (Tick one only)	Yes		No							
How much money does household spend weekly on food? (Tick one only)	1	2	3	4	5	6	7	8	9	10
	R57.36	R57.36- R114.72	R114.72- R172.08	R172.08- R229.44	R229.44- R289.80	R289.80 – R344.16	R344.16- R401.52	R401.52- R458.88	R458.88- R516.24	R516.24- R573.60

Marital status of the caregiver (tick one only)

1	2	3	4	5	6	7	8
Unmarried	Married	Divorced	Separated	Widowed	Living together	Traditional marriage	Other, specify

Now decide on the following:

Type of dwelling	1	2	3	4	5
	Brick, concrete	Plastic	Tin	Plank, wood	Other, specify:
Number of people sleeping in house for at least 4 nights per week?					
Number of rooms in house (excluding bathroom, toilet, kitchen, if separate)					
Number of people per living/sleeping room (tick one)	1	2	3		
	0-2 persons	3-4 persons	More than 4		

APPENDIX 4:
NEEDS ASSESSMENT QUESTIONNAIRE

HOME GARDENING TRAINING PROGRAMME QUESTIONNAIRE

Subject Number _____ **Interview Date** _____

(All information in this questionnaire is confidential)

Subject Name: _____ Gender: M _____ F _____

DOB: _____ Age: _____

Address: _____

_____ Tel: _____

1. HOME GARDENING KNOWLEDGE AND SKILLS

Do you know anything about home gardening?

B1

Yes	1
No	2

Have you received any formal agricultural training skills in home gardening?

B2

Yes	1
No	2

Have you ever being trained in the following?

B3

Soil management	1
Plant management	2
Harvesting	3
Storage of harvested vegetables	4
Preparation of vegetables	5

Have you ever worked in a garden before?

B4

Yes	1
No	2

How often should you work in a garden?

B5

Every day	1
Once a week	2
Twice a week	3
Three times a week	4
Don't know	5

Do you have any knowledge of the following?

B6

Sowing	1
Transplanting	2
Weeding	3
Pest control	4
Harvesting	5
Storage	6
Food processing	7

Do you know what a raised bed is?

B7

Yes	1
No	2

What is the importance of making a raised bed?

B8

Ease for working	1
Ease for pest control	2
Water conservation	3
All of the above	4
None of the above	5
Don't know	6

When is the most convenient time for you to plant vegetables?

B9

Summer	1
Spring	2

Autumn	3
Winter	4
Do not know	5

How far apart should the vegetables in the garden be planted?

B10

20 centimetres apart	1
30 centimetres apart	2
40 centimetres apart	3
50 centimetres apart	4
60 centimetres apart	5

How often do you water your plants?

B11

On demand	1
Once a day	2
Twice a day	3
Once a week	4
Any time	5

How should you take care of your garden?

B12

Watering	1
Thinning for access to plant	2
Removing weeds	3
Raking the soil	4
All of the above	5
None of the above	6

How will you control the pests in your garden?

B13

Use insecticides	1
Use a nursery net	2
Natural way	3
All of the above	4
None of the above	5

When is it safe to harvest vegetables after using insecticide?

B14

Immediately after applying it	1
12 hours after applying it	2

24 hours after applying it	3
A week after applying it	4
2 weeks and more after applying it	5

What do you do with the vegetables after harvesting?

B15

Use for own consumption	1
Sell them to the local market	2
Give it to the community	3
Sell to the neighbours	4

Why are vegetables consumed?

B16

For health purposes	1
To still hunger	2
For status (proof that you can afford it)	3
Do not know	4

2. INTEREST IN THE HOME GARDEN.

Do you like to do gardening?

C1

Yes	1
No	2

Rate yourself on how interested you are in home gardening.

C2

Very interested	1
Interested	2
Not so interested	3
Not interested at all	4

Do you think the garden will be of value to you?

C3

Yes	1
No	2
No idea	3

Who will normally take care of the garden?

C4

Children	1
Mother	2
Father	3
Helper	4
Any other person	5

APPENDIX 5

INTERVIEW SCHEDULE

The researcher will conduct an interview with those who participated in the home gardening project. This interview will be conducted with one person at a time, so that the participants cannot influence each other's answers.

The researcher will conduct interviews in order to find out how successful the gardens were and what the participants harvested from the gardens.

Which vegetables were you able to harvest?

Regarding the vegetables you were unable to harvest, what do you think the reason was for the failure of the crop?

Were you able to use insecticides in your crops, and which did you use?

When did you harvest your vegetables after using insecticides?

How did crop rotation help you?

How good was your harvest?

How long did your vegetables sustain you?

Did the home gardening project help you?

Would you advise other people to be part of a project like this?

With the knowledge you have gained, would you be able to train others?

APPENDIX 6

RATING SCALE

The participants will be asked to rate the effectiveness of the training programme and the trainer (researcher); from this information the researcher will learn whether she was successful in providing knowledge to the participants.

Rating scale					
Very satisfied - 5					
Satisfied - 4					
Average - 3					
Unsatisfied - 2					
Poor - 1					
Trainer	Respondent 1	Respondent 2	Respondent 3	Respondent 4	Respondent 5
Training programme					

APPENDIX 7

NOTES: ENGLISH VERSION

Home gardening training manual

PREPARATION FOR INDIVIDUAL CROPS

Mark out your complete garden (3 m long and 4 m wide) and dig it over with a garden fork to the depth of the fork's teeth.

Start from the one side and prepare a bed for beetroot. (See Stark Ayres Booklet)

BEET (Crimson globe)

Beetroot is a cool-season crop that likes to be planted in full sun, in well-drained soil that is rich in organic matter. (pH of 6.0 -7.0.)

Bed Preparation

Mark out beetroot bed. (3 m long and 60 cm wide =1.8m² =110 g or one fifth of the packet).

Draw a narrow furrow 2 cm deep along each row with a wooden peg.

Plant 2 seeds directly in the furrow, 2 cm deep and 7 cm between plants in rows that are 20 cm from each other.

In our area, which is defined as moderate warm highveld, it is best to sow seed during October.

Sow at monthly intervals but give more water during the months of November to February to keep cool.

Keep soil damp until seeds have germinated.

Never let the soil dry out but water in such a manner that young seedlings are not damaged.

Thin out the seedlings when they are 4 cm high and draw up a little soil against the remaining plants to support them. The area between plants should be 7 cm.

If the plants are too close together, when they are 7 cm high a second thinning-out can be done.

Very important – Do not plant in a bed where fresh manure has been worked into the soil. The best results are obtained when planted in a bed where a lot of manure was incorporated in the previous season.

Harvesting

It will take about 90 days before you can harvest your beetroot. Pull them out without damaging the beetroot and twist off the leaves 5 cm from the beet so as to prevent bleeding. The leaves can be used like spinach and the swollen roots for a salad after being cooked.

Pests and diseases

Cutworms often feed on the young seedlings. Cutworm bait from Kombat can be applied during late afternoon.

Protect seedlings from birds and other animals.

A fungal disease, leaf spot, is common on beets particularly during wet weather with medium temperatures. Crop rotation and the use of clean seed are the basis for long term control. Cabbage or onions must be planted in this area for the second season, and beans in the third season.

BEANS (Espada)

Espada is a dwarf bean that likes a loose, friable soil with good drainage and a pH of 6,0 – 7,5, previously planted with heavy feeders such as cabbage, cauliflower or potatoes.

It is very important that growth must be quick, so that pods are not hard or misshapen. Therefore it is important that you add your 2:3:2 fertiliser.

Bed preparation:

After you have left a walkway of about 40cm from the beetroot bed, mark out your bean bed. (3 m long and 0.9 m wide = 2.7 m²)

Rake the soil to an even bed and raise a ridge around the bed.

Sprinkle the 2:3:2 (22) fertiliser over the bed (60 g per m² = 162 g)

Draw a narrow furrow 4 cm deep with a wooden peg.

Plant 1 seed every 7 cm in the furrow. Make another furrow 50 cm away from the first and plant in the same way.

The best time for sowing is between August and January.

Sow at monthly intervals but give more water during November to January to keep cool.

Keep soil damp until seeds have germinated.

Never let the soil dry out but water in such a manner that young seedlings are not damaged.

Cultivating once or twice will be enough to remove all the weeds. Draw a little soil up against the stem during first cultivation to prevent plant damage through wind.

Harvesting

The pods will be ready in about 55 days.

The pods should be removed while they are still young and tender and before swelling of the seeds occurs. Pick the beans twice a week. Be careful not to damage the plant when picking. The plant should be held with one hand while the pods are removed with the other.

Pests and diseases

Cutworms – use cutworm bait.

CMR beetles – feed on flowers – hand pick them early in the morning or if infestation is bad, spray with BHC or Malathion.

Bean stem fly – small black fly that causes lower yields. Spray Malathion.

Diseases

Only troublesome in warm overcast wet weather.

Examples are Anthracnose, Brown rust and Bacterial blight.

For crop rotation, plant tomatoes, potatoes or Swiss chard during the second season, carrots and beetroot the third, and cabbages, onion or cauliflower during the fourth season.

SWISS CHARD. (Fordhook Giant)

Swiss chard is loosely called spinach but it is not a true spinach. It is more productive, has a shorter picking season (4 months) and is more tolerant to heat than spinach.

Swiss chard likes to be planted in a full sun area with temperatures from 10° – 30° C and a pH of 6.0 – 7.0. It will not tolerate any soil acidity and a dressing of dolomitic lime should be applied on suspected soils.

Thorough soil preparation is necessary before any planting or sowing is to be done. Incorporate a lot of old manure or compost. A dressing of 60 – 90 g/m of 2:3:2 (22) prior to sowing will encourage rapid growth.

Bed preparation

After you have left a walkway of 40 cm from the bean bed, you can mark out the bed for the Swiss chard. (3 m long and 80 cm wide = 2.4 m²).

Sprinkle old poultry or cattle manure or compost in a thick layer (3cm) over the bed and dig it in to fork's teeth depth.

Rake to an even bed and raise a ridge around it.

Sprinkle 2:3:2 fertiliser over the bed (60 g/m² = 144g).

Draw a narrow furrow 2 cm deep with the wooden peg.

Plant 2 seeds every 20 cm in the furrow. Make another furrow 40 cm away from the first and plant the same way.

The best time for sowing is between August and May. Sow at monthly intervals to ensure a constant supply.

Germination takes place about 8 – 10 days later.

Thinning out can be done about 3 weeks later where the plants can be lifted out carefully and used to fill up gaps or plant out additional rows.

From the time that picking commences, monthly side dressings of LAN will maintain the vigorous growth as will liquid manure applications every 2 to 3 weeks.

Harvesting

Start hand picking 2 to 3 leaves per plant from about 8 weeks.

When the leaves start spreading out to form a rosette, it is a indicator that the picking season is coming to an end.

Pests and diseases

Caterpillars – spray with Malathion or Karbaspray.

Leaf spot occurs sometimes in warm weather with high humidity.

Spray with Dithane m45 and repeat 5 – 10 days later.

CARROTS (Chantenay Karoo)

Carrots prefer cool growing conditions, but if adequate moisture is available they can be grown during most of the months from October to March. The ideal soil for carrots is a deeply worked sandy loam that has been improved with a lot of compost or manure for a previous crop of cabbages or cauliflowers. The best pH is 6,0 – 7,0.

Heavy soils do not allow roots to develop freely and make harvesting extremely difficult.

Do not incorporate fresh manure or other organic material, as this could cause forked roots, crooked growth and the development of excessive numbers of coarse side roots. It also introduces a quantity of weed seeds.

Bed preparation

After leaving a walkway of 40 cm from the Swiss Chart bed, you can mark out the bed for the carrots (3 m long and 60 cm wide = 1,8 m²).

Dig the soil over to the depth of a fork's teeth and remove all stones, hard objects and roots of grass. Break up all clods and rake the soil to a fine tilth. Raise ridge around it.

Sprinkle 2:3:2 (22) fertiliser over the bed (60 g/m² = 108 g).

Draw a narrow furrow, 2 cm deep, in the middle of the bed. Put a quantity of seed in the palm of your one hand. Taking a pinch of it with the other hand and rubbing it between finger and thumb, sprinkle along the row.

Make two other rows left and right (10 cm from the centre row) and plant the same way. Cover the seed with soil, firm and water.

Weed control, watering and thinning are the three main chores.

Give a shallow cultivation as soon as the rows can be seen. Handweed 5 cm on either side and in the rows. Do not disturb carrot roots.

When the third true leaves are well developed you can start thinning the extra seedlings so that there is a space of 8 cm between plants.

Earth up the rows a little after thinning and give a light soaking.

Always cover carrot shoulders with soil so as to prevent green shoulders. After thinning, spread the fertiliser LAN at a rate of 60 g/m². (One teaspoon for every 5 plants).

Harvesting

It will take about 100 days before you can start harvesting your carrots.

Harvesting is best done by removing the biggest carrots and so making room for the remainder to develop.

Pests and diseases

Aphids - a grey, mealy and waxy pest in large numbers at the base of the foliage especially during hot weather. Spray with Metasystox and if crop is more mature then Malathion is more suitable.

CABBAGE (Cape Spitz)

Cabbage is a cool seasoned crop but can be planted most of the time in most areas. Some cabbage cultivars can withstand high temperatures.

Bed preparation

Cabbage can be planted in most types of soils but they need a lot of nutrients. Work as much compost into the soil before planting if available. It is very important to dig deep and prepare properly. Mark out cabbage bed (3m long and 90 cm wide = 2.7 m²) after walkway of 40 cm. Dig to fork's teeth depth, rake to an even bed and raise a ridge around it.

Sprinkle 2:3:2 (22) fertiliser over the bed (60g\ m²= 162g).

Draw a narrow furrow 2 cm deep with the wooden peg. Plant the seeds every 30 cm from each other. Make another row 50 cm away from the first and plant in the same way.

Germination took place after about 10 days. Keep wet but careful with the watering if the heads become firm. A heavy rainfall during this time can cause the heads to crack open.

A side dressing of liquid fertiliser can be given at intervals of every 3 weeks.

Harvesting

To harvest cabbage you just have to cut it with a sharp knife. Cut it off together with 3 or 4 leaves on it. Remove the remaining stem from the soil every week so as to prevent pests and diseases. In the home garden you can start harvesting from about 14 days before it become firm and hard so that the harvesting time could be lengthened.

Pests and diseases

It is important to do insect and pest control during all the stages of cabbage growth. Trips (at the bottom of the leaves) that sucks the sap from the plant can be sprayed with Metasystox. Worms and other chewing insects can be sprayed with Malathion.

Common diseases are black rot and powdery mildew when crop rotation was not practiced during wet weather.

APPENDIX 8

NOTES SOTHO VERSION

TOKISETSO YA HOJALA

Tshwaya serapa sa hao (bolelele ba dimitara tse tharo (3m) le bophara ba dimitara tse nne (4m). E tjheke ka fereko ho lekana le meno a fereko (garden fork)

Lokisa karolwana e itseng ya serapa bakeng la ho jala bete (beetroot) (Sheba bukana ya Stark Ayres)

BETE

Bete ke semela se batlang ho jalwa ha letsatsi le tjhabili hantle mobung o nonneng (pH ya 6.0 – 7.0).

BOITOKISETSO

Tshwaya moo o tlo jalang teng (bololo ba di-mitara tse tharo 3m le bophara ba di centimitara tse mashome a tshelletseng 60 cm = 1.8 m²).

Haraka mobu hore o lekane hantle. Phamisa mobu ka mahlakoreng hore mobu ose ke wa hoholeha.

Hasa monontsha (2:3:2 (22) hodima mela ya befe (60g per m² 110g kappa nngwe bohlanong one fifth ya pakete).

Bula foro ya botebo ba disentimetara tse peoli (2cm) ka thupa jala peo tse pedi ka forong botebang ba 2cm, disentinitara tse supileng (7cm) pakeng tsa dijalo ka mela arohange ka disantimetara tse mashame a mabedi (20cm).

Sebakeng sa rona se tsebahalong se futhumetse mme ho hantle hore bete e jalwe ka mphalane (October).

Ho hlakahala hore bete e fumantshwe metsi a mangata ka pudungwane (November), ka hlakola (February) e bolokwe e phodile.

Boloka mobu o le mongobo ho fihla peo e mela.

Se ke wa tlohela mobu o ome empa leteng o nweletse hantle hore peo e seke ya shwa.
Ha peo e se e hodile bophamoba disentimitara tse nne (4cm) o phahamise mobu pela dijalo ho di tshehetsa mme di arahane ka disentimitara tse supileng (7cm)
Hadijalo di se di le bophahomo ba 7cm ho ka hlalwa hape.
Ntho ya bohlokwa ke ho hoopla o se ke wa jala mobung ogetang ho tshelwa manyolo.
O ka thola diphetho tse ntle ha o jala mobung o ileng wa tshelwa manyolo nakong e fetileng.

KOTULO

Hotla nka matsatsi a mashome a robang (90days) pele o ka kotula bete.
Di ntshe ntle le ho e utlwisa bohloko.
Mahlaku a ka phehuwa a jewa mme karoloe ka fatshe (bete) e ka phehuwa mme ya etswa salad.

DIKOKWANA LE MAHLOKO

Diboko (cutworms) di rata ho japeo ha e sa le nyane mme moriana (kombat) e ka sebediswa motsheare wa mantsiboya (afternoon)
Sireletsa peo ho dinanyane le diphoofola tse ding.
Khabetjhe (cabbage) le eie (onions) di ka jalwa hona mobung ona ha ho getwa hontsha bete, , dinawa kamora tsona mme kamora moo.

DINAWA

Dinawa tsena di rata mobu o arohaneng oo ho neng ho jetswe dijalo tse tshwanang le khabetjhe, cauliflower kappa ditapole.
Ho bohlokwa hore di hole kapele hare dinawa di se ke tsa ha thata.
O lokela ho tshela manyolo (Monontsha) o lekaneng.

TOKISETSO

Disentimitara tse mashome a mane (40cm) ho tloha seratswaneng sa bete, tshwaya seratswana sa dinawa (bolelele ba dimitara tse tharo (3cm) le bophara ba (0.9 wide =2.7 m²).

Haraka mobu o lekane hantle ebe o ophahamisa ka mahlakoreng ho etsa seratswa se setle. Tshela monontsha (fertilizer) 2:3:2 (22) seratswaneng (diagram tse lekgolo le mashome a tshelletseng le metso e mmed (102g).

Etsa foro peo disentimetara tse supileng (7cm) ka hara foro o nto e tsa foro e nngwe disentimitara tse mashome a mahlano (50cm) ho tloha forong ya pele mme o nne o jale jwalo.

Nako e ntle ya ho jala dinawa ke pakeng tsa Phato (August) le Pherekong (January).

Di nweletse haholo ka Pukungwane (November) ho fihlela ka Pherekong (January) ho di boloka di phodile.

Boloka mobu o le mongobo ho fihlela peo e mela.

Se ke wa tlohela hore mobu o ome empa o nweletse ho lekanang hore o seke wa bolaya peo .

Hlaolela peo ya hao hanngwe kappa habedi ho tlosa lehola. Phahamisa mobu ho fihlela kutung ha o hlaola kgetlo la pele ho thibela hore dijalo tsa hao di senyehe kappa di robehe ha moya o le teng.

KOTULO

Dinawa di tla be di loketse ho kotulwa ka mora matsatsi a mashome a mahlano le metso e mehlano (55).

Di lokelwa ho ntshuwa di sa le nyane di le bonolo.

Di ntshe (kotule) habedi ka beke.

Hlokomela hore o se ke wa di utlwisa bohloko ha o di ntsha.

O tsware hantle ka letsoho hore di se ke tsa kgaoha.

DIKOKWANE LE MAHLOKO

Diboko – sebedisa ntho ya ho tswasa diboko (monawa) CMR Beatles – di ja malomo – di tlose ka letsoho hosing lapa haeba di le ngata haholo di tshele ka BHC spray kappa Malathion.

MAHLOKO

A hlaha haholo ha ho tjhesa kappa ho ho le mongobo mehlala ya teng ke Anthracnose, Brown rust le Bacterial blight.

Ha o geta ho ntsha dinawa o ka jala tamati, ditapole kappa Swiss Chart, kamora tsona dihwete, bete ka mora moo khabetjhe, iei kappa cauliflower.

SIPINASHI

Swiss Chart e ka bitswa sipinashi empa hase sona hantle.

Se beha haholo hape le kotulo ya tseng e kgutshwane ho isa oli gweding tse nne feela.

Hape Swiss Chart e mamella motjneso ho feta spinach.

E rata ho jalwa moo ho ho nang le mofuthu o ka bang 10 – 30 C.

Swiss Chart ha e utlwane le mobu o tlang ho silifatsa.

Dolomitic lime e tlamenile ho sebediswa ho nontsha mobu.

Mobu o hlwekisitsweng o bohloka haholo pele ho tjalo le kotulo e etsahala.

TUKISETSO YA HO ALA

Ka morao hoba o lesele seratswana bolelele bo ka bang (40cm) mashome a mane a disentimitara hotswa mo along wa di nawa o ka tshwaya moalo wa hao, bolelele bo kabang 3m long le bophapa bo ka bang mashome a robedi a disentimitara.

Fafatsa / fokela mo moutsha wa dikgoho, dikgomo ho 3cm ebe o epa ka foroko, e be o nto hareka seratshwana sa hao.

Fafatsa mo moutsha wa hao di gramo tse ka bang mashome a tsheletseng le m2 hore lo le kane 144g.

Thala mola o tibileng ka lepolanka disentimitara tse pedi ho etsa foro .

Jala peo ya hao di sentimitara tse mashome mebedi forong.

E tsa foro enquire disentimitara tse mashome a mane thokwana le foro yo pele e be o a jala.

Nako e ntle ya tjalo ke Mphalane le Motsheanong.

Jala le dikgwedi tsa kgefutso ho nnetefatsha dijalo tsa hao.

Ho mela ha peo ho nka sebaka se ka etsang matsatsi a robedi ho isa ho a mashome a mararo.

KOTULO

Qala ka ho kotula makala a mabedi ho isa ho a mararo ho isa dibeke tse robedi.

Ha mahlaku a qala / ho bontsha ho pona, hono ho re bolella hore nako ya kotulo e fihhle pheletsong.

DIKOKWANA LE MAHLOKO

Mafokolodi / dikokwana di ka nyanyatswa ka Malathion kappa karba spray ho di bo laya

Mahlaku a nang le matheba a hlaha haholo ha boema ba lehodimo bo le bottle.

Fafatsa ka dithane M45 ka worao ho matsatsi a mahlano ho isa ho a mashome.

DIHWETE

Dihwete di ikgethela hohola sebakeng se phodiling empa ha mofuthu o bateng di ikgolela haholo dikgwedi tse tjhesange lena Mphalane ho ya ho Hlakubele (October to March).

Dihwete di ka ikgolela hantle ho mobu o nonneng moo ho neng jwetswe (cabbage) dikhabetjine kappa cauliflower.

Mobu o boima ha o wa loka hobane o sitisa methatso ya dihwete ho nama / ho hola hantle hape le nako ya kotulo e ba thata

Manyoro a seng hantle (fresh) a ka tisa methato e kang foroko, hape ka tisa lehola le sa batla haling

TUKISETSO YA LE LAO / HO ALA

Ka mora ho tsamaiso e ka bang mashome a mane (40 cm ho isa ho Swiss Chart bed.

Oj ka etsa le alo moalo ho tswa no sehwele sa 3m metara tselong (botelele) le 60 cm bophara disentimitara tse ma =1,8m² mashome a tsheletseng a lekana le 18m².

Epa moku ka meno a foroko e be o tlosa majwe a thata ha mmoho le methato ya jwang.

Thuba makwete o hle e be o hareka mobu / makwe hofihlela mobu o ba hantle.

Nyanyatsa ka monontsha wa hao ha dima mo alo.

Thala foro e botebo ba disentimitara tse pedi (2cm) mahareng a moala.

Nka peo ya hao o e tshele ka letsohona le leng e be o nka bohashana ba peo e ngwe o e pikitla pakeng tsa menwana ho e tshela ka forong.

E tsa ding di tsela ka letsoho le letona le le letshehadi (10cm of the centre rold) e be o etsa jwalo ka pele.

Kwahela peo ka mobu, e be o tisa / tshela ka metsi.

Dintlha tse tharo tsa bohlokwa ke hohlahola honosetse le houtsha lehola.

Fetola mobu ha mela e qala ho hlaha.

Ntsha le hola ka letsoho metara tse hlano mahlakore ka bobedi.

Se ke wa utlwisahloko metso ya dihwete.

Ha o qala o boua mahlaku a se a tiile e ka kgona hore o hlahole e be o etsa sebaka sa disentimitara tse robong manareng a sejalo.

Ka mehla e tsa hore dihwete tsa hao di kwahetswe ka mobu ho thibela botala ba mahetla.

Kamora hlaholeloya hao nyanyatsa monountsha wa LAN 60 g/m².

KOTULO

O tla nka matsatsi a lekgolo pele o ka kotula dihwete tsa hao.

Ho kotula ho bohlokwa haholo ha o ka tlosa dihwete tse kgolo pele, e be o etsa phapus, ho siela dihwete tse setseng ho hola.

DIKOKWANA LE MAHLOKA

Aphids = di hlaha di le ngata haholo ha ho futhumetse.

Nyanyatsa ka metasystox, ha dijalo tsa hao di le hantle , tshela malathai ho di natlafatsa.

APPENDIX 9 LANGUAGE EDITING

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To Whom It May Concern

This certifies that the following dissertation has been edited for language accuracy.

I trust that the corrections made in the text have been applied by the author of the document after due consideration:

IDENTIFYING TRAINING NEEDS FOR HOME GARDENERS: A strategy to
develop a training programme

presented in fulfilment of the requirements for the degree of MTech
at the
Vaal University of Technology

By

Lebogang Lekotoko (Makhado)



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