Community Gardens as a strategy for coping with climate shocks in Bikita District, Masvingo, Zimbabwe.

By

Hazvibvi Daphine Muzawazi

Submitted in partial fulfilment of the requirements for the degree

MSc Agric (Agricultural Extension)

Department of Agricultural Economics, Extension and Rural Development

Faculty of Natural and Agricultural Sciences

UNIVERSITY OF PRETORIA

PRETORIA

November 2015

DECLARATION

I, Hazvibvi Daphine Muzawazi, declare that this thesis hereby submitted for the degree of Master of Science in Agricultural Extension at the University of Pretoria, is entirely my own work and has not been submitted anywhere else for the award of a degree or otherwise.

Signature: …..……

Date: ……

DEDICATION

I dedicate this dissertation to my daughter Rufaro Lianne.

ACKNOWLEDGEMENTS

I would like to extend my sincerest gratitude to the many people who made this study a success beginning with the Lord Almighty to whom I owe all that I am and the many blessings with which He has awarded me. Secondly I would like to thank my family and parents, Mr and Mrs Muzawazi for encouraging me to take part in this programme and support both financially and emotionally, they have been such an inspiration. To my husband Arnold Tarugarira, thank you for the patience and support in all aspects of working on this dissertation.

Thirdly and more importantly I would like to thank Dr S. E Terblanche for the guidance and giving me the opportunity to work with and learn from him through whom I acquired extensive knowledge that helped build up this study. I will forever be grateful for your undying support. Many thanks also go to Dr C. Madakadze, the co- supervisor of the research.

My sincere gratitude also goes to the Department of Statistics team (University of Pretoria) Dr Mike Van der Linde and Joyce Jordaan for the assistance they provided in construction of my questionnaire, data entry and data analysis. Lastly I also thank my colleagues and all those who supported me and took part in my study providing me with the information that helped compile the study.

The research component of my studies was funded by Swedish International Development Cooperation (SIDA) through The African Network for Agriculture, Agroforestry and Natural Resources Education (ANAFE), as part of the Strengthening Africa's Strategic Agricultural Capacity for Impact on Development (SASACID) Project. Thanks also go to the CARITAS and CARE International Organization team working in the Bikita District, Zimbabwe for all the assistance they rendered during the data collection process.

May the Lord guide and bless you all

ABSTRACT

Community Gardens as a strategy for coping with climate shocks in Bikita District, Masvingo, Zimbabwe.

By

Hazvibvi Daphine Muzawazi

Study Leader: Dr SE. Terblanche
Co-Supervisor: Dr C. Madakadze
Department: Agricultural Economics, Extension and Rural Development
Degree: MSc. Agric. (Agricultural Extension)

Drought is the most important climate shock affecting livelihoods and agricultural production of mostly rural households. In a bid to reduce the effects of climate variability, coping strategies are being embarked on in most rural areas of the world so as to reduce poverty and food insecurity and one of them is community gardens.

The purpose of the study was to objectively look at the dynamics at work in community gardens, that is, the significance the gardens have on poverty, food security and income of rural farmers. The study was carried out in Bikita District, Masvingo Province found in the drier south-eastern low-veld area of Zimbabwe. Rural farmers in this area have been hit the hardest by drought and the changes that climate change has brought about to agricultural production. This has resulted in a greater proportion of farmers being unable to meet their food and income requirements making them more vulnerable to climate shocks. How the gardens are assisting the rural farmers in coping with drought as a climate shock was also considered.

Data collection made use of both primary and secondary techniques. Structured interviews were administered to a total of 130 randomly sampled community garden participants. The study also used semi- structured interviews which were administered to the donor agents involved in the gardening projects, that is, CARE and CARITAS International Organizations. Key informant interviews were also administered to the district extension

advisory officer involved in the projects. The study also made use of a focus group discussion in order to capture farmers' perceptions of climate change and the general impact of community gardens on the community as a whole.

SPSS was used to calculate all frequencies and descriptive statistics as well as Chi-square test; Fishers exact tests; cross tabulations; percentages; mean and median variances presented in the study.

The main findings of the study showed that: community garden participants were mainly women (86%) who are left in the rural areas to fend for the households alone as husbands have migrated to cities and the Diaspora in search for better opportunities.

A greater number of farmers expressed ignorance on the existence and risks associated with climate change but agreed that temperatures have increased and rainfall has decreased in the past decade. There was also no significant association between age groups and knowledge of existence of climate change. Chi-square test results showed a significant association between age groups and how they rated the impact of climate change adaptation projects ($p=0.030$). The economically active age group of 40-49 years did not respond positively to the impact of climate change adaptation projects. They rated the climate change adaptation projects as somewhat helpful. A number of the interviewed farmers (53%) indicated that, they do not acquire income from sale of their crops and vegetables. Most of the harvested produce is used for household consumption as 86% of the respondents also highlighted that as the main reason they joined the community gardens. However, a number of the respondents use income acquired to obtain basic necessities, pay for child education and maintaining their farm business.

Results also showed some major benefits associated with community gardens. Social benefits include: social capital, development of farming skills and collective effort; economic benefits include: increased income, nutritious food, community based employment, better quality of life, education and training; Environmental benefits include: sustainable agriculture.

A major constraint that farmers agreed on was the insufficiency of water. Chi-square test results showed a significant association (p=0.003) of age groups and how they rated the source of water for irrigation. The older aged groups of 50-59 and 60 and over were more negatively inclined towards the sufficiency of water supply and rated it as totally insufficient. Other shortcomings indicated also included: long distance to gardens, lack of fencing and protection, birds and predators and limited institutional support.

TABLE OF CONTENTS

List of Tables

List of Figures

List of abbreviations used in the document

Abbreviation	Meaning
AFRA	Association for Rural Advancement
AGENT	Agribusiness Entrepreneur Network and Training
AIDS	Acquired Immunodeficiency Syndrome
ANAFE	African Network for Agriculture, Agroforestry and Natural Resources Education
AREX/ AGRITEX	Agriculture Research and Extension
CARE	CARE International Organization
CARITAS	CARITAS International Organization
CBO	Community Based Organizations
CFU	Commercial Farmers Union
CONEX	Department of Conservation and Extension
CTA	Technical Centre for Agricultural and Rural Cooperation
DEVAG	Department of Agricultural Development
ENDA- Zimbabwe	Environmental Development Activities
FAO	Food and Agriculture Organization
FEWSNET	Famine Early Warning System Network
FPL	Food Poverty Line
FTLRP	Fast Track Land Reform Programme
GDP	Gross Domestic Product
GEF	Global Environment Facility
GVT	Government
HIV/AIDS	Human Immunodeficiency Virus/ Acquired immunodeficiency Syndrome
IDRC	International Development Research Centre
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IKS	Information Knowledge Systems
IPCC	Intergovernmental Panel on Climate Change
MADA	Masvingo Agro-Dealers Association
MDG's	Millennium Development Goals
MR&U	Management of Risk & Uncertainty in Agriculture
NEPAD	New Partnership for Africa's Development
NGO's	Non-Governmental Organizations
RDC	Rural District Council
SADC	Southern Africa Development Community
SAP	Structural Adjustment Programme
SASACID	Strengthening Africa's Strategic Agricultural Capacity for Impact on Development

SNV	SNV Netherlands Development Organization
SPSS	Statistical Package for the Social Sciences
SSA	Sub-Saharan Africa
SWOT	Strengths, Weaknesses, Opportunities, Threats
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNSO	United Nations Statistical Office
WFP	World Food Programme
ZFU	Zimbabwe Farmers Union
ZIMVAC	Zimbabwe Vulnerability Assessment Committee

CHAPTER 1: INTRODUCTION TO THE STUDY

1.1 BACKGROUND

The world is facing multiple challenges in the 21st century. These challenges include poverty, food security, scarcity of water, and most importantly, new and complex challenges emerging due to global warming and climate change (Wani, Rockstrom, Owesis., 2009). The most crucial climate issue for small-holder farmers in arid and semi-arid regions of Zimbabwe is rainfall (Aguilar, Aziz Barry, Brunet, Ekang, Fernandes., 2009). It is estimated that only about 37% of the country receives adequate rainfall for rain fed agriculture (FAO, 2005). This makes water a far greater constraint to agricultural productivity than land. Changing rainfall patterns, and increases infrequency of droughts and floods have always adversely affected yields of rain fed crops and livestock productivity in Zimbabwe. Projections of future climate change impacts place Southern Africa's agriculture sector at the forefront of climate change vulnerability with potential negative impacts on revenue from dry land farming (Kurukulasuriya & Mendelsohn, 2006). Agricultural production in many areas will likely be especially hard hit, with yields declining by 20-50% by 2050 according to IPCC estimates (Pachauri & Reisinger, 2007). With more than 90% of small scale-farmers in Zimbabwe depending on rain fed agriculture for their livelihoods, the impacts of changing rainfall patterns and increasing frequency of droughts could be devastating, unless concrete steps are taken to enhance the resilience of rain fed agriculture upon which millions of small-holder farmers depend for their food security and livelihoods.

Food insecurity is becoming the order of the day in most rural areas of the world. According to World Bank (2000), 80% of the rural people are currently facing food insecurity and are failing to cope with harsh climatic changes to secure their livelihoods. Recent studies by the Zimbabwe Vulnerable Assessment Committee (ZimVAC) (2009) indicates that, 55% of the rural population has no livestock to sale in times of vulnerability, hence vulnerable to food insecurity. Climate change is becoming the main cause of food insecurity leading to poverty especially in most rural areas of the world. Otto (1993), noted that, the problems of poverty, under

development and environmental degradation are interlinked and being caused mainly by climate change. WFP (2008) also noted that, increased temperatures are adding to water problems causing additional loss of moisture from soil. It estimates that, by 2020 between 75 and 250 million people are likely to be exposed to increased water stress and that, rain fed agriculture yields could be reduced up to 50%; hence, food insecurity is becoming unbearable in most rural areas of the world. FAO (2002) also noted that, most common and serious results of climate change are chronic food insecurity and 27% of the total population in Africa is undernourished. In a bid to reduce the effects of climate shocks, coping strategies are being embarked on in most rural areas of the world so as to reduce food insecurity one of them are community gardens.

Some of the challenges for adaptation interventions in arid and semi-arid regions of Zimbabwe includes insufficient local level historic and future climate change information and relevant examples of adaptive strategies that work for a given context (Nhemachena & Mano, 2007).

Maize is the staple food of the communities living in the communal lands of Zimbabwe. However, maize has been failing in the recent years especially in the semi-arid areas such that people have resorted to gardening as a source of income to purchase food. A study carried out by Campbell, Jeffrey, Kozanayi, Luckert and Zindi (2002) in Chivi shows the importance of gardening in the semi-arid areas of Zimbabwe. All the households sampled engaged in dry land crop production with 84% having access to gardens for small-scale irrigation. Slightly more than half of the gross income from gardening comprises cash while about a quarter of the dry land crop gross output is sold with the balance left for subsistence purposes.

Garden production stands out in three ways – firstly it is something practiced by a wide range of household types. Secondly, a high proportion of its income is cash (as compared to dry land production), and thirdly it is predominantly women who provide labour for gardening production (Campbell, et al., 2002). In addition to cash income, specific environmental benefits of community gardens include reduction in pressure to cultivate marginal land, particularly stream banks, and the promotion of longer-

term management strategies due to decreased risk and increased security of tenure that the schemes bring (Lovell, Batchelor, Waughray, Semple., 1996).

Community gardens according to Dunn (1979) have existed since the beginning of cities as evidenced during the archaeological digs showing that there were some form of shared gardens in most cities and rural areas from 1700 century until the present time. Community gardens have been used in American cities since the 1890s, with the first gardens appearing in Detroit (Community Gardening Toolkit, 2003) and according to Eade (2000), they started in United Kingdom based much in urban areas. World Bank (2000) noted that, gardening can enhance food security in several ways most importantly through direct access to a diversity of nutritionally-rich foods, increased purchasing power from savings of food bills and income from sales of garden products and fall-back food provision during Journal of Agriculture and Sustainability 193 seasonal lean periods. Not only rural communities are benefiting from these cooperative gardens, there are also becoming an increasingly important source of food and income for poor households in peri-urban and urban areas (Becker, 2002). According to WFP (2008) successful field projects have been implemented in Bangladesh, Bhutan, Niger and Africa just to mention but a few. These gardens have an established tradition and offer great potential for improving household food security and alleviating micronutrient deficiencies.

After realizing that shared gardens were contributing much to the economy and social lives of the past, Non-Governmental Organizations adopted the idea of these community gardens in 1945 so as to reduce vulnerability of the rural people to poverty. The idea was adopted to reduce the effects of climate change and poverty as poverty eradication has proven to be an extremely complex task for both governments and non-governmental organizations (World Bank, 2004).

According to Eade (2000), it became better understood later that, the causes of poverty and vulnerability were structural and not natural hence, alternatives by NGOs were adopted to reduce the results of food insecurity at a household level.
To reduce the effects of poverty, most development assistance organizations are emerging to address the interlinked problems of poverty, under development and environmental degradation caused by climate change (Otto, 1993). In particular;

NGOs are a dynamic, diverse group of organizations operating at a local, national and international levels fighting against poverty. According to IFAD (2001), since the mid-1970s, the NGO sector in both developed and developing countries has experienced exponential growth with estimates of over 15% of overseas development aid channelling funds to NGOs.

According to Bebbington (1993), NGOs are said to be key players in international development and they became more influential advocates for democracy and social justice, important part of civil society coalitions and play an essential role in humanitarian responses. Otto (1993), noted that NGOs activities encompass relief and humanitarian aid for refugees, displaced persons, economic and rural development programs, natural resources and conservation projects, public health interventions and many others. NGOs of various types and sizes emerged throughout Zimbabwe with a concern of food security.

As development assistance has come under greater scrutiny by NGOs which can be traced back to the period just after world war 2 during the development era launched by President Truman in 1949, their activities are becoming of great importance in most rural areas of the world (Eade, 2000) . These include Oxfam, Save the Children Fund, Care just to mention but a few. The major concern of these NGOs is to reduce food insecurity by providing people with necessities (Marsh, 1998). (Chambers, 1997), noted that, NGOs in developing countries emerged after realizing that governments are doing little to promote rural livelihoods and reduce food insecurity. One of the NGOs activities are cooperative ‘gardens being implemented especially in rural areas to improve rural livelihoods and increase income levels of the people through selling products from the gardens.

NGOs are bringing resilient strategies which go hand in glove with the major livelihood strategy such as cooperative garden which was implemented by Help German International Organization in Rushwaya village in Gokwe South District of Zimbabwe. The garden was established by Help German International Organization and inputs like seeds, fertilizers, cans, fencing wire were provided to the participants by the organization. Therefore, the main focus of this research is to assess the

contribution of community gardening to rural livelihoods and observing whether their incomes and food have increased or not.

1.1.1 AREA OF STUDY

Zimbabwe lies between latitude 15 and 18^{0}S, and longitude 23 and 33^{0}E. National average annual rainfall across the country ranges from 500 to 750 mm. Northern regions receive between 750 to 1250 mm, whereas the eastern highlands get as much as 1 250 to 2000 mm per annum. However, the south and southwest low-lying parts of the country have a rather dry climate with unreliable rainfall. These areas receive little amounts ranging from 250 to 500 mm per annum. The country has been divided into five agro ecological zones on the basis of annual rainfall received and agricultural suitability of the land.

Figure 1.1 below, shows the five agro-ecological zones of Zimbabwe.

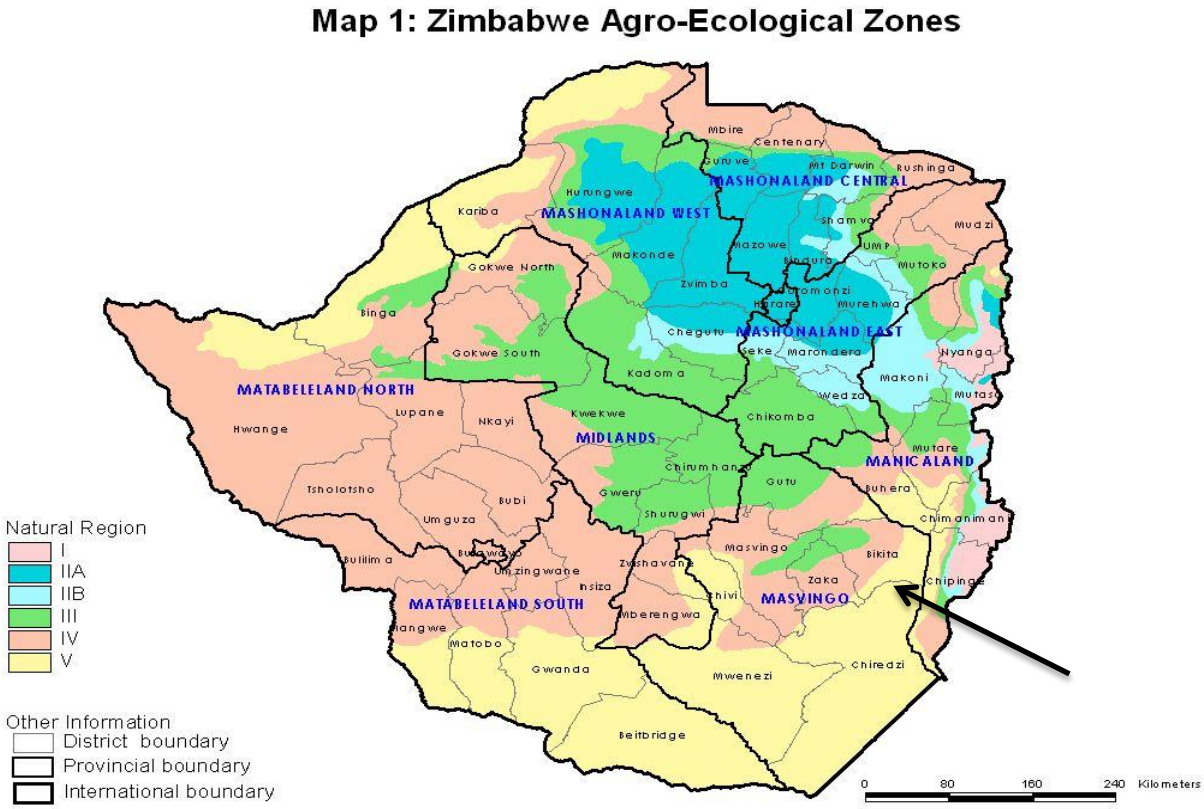

Figure 1.1: Map of Zimbabwe showing the five Agro-ecological Zones of Zimbabwe. ***(Source of data: (Food and Agriculture Organization, 2010).***

Natural Region 1 receives the highest rainfall whereas Natural Region V is the driest. Inter-annual variability in rainfall is relatively high, ranging from 16 percent on the northern plateau to 48 percent in the Limpopo River Valley. (Unganai & Murwira, 2010). Seasons in which rainfall is 20% or more below the long-term average for the country occur on average about once in four years (Frost, 2001).

Table 1.1 below shows the characteristics of the natural regions of Zimbabwe.

Table 1.1: Characteristics of Natural Regions of Zimbabwe. ***Source of data: (Clarion University of Pennsylvania, 2013).***

AEZ	Area Covered	Agric Production	Description
1	7000km/ 2%	Specialised and diversified farming	<1000m rainfall, tea, coffee, plantation farming, macadamia, fruits, intensive livestock production
2	58 600km2/ 15%	Intensive farming	750-100mm rainfall, Intensive crop and livestock production
3	72 900km2 / 19%	Semi-intensive farming	650-800mm of rainfall. Severe mid-summer droughts but maize, tobacco, cotton and other cash crops grown
4	147 800km2 / 38%	Semi extensive	650- 800mm of rainfall .Livestock and drought resistant crop production
5	104 400km2 / 27%	Extensive	<450mm rainfall supports extensive cattle or game protection

As illustrated in Table 1.1 and figure 1.1 above, the Masvingo province lies within regions 3, 4 and 5. Northern parts of Gutu, Zaka; north-western Bikita, Chivi north and south and western Masvingo districts are categorised as region 3. Most portions of Gutu south, Zaka and Masvingo and Bikita central are in region 5.

1.1.1.1 Masvingo Province

Masvingo is one of the ten provinces in Zimbabwe found in the drier south-eastern lowveld of the country (Figure 1.2). The province has an area of 56,566 km² and a population of approximately 1.3 million (Central Statistics Office, 2002). There are

seven administrative districts run by Rural District Councils (RDCs), namely Bikita, Chiredzi, Chivi, Gutu, Masvingo, Mwenezi and Zaka. The province is predominantly semi-arid; rainfall is minimal, highly variable/erratic and uncertain making the province prone to droughts.

The bulk of the province is set as region 5 in the country's climatic agro-ecological regions. Though most of the province is generally dry, it does possess some of the most agriculturally fertile soils, inland water bodies and river systems (Save, Runde, Mwenezi, Mutirikwi and Limpopo). River systems dominate the drainage system in the province), drought tolerant and sturdy vegetation like Mopani trees, and very rich natural pastures (Murwendo & Munthali, 2008). Kopjes, hills and mountain ranges dot the countryside. The dominant agricultural activities include subsistence cultivation of drought resistant cereal crops (sorghum, rappoko, millet, and some varieties of maize) and cattle rearing (and commercial cattle ranching). (Wikipedia, 2012)

Figure 1.2 below shows the location of Masvingo Province on the Zimbabwe Map.

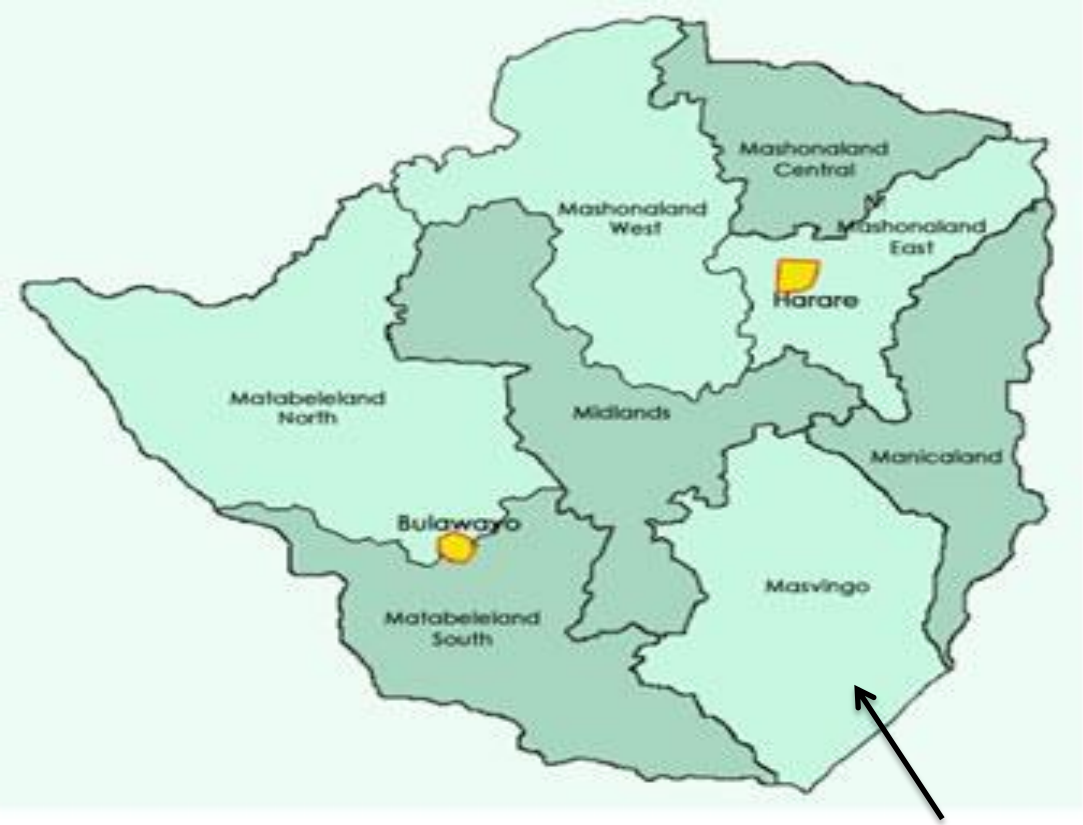

Figure 1.2: Location of Masvingo Province in the Zimbabwe Map. *Source of data:* (The Zimbabwe Mail, 2014).

1.1.1.2 Bikita District

Bikita district lies within Natural Region IV and it is 100 km east of Masvingo town. One is one of the districts located in the South Eastern part of Zimbabwe. It is located 20^{o} 4' 60S and 31^{o} 37' 0E and is 986 m above sea level. The area is mountainous characterized by steep slopes with sandy-loamy soils. 81% of the district is classified as belonging to the natural regions (4 and 5) with mean annual rainfall ranging from 400mm to 700mm which is received between November and 12 April. The mean temperature is 19^{o}C with mean maximum and minimum temperatures of 26.0^{o}C and 12.8^{o}C respectively.

It is subject to seasonal droughts (Unganai, 1996) and was particularly hard hit by 1992, 1994, 2002, 2004 and 2008 droughts that affected Zimbabwe. It covers an area of approximately 10,000 km², and has a population of around 200,000 people.

Agriculture is the major livelihood activity in the area and the main crops grown are maize, sorghum, groundnuts and rapoko with maize being the dominant crop grown (Mugabe, Chivhizhe, Hungwe., 2008).

As is the case for most of Zimbabwe, rain-fed crops are grown during one distinct cropping season from November to April across the district. Rainfall distribution is very poor, mid-season are a common feature of the district's climate and frequent short seasons make it difficult for smallholder farmers in the area to secure food and decent livelihoods. Households in Bikita District depend on food handouts in most years (Mugabe, 2008).

Figure 1.3 below shows the position of Bikita District in the Masvingo Province.

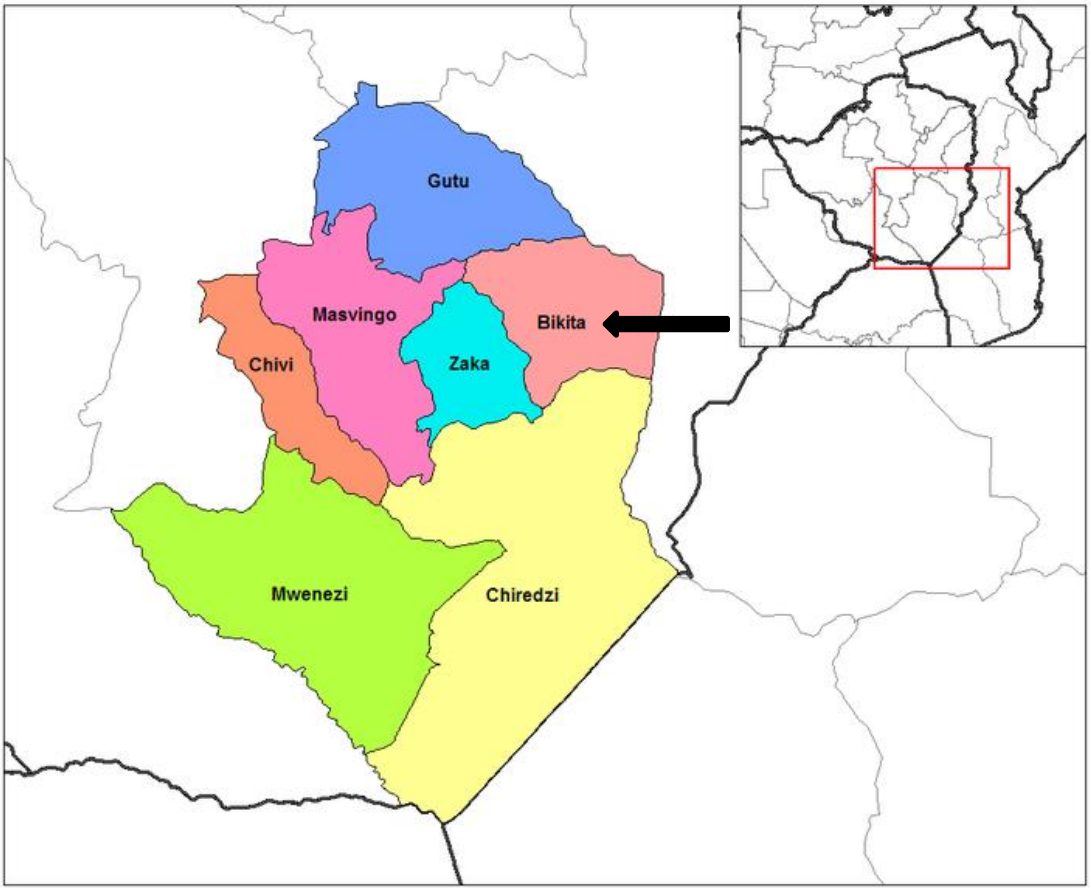

Figure 1.3: Location of Bikita District in the Masvingo Province. ***Source of data: (Wikipedia, 2014).***

`

1.1.3 Food Security Status

Despite significant progress in farming and the fact that food insecurity has become less frequent over the last 20 years, Africa is, according to FAO, the only continent where the absolute number of undernourished people has increased over the same period. In 1990, less than one undernourished person in five was living in Africa, while today's figure has risen to over one in four. Along with South Asia, Africa is the continent most seriously affected by food insecurity (NEPAD, 2013).

Food insecurity has a particularly strong impact on young children and their mothers; within families in the African context where the best food is sometimes kept for the men, young children along with pregnant and breastfeeding women are more liable to suffer from nutritional deficiencies. Food insecurity is a problem that affects the rural world more than cities because the people producing food often do not make

enough to feed their families due to the lack of adequate access to means of production (land, manure, tools), and rural communities are poorer and struggle to buy the food they are missing (NEPAD, 2013).

The crop situation in the 2013 season, particularly in the southern parts of Zimbabwe, is poor due to recurring droughts. Seventy-five percent of the crop in Masvingo was written off in the 2012 season due to the dry spell. The Government of Zimbabwe estimated that at least 1.6 million people would face food insecurities between January and March 2013. The Famine and Early Warning Systems Network revealed that this represents a 60 percent increase in the number of people in need of food compared to the same period in 2011. This grain shortage has pushed up maize-meal prices (Office, 2013).

In Zimbabwe food security was at a critical level. Effectiveness of Drought Mitigation Strategies in Bikita District, Zimbabwe primarily due to the lack of food, as the country passed through the peak of the hunger season prior to the new harvest experienced in April 2008. However, the biggest challenge to farming and food security in Zimbabwe today is not funding, not skills shortage but climate change and global warming (FAO, 2008). In February 2008, the rains tapered off causing extreme dry weather conditions in several provinces of the country (Ministry of Agriculture., 2008). There was a long dry spell which seriously damaged the crops and yields for the main season crops. The worst affected provinces included Masvingo, Manicaland, Mashonaland East and Matabeleland South (FAO, 2008). Changing climate and weather systems pose a serious threat to agriculture, as they have disrupted rains, cause d droughts and resulted in higher average temperatures.

The yields of maize (which is the staple food) in the smallholder sector have declined from 1.7 t/ha in 1996 to 0.5 t/ha in 2007 because of persistent droughts and inability to purchase inputs. This has resulted in a sizable proportion of rural people being unable to meet their food requirements. According to Buckland et al., (2000), within the agricultural sector drought is arguably the most important climatic challenge and has major impacts on rural livelihoods. In most rural areas in Zimbabwe rain-

fed agriculture is the basis of livelihoods such that fluctuations in annual rainfall cause corresponding variations in viability of agriculture. About 70% of the Zimbabwe`s population lives in rural areas and derive their livelihoods from subsistence agriculture and other rural activities (Buckland, et al., 2000)

Figure 1.4 below shows the levels of food insecurity severity in the Districts of Zimbabwe.

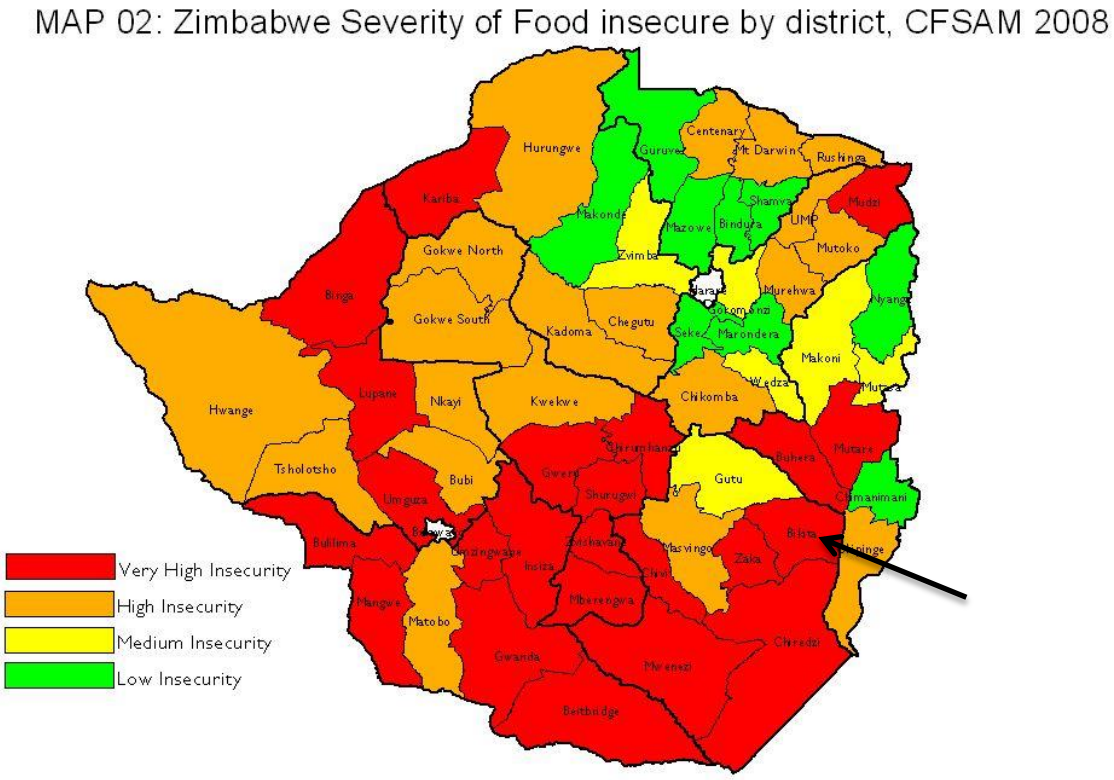

Figure 1.4: Zimbabwe Map showing levels of Food Insecurity in the various Districts of Zimbabwe*. Source of data:* (Food and Agriculture Organization, 2011).

A report by the Famine Early Warning System Network (FEWSNET) said although most households in rural areas had come through the peak hunger season, adverse agricultural conditions were affecting Masvingo, Matabeleland South and Manicaland provinces, among other areas in Zimbabwe.

In Bikita district, subsistence farmers are producing less on their fields as the years are progressing; as a result there is a food shortage and effects of drought are worsening with time. Rainfall is erratic, poorly distributed and falls predominantly for

only a few months each year resulting in livelihood insecurity since water scarcity and food security are interrelated problems. The mitigation strategies are used by the households but the effects of drought are increasing demanding for continuous assessment and improvement of these coping mechanisms. There are also challenges associated with the implementation of the strategies and these should be identified and combated for to increase the effectiveness of the strategies.

As shown in the Figure 1.4 above, Bikita (indicated by the black arrow) is one of the areas that have very high food insecurity in Zimbabwe.

1.2 PROBLEM STATEMENT

In Zimbabwe, rain fed agriculture is a major source of livelihood for the majority of small-holder farmers located in semi-arid regions of the country (Kahinda, Rockstrom, Taigbenu, Dimes., 2007). Despite great strides made in improving agricultural productivity in many developing countries, many households in southeast Zimbabwe still face poverty, hunger, food insecurity and malnutrition in those areas where rain fed agriculture is the main source of livelihoods and food. This situation has been exacerbated by the fact that rain fed agriculture is generally overlooked by development investors, researchers and policy makers due to limited confidence in its ability to increase agricultural production and development. However, case studies from Africa and elsewhere demonstrate the potential of rain fed agriculture in achieving food security, improving livelihoods and most importantly addressing issues of equity and poverty reduction in dry land areas - the hot spots of poverty (Wani, et al., 2009).

Bikita District being in the agro-ecological region V experiences minimal rainfall and successive bouts of heat waves and droughts. Mutekwa (2009) argued that in some cases, floods and mid-season prolonged dry spells have been experienced in Bikita in the same season. It has been observed that climate change and variability has made rain frequently erratic and unreliable making it extremely difficult for rural farmers in Bikita to invest in agricultural activities. The increased frequencies of extreme weather conditions in the Masvingo Province particularly in Bikita are

depressing yields and damaging crops especially at the key growth stages. Recurrent and protracted heat waves are causing excessive wilting of crops in the fields which has increased the levels of food insecurity in the district. This finding is in agreement with (Slater, R., Peskett, L., Ludi, E., Brown, D., 2007), who also highlighted that climate change is reversing and slowing down the poverty reducing capacity of agriculture which is simultaneously eroding the source of income and livelihood for the rural poor. This has aggravated food insecurity and vulnerability to hunger and poverty in Bikita and the surrounding districts.

This scenario is worsened by the fact that most of the rural farmers in Bikita do not have the adaptive capacity due to poverty and reliance on basic technologies. It is against this background that the effects of climate shocks have been felt by the poorer communities such as Bikita where the majority if not all of the people depend on agriculture for their livelihoods. It has been observed that Zimbabwe in general and particularly Bikita have witnessed marked transformations in the climatic conditions which are critical for sustainable agricultural activities.

There has been a general increase in temperatures, declining rainfall, deteriorating soil moisture and fertility as well as shortening of the crop growing season. All these have coagulated to reduce agricultural productivity in Bikita and consequently making people vulnerable to food insecurity. Dry spells have also become more frequent in the recent years. Loss of livestock has also become more rampant in Bikita due to diseases and poor pastures as a result of poor rainfall. Given the fact that water availability is a key component for agricultural productivity and food security, erratic rainfall has thus constrained the sustainability of agricultural activities especially in areas that receive very low annual rainfall like a Bikita.

In Bikita District, rural farmers face the difficult management decisions on how to allocate limited resources among crop production, livestock production and off-farm employment. The main barrier to overall productivity and adaptive capacity is how effectively farmers make use of limited amounts of water and available climate information. Crop production in Bikita District is highly oriented towards rain fed maize production. A key constraint to livestock production in the communal areas of Bikita is that overgrazing in the wet season does not allow sufficient fodder to be

carried over to the dry season result in a shortage of fodder during this period. The situation is aggravated by frequent droughts and declining safety net resources of poor farmers in the dryland areas (Unganai & Murwira, 2010).

The risk and uncertainty associated with semi-arid regions in particular, is the occurrence of drought and the frequency of crop failure. This means that farmers adopt risk-averse strategies in order to surpass the dry season (Scoones, 1998). Such strategies, placed in the context of high livestock and human populations may encourage heavy dependence on the environment. Rural communities in Bikita District depend on a wide range of natural products to supplement their livelihoods, most of them derived from the commons.

Water scarcity is one of the greatest limitations to crop productivity in the Southeast part of Zimbabwe which includes Bikita District (Unganai & Murwira, 2010). Therefore, even modest improvements in crop resistance to drought, infield soil moisture management and in water use efficiency will have significant productivity and economic impacts. As climate change takes root, the water balance of the district is becoming more precarious making household food-insecurity worse.

Vulnerability to climate variability, particularly drought, is well documented. The catastrophic drought of 1991/92 offers valuable insight into the region's vulnerability to climate related shocks. The 1991/92 drought in Zimbabwe resulted in the near collapse of the region's animal and crop production systems. Livestock and wild-animals perished in large numbers during that drought period. The importance of rain fed agriculture varies regionally but produces most of the food for poor communities in developing countries. In sub-Saharan Africa, more than 95% of the farmed land is rain fed (Unganai & Murwira, 2010).

Drought relief programs have been implemented almost every other year since Zimbabwe's independence in 1980 as smallholder farmers frequently experience dry spells. Due to the unreliability of rain fed agricultural, people in Bikita have resorted to alternative livelihood methods such as firewood trading, brick making and community gardening. The problem is also the uncertainty of community gardens as a strategy to cope with drought and climate shocks.

1.3 PURPOSE STATEMENT

The purpose of this paper is to objectively look at the dynamics at work in community gardens in Bikita District, Masvingo province, Zimbabwe. The significance of the gardens on poverty, food security and income, will be investigated and discussed. How the gardens are assisting the rural farmers in Bikita District in coping with drought as a climate shock will be considered.

The study is part of the African Network for Agriculture, Agroforestry and Natural Resources Education (ANAFE) in collaboration with the University of Pretoria which is engaging in the broader Management of Risk & Uncertainty in Agriculture (MR&U) theme of the 'Strengthening Africa's Strategic Agricultural Capacity for Impact on Development (SASACID) project. The SASACID project is a transformative initiative developed by ANAFE to build capacity and improve the quality, relevance and application of tertiary agricultural education in sub-Saharan Africa.

The MR&U theme intends to build the capacity of young scientists, generate new and rigorous knowledge for risks and uncertainty, particularly in small-scale farming and food systems, and facilitate the sharing of this knowledge.
The risks and uncertainty studies were in the following:

- Production and socio-economic arena,
- Climate change and variability,
- Agrochemicals,
- Biosafety
- Land Use Land Cover and natural resource management

1.4 RESEARCH OBJECTIVES

The overall objective of the study is:

To assess the significance of community gardens in coping with climate shocks as well as, focusing on the direct significance of the gardens on the participating

farmers' livelihoods in Bikita District, Masvingo that is; food security status, income and poverty.

- An in-depth assessment of the community gardens, the local people who are engaging in community gardening in Bikita District and their socio-economic status, knowledge, perceptions and attitude towards drought and climate shocks.

- Successes, constraints and institutional support of community gardens in Bikita District and the overall significance of the activity as a drought and climate shocks coping strategy.

- To analyse the needs and challenges of the community garden participants in Bikita so as to come up with an in-depth knowledge of how the activity can be supported and improved.

1.5 KEY RESEARCH QUESTIONS

- What is the socio-economic status of the rural farmers in Bikita District which contributes to their vulnerability to drought and other climate shocks?

- What are Bikita District farmers' perceptions towards climate shocks and how has it affected the community in terms of agricultural production?

- Who is mainly participating in community gardening in Bikita and what is the overall significance of the activity? (Social, Economic, Physical)

- What are some of the challenges being faced by rural farmers in Bikita and how would they hope for the challenges to be addressed?

1.6 CONTEXT AND UNITS OF ANALYSIS

The units of analysis in the context of the study are farmers be it men or women engaging in the community garden projects. The study will also interview a small percentage of farmers who are not participating in the programme so as to get their perception towards this project and why they are not involved in it. Focus of the study will be on farmers in the rural area of Bikita, Zimbabwe.

1.7 ACADEMIC VALUE AND INTENDED CONTRIBUTION OF THE PROPOSED STUDY

Drought and Climate Change are global issues, not only affecting Zimbabwe or Africa only. The implementation of community gardening projects and programmes is envisaged to alleviate poverty and provide food security for the small scale rural farmers in semi-arid areas. Several studies on drought and climate change adaptation have shown that the practice of community gardens is indeed assisting farmers to cope and mainly poverty alleviation, income and food provision.

1.8 DELIMITATIONS

The study only tries to determine the link between drought, climate shocks and community gardening as a coping strategy at specific areas of the Bikita District. This paper does not investigate small food gardens located at the homes of clients. These backyard gardens which are quite common are of a much smaller scale and are usually cared for on a part time basis by the home inhabitants. The dynamics involved in these small backyard gardens are quite different from community food gardens.

The study did not, by any chance, give a national reflection on the effectiveness of community garden projects, but it will only reflect on what is happening in Bikita District, particularly in the wards chosen. The study will cover those groups of people that are involved in gardening, and other households that are not necessarily involved in gardening. The results cannot be generalised to the whole of Zimbabwe,

although lessons can be learned for areas with similar characteristics that is the Semi-arid and Arid areas.

CHAPTER 2:LITERATURE REVIEW

2.1 INTRODUCTION

The purpose of this chapter is to review the literature on spiral downfall of agricultural production in Zimbabwe due to the effects of drought during the past decade and how the effects are also being felt on the economy of Zimbabwe. The chapter will also dwell a little on the impact of climate variability and climate change and the effects on agricultural production. Thirdly, the chapter will focus deeply on drought as a major climatic shock, its occurrence and impact in the region and to smallholder farmers. The chapter will also highlight the conceptual framework that is built upon context of vulnerability of small holder farmers to climate shocks and their adaptive capacity. Lastly, the chapter focuses on potential of community gardens and their impact on the socio-economic status of rural farmers and countries that have adopted this practise as a remedy for coping with climate shocks. The challenges being faced in community gardens were also considered in this chapter.

2.2 AGRICULTURAL PRODUCTION IN ZIMBABWE

Agriculture, the main driver of economic growth in Zimbabwe, has declined over the years. The Zimbabwean economy has been characterised by low agricultural output of the major commodities, high inflation, shortages of foreign currency and basic food commodities, increased food insecurity, and high unemployment among the population, particularly of poor marginalised smallholder farmers. Declining donor support to the country and the low levels of investment has affected all sectors of the economy. Skilled personnel have migrated to regional and international destinations. Both the public and private companies have been affected, the telecommunications and media sectors included. Although post Fast Track Land Reform Programme, there are many new farmers with little technical knowledge of farming, particularly small scale farmers, the poor performance of the economy has led to government, private companies, NGOs, civil society organisations scaling down in their operations due to financial problems, poor electrical supply, fuel shortages and poor telecommunications (Chamboko, 2007).

Zimbabwe's agricultural sector has long been the key to its economic stability and growth. Not only does it form the basis of the direct and indirect livelihoods of almost 70% of the population, but economic growth is also directly linked to the performance of this sector. The growth and development of agriculture are expected to support the improvement and growth of the other sectors of the economy, namely industry and services. However, Zimbabwe's economy has struggled, agriculture more so than most other sectors, to cope with the combined effects of the Fast Track Land Reform Programme (FTLRP), hyperinflation, capital constraints and government controls on markets. Zimbabwe's real GDP declined by more than 71% between 2000 and 2008 (Robertson, 2011) with overall agricultural production declining by 30% over the same period (Sukume & Guveya, 2009). The government's land reform programme and the subsequent collapse of the agricultural sector, which once provided 400 000 jobs and was the country's main source of export revenues and foreign exchange, are seen as the prime cause of the prolonged economic crisis (Richardson, 2004). The deterioration of commercial agriculture and the sector in general, which led to the country becoming a net importer of food by 2002, has resulted in a substantial fall in formal employment opportunities, output, exports and secondary demand generated by the modern or capitalised sector (World Bank; Government of Zimbabwe, 2010).

The agricultural sector, being the backbone of the economy underpinning economic growth, food security and poverty eradication, continues to experience severe challenges within its entire value chain ranging from lack of agricultural finance and lack of affordable inputs. This has also been exacerbated by prolonged periods of drought caused by climate changes. Once known as the breadbasket of the Southern African Development Community (SADC) region, Zimbabwe is now characterised by chronic food insecurity and is entirely dependent on international aid, particularly food aid (Makumbe, 2009). After 2000, there have been several emergency-related programmes, from food relief to input support schemes, funded by the government or bilateral or multilateral donors, to improve food security and (mainly subsistence) agricultural output.

Productivity is low, which is related to a low level of capital endowment, leading to a restricted uptake of productive farm technologies and, subsequently, to low yield and

output (ZimVAC, 2009). The rural market economy collapsed because of the economic crisis, as well as constant interventions by the state and donors. This led to the collapse of input and output markets and efficient price-setting mechanisms, among other things (Esterhuizen, 2010).

Several issues are hampering this shift and the subsequent re-initiation of a solid, positive growth path for both agriculture and the overall economy: The lack of a relevant and well-defined policy and institutional framework, leading to an ill-defined overall development strategy and unstructured institutional entities, (parastatals, for example) and arrangements including contractual arrangements namely:

- Deteriorating infrastructure for the marketing and movement of produce, such as roads and telecommunications, as well as overall production capacity (including a lack of fuel, electricity and input manufacturing industries) leading to high costs or scarcity of production factors (Kapuya, Saruchera, Jongwe, Mucheri, Mujeyi, Ndobongo, Meyer., 2010); (Moyo, Scoones, Cousins., 2009)

- A lack of efficient and effective support to agriculture, such as research and agricultural extension, leading to a limited transfer of technology from research, restricted dissemination of productive farm technologies, and a lack of commercial farming skills;

- Limited access to working capital and difficulties in accessing agricultural finance, which stem from a lack of credit, financial services that are poorly adapted to the new tenurial situation, and unfavourable borrowing conditions and Inadequate training in production and crop management, stemming from poor extension services, and, therefore, a limited transfer of technology from research (Kapuya, et al., 2010).

2.3 IMPACT OF CLIMATE CHANGE AND VARIABILITY

Climate Variability is defined as variations in the mean state and other statistics of the climate on all temporal and spatial scales, beyond individual weather events. The term "Climate Variability" is often used to denote deviations of climatic statistics over a given period of time (e.g. a month, season or year) when compared to long-term statistics for the same calendar period. Climate change refers to a statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer). In essence, climate variability looks at changes that occur within smaller timeframes, such as a month, a season or a year, and climate change considers changes that occur over a longer period of time, typically over decades or longer (IPCC, 2007).

Developing countries tend to suffer more from the impact of climate change and variability, yet they are least able to adapt to new climatic conditions. Vulnerability thus manifests itself in poorer countries and communities due to a lack of resources or entitlements and lack of capability to respond or adapt to climate variability. It should be underscored that the ability to adapt and cope with climate variability hazards depends on economic resources, infrastructure, technology, and social safety nets (Slater, Peskett, Ludi, Brown., 2007). However, developing countries like Zimbabwe often do not have the requisite resources for these and thus are ill-prepared to deal with climate change and variability. It is worthy alluding to some influential studies conducted, such as that by Rosenzweig & Parry (1994) which examined world food supply, food prices and the number of people at risk from hunger in developing countries.

Pockets of food insecurity are plaguing areas in Southern Africa where floods or prolonged mid-season dry spells have reduced harvests. Communities are battling to access food and desperate families increasingly go hungry, according to a Famine Early Warning Systems Network assessment conducted in July. It points out varying food insecurity levels across the Southern African Development Community region, with higher levels in Lesotho and greater food insecurity anticipated in Namibia — the two countries where the impact of excessive rains and floods on crop production and livelihoods is most severe.

Conditions in these areas remain a concern as harvests have been reduced. The resulting food deficits have had adverse impacts, especially on poor households that, even in average production years, face constraints in accessing adequate food.

Climate change is expected to play havoc with the region's food security in the future and hamper efforts to achieve one of the key millennium development goals — to "eradicate extreme poverty and hunger" and halve the number of people living on less than $1 a day by 2015. In a presentation at the African Agriculture Summit in Cape Town in 2011, William Barclay, senior regional programme adviser for the World Food Programme, said that 65% of the global total increase in climate-related hunger was likely to occur on the African continent. He said rain-fed farming dominated food production across much of the continent, covering about 97% of total crop land. He mentioned that climate change will worsen existing food insecurity. Agronomists predict that yields of corn, soya bean, maize, wheat and rice will decrease dramatically as temperatures rise. Models predict that climate change will put South Asia and Africa at great food security risk by 2030, and by 2100 half of the world's population could be food insecure (Sosibo, 2011).

The International Food Policy Research Institute says that roughly 65% of sub-Saharan Africa's population relies on subsistence farming. A typical subsistence farmer in the region is female and uses no fertilisers, high-yield seeds, irrigation or medication for her animals. In South Africa women are inadvertently at the frontline of climate change effects, both as producers of food and as the people who ensure that families are fed. But according to a study by Yvette Abrahams of the Commission on Gender Equality in 2005, women have not benefited from land reform. Female-headed households make up less than 10% of the beneficiaries of land restitution and less than a quarter of those South Africans who have benefited from land redistribution and tenure reform.

According to Ellis (2000), in sub-Saharan Africa reliance on agriculture tends to diminish continuously due to the effects of climate change that have undermined the sustainability and reliability of the agricultural sector. It has also been noted that the anthropogenic signal of climate change has been detected in Africa and Asia with strong statistical significance, making mitigation strategies a sensible option,

especially in sub - Saharan Africa, where the highest concentrations of rural poor relying on agriculture reside. As such, agriculture is extremely critical in sub - Saharan Africa in terms of subsistence, contribution to the GDP (about 35 percent), employment (70 - 80 -per cent of total labour force) and foreign exchange earnings (about 30 percent) (Abalu & Hassan 1998).

2.4 DROUGHT AS A MAJOR CLIMATE SHOCK

Drought is a common occurrence in sub-Saharan Africa (SSA) in general, and in southern Africa in particular. It has been defined as the condition of abnormally low rainfall, outside the normal expected parameters that would support productive activities. The frequency of droughts and below-normal rains seem to be increasing in line with climate change. Droughts significantly reduce food availability at both national and household level, as well as limiting rural employment possibilities. Poor smallholder farmers in Africa have had to face the reality of crop failure and acute food shortages. The largest food crises in Africa that required large-scale external food aid have been attributed fully or partially to extreme weather events. The impacts of droughts are contingent on the interaction of meteorological anomalies and these indirectly lead to increased environmental degradation, deforestation etc., which could be a factor in civil strife causations (Chikobvu, S; Chiputwa, B; Langyintuo, A; La Rovere, R; Mwangi, W, 2010).

In Zimbabwe, as in much of SSA, drought is frequent with devastating effects on household livelihoods. This is exacerbated by limited financial resources, inadequate understanding of drought impact, and poor coordination amongst agricultural agencies. Drought, therefore, is a form of supply-side shock outside a country's control and has consequences on domestic economic variable. In Zimbabwe, the famines of 1974, 1982, 1992, 2002, and 2004 affected the lives and livelihoods of millions of rural households, and were mainly caused by droughts (Rukuni, 2006).

According to a community participatory and biophysical climate risk analysis that was conducted for Chiredzi, one of the districts in Masvingo province, Zimbabwe, by the (UNDP/ GEF, 2009), it was revealed that drought is the most important climatic

hazard/ shock affecting livelihoods of rural farmers in the area. There are five drought types: **early season** (characterized by delayed or slow onset of the rains), **mid-season** (rains break for weeks on end about January/February), **terminal** (rains just terminate from about January/February), **seasonal** (rains are light and patchy throughout the season) and **extreme drought** (in this case rains fail for two or more consecutive seasons) are a regular feature of the district's climate. The extreme drought type usually calls for state intervention to save livestock and human-lives. (UNDP/ GEF, 2009).

Risks associated with drought includes: crop failure, lack of fodder for cattle, lack of water for cattle & irrigation, insufficient water for hygiene purposes, loss of income from agriculture, migration and associated impacts on families, increase in school drop-outs, increase in deforestation, loss of biodiversity and saline water intrusion. (Unganai & Murwira, 2010).

Due to unreliable rainfall and successive hot periods, there have also been consecutive droughts in Bikita which have aggravated the villagers' downward spiral of food insecurity. It has been further observed that rainfall and climatic regimes have been highly unpredictable for the past few years, characterized by recurrent droughts of varying severity. This finding confirms conclusions made by (Mutekwa, 2009) who argued that the unpredictability of precipitation presented more challenges to the farmers than any other climate shocks elements. The most serious droughts in Bikita tend to occur at a ten year interval with the notably serious droughts being experienced from 1982, 1992 and 2002 and 2008, with evidence of even serious droughts to recur in the coming years.

2.4.1 Occurrence of drought

According to IFAD, (as cited by Benson, Thomson and Clay, 1997), at least 60 percent of Sub-Saharan Africa (SSA) is vulnerable to drought and probably 30 percent is highly vulnerable. Extreme drought in the Limpopo River Basin is a regular phenomenon and has been recorded for more than a century at intervals of 10-20 years.

In the period 1980-2000, the SADC region was struck by four major droughts, notably in the seasons 1982/83, 1987/88, 1991/92 and 1994/95. This corresponds to an average frequency of once every four or five years, although the periodicity of droughts is not necessarily so predictable. Gommes & Petrass (1994), identified three drought cycles during the years 1960 to 1993 with lengths of 3.4, 7.1 and 5.8 years, respectively. Amplitudes were 0.38, 0.35 and 0.28 standard deviations, respectively.

2.5 IMPACT OF DROUGHT IN SOUTHERN AFRICA

2.5.1 Macroeconomic impacts

Drought is the most important natural disaster in Southern Africa in economic, social and environmental terms (Buckland, Eele and Mugwara, 2000). A report by the United Nations Development Programme (UNDP) states that drought is considered by many to be the most complex and least understood of all natural hazards, affecting more people than any other hazard (UNSO, 1999).

Buckland, et al (2000), reported that little research has been done on the macroeconomic impact of drought in Southern Africa. The main reason is that drought is typically perceived as an agricultural or food supply problem. However, for most SADC countries drought represents the most important type of economic shock they are likely to experience. It is important for governments to understand the macroeconomic impacts of drought when developing drought management policies and programmes.

Drought has primary and secondary (ripple) effects on a household or national economy. Primary or physical impacts include reduction in agricultural production, hydroelectric power generation, water intensive non-agricultural production (processing), and domestic availability of water, which has health implications. Secondary impacts are those that affect gross domestic product (GDP), e.g. reduction in industrial output may lead to inflation and lay-off of labour, which

increases unemployment. These factors reduce demand, expenditure, savings and GDP.

Drought is a chronic problem in Southern Africa and has a major impact on rural livelihoods with the effects lingering long after the actual event. Buckland, et al (2000) wrote that the economies of the [SADC] region are particularly susceptible because of their geographical position, the high proportion of people dependent on rain fed agriculture for their livelihoods, and the strong links between agriculture and the rest of the economy. In the case of the 1991/92 drought in Southern Africa, estimates put the total number of people affected at 86 million, 20 million of whom were considered to be at serious risk of starvation. Cereal output in SADC (excluding South Africa, not then part of the community) fell from an average of 11.3 million tonnes to 6.2 million tonnes. Import needs rose to 7 million tonnes, with a further 5.5 million tonnes for South Africa. In total, 11.4 million tonnes of cereal were imported.

Botswana experienced several periods of prolonged drought affecting the entire country from 1981 to 1986 that were caused by a succession of below average rainfall years. The cumulative effect was devastating in terms of food and water availability and caused large-scale mortality in livestock and wildlife (Bhalotra, 1987). This drought is widely regarded as the worst to affect Botswana in living memory. A second period of drought in 1991/92 also affected the entire country and caused widespread crop failure and livestock mortalities.

In the 1991/92 agricultural season, Zimbabwe experienced the worst drought in living memory, with complete failure of crops and devastation of the livestock sector that rendered most areas semi-deserts. The economic effects were also felt outside the agriculture sector. Largely as a result of the drought, through water and electricity shortages, manufacturing output in Zimbabwe declined by 9.3 percent, with a 25-percent reduction in volume of manufacturing output and 6-percent decline in foreign currency receipts (Chenje, 2000). In the period 1991-97, the country experienced three major droughts requiring the importation of food to alleviate the associated food shortages. Serious reductions in agricultural output resulted in reduced economic growth and loss of the much-needed foreign exchange normally derived from agricultural exports.

Mozambique regularly experiences both extremes of rainfall variability - periods of insufficient rainfall as well as severe flooding caused by excessive rainfall and cyclones. The drought in southern Africa in 1991/92 also had enduring effects and affected more than 1.3 million people, especially the rural poor of the southern and central zones. The impacts were exacerbated by the civil war and caused widespread loss of food supplies and livestock, and environmental degradation (Manjate, 1997).

The World Food Programme (WFP) alone spent nearly US$200 million in providing food aid relief. The southern province of Gaza is one of the most drought-prone as well as flood-prone provinces in the country because of its proximity to the Limpopo River and low-lying coastal areas.

In the 1992 drought in South Africa, it was estimated that 50 000 jobs were lost in the agriculture sector, with a further 20 000 in related sectors, affecting about 250 000 people (AFRA, 1993). Although the direct contribution of the agriculture sector to GDP is relatively small (about 5 percent), it still plays an important role in the economy through backward and forward linkages to other sectors (e.g. the purchase of goods such as fertilizers, chemicals and implements as well as the supply of raw materials to industry). The Reserve Bank (Pretorius & Small, 1992) calculated the agricultural multiplier to be 1.6, and using simulation modelling calculated the loss to GDP during the 1992 drought at about 1.8 percent, representing US$500 million. This is a substantial impact from a sector playing a relatively small role in the economy.

Experts forecast climate change may reduce certain crop yields by 20-30% in the next 30 years and the largest losses are likely to be in developing countries. Despite the availability of farming technology to increase harvests, many African farmers are worried about the future. Over the last decade, they have seen ‘big changes’ in the continent’s weather patterns. As well as less rainfall, many farmers speak of heavier rains when they come; bringing floods. This unpredictability in the weather is believed to be caused by climate change. Losses to harvests are causing huge problems across Africa, where farmers rely on a regular pattern of the seasons (Our Africa, 2011)

2.6 CONCEPTUAL FRAMEWORK

The conceptual framework adapted in this study is built on the vulnerability framework. The framework was chosen because it enables the identification of factors that affect agricultural production for farmers especially in the rural areas and the factors that contribute to the level in which farmers can adapt to these stress or the lack thereof, which causes them to be highly vulnerable to stresses up to the influences of individual or community and institutional support, strategies and policies on the livelihood outcomes that may reduce farmers' vulnerability to shocks and stresses like climate change.

2.6.1 Climate signal

The climate signal comprises long–term changes in average climate conditions, as well as changes in climate variability such as changes in the timing, intensity and duration of precipitation and extreme weather events, like droughts and floods. The response of actors and systems depends on the characteristics of the climate stimulus, including the degree of exposure to the stress and the scale and magnitude of the event (Smithers & Smit, 1997).

2.6.2 Adaptive capacity

Adaptive capacity is the ability (or potential) of a system to successfully adjust to climate shocks including climate variability and extremes (Pachauri & Reisinger, 2007). Adaptive capacity comprises adjustments in both behaviour and in resources and technologies.

2.6.3 Context of vulnerability

The impact of climate shocks on the well–being of individuals, households, and communities and their ability to respond to those changes depends on the context in which climate change occurs (Adger, Dessai, Goulden, Hulme, Lorenzoni, Nelso;

Naess, Wolf, Wreford., 2009). The context includes all the factors that determine an individual's, households, groups, or community's vulnerability to climate shocks.

Figure 2.1 below attempts to show the vulnerability framework, which is a cycle of events on how the categories shown interact with each other in terms of how farmers can be affected by climate shocks and how the vulnerability and adaptive capacity can be measured by their socio-economic factors and how their individual, household or community strategies (community gardens) in conjunction with institutional support and policies can assist to make their socio-economic factors better for them to adapt and handle stresses and shows thus having a more positive livelihood outcome.

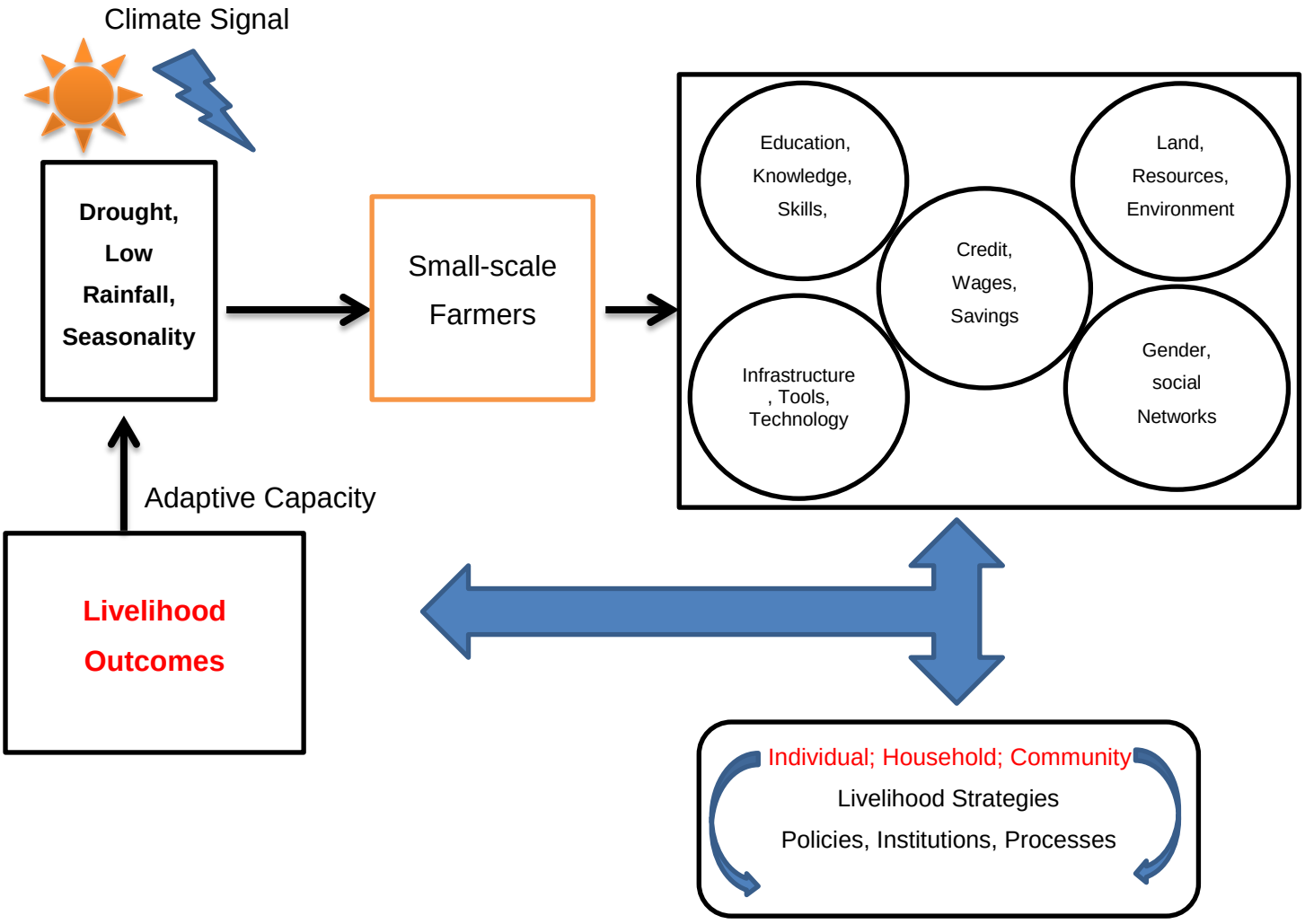

Figure 2.1: Conceptual Framework. ***Source of data*** **(Thomas Fellmann, 2012)** ***Vulnerability Frameworks - University Pablo de Olavide, Seville, Spain***

This framework categorizes the main components of the vulnerability as biophysical characteristics, user characteristics, information and technology, and institutional arrangements. All of these components are interrelated, as indicated by the arrows connecting them. The climate change literature often defines vulnerability in terms of exposure, sensitivity, and adaptive capacity based on the (IPCC, 2007).

Socio-economic factors are important for the adaptive capacity of a system; integral role of institutions, governance, and management in determining the ability to adapt to climate shocks. Some socio-economic determinants of adaptive capacity are generic for example, education, income and health; others are specific to particular climate shocks such as floods or droughts for example, institutions, knowledge and technology. The more adaptive capacity a system has, the greater is the likelihood that the system is able to adjust and thus is less vulnerable to climate change and variability.

2.7 COUNTRIES THAT ARE IMPLEMENTING AGRICULTURAL ADAPTIVE STRATEGIES TOWARDS CLIMATE SHOCKS.

In Mali, for example, 'short-cycle' crops are being sown, which can be harvested in three months rather than the more usual five.

Adaptive strategies implemented by the (UNDP/ GEF, 2009), Coping with Drought and Climate Change project in Zimbabwe in various areas of the Masvingo district included: natural resources management, captive crocodile breeding and aquaculture as alternative livelihood sources; optimizing farmer/community crop mix to include maize, sorghum, pearl millet, groundnuts, cowpea and cassava, optimizing variety selection to include improved genetic materials and farmers' own traditional varieties (landraces), practicing different forms of infield rainwater harvesting and soil moisture conservation; and optimizing livestock production during the dry season to enhance availability of draught power.

Uganda through the establishment of new partnership with Ugandan NGOs and community based organizations and the creation of numerous income generating

activities at the grassroots, helped poor communities to improve their livelihoods (WFP, 2008). In Russia 277 000 gardens were implemented and operating under the responsibility of NGOs so as to improve income levels of the rural dwellers, specifically participants of economy (Marsh, 1998).

In Bangladesh, CARE International Organization supported women to plant kitchen gardens to increase the diversity of their food crops. Diversification is one of many important risk management strategies for climate change adaptation.

Although all these adaptive strategies have been implemented, this paper focuses on community gardens as a starting point towards adapting and supplementing food and income to cope with drought. However, adapting to climate shocks will take time and investment, especially since a number of solutions are needed for the different soils, habitats and climate conditions across the African continent. But this process of adaption is vital. Hunger and insecurity causes conflicts over land and water which lead to greater famine. Therefore a lot rests on creating an efficient and successful farming system in Africa which can enable the continent to feed its people.

2.8 THE POTENTIAL OF COMMUNITY GARDENS

2.8.1 Community gardens

The goal of community gardens is to increase household and intra household food security throughout the year. Community gardens provide marketing opportunities to rural people and built a base for food production for the vulnerable. Mass establishment of community gardens in Bikita was done by Non-Governmental Organisations namely Action Faim, CARITAS International and CARE International Zimbabwe in a bid to maintain sustainable rural livelihoods among the rural households.

Communities have been upgrading communal gardens by selling the surplus production to obtain household income. Auret (1990) revealed that NGOs assist in

establishing small irrigated vegetable gardens as they are a major component for the daily food consumption.

Community gardens were initiated back from the eighteenth and nineteenth centuries where tropical vegetable culture survived in remote areas and mixed gardens in South East Asia (Grigg, 1974). According to Taylor & Francis (2009), community gardens in Africa involved irrigation in home gardens since prehistoric time with the provision of vegetables for household consumption. Community gardens are a place to grow food crops, flowers and herbs in the company of friends and neighbours. It may also be a place to reconnect with nature or get physical exercise. Basing on this definition community gardens have attracted different meaning, uses, and purposes to different societies and communities. As a result some use community gardens because they lack adequate space at their homes to have a garden and to build a sense of community among neighbours (Middleton, 2009).

In rural areas, community gardens take different shapes, forms and sizes and purposes that make them differ from each other and from place to place. Community gardens are innumerable i.e. Neighbourhood community gardens, Youth Communal gardens and School gardens, Nutritional gardens, Entrepreneurial and Market gardens, Home gardens, Therapy gardens and Demonstration gardens.

Community gardens promote food security as children and the elderly participate in this field of agriculture (World Bank, 2007).

Neighbourhood community gardens as eluded by Middleton (2009), are located on land that is divided into different plots for individuals or families. These gardens have leaders, committee for management and can be found at churches. In Zimbabwe they are found in wetlands as dambos distributed by headmen for each household (Leach, 1990). Crops such as maize, sorghum, vegetables and bananas are found in these gardens. Youth and School gardens are found in schools for educational purposes to young people. They are located at a community centre for the unemployed youths to earn a living. At schools they provide classroom lessons in

different subjects such as agriculture and science subjects. Species such as vegetables, groundnuts, beans, maize, and tomatoes are found in these gardens.

Nutritional gardens, as they are also known in Zimbabwe, are mainly funded by NGOs through the ministry of health and land is allocated to the vulnerable groups in order to offer supplementary diets to everyday meals. Green vegetables, onion and carrots are mainly found and especially medicinal plants, (Moyo & Tevera, 2000). There are also Entrepreneurial and Market gardens which specialize in improving the market, were established by Non-Profit Organizations to teach business and job skills to youth and vulnerable groups. The participants are paid by money after sales, (Middleton, 2009). Crops mainly found in these gardens are vegetables, fruit trees like oranges and avocados and also cash crops which are coconuts and sugarcane.

In 2006, CARE International Zimbabwe assisted in establishing community garden projects in Mberengwa District, in the Midlands Province of Zimbabwe. The Imbahuru Community Garden in Zimbabwe was mainly established to accommodate the vulnerable groups to alleviate rural poverty. *Imbahuru* Community Garden has proved to be a livelihood which is sustainable, cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provides sustainable livelihood opportunities for the next generation, and which contributes net benefits to other livelihoods at the local and global levels in the long and short term, (Ellis, 2000).

In Zaka District in the Masvingo Province, Care International, since 1997, has also managed to establish community gardens in 31 wards which are benefiting a total of 2686 households. Amongst the beneficiaries, the disadvantaged groups are key targets i.e. people affected and/or infected by HIV and AIDS, people with disabilities and widows constitute a significant percentage of participants and there is deliberate bias to target them, an effort that is meant to protect loss of their economic asset base (CARE International, 2006).

Home gardens take different size and activities. They are called small gardens or kitchen gardens located near the homestead specifically for vegetables. Water to irrigate these gardens is obtained from water that was used for dish washing and

bathing. They are mostly found in arid and semi-arid areas in sub Saharan Africa. They may be individually or communally owned, (Maroyi, 2009). Home gardens can take a form of nurseries to provide seedlings, floriculture with ornamental plant located in peri-urban for market and they can also be home market gardens.

Community gardens are located in a communal centre, organized and managed by a community group to share work and rewards. They own the land collectively and share the proceeds among members. They can donate to food pantry what they harvest at their pleasure. Community gardens can accommodate at least thirty people up to more than two hundred people. Different types of crops are grown such as cereals that are maize, sorghum, cash crops, timber, forage, fruit trees and different types of vegetables. The food bank normally dominated these gardens and located at a food pantry. Food bank and pantry are for storage facilities and volunteers are participants or food pantry clients who grow and donate to the food pantry. Cereals such as maize, nutritional crops like beans and peas are grown in these gardens.

It is not surprising to observe that the importance of these community gardens is not only limited to providing food. They also play a vital role in providing therapy especially for hospital patients. Therapy/ nutritional gardens are mainly for horticultural therapy to hospital patients, located at hospitals, prisons and senior caters. A horticulture nutrition therapist leads these programs and activities (Chazovachii, Mutami& Bowora, 2013). Horticultural plants are cultivated in these gardens such as ornamental crops, herbs, medicinal plants, flowers, garlic and different types of vegetables.

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

A method of selecting beneficiaries in community gardens is limited to social and technical criteria. Local community based organizations play an important role in

selecting beneficiaries. According to Eshtayeh & Earis (2006), women are invited to a meeting in which information is collected from the community based organizations (CBOs) representing the CBOs but also from the public to foster transparency. Moyo & Tevera, (2000), noted that in national gardens which are funded by Non-Governmental Organizations (NGOs) through the ministry of health, the councillors who are recognized politically as leaders allocate land for gardens .This sometimes creates conflicts with traditional leaders who feel they are the ones responsible for distributing land as it was inherited from their ancestors.

Nutritional gardens normally favour the sick to get balanced diet mostly those with chronic diseases like tuberculosis, AIDS and others. NGOs collect information about the living standards, family size, assets and choose according to the vulnerability context of that communal area.

2.8.2 Community gardens and rural development

Community gardens have important resources with socio-economic reproduction roles for the communal people (Moyo & Tevera, 2000). Some villagers have resorted to gardening while waiting for the rain season and they make profits using them for accessing inputs during the main season of farming (New Farmer, 2004). Some A1 resettled farmers in Shamva, a rural village in the Mashonaland Central Province, about 90 km north-east of Harare, Zimbabwe who have no adequate irrigation facilities have opted for gardening instead of irrigation schemes because of their huge profits. Huge profits are being made from gardening by selling their crops to Mbare Musika a major fresh fruit and vegetable market in Harare, Zimbabwe and also along Shamva Road (Farmer, 2004).

Scoones (2010) postulated that gardens have benefited women through specialization and they obtained vegetables, groundnuts and Bambara nuts for the household food consumption. Communities have benefited from participation in those gardens where they derive their income. Community run schemes have performed better than government managed schemes because of their flexibility, lower cost of operation and participation of women (Rukuni, 2006). Community

gardens in rural areas utilized wetlands as source of water to irrigate their crops and vegetables. These wetlands existed together with community gardens for many years and proved to be highly productive as they contribute to social and economic welfare of many rural families (Rukuni, 2006).

The use of wetlands to vegetable gardening is increasing in small holder farmers. More so, community gardens contribute to the affected and vulnerable household's food security. Implementing organizations are helping promoting vegetable gardens to help vulnerable groups and affected households get access to vegetables to ensure food and nutrition security (FAO, 2002).

These nutritional gardens have benefited households and chronically ill people with herbs and vegetables as they improve their nutrition throughout the year. These are also activities for women where income generation becomes easy for them. Medical plants found in these community gardens such as garlic and onions have role of treating HIV related symptoms, improving digestion and stimulating appetite (FAO, 2002). Gardens are for income generation and food producing activities. These are necessary for the contribution to food security and safety. Over US$2,8 million worth of food was produced from the subsistence gardens during the depression end by the time of second war, and the food administration set up a nutritional victory garden programme which saw huge benefits, (FAO, 2002); (Chazovachii, et al 2013).

Although other community gardens are illegally located along river banks they have supported families through income and food throughout the year, (Scoones, 2010). Micro irrigation has been also more successful with gardens being the source of year around vegetables and maize. These are found in resettlements and are an important basis for livelihood strategies (Scoones, 2010),

Communities have upgraded gardens and individuals from these gardens sell surplus produce to obtain household incomes which in turn cater for household food security, basic and other emergencies.

2.8.3 Social benefits of community gardens

Community gardens benefit the communities to build social networks through sharing gardening activities. According to Moyo & Tevera (2000), family and kinship act as the distributive mechanisms as well as promoting interpersonal relations and social identity of individual members. This mainly happen in sharing gardens among the families who participate. Gardens have promoted intermarriages between the families and thereby building networks of kinship.

Community gardens act as a survival strategy for the poor in many communities to share resources together in order to meet their daily basic needs and mutual obligations. Preservation of aesthetic and cultural values is demonstrated in Asian gardens. Home gardens were also useful in the slavery stage and were influenced by African slaves in Caribbean as food used by poor people as a strategy against food inflation resulting from heavy reliance on imported food.

2.8.4 Potential contributions of community gardens to the Millennium Development Goals (MDG)

According to Wikipedia (2013), the Millennium Development Goals (MDGs) are the eight international development goals that were established following the Millennium Summit of the United Nations in 2000, following the adoption of the United Nations Millennium Declaration. All 189 United Nations member states at the time (there are 193 currently), and at least 23 international organizations, committed to help achieve the following Millennium Development Goals by 2015:

1. To eradicate extreme poverty and hunger
2. To achieve universal primary education
3. To promote gender equality
4. To reduce child mortality
5. To improve maternal health
6. To combat HIV/AIDS, malaria, and other diseases
7. To ensure environmental sustainability
8. To develop a global partnership for development

The three most important goals that are related to this study are:

2.8.4.1 MDG1: Eradication of extreme poverty and hunger

According to (FAO, 1997), community gardening production, particularly of root and tuber crops, bananas, fruit tree, vegetables, small-scale livestock contribute to improved food security and income generation. It provides a safety net for the poor, who do not have access to credit or other forms of saving.

2.8.4.2 MDG 3: Promote gender equality and empower women

Women tend to be more active in the community gardens as they have less access to formal income generating activities. Their focus on household and family related activities impedes them from taking up income generating opportunities. Community gardens present a livelihood strategy which can give good returns to limited resource input.

The official theme for the International Women's Day for 2011 was "Equal access to education, training, and science and technology: Pathway to decent work for women." As the rest of the world celebrated International Women's Day on 8 March 2011, Action Aid International Zimbabwe, a Non-Governmental Organization which advocates for the rights of the poor and excluded people, especially women, said that many women in Zimbabwe are food insecure because they do not have access to land, education, training, and information and farming inputs (United Nations, 2011).

2.8.4.3 MDG 7: Ensure environmental sustainability.

Community gardens can also benefit the community by converting neglected land into positive land for the community. Under-utilized and empty land was mainly due to effects of climate shocks. Community gardens help to eliminate these problems by reclaiming ownership of land through the constant presence of people. Environmental benefits of community gardens also include increasing pervious surfaces and allowing for groundwater recharge, improving air quality through the

addition of plants crops and vegetables to the land thus promoting sustainability (Dow C, 2003)

2.8.5 Challenges faced in community gardens.

Community gardens face many challenges that limit their production and interaction between members. Lack of irrigation equipment undermined the ability of poor households to raise their agricultural incomes and made them even more vulnerable to frequent droughts. Power relations are an impediment to the success of gardens. These relations determine the controls of gardens. There are also illegitimate forms of transferring land or selling of land or expansion of plots which is common in gardens. This was as a result of usurpation of powers of traditional leaders to manage land and other natural resources lead to protest against rules (Moyo & Tevera, 2000).

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

The major key would be improving extension and support systems geared towards meeting the needs of small-scale farmers because they require different kinds of systems from commercial farms, which are generally prioritised by governments. This would mean that governments need to be proactive about engaging their subsistence and small-scale farmers in development projects and provide appropriate support for them. Gender and Climate Change Southern Africa said that in recent years there has been high death rate of extension officers, who advise farmers, in the agricultural sector in the region especially due to HIV/AIDS. This is

crippling a lot of small-scale farmers who need advice about how to deal with changing climate conditions, (Sosibo, 2011).

2.9 CHAPTER SUMMARY AND INSIGHTS

The objective of this chapter was to look at the decline of agricultural production in Zimbabwe due to the effects of drought. It also aimed to show case the issues regarding climate shocks and climate variability and how it has affected food security in the region and continent as a whole. The chapter also illustrated how the rural farmers especially those located in the drier areas of Zimbabwe are hit the hardest by drought because the areas do not receive a lot of rain under normal circumstances and are experiencing high levels of food insecurity. Their reliance on rain for agricultural purposes has resulted in them experiencing high levels of poverty as there is little to no harvest due to drought. The chapter also illustrated a conceptual framework which was development under the context of vulnerability to highlight how rural farmers have low adaptive capacity to cope with climate shocks due lack of education, skills, knowledge, access to credit, to name a few, which result in them failing to cope with the effects of climate variability.

The potential of community garden activities as a tool for assisting farmers to cope with drought and be able to produce food instead of reliance on rain-fed agriculture was also highlighted in this chapter. Community garden impacts on the socio-economic status of farmers and the impact the gardens are having on the different countries that have implemented the activity was also discussed in this chapter. It was concluded that community gardens indeed are a source of supplement of nutritious food for the farmers and has brought about vast changes in the farmers' livelihoods. Community gardens are now a source of employment especially for the uneducated women residing in rural areas. Challenges being faced during community gardens could also not be ignored. In as much as the gardens are being used to address the problem of food insecurity, water seems to be a great factor also affecting the activity. There is not enough water and irrigation equipment to service all the gardens as demand from the few sources is high. Other challenges also include conflicts over distribution of land, lack of funding to maintain and run he

gardens and poor markets to sell produce from gardens. What is also needed is to improve the extension and support system in the region as a whole.

CHAPTER 3:RESEARCH DESIGN AND METHODS

3.1 INTRODUCTION

An integrated methodological approach was employed in conducting the research. A triangulation of both quantitative and qualitative methods was used in order to give the research statistical and conceptual significance. This chapter will briefly describe the sample, sampling techniques, data collection methods and data analysis tools used in the study. The last part of the chapter presents the analytical framework outlining the main enquiry strategy that was used to analyse the data and answer the research objectives

3.2 SAMPLING

The sampling frame for the household component of the assessment was at least one hundred and thirty registered households participating in the community gardening project activities in Bikita. Participants were selected using purposive sampling, and were also selected from three wealth categories (poorest, poor, and average) defined by the community. The wealth categories were based on indicators such as the number and type of livestock owned, ox carts (scotch carts) and ox-ploughs.

3.3 DATA COLLECTION SOURCES AND TYPES

An instrument is any tool that is used in data collection. Florian (2006) defines a research instrument as a tool that is used for collecting data needed to find solutions to the problem under investigation.

The study used both qualitative and quantitative data obtained from primary and secondary sources. Primary data was collected through a structured questionnaire administered to the farmers engaging in community gardening in Bikita. These interviews were structured around a standardized set of exercises using a number of

participatory methods, including. 'Before' and 'After' scoring, impact scoring, and proportional piling.

The farmer questionnaire had five brief sections. Section one to two required details of the participants with regards to their location; identification; socio-economic data; demography; production assets; land size, ownership and land use. Section three was mainly to capture farmers' production in terms of crops/ vegetables produced; irrigation; harvesting and distribution channels; marketing and challenges involved from the producing stage up to the distribution stage. Section three also identified the support services available for the farmers. These included extension support services available and frequency of these services that is rendered to farmers. Section four aimed to capture farmers' general knowledge and perception of Climate shocks and if effects. This section also reviewed whether the farmers are aware of the changes brought about by climate shocks and the measures they have taken to adapt to the climate shocks. The last section of the questionnaire aimed to have a deeper understanding of the community gardens. This included the main purpose farmers enter into community gardening; selection criteria; changes brought about by the gardens, shortcomings of the activities the farmers' views on how these can be addressed. (Annexure A)

3.3.1 INTERVIEWS

Interviews are face to face meetings between the interviewer and the interviewee. For the purpose of this study, semi- structured interviews were used as the principal data gathering technique for this study.

3.3.1.1 Key informants interviews

Key informant interviews are qualitative in- depth interviews with people who know what is going on in the community. The purpose of using in depth interview is to elicit from the key informants what they know vis-à-vis the focus of a particular study.

The advantages of using key informant interviews in this research is to collect information from a wide range of people including government officials,

professionals, who have first-hand knowledge about the community and woman land rights problems, lack of access to information, communication, training and resources. This will allow the interviewer to establish rapport with the respondent and provided an opportunity to build relationships. One of the weaknesses of this method is that a researcher might face challenges in selecting the right key informant (Neuman, 2000).

For this study, the three key informants who were interviewed were the government official, in this case, the district extension officer; one of the key participant for CARE International and one from CARITAS Non-governmental organizations, who are hands on, on the gardening projects in Bikita district. The main purpose of these key informant interviews were for the researcher to get background and first-hand information from the people who are working with the community garden participants, that is, their experiences and knowledge of the area, and to get their perspective of the issues affecting the farmers in their area and how they can be addressed.

3.3.2 FOCUS GROUP DISCUSSIONS

According to Krueger & Casey (2009), focus groups are a carefully planned discussion designed to obtain perceptions on a defined area of interest in a permissive non-threatening environment. A focus group is a form of qualitative research in which a group of people are asked about their attitude towards a product, service, concept, advertisement, idea, or packaging (Neuman, 2000).

Questions were asked in an interactive group setting where participants were free to talk with other group members. The main purpose of focus group research was to draw upon respondents' attitudes, feelings, beliefs, experiences and reactions in a way in which would not be feasible using other methods, for example observation, one-to-one interviewing, or questionnaire surveys. These attitudes, feelings and beliefs may be partially independent of a group or its social setting, but are more likely to be revealed via the social gathering and the interaction which being in a focus group entails (Creswell, 2003).

Compared to individual interviews, which aim to obtain individual attitudes, beliefs and feelings, focus groups elicit a multiplicity of views and emotional processes within a group context. In a focus group the researcher was interested in such things as how people respond to each other views and build up a view out of the interaction that takes place within the group.

In line with the assertion of Krueger (1997), the advantages of this technique are that focus group discussion produces data and insights that would be less accessible without interaction found in a group setting. Focus groups also provide an opportunity for disclosure among those in a similar setting where participants are validated. One of the challenges of focus groups is that it tends to become influenced by one or two dominant people in the session thus making the output very biased. The moderator plays an essential role in handling the situation, but if the moderator is not experienced enough, it is very easy for the whole discussion to be dominated by a few people (Creswell, 2003).

The focus group discussion held for the study included representatives from all three wealth categories, and both male and female respondents. These discussions included several participatory exercises. Of these, a SWOT analysis which looked at the Strengths, Weaknesses, Opportunities and Threats associated with the community gardens project.

The focus group discussion was also used in order to capture farmers' perceptions of climate shocks and the general impact of community gardens on their community as a whole.

3.4 DATA MANAGEMENT

Data collected from the household survey was entered, verified, coded and cleaned using the Microsoft Excel software package due to its ease of handling both string and coded variables. The coded data was exported into the Statistical Package for Social Sciences (SPSS 20.0) for Windows for descriptive analysis. SPSS was chosen due to its great analysis capabilities and ability to handle the multiple forms

of data collected in the survey. SPSS was used to calculate all frequencies and descriptive statistics as well as Chi-square tests, Fishers exact tests, cross tabulations, percentages and mean variances presented in the findings chapter. The data was captured and analysed by the Department of Statistics at the University of Pretoria.

3.5 DATA ANALYSIS AND ANALYTICAL FRAMEWORK

Table 3.1 outlines the research analytical framework highlighting the study objectives, research questions, data sources as well as the methodology that will be used to answer these questions and objectives.

Table 3.1: Analytical Framework

Objectives	Questions	Methodology	Data Source
(i). To assess the significance of community gardens in coping with climate shocks as well as, focusing on the direct significance of the gardens on the participating farmers' livelihoods in Bikita District, Masvingo that is; food security status, income and poverty.	(i) What is the socio-economic status of the rural farmers in Bikita District which contributes to their vulnerability to drought and climate shocks?	Descriptive Analysis, mean, median variances,	Primary + Secondary Data
(ii). An in-depth assessment of the community gardens, the local people who are engaging in community gardening in Bikita District and their socio-economic status, knowledge, perceptions and attitude towards drought and climate shocks.	(ii) Who is mainly participating in community gardening and what is their knowledge, attitude and perception towards climate shocks and its effects on agricultural production?	Descriptive Analysis, mean and median variances, Cross tabulations, Chi-Square Tests and Fishers Exact Tests	Primary + Secondary Data

(iii). Successes, constraints and institutional support of community gardens in Bikita District and the overall significance of the activity as a drought and other climate shocks coping strategy.	(iii) What is the overall significance of the activity? (Social, Economic, Physical)	Descriptive Analysis, Cross tabulations, Chi-Square Test and Fishers Exact Test	Primary + Secondary Data
(iv) To analyse the needs and challenges of the community garden participants in Bikita so as to come up with an in-depth knowledge of how the activity can be supported and improved.	(iv) What are some of the challenges being faced by rural farmers and how would they hope for these to be addressed?	Descriptive Analysis, Cross Tabulations, Chi-Square, Fishers Exact Test	Primary+ Secondary Data

3.6 CHAPTER SUMMARY

This chapter presented the methods that were used to conduct the study, to answer the study objectives and hypotheses. The chapter first discussed the data collection methods, sources and entry and packaging methods. The last part of the chapter discussed the analytical framework that was used to analyse the collected data.

CHAPTER 4:FARMER HOUSEHOLD CHARACTERISTICS AND FARMER'S PERCEPTION TOWARDS CLIMATE SHOCKS AND THIER EFFECTS

4.1 INTRODUCTION

Chapter four outlines the basic demographics of the farmers and their socio-economic characteristics. This is intended to assist in analysing the farmers' position socio-economically in terms of education, skills, employment level, household income, and assets, and to assist in elaborating how the farmers are highly vulnerable to drought and climate shocks due to their socio-economic status and to measure their adaptive capacity. The chapter also seeks to highlight farmers' knowledge and perception towards climate shocks and its effects especially on production in Bikita District. The socio-economic data is necessary to clearly indicate to service providers who are the necessary vulnerable people they are working/ supposed to work with.

4.2 SOCIO-ECONOMIC CHARACTERISTICS OF THE HOUSEHOLDS

4.2.1 Gender of household head / respondent

The importance of illustrating gender into the study is for the purposes of understanding the gender gap in the gardens. It gives and illustration of how many females and males are actually participating or contributing to the production process in the community gardens. Table and Figure 4.1 below illustrate respondent's gender.

Table 4.1: Gender of respondents participating in community gardens in Bikita District, Zimbabwe

Gender	Number of Respondents	%
Male	18	14
Female	112	86
Total	**130**	**100**

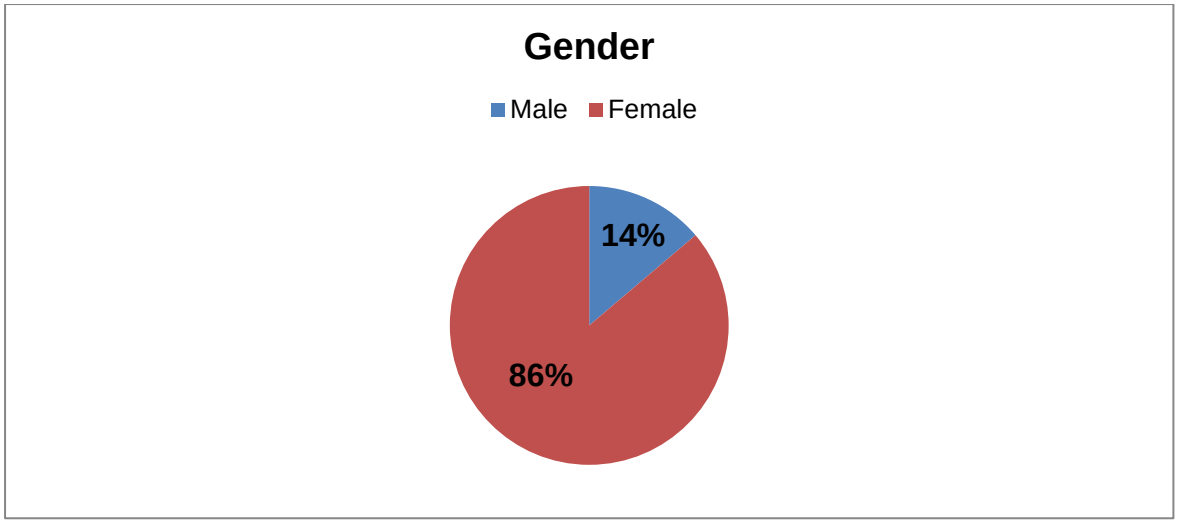

Figure 4.1: Gender of respondents participating in community gardens in Bikita District, Zimbabwe

As seen in Table 4.1 and Figure 4.1 above, 86% of the respondents are female, leaving only 14% of the participants being male. This has mainly been attributed by the fact that, most men in rural area travel every day to work in the nearby town of Masvingo while leaving the women to perform the gardening tasks as they have more free time on their hands. Though most of the households are male headed, the huge gender gap has also been contributed by urban migration of men to the big cities and to the diaspora like the nearby South Africa and Botswana, in search for better working opportunities, leaving their wives behind to tend the family. With no other qualification or technical skills, the wives are left with little choice but to participate in gardening in order to supplement food and income in the home, according to data collection activities.

4.2.2 Marital status and relationship of respondent to head of household

Marital status and relationship of respondent to household was mainly used to justify the gender gap.

Table 4.2: Summary of marital status of respondents participating in community gardens and their relationship to head of household

Marital Status	**Number of Respondents**	**%**
Single	3	2
Married	97	75
Divorced	7	5
Widow	18	14
Living Together	5	4
Total	**130**	**100**
Respondent relationship	**N**	**%**
Head of household	29	23
Wife	87	70
Mother	5	4
Son	1	1
Daughter	3	2
Total	**125**	**100**

The Table 4.2 above illustrates the respondent's marital status and relationship they have to the head of households. As mentioned before, the head of households, who were normally, the husbands were not present during the interviews leaving the researcher to interview the next best person who was available in the household. As seen in Table 4.2, 70% of the respondents were the wives of the head with a small percentage of 23% being the head and participating in the community gardens. At least 75% of the participants are married, a greater percentage being the wives and followed by a small percentage of 14% being widowed females.

From the above findings, it may be concluded that, community gardening is an activity mainly involving married people with the wives being the ones who participate the most. They are left behind by the husbands and do not have much choice but to supplement income through gardening activities.

4.2.3 Age of respondents

Age of respondents serves as a proxy to measure experience of farmer in farming activities. Table 4.3 below shows age of respondents participating in community gardening. The overall age of the farmers ranged from 16-88 years. This shows that there is participation in community gardens from all age groups from young to old. The ages were divided into 3 categories, which were; 0-40 representing the youth; 41-59 which are the economically active and lastly 60 years and over which represent the elderly.

Table 4.3: Age of respondents

Age Category	Number of Respondents	%
0-40	50	39
41-59	49	38
60-over	30	23
Total	**129**	**100**

As seen in the Table 4.3 above the more active participants of the community gardening range from 0-59 years of age, which is the youth and the economically active people with percentages of 39% and 38% respectively. Agricultural production involves mostly manual labour especially at a small scale level.

According to the findings, the mean age which is 47 years, falls under the economically active age group. The youngest respondent was 16 years and the oldest respondent was 88 years. A lower percentage of 23% of the elderly is an indication that there is little participation from them due to old age and ill health. According to data collection activities, the elderly are more poverty stricken and vulnerable as most of their young and able bodied children reside in big cities in search for better income generating activities.

4.2.4 Highest level of education of respondents participating in Community Gardens

Level of education and skills contributes a great deal to the socio-economic status of a household or individual. Higher levels of education are associated with better economic and psychological outcomes (i.e.: more income, more control, and greater social support and networking. Education plays a major role in skill sets for acquiring jobs, as well as specific qualities that stratify people with higher socio-economic status from lower socio-economic status. Education also plays a major role in farmers' ability to adapt to technologies and innovations, interpret information and being open minded about the changes that are taking place in agricultural revolution (Sahaya Saila & Chamundeswari, 2014). The data is presented in Figure 4.2 below.

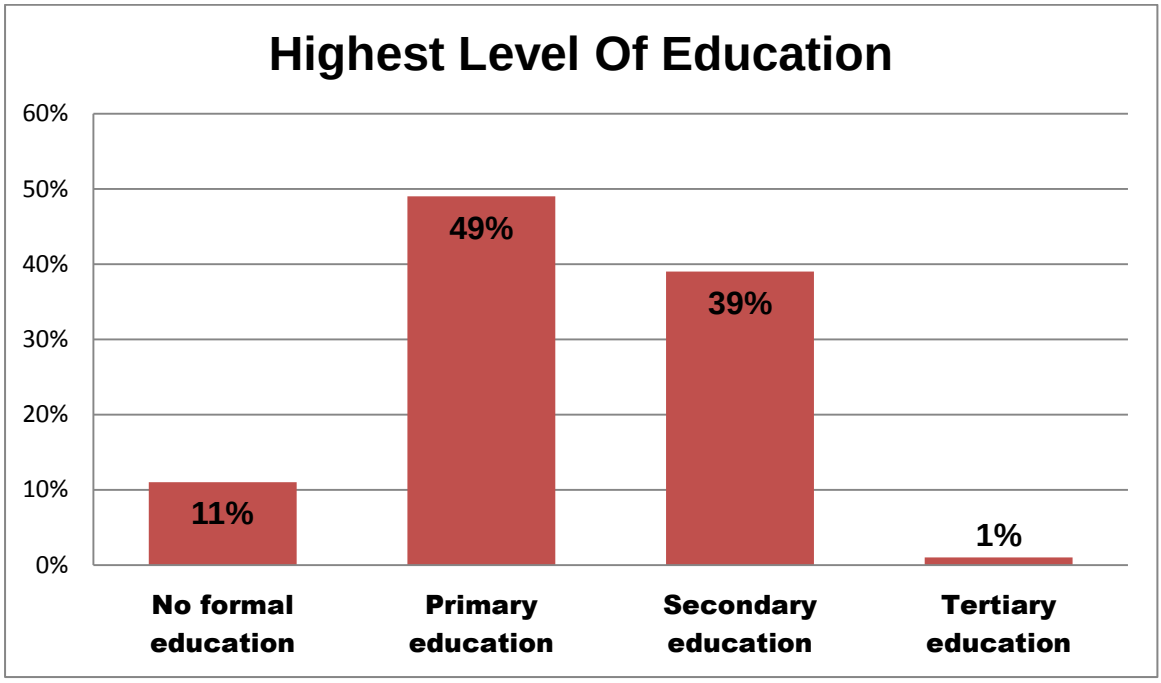

Figure 4.2: Community garden participants' highest level of education

The study indicates that 49% of the farmers do have formal basic education in terms of primary education and 39% have secondary education while only 11% of the farmers do not have any formal education. This percentage mainly consists of the elderly who are 60years and older. According to the respondents, most of them especially 60 years and older grew up at the time before independence in Zimbabwe

and there was little exposure to education especially for women. They had to stay at home or given up for marriage therefore not exposed to education. According to some respondents, the liberation struggle in Zimbabwe also contributed to a high number of the people of age group of 60 and older to not be exposed to any form of education as they were taken away to be trained for the armed struggle at a very young age.

As seen in the Figure 4.1 and Table 4.1 which show that 86% of the respondents are female, and the greater percentage of these have only been exposed to primary and secondary education only proves the fact that, women are still not being exposed to tertiary or technical training.

4.2.5 Number of residents in the respondents households

Number of residents in each household (Table 4.4) was also collected as a means to determine the dependency ratio in the households of the farmers. Having a large family size can have its advantages and disadvantages. A great advantage of large family is the availability of more labour for agricultural activities especially if household consists of more economically active adults than youngsters. The only disadvantage is that, more members in the household mean more expenditure and, low agricultural production puts more pressure on a large household than a small one, as agriculture serves as the major source of income and food for rural farmers in Zimbabwe.

Table 4.4: Number of residents in the households

Residents Category	Number of Respondents	%
1-3	18	14
4-7	84	65
8-11	28	22
Total	**130**	**100**

A total of 65% of the residents in a household in rural Bikita District is ranging between 4-7 people, followed by 8-11 residents with a percentage of 22% and lastly

1-3 people has the lowest percentage of 14%. This shows quite a high number of dependencies present in the various households.

4.3 EMPLOYMENT STATUS AND INCOME OF RESPONDENTS

Employment status is a very important variable to measure the socio-economic status of the farmers. It encompasses both income and educational attainment. Agriculture is the main source of employment especially in the rural areas of Zimbabwe and most rural households derive their livelihood from agriculture (Vitoria, Mudimu & Moyo, 2012). The employment status of respondents is indicated in Table 4.5 and Figure 4.3 below.

Table 4.5: Employment Status of Respondents

Employment Category	Number of Respondents	%
Not Employed	46	37
Employed	3	2
Self-Employed	77	61
Total	**126**	**100**

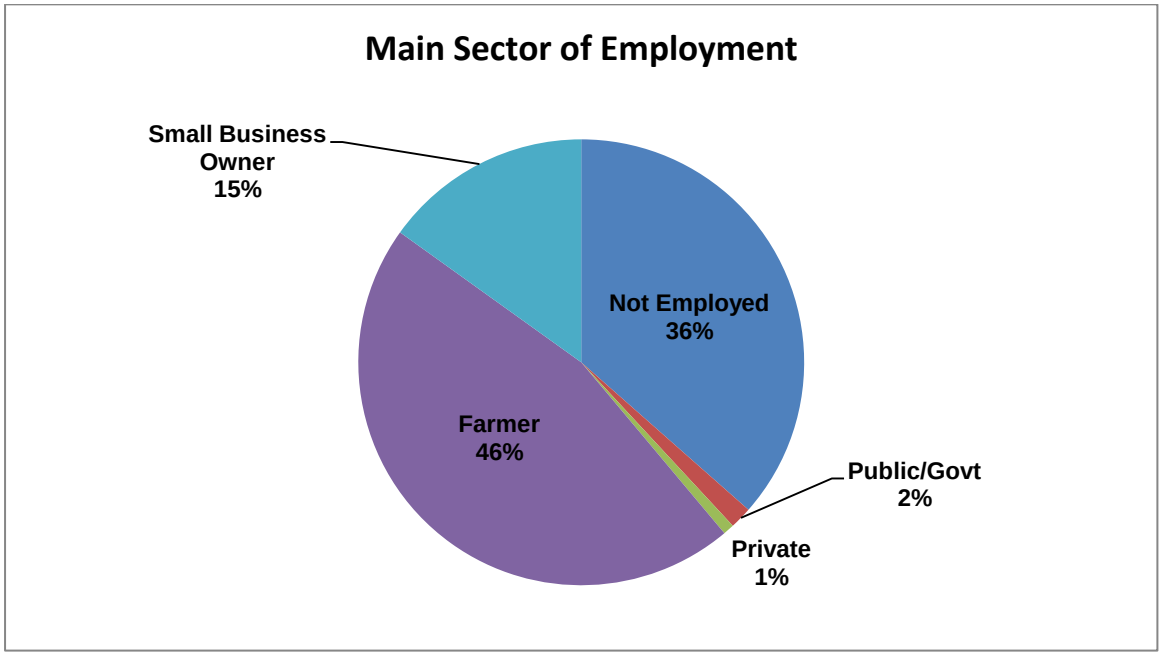

Figure 4.3: Respondents main sector of employment

As seen in Table 4.5, 37% of the respondents mostly women, are not formally employed. 61% however are self-employed, where most of them have small businesses like welding, brick making and scotch cart hire or they engage in full time farming and only 2% are formally employed. Figure 4.3 above shows that 46% of the respondents are full time farmers and 15% of them own a small business. This leaves 37% not employed and only 3% being formally employed in private, public or government sector.

4.3.1 Farmer's income

According to Vitoria et al, (2012), income is an important factor used to determine the socio-economic status of a household. It influences a family's ability to save, accumulate wealth and pass the wealth on to future generations. In this era where money is the most important facility in order for any individual to access goods and services, it is rather hard or almost impossible for rural farmers to be able to have access to equal goods and services as they live or very low and unreliable income. This also puts them on a vulnerable spot as they always do not have enough income for basic services like education, health and healthy nutritious food.

As seen in the Figure 4.3 above, only two and one percent of the farmers are formally employed and the rest are farmers and small business owners whose income is influenced by the environment and markets.

4.3.1.1 Respondents Main Source of Income

Table 4.6 and Figure 4.4 below indicate the various main sources of income according to the respondents practising community gardens.

Table 4.6: Respondents main source of income

Income Source	Number of Respondents	%
Rain fed Agriculture	19	16
Off Farm Employment	3	3
Gardening	47	40

Casual Labour	24	21
Small Village Business	12	10
Remittances	12	10
Total	**117**	**100**

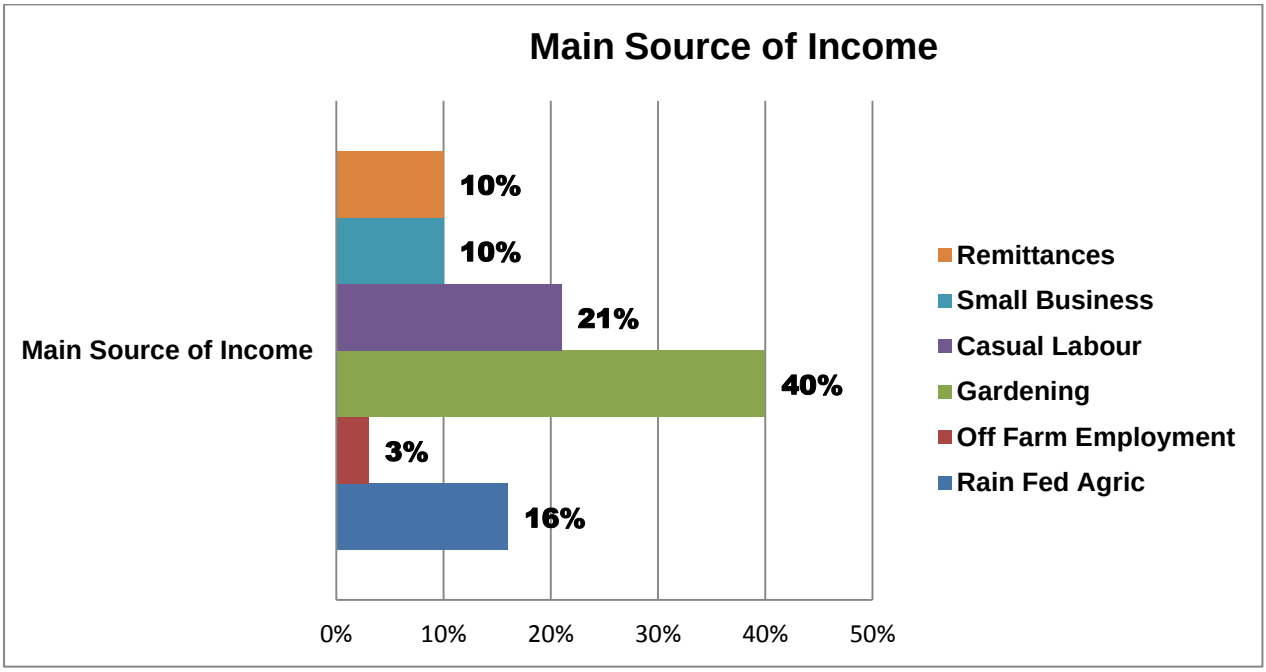

Figure 4.4: Respondents' main source of income

The Table 4.6 and Figure 4.4 above also confirm how gardening is the main source of income for the farmers. In Table 4.6, 40% of the farmers are involved in gardening as the main source of income, with casual labour following behind with 21% and rain fed agriculture with 16% respectively. Only 10% of the respondents obtain their main source of income from remittances and small businesses. According to the study, casual labour involves the farmers engaging in small part-time jobs for example, tilling other farmers' land, assisting in harvesting of produce, in exchange for cash or other forms of payment like cattle or chicken. Some casual jobs also include herding cattle, young children completing household tasks in neighbours' homesteads in exchange for food or crop like maize, groundnuts or beans which are used as a source of food. As the greater population in the area is not employed and not qualified for most jobs, casual labour plays an essential role in providing sustainable livelihoods for the local people.

Rain fed or dry land agriculture has been a source of livelihood for rural farmers for years and is still a highly engaged activity for the local farmers. It involves planting of maize, groundnuts, sorghum, beans and most grain crops. Very little monetary income is generated from this income source as it is mainly for subsistence purposes where the farmers store up the grain for home consumption for the rest of the year. Very little is sold as the famers' just plant enough for the family and harvest depends on the amount of rainfall received that season. A small amount of the farmers (10%) have their main source of income from small businesses in the village. Local villagers are earning a living by selling recharge vouchers and charging mobile phone batteries on solar-powered chargers, welding and fixing of hand equipment tools like hand ploughs, wheel barrows and shovels for a fee.

Only 10% of the respondents receive income inform of remittances from family members living and working in the diaspora. Farmers who receive the remittances are mainly the elderly and widowed who have sons and daughters who have immigrated to the nearby countries of South Africa and Botswana or are working in the urban areas. According to the respondents, a number of them resort to informal channels to receive this money as a lot of their relatives and family members are illegal immigrants and do not possess the right documentation to be able to send money through the formal channels like Western Union or Money Gram or the bank. They send a certain amount of money on a monthly or yearly basis mainly by road through public transport. Sometimes the remittances come in form of groceries, seed and fertilizers which could not be classified in monetary terms.

Only 3% of the respondents obtain an income from off-farm employment. The mean monthly income (US$) obtained by the respondents from off-farm employment is US$26.85. The most common form of off-farm employment are famers who are formally employed in the shops at the near-by business centres who work as shop keepers, or in liquor stores. This shows that the impact of off-farm employment is very little and does not provide much support in the household.

4.3.1.2 Overall Monthly Income from all Activities

The results indicate that there are high levels of poverty and food insecurity in the farmers' households, making them highly vulnerable and unable to cope with the stresses that come onto their household. With the low levels of education of respondents as shown in Figure 4.2 and large numbers of household dependents as shown in Table 4.5, makes them unable to engage in any other economically viable activities besides farming in order for them to supplement their income.

The National Food Poverty Line (FPL) as stated by the Zimbabwe National Statistical Agency in January 2014 stood at US$32.00. The cost of living for an average Zimbabwean has shot up with the shopping basket for an average family of five increasing from US$505 in December 2013 to US$511 in January 2014. According to Zimstat, (2014), the total consumption poverty datum line for one person increased marginally by 1.19% to US$102 with figures for an average five-member family pegged at US$159.

The median monthly income for the farmers, from all activities is US$20 per month. This is way below the poverty datum line and only proves to show that the average person living in rural areas of Zimbabwe is very poor.

4.4 LAND OWNERSHIP, USE AND FARM ASSETS

4.4.1 Land

According to the research, the respondents own different pieces of land. Land use in the Bikita district is mainly characterized by large fields which are mainly for dry land farming of staple crops which include maize, sorghum, millet, groundnuts and beans. Farmers own between 1ha-13ha of land each. These are generally far from their homesteads and the famers have to walk some kilometres to get there. These fields rely mainly on rainfall for water and crops are planted and harvested seasonally. The fields are at their most productive state in the rainy seasons of the year. The respondents indicated that they accessed this land through inheritance from their ancestors and have continued tilling the land and passing it down from generation to generation.

The respondents also own a piece of land which was distributed for community gardens. These are also a distance away from the households and some are nearer to farmer's homes. The gardens are mainly used for vegetable production which includes cabbage, carrots, onions, tomatoes, covo/ kale and butternut and crops which include maize, groundnuts, beans, and round nuts. The gardens are a large piece of land which is divided into different plots of land and distributed amongst 10-30 participants wanting to engage in community gardening. Some of them are well protected, fenced and gated and have boreholes or a river close by for water purposes.

Lastly farmers also use land around their households for homestead gardens. These gardens are located within the homestead and therefore easily accessible. There is high safety since it is located within reach of everyone in household and the gardens are usually sized according to size of homestead. In the homestead gardens, farmers plant maize, sweet potato and vegetables mainly for consumption in the household.

One of the positive elements of homestead gardens is that it is a walk away from the household. Therefore it is convenient for any member of the family to go out of the house and pick up whatever is needed anytime of the day.

4.4.2 Utilization of land

Some of the respondents mentioned that they are unable to use all the land that is available for gardening purposes. According to the findings, farmers only manage to utilize a mean area of 81% of the land that they secured for the community gardening activities.

Figure 4.5 below shows the main reasons cited by the respondents for underutilization of land owned.

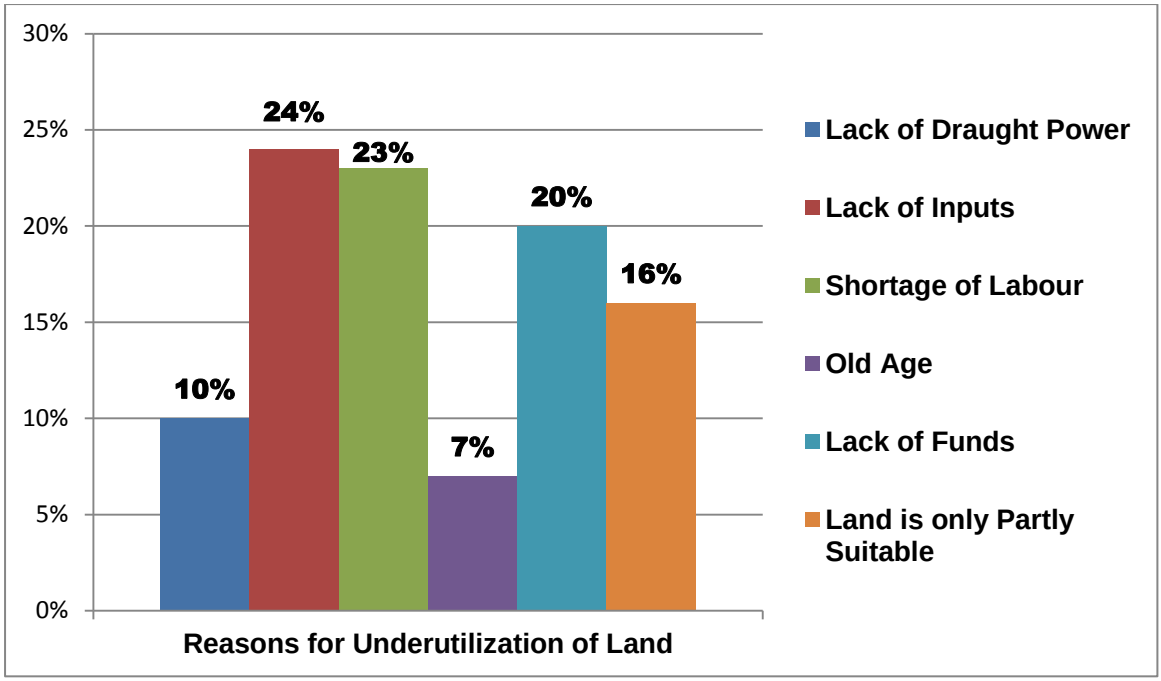

Figure 4.5: Respondents reasons for underutilization of land

As shown in the Figure 4.5 above, 24% of the farmers highlighted lack of inputs as the main reason why farmers are failing to use all the land they have available. The respondents mentioned that inputs are too expensive to access and the input donor programmes do not give them enough seed and fertilizers that can cover the total area of their land. This is followed by 23% of the respondents who highlighted shortage of labour as a major reason for underutilization of land. There is not enough labour to till the land, plant and harvest the produce. In some households, the able bodied individuals have all migrated to towns and cities thus leaving the elderly to farm on their own. At least 7% of the respondents cannot fully utilize their land due to old age.

Another major reason which 20% of the farmers mentioned is that of lack of funds. The farmers only rely on farming as a source of income which most of the time they do not have enough to spare and sell to acquire cash. This then means that they have limited funds to purchase inputs, farm equipment, pay for hired labour and general maintenance of the fields. Financial institutions are reluctant to give the farmers finance as they lack collateral security. 16% indicated that part of the land they own is unsuitable for agricultural activities and 10% mentioned lack of draught power which is mainly used for land preparation and tillage. The reasons mentioned

by respondents included livestock not healthy and strong enough to provide power to till land. The respondents also highlighted how they lost a lot of livestock through death from drought and disease.

4.5 FARMERS' ASSETS

4.5.1.1 Livestock Owned by Respondents

In the Zimbabwean/ African culture, owning a certain amount of livestock especially cattle and goats is regarded as a form of status symbol or wealth status especially in the rural areas. Livestock perform many roles in mixed systems such as recyclers of nutrients in the form of manure and providers of draught power for ploughing and treshing, animals support the production of crops.

The Table 4.7 below shows the different types of livestock owned by the Community garden participants in Bikita District, Zimbabwe.

Table 4.7: Livestock types owned by respondents, source and primary reason

Livestock Type	Number of Respondents	Mean/ Average number of Animals	Source	Primary Reason
Broilers	7	33.86	Bred on the farm	Cash
Layers	4	4.50	Bred on the farm	Cash/ Food Security
Pigs	5	5.20	Purchase from other farmers	Cash
Cattle	77	3.45	Purchase from other farmers	Wealth and Investments
Goats	96	3.53	Purchase from other farmers	Food Security
Hens	56	7.55	Purchase from other farmers	Cash and food Security
Donkey	6	3.33	Purchase from other farmers	Wealth and Investment

Livestock are also kept as a kind of bank and insurance to cope with shocks – animals can be sold when cash is needed to invest in other farm components or household needs. And they provide insurance when shocks like droughts occur. In many cultures, livestock assume socio-cultural roles, as large livestock herds are associated with status in a community and animals are often given as dowry. In fact, in many instances, meat and milk are considered as useful by-products of keeping livestock, not as the primary products.

As seen in Table 4.7 above, on average, seven (7) respondents have at least 34 broilers and they are all bred on the farm and sold for cash purposes. Only four (4) respondents own five (5) layers which are also bred on the farm and eggs produced are sold for cash and eventually the layers are consumed by the family when they stop producing eggs. However, 77 respondents indicated that they own at least three (3) cattle and 96 own at least four (4) goats respectively.

At least 56 farmers own eight (8) hens/ traditional road runners. The hens are a source of food especially on special occasions like Christmas day or New Year's Eve. Hens also provide eggs for food and that is why they are mainly kept for food security purposes. The respondents mainly access these from other farmers in form of purchases, barter trade or obtain them as payment from casual labour rendered. Cattle, goats and hens are also used as gifts and during traditional ceremonies like payment of lobola/ bride price.

None of the farmers practise livestock farming for commercial purposes. Cattle are mainly used for labour purposes of pulling the ox-drawn ploughs when tilling the land and also pulling of scotch carts to transport goods. This, at the end of the day makes them unsuitable for commercial purposes. During the focus group discussions, the majority of the respondents mentioned that drought has caused them to lose a lot of livestock. In the late 90's and early 2000, a number of the respondents mentioned how they owned about 10-15 cattle and 20 or more goats, but as the years progressed and because of climate shocks, most of the animals have died of hunger.

Six of the respondents also own on average, three (3) donkeys. As seen in the Table 4.7 above, these are also mostly purchased from other farmers. A large percentage

of the respondents keep these for cash and food security purposes. Donkeys are mainly used as a form of transport to pull scotch carts in transporting produce for sale and also transporting the farmers themselves.

4.5.1.2 Farm Equipment

The Table 4.8 below shows the different forms of equipment used by respondents for farming activities.

Table 4.8: Farm equipment used by respondents during their farming activities

Equipment Type	Number of Respondents	Own	Borrow	Community Shared
Hand Equipment	114	97%	2%	2%
Wheel Barrow	105	40%	53%	7%
Knapsack Sprayer	99	10%	52%	38%
Chicken House	90	71%	12%	17%
Storage Barn	58	67%		33%
Scotch Cart	70	13%	87%	

Table 4.8 above shows that the majority of the respondents own some form of farm equipment. Hand equipment is owned by the highest percentage of respondents (97%). Hand equipment includes hand ploughs, picks, shovels, watering cans and racks for use in the fields and in the community gardens. A total of 40% of the respondents own wheel barrows and 53% of the farmers borrow wheel barrows from other farmers, while 52% of the respondents borrow knapsack sprayers from their colleagues and they also share the sprayers provided mainly by the active donors in their community like non-governmental organizations.

The majority of the farmers (71%) own a chicken house for hens, broilers and layers while 67% of the respondents also own a storage barn for storage of harvested grain produce from the fields for food in the household. A total of 87% borrow/ hire scotch carts from other farmers so as to transport their produce from the fields to storage barns at a price or in exchange for a part of their produce. Hiring of scotch carts is also a popular form of business taking place in the rural area as a form of cash for the scotch cart providers.

4.6 IMPACT OF CLIMATE SHOCKS IN BIKITA DISTRICT

The respondents' knowledge and perception of climate shocks is indicated in Figure 4.6 below.

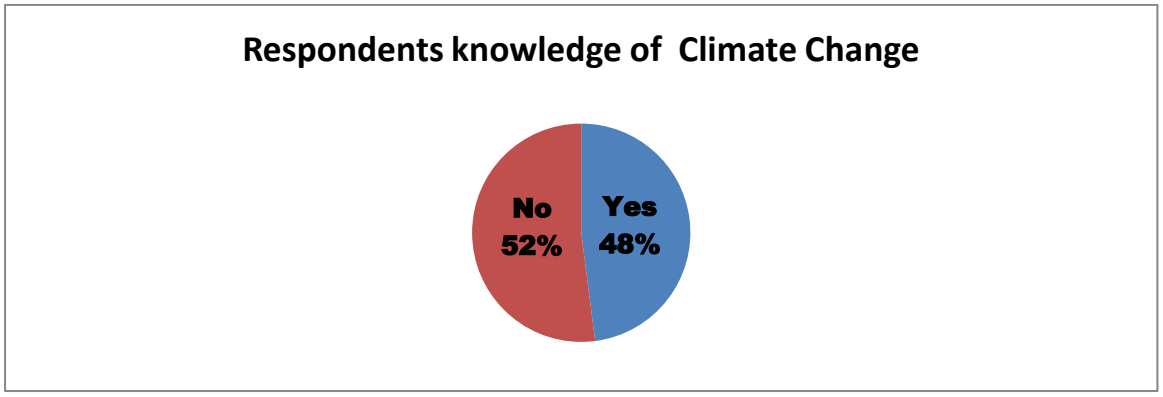

Figure 4.6: Respondents knowledge of climate shocks

A greater number of the communal farmers (52%) expressed ignorance about the threats posed by climate shocks and variability, most of them acknowledged drastic changes occurring in their areas that have had negative ramifications on agricultural productivity.

A Chi-square test was conducted to analyse the relationship between age groups and their knowledge of climate shocks as shown in Table 4.9 below.

Table 4.9: The statistical association between age groups and their knowledge of Climate shocks

Question	Chi-square Test	p-value	Fisher's Exact Test	p-value
Have you ever heard of the phrase "Climate shocks "	1.173	0.760	1.199	0.761

The results in Table 4.9 above show that there is no significant association between age group and knowledge of climate shocks (p=0.760).

Table 4.10 below, shows what the respondents have noticed when they say that climate has changed. As portrayed in the Table 4.10 below, 56% of the respondents

acknowledged that temperatures have indeed increased in the past years and 38% sited that rainfall has decreased.

Table 4.10: Respondents' knowledge on the long-term changes in the average temperature and rainfall over the last 10 years

	% of Respondents	
Have you Noticed Changes in Temp/Rainfall	**Temperature**	**Rainfall**
I cannot say as I do not know	8%	2%
No change	15%	15%
Has altered	7%	12%
Has decreased	14%	38%
Has increased	56%	33%
Total	**100**	**100**

Temperature is rising while precipitation is declining from time to time. Untimely rain and frequent drought are challenging crop production in the Bikita area. Drought is perceived, by respondents, as the primary climate related hazard which is occurring frequently and affecting their livelihood. Individual's vulnerability to this hazard varies based on their hazard coping capacity. Lack of modern early warning systems, inflexible cropping calendar and narrow choice of crop varieties should aggravates the vulnerability.

There was a general consensus among majority of the farmers in Bikita that climate shocks and variability being experienced is leading to significant agricultural transformation especially reductions in agricultural productivity. It is argued that these climatic transformations are threatening the sustainability of the agricultural activities in Bikita. More so, the fact that Bikita lies in Agro - Ecological Region V has meant that without availability of water there is hardly any agricultural activity possible.

Table 4.11 below shows the main factor that the respondents stated that has been caused by climate shocks and that is greatly affecting their production.

Table 4.11: The main factor which is greatly affecting present production as indicated by respondents

Main Factor	Number of Respondents	%
Low rainfall	69	56
High temperature	22	18
Pest causing diseases	5	4
Labour	2	2
No institutional support	8	7
Poor soil quality	5	4
Insufficient farming equipment	1	1
Lack of water for irrigation	12	10
Total	**124**	**100**

A total of 56% of the respondents illustrated that low rainfall is their major cause of concern while 18% also picked high temperatures as a factor affecting their production as well.

Table 4.12 below, shows the responses given by farmers to the question of whether there are rain gauges and thermometers available to confirm the existence of climate shocks in the Bikita area.

Table 4.12: The availability of rain gauges and thermometers in Bikita District according to farmers' responses

Weather Station Gadget	Available %	Not Available %	Total
Rain Gauge	17	83	**100**
Thermometer	17	83	**100**

Rain gauges and thermometers are essential weather gadgets especially for farmers. According to Reynolds (2014), the rain gauge is an instrument that measures the amount of rain that falls in a given amount of time. It is also known as a udometer or pluviometer. Data can be read manually or by the Automatic Weather Station. Some rural areas employ volunteers to read gauges and send the information to the appropriate agency.

Meteorologists, hydrologists and weather reporters use information gathered from rain gauges to report how much rain a specific area has received, both for a single event and accumulation over time. Comparing current data to previous years helps them gauge if an area is receiving too much or too little rainfall and how that will affect plant life, food and water supplies. Rain gauge data are also useful to farmers and gardeners for planting and harvesting purposes (Reynolds, 2014).

Temperature is measured with a thermometer and refers to how hot or cold the atmosphere is. Agriculture relies on accurate weather forecasting: when to plant, when to irrigate, when to harvest.
As shown in Table 4.12 above, 83% of the respondents said there are no thermometers and rain gauges in their area to confirm climate shocks as there are no weather stations that exist in the communities as well.

Figure 4.7 below shows the farmers' responses on the existence of weather stations in their areas and their knowledge of use of weather station gadgets in the weather station.

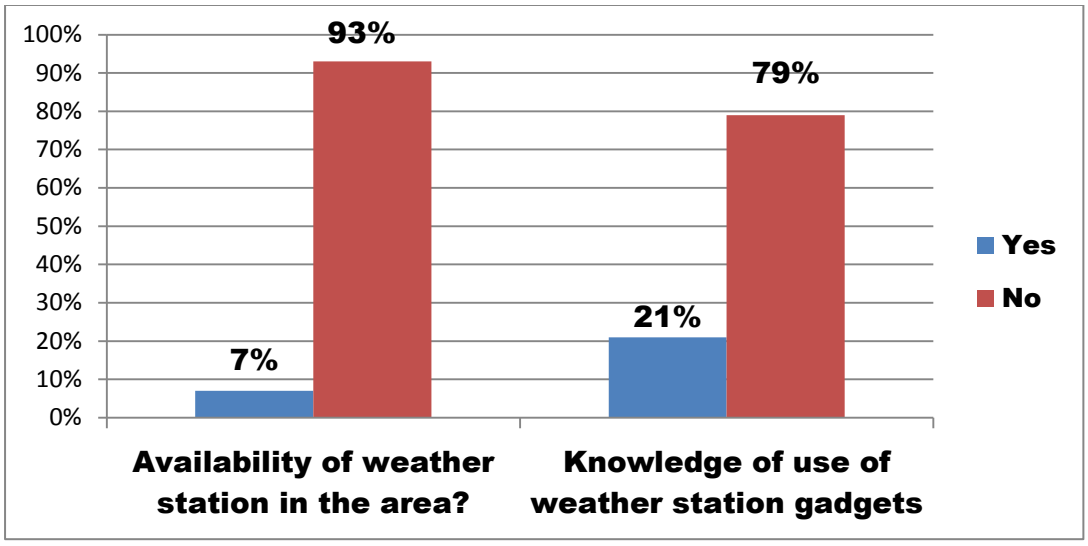

Figure 4.7: Farmers responses on availability of weather stations and knowledge of use of the weather station gadgets

The majority (93%) of farmers highlighted that there are no weather stations available to assist them in predicting the weather. A total of 79% of the farmers also

indicated that they do not know how to use the gadgets of the weather station. However, 21% did express some knowledge of use of weather station gadgets.

A Chi-square test was used to test the association of age groups and their knowledge of use of weather station gadgets. The results showed that there is no significant association between age and knowledge of use of weather station gadgets ($p=0.123$). Similarly, another Chi-square test was also used to determine the relationship between level of education of respondents and knowledge of use of weather station gadgets. The results showed that there is no significant relationship between level of education and knowledge of use of weather station gadgets ($p=0.772$).

A weather station is simply a facility with tools and technology used to forecast the weather. Different types of thermometers, barometers, and anemometers, which measure wind speed, are found at weather stations.

If farmers knew more about how the atmosphere functions, they would be able to make more accurate forecasts from day to day or even from week to week. This can help them make more accurate farming choices and preparations for any changes as weather patterns are never constant. Making such forecasts, however, would require knowing the temperature, atmospheric pressure, wind speed and direction, humidity, precipitation, and cloudiness at every point on the earth.

It was also observed that farmers in Bikita still rely heavily on traditional knowledge and Indigenous Knowledge Systems (IKS) in both adaptation and mitigation strategies devised by the smallholder farmers. It emerged that through meticulous study of plant and animal behaviour such as bird species like (*Dendera and Mafudzamombe*) people could easily predict the likelihood of a severe drought or low rainfall and thus would be able to adequately prepare in advance for the impending climatic catastrophe. These traditional coping strategies are largely based on experience that have been accumulated over the years and transmitted from one generation to the other. Mutekwa (2009) thus argued that lessons learnt from previous climatic stresses provide important entry points for social learning and enhanced adaptive capacity to both wetter and drier periods now and in the future.

More so, traditional myths and beliefs were also of paramount significance in Bikita in the quest to promote sustainable utilisation of critical resources like water, wild fruits, pastures and other resources.

4.6.1 Adaptive strategies implemented by farmers in Bikita District to cope with climate shocks

With the increasing intensity of drought/rainfall variability and floods observed throughout Sub-Saharan Africa in recent years, it is predicted that these effects of climate shocks will continue to have a negative impact on small-scale agriculture across the continent (Easterling, 2007). Much empirical evidence, however, suggests that adapting to climatic effects is not entirely beyond farmers' control (Nyong, Adesina, Osman, Elasha, 2001). These sources see farmers in the agriculture sector as innovators with a sophisticated body of 'indigenous knowledge' comprised of practices gained through experience and transmitted through members of a community (Agrawal, 2003; Berkes, 1999).

Adaptive strategies implemented by farmers in the Bikita District include:

- natural resources management;
- captive crocodile breeding and aquaculture as alternative livelihood sources;
- optimizing farmer/community crop mix to include maize, sorghum, pearl millet, groundnuts, cowpea and cassava;
- optimizing variety selection to include improved genetic materials and farmers' own traditional varieties (landraces);
- practicing different forms of infield rainwater harvesting and soil moisture conservation;
- diversification into non-agricultural activities, staggering planting and
- Optimizing livestock production during the dry season to enhance availability of draught power.

Although all these adaptive strategies have been implemented, this paper focuses on the performance of community gardening as a starting point for a transition

towards sustainable agricultural production in semi-arid regions of southeast Zimbabwe under a changing climate.

Respondents were requested to indicate the extent to which climate shocks adaptation projects are assisting them to cope with drought and other climate shocks.

The findings are indicated in Table 4.13 below.

Table 4.13: Farmer's responses towards the extent to which climate shocks adaptation projects are assisting them to cope with drought and other climate shocks

Response Rating	Number of respondents	%
Not at all	35	27
Somewhat helpful	42	32
Helpful	40	31
Very helpful	13	10
Total	**130**	**100**

The findings show that:

- At least 10% of the respondents said that the climate shocks adaptation projects are very helpful.
- 31% highlighted that the climate shocks adaptation projects are helpful.
- 32% mentioned that they are somewhat helpful but not to the full extent.
- 27% however, illustrated that the projects are not at all helping them.

The Chi-square test was used to determine age group association and responses given with regards to climate shocks adaptation projects helping to cope with drought and climate shocks as Table 4.14 below.

Table 4.14: The statistical association between age groups and their responses with regards to impact of climate shocks adaptation projects

Question	Chi-square Test	p-value	Fisher's Exact Test	p-value
Are the climate shocks adaptation projects helping you to cope with the risks of drought and other climate shocks?	18.435	0.030	18.555	0.020

Results from Table 4.14 above show that there is a significant association between the two variables (p=0.030).

Table 4.15: Crosstabulation of age groups and how they responded to impact of climate shocks adaptation projects

			VV5: Age groups				
			39 years and younger	40 - 49 years	50 - 59 years	60 years and older	Total
V177: Are the climate shocks adaptation projects impacting / helping you with regards to coping with the risks of drought and climate shocks?	**Not at all**	Count	16	8	8	3	35
		Expected Count	13.0	8.1	5.7	8.1	35.0
		Std. Residual	.8	.0	1.0	-1.8	
	Somewhat helpful	Count	10	15	7	9	41
		Expected Count	15.3	9.5	6.7	9.5	41.0
		Std. Residual	-1.3	1.8	.1	-.2	
	Helpful	Count	17	7	4	12	40
		Expected Count	14.9	9.3	6.5	9.3	40.0
		Std. Residual	.5	-.8	-1.0	.9	
	Very helpful	Count	5	0	2	6	13
		Expected Count	4.8	3.0	2.1	3.0	13.0
		Std. Residual	.1	-1.7	-.1	1.7	
Total		Count	48	30	21	30	129
		Expected Count	48.0	30.0	21.0	30.0	129.0

To see which cells in the cross table contributed most to the Chi-square value, a standardised residual value of greater than or equal to 2 or less than or equal to -2 is used. According to Table 4.15 above, 15 persons who were aged between 40 and 49 years rated the climate shocks adaptation projects as somewhat helpful but,

however, under the null hypothesis of no association, an expected number of 9.5 were found. Therefore more than what was expected in the age group 40 – 49 years rated the climate shocks adaptation projects as somewhat helpful.

However, although no person in the age group 40 – 49 rated climate shocks projects as very helpful, under the null hypothesis of no association, an expected number of 3.0 were found. Therefore fewer than what was expected in the age group 40 – 49 rated the climate shocks projects as very helpful. This seems contrary to the first part. Therefore, the economically active age group did not respond positively to the impact of climate shocks adaptation projects.

From the focus group discussions, farmers argued that, the organizations come into their community and impact a lot of knowledge on how they can reduce their vulnerability to climate shocks and they end there. The organizations put little effort in assisting farmers to implement those ideas. Farmers said they rarely have capital and finances to start up, run and maintain those projects. The respondents highlighted the need for more finance and technological advancements which can ease the pressure of starting and running climate shocks projects.

4.7 SUMMARY

From the results in Chapter 4, it may be concluded that:

- A total of 130 respondents were interviewed and 86% of the community garden participants were female;
- There is almost an even distribution of community garden participants from all age categories of the youth (39%); economically active (38%) and the elderly (23%) with the mean age being 47 years;
- Most participants have basic education of primary and secondary education;
- Respondents are not formally employed but are rather self-employed farmers with their main source of income coming from farming and gardening activities;

- Farmers expressed some significant ignorance to the knowledge and existence of climate shocks, but they did agree to the effects that drought has brought to their products in the past decade. Chi-square test also revealed no significant association between age groups and knowledge of climate shocks ;
- There is no existence of weather stations in the areas and no weather station gadgets available to assist farmers in predicting weather patterns and prepare for farming seasons and
- The Chi-square test was used to determine age group association and responses given with regards to climate shocks adaptation projects helping to cope with drought and other climate shocks and results showed that the economically active age group did not respond positively to the impact of climate shocks adaptation projects.

CHAPTER 5:THE OVERALL SIGNIFICANCE OF COMMUNITY GARDENS IN BIKITA DISTRICT

5.1 INTRODUCTION

The level at which community gardens contribute to people's lives vary from person to person, and from household to household, respectively. The inspiration and ambition to join and disjoin community gardens is largely determined by personal or household circumstances rather than peer or community pressure and external factors. At aggregate level, the existing literature has shown that community gardens should not be discarded or neglected owing to their diversity and complexity. Indeed, the literature further argues that community gardens have a multitude of interrelated uses. As such, these uses often include environmental, social, and economic uses, to mention but a few. This chapter seeks to focus solely on the significance of community gardens whilst also prioritising the benefits that accrue to those who partake in the activity.

In short, the chapter begins by careful illustration of the histories of the associations interviewed as these provides the basis upon which the study was based. Two gardens are described in detail so as to provide and demonstrate the motive or the reasoning behind their formation. Meanwhile, a short description of the number/s of people interviewed jointly (in case of focus groups) or individually (in case of individual interviews –particularly with leaders). A brief summary of data collection activities will also help in explaining what actually transpired on the field.

5.2 IN-DEPTH LOOK AT COMMUNITY GARDENING

In Zimbabwe, while land is jointly owned in community gardens, each farmer has his/her own allocation within a large garden area. The size of holding per farmer is determined by the number of beneficiaries in the households, land size available, water availability, farming equipment and ability to utilize the land fully. The large garden is divided into sections within which each household has an average total area of at least 0.06 hectares. Infrastructure is owned collectively. The community

gardens manage their activities through the establishment of management committees. Each committee on average has about seven members whose positions are chairperson, vice chairperson, secretary, vice secretary, treasurer and two committee members. The committees are responsible for various aspects like dam and water management and catchment protection. It is also the responsibility of these committees to ensure that members observed the requirements of the constitution (Focus group discussions).

According to the focus group discussions, constitutions, regular meetings, minutes of meetings and records of activities are some of the tools used in the management of gardens. Farmers are assisted by support institutions to draw up constitutions, which become the garden management reference resource. The meetings are held to discuss general and developmental issues related to the garden. Local leadership also assists in enforcing the rules of the constitution. Members work in the garden on specified days, enter and leave the garden at the same time. To enforce discipline, there are various fines for various categories of offences. Elections to change the office bearers are held as indicated by their constitution. To become a member, one has to pay a certain fee and provide own labour. Those who wish to resign are free to do so but would get no terminal benefits.

According to data collection activities, the interviewed farmers in Bikita District have been practising community gardening from between three weeks to 25 years. Even though the farmers own land for dry land farming and livestock, they have resorted to community gardening because of the lack of produce in the fields due to drought. The greater percentage of the respondents recently joined the community gardening activities due to the support and awareness that is growing in rural areas by the private and public sector on the importance of supplementing their usual dry land farming with gardening. Community gardens are also part of the various activities that are being implemented in the dry areas in order to cope with drought and other climate shocks.

According to the district extension officer for Bikita, the district has an average of 33 rural wards and each ward has approximately 10 community gardens servicing the different households. This makes Bikita District to have approximately 330

gardens. The exact figure for the total number of gardens could not be determined as the existence of the community gardens is determined by availability of water. When there is little or no water available, a number of gardens close down, only to resume operations when water is available.

5.2.1 Types of community gardens involved

The study was conducted on 9 major community gardens within ward 6 and ward 32 of the Bikita District. The gardens are:

- Chamatere Garden- 42 participants Size= 2.52ha
- Tambanebadza Garden- 36 participants Size = 2.16ha
- Hamamawoko Garden- 16 participants Size = 0.96ha
- Boterekwa Garden- 14 participants Size = 0.84ha
- Mufaro Garden- 11participants Size = 0.66ha
- Wasara wasara Garden- 4 participants
- CARE Garden- 3 participants
- Dzingazhara Garden- 2 particpants
- Kugutakushanda Garden- 2 participants

The total size of the garden was calculated by average size of piece of land per member (0.06ha) X number of members in the garden. The total size of the remaining 4 gardens above could not be determined.

Due to time and logistical constraints faced when trying to mobilize the community members, the focus group discussions were held with members from only two of the gardens namely Tambanebadza and Hamamawoko.

5.2.1.1 Community Garden 1: Tambanebadza

This garden is situated in Ward 32 of the Bikita District. It has been in existence for the past four years. This community garden was first initiated by Dutch CARE Non-Governmental Organization. The main reason for members joining this garden was for them to improve on their household nutrition. When asked why some of the

community members have not joined community gardens, they mentioned reasons which included, poor health, laziness, old age, and stereotypes associated with community gardens.

According to the focus group discussion held with the participating members, the word “Tambanebadza” is a shona name meaning “play with the hand plough.” The group members decided to name their garden as a form of encouragement to others that it is better to ‘play with the hand plough’ as it is a source of food and survival than engage in other activities which do not benefit the household in any way.

The participants expressed knowledge of climate shocks as long periods of very high temperatures and extremely low temperatures when it is time for winter. This has impacted especially on their yields which have become very low and poor due to lack of good rains. The benefits accrued from participating in community gardens include, good food and money for day to day expenses. Members also highlighted that they can now afford to join associations which make access to inputs easier when they purchase as registered groups.

According to the focus group, some of the constraints they face include long distances to fetch water especially for the elderly and lack of farm equipment. The participants desire to have irrigation systems, tanks or boreholes nearby to manage their water crisis and protection for their gardens.

5.2.1.2 Community Garden 2: Hamamawoko

The second focus group discussion was held at Hamamawoko community garden. This garden is also situated in Ward 32. It has been in existence for the past 3 years now. The main reasons mentioned by the participants for joining the garden were mainly: to acquire skills and learn from the neighbouring gardens; to get some source of income and also because of the benefits that were highlighted by the extension officers from AGRITEX. The garden was mainly initiated by the extension officers from the AGRITEX Department.

The members named the garden “Hamamawoko” which means “your real relative is your hands,” also as encouragement to the members that, working with your hands is the only way you can have access to food as compared to relying on friends and relatives for income and food. The group expressed wide knowledge of climate shocks as the state where there is shortage of food due to poor rains and seasonal changes especially rainfall changes. Rainfall has become very little. The group members also discussed how climate shocks have impacted their community and they mentioned a few effects which were: changes in planting patterns from early planting to late planting; poor yields; uneven distribution of rainfall; destruction of veld pasture and poor quality produce.

When asked about the benefits of being a member of community garden, the members expressed a high level of satisfaction due to the fact that, the community garden is now providing income for their families. Participants also mentioned that, because of belonging to a community garden, they are now able to access seed and fertilizers, knapsack sprayers, treated poles, fencing and chemicals because they can now afford to purchase those from the proceeds. They also now have access to a number of horticultural crops nearby from their gardens and good food.

Participants also mentioned concern over lack of security of their gardens. The gardens are also vulnerable to animals and birds and destruction from other community members. Community members desired access to more markets and tanks to store water and for irrigation so they do not have walk long distances to fetch water.

5.2.2 Reasons why farmers in Bikita District entered into community gardening

The drive towards community gardens seems to vary dramatically from person to person depending on his/her personal circumstances. The overwhelming majority of those who enter community gardens seem to pinpoint or specify the most important reasons that drove them into this activity. Most frequently, hunger/ household consumption has appeared important in terms of attracting people to join community gardens with a percentage of 86%. This is motivated mostly by high percentages of

participants who unanimously agreed that community gardens add a significant value insofar as reducing the rate of poverty especially in the household.

As seen in Figure 5.1 below, 86% of the members of community gardens pointed out that they entered community gardening in order to produce food for home consumption purposes. Similarly, income generation has also appeared to be a significant driving factor that actually propels people to join community gardens. Normally, income is generated when they begin to sell the surplus of the food produced. However, participants – particularly members of community gardens have pointed out that their main aim is not to sell. In this context, social benefits like social cohesion and preserving tradition, also determined some of the reasons why respondents joined community gardens.

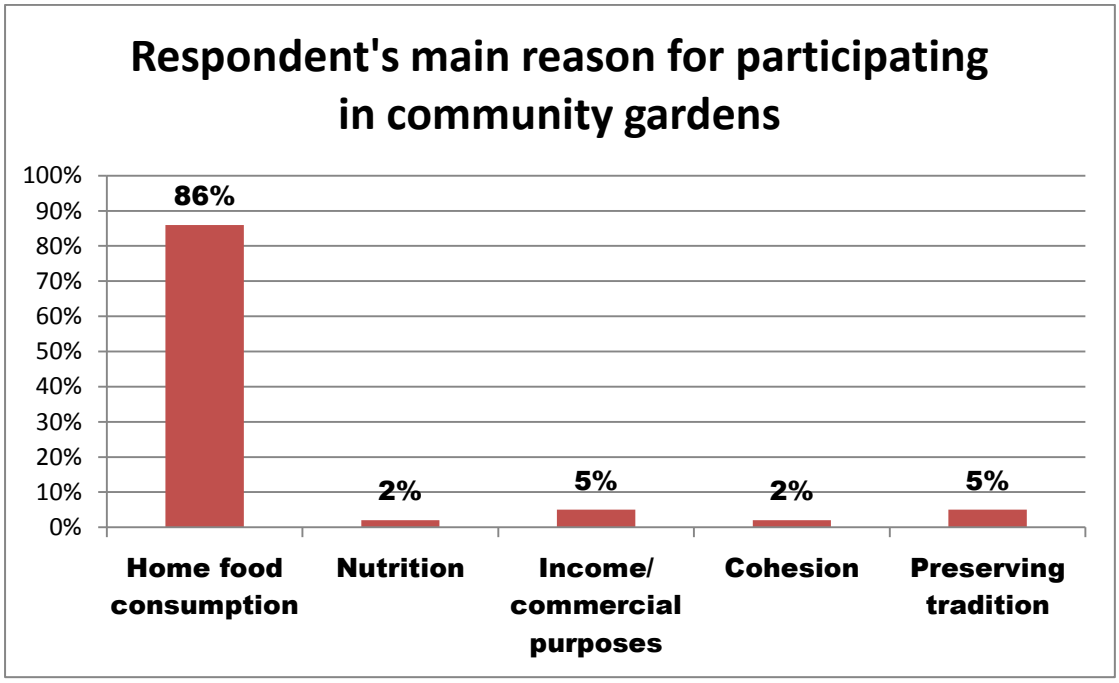

Figure 5.1: Main reason for participating in community gardens

According the focus group discussion, held with farmers, social factors contribute to why some of the local people in the community have not joined community gardening, despite efforts by local authorities in encouraging them.

A focus group discussion held at the Hamamawoko Community Garden mentioned laziness, old age, health issues and disability as the major reasons why some local

people do not join community gardens. Another focus group discussion held at Tambanebadza Community Garden also cited the same reasons of ill- health and laziness as the major reasons why people do not participate in community gardens. They also mentioned the fact that, a number of wives go to towns and cities to be with their husbands for periods of times, thus by the time they come back to the village, they would have missed out on a number of activities.

5.2.3 Initial role players and selection of community garden participants

Figure 5.2 below shows the main key players in initiating community gardens.

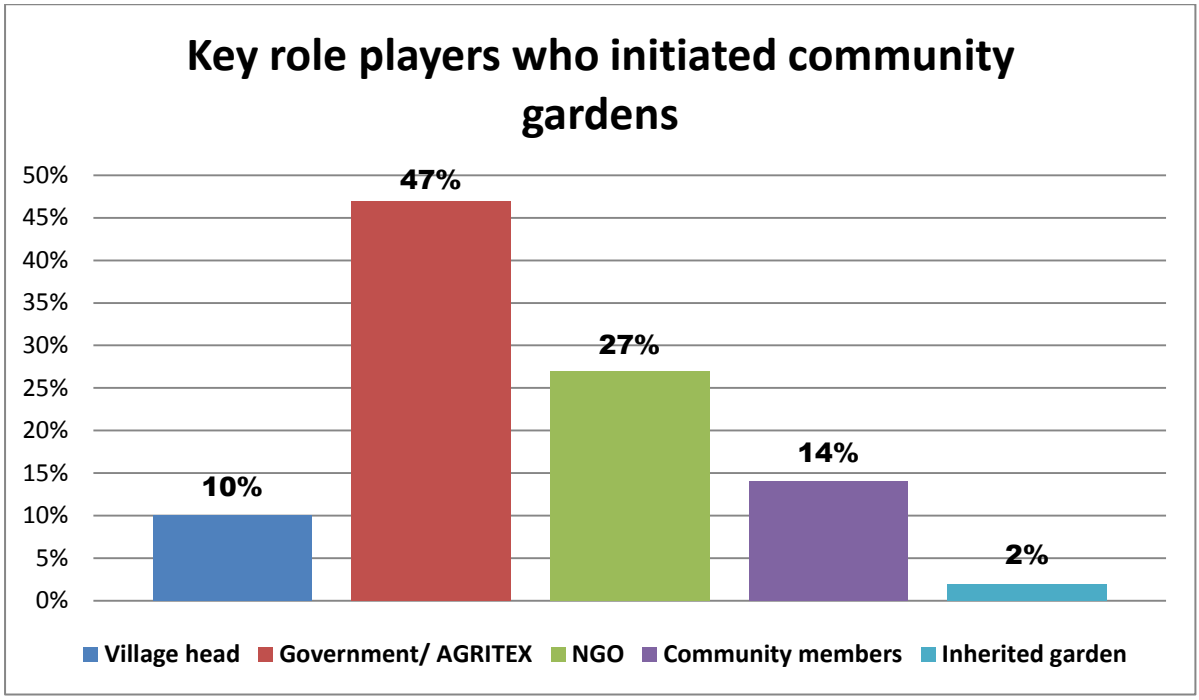

Figure 5.2: Main role players in initiation of community gardens in the area

As shown in the Figure 5.2 above, the government in conjunction with the Agricultural Extension Department (AGRITEX/ GVT) in Zimbabwe is playing a huge role in initiating and supporting community gardens in Bikita district. A total of 47% of the respondents highlighted this. At least 27% of the respondents also mentioned that Non-Governmental Organizations also play a pivotal role in activities which support community gardens. In Bikita District, CARE International and CARITAS International are the main non-governmental organizations actively involved in community gardens.

The beneficiaries of community gardens have highlighted that they get support from government and non-governmental organizations. Findings indicate:

- 53% of the farmers mainly receive some form of training and advice;
- 16% get farm equipment and farm inputs from the role players;
- 11% receive assistance in form of land preparation.

Table 5.1 below shows how farmers were selected to join community gardens.

Table 5.1: Selection of community members into joining Community gardens

Selection criteria	Number of respondents	%
Communication	5	5%
Voluntary/self	76	76%
Village head	7	7%
Vulnerability status	1	1%
Coordinator	7	7%
Paid joining fee	4	4%
Total	**100**	**100**

As seen in the Table 5.1 above, 76% of the respondents voluntarily joined community gardens especially after realising the benefits that are brought about by this activity. Only 4% of the respondents paid joining fee in order to join the gardening activities. Only (1%) were chosen due to his/her vulnerability status by the gardening coordinators and 7% each were selected by the village head or coordinators in their respective areas and 5% of the farmers only joined after communication by role players on the importance of community gardening as a coping strategy to drought.

5.3 PRODUCTION IN THE COMMUNITY GARDENS

According to the study, farmers in the community gardens engage mostly in horticulture/ vegetable production and crop production. The vegetables planted in the community gardens in which the study was conducted are mainly; Rape (Kale),

covo, cabbages, tomatoes, onion, carrots and chillies. Tomatoes, covo, onion and rape being the most popular than the rest as the seeds are more easily accessible than the rest. Crops grown include round nuts; groundnuts; maize and sugar beans.

5.3.1 Labour

According to data collection activities, most of the labour provided in the community gardens is permanent labour from family members who are mainly school going children. They usually attend to the gardens before leaving for school and after school. Labour is also sometimes casually hired from time to time especially during cultivating, weeding and harvesting.

5.3.1.1 Payment for labour provided in the community gardens

Figure 5.3 below shows the methods used to pay for labour by the participants of community gardens.

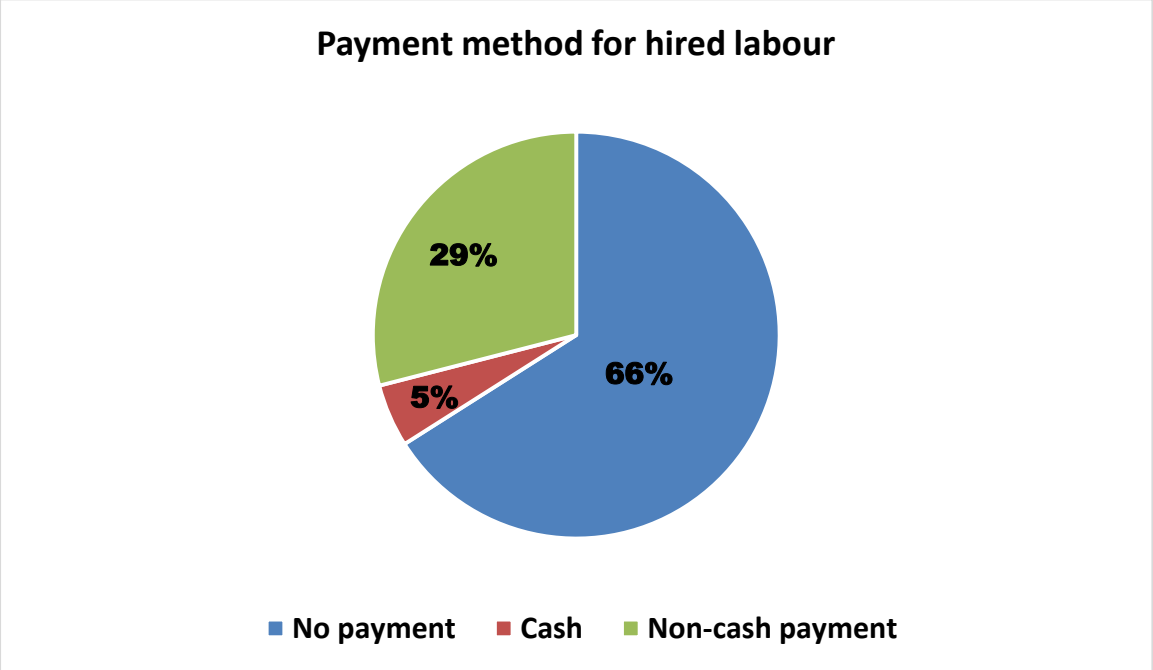

Figure 5.3: Methods used to pay for labour

As seen in the Figure 5.3 above, 66% of the respondents do not pay for labour provided in the community gardens. This is mainly due to the fact that, the greater

percentage of labour is provided by family members and produce is for home consumption (Observation). However, 29% of the respondents pay in form of non-cash items. The study indicated that the local people who are hired to work in the gardens get their payment inform of; bags of maize, food, clothing and some also get a share of the produce when harvesting time comes as part of payment. Livestock is also a popular way of payment for labour provided in the community gardens in form of chickens. Some workers refuse cash as form of payment and rather obtain food and livestock as it is a more easier to get food than to get cash and then embark on a long journey to towns and cities to buy food. A small percentage (5%), pay their hired labour in form of cash.

5.3.2 Irrigation

It is common knowledge that water is the main component that completes the cycle of agricultural productivity. Figure 5.4 below shows the types of water used to irrigate community gardens by the rural farmers of Bikita District.

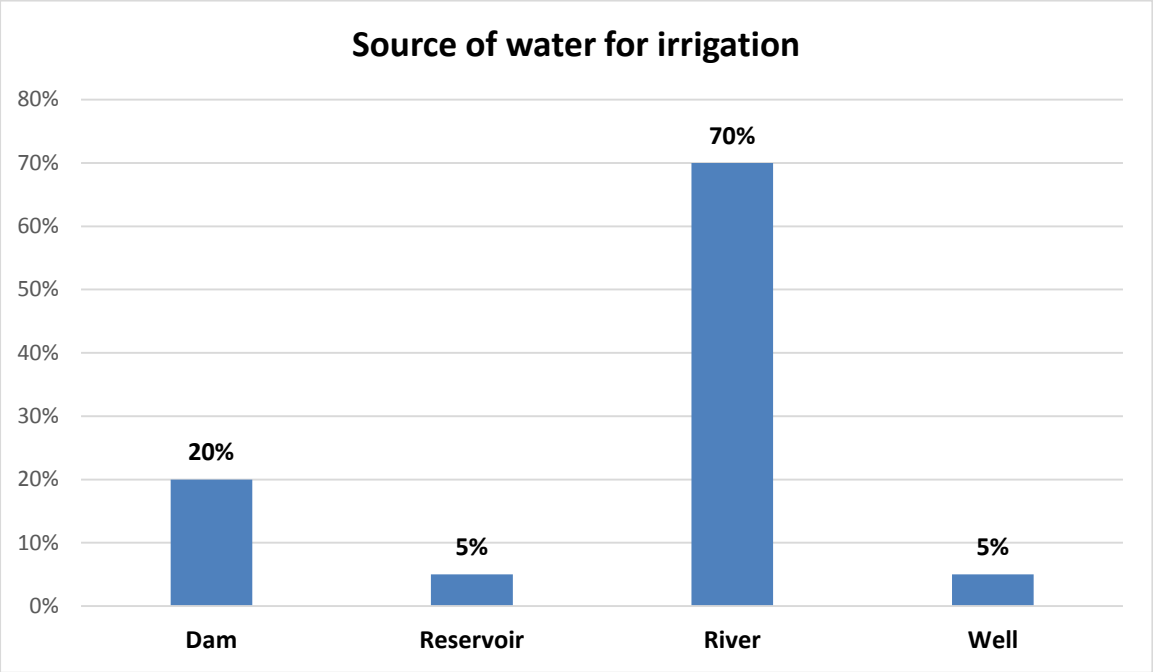

Figure 5.4: Source of water for irrigation

According to Figure 5.4 above the river is the main source of water for irrigating the crops and vegetables in community gardens as confirmed by 70% of the respondents. Farmers highlighted how they have to walk long distances to fetch

water from the river for their gardens and they use hand irrigation to water their plants. At least 83% of the respondents use hand irrigation which involves the use of buckets, watering cans and drums to store and supply water for their gardens. A small percentage of the respondents make use of a hose pipe, flood irrigation and sprinklers for irrigation.

Water conservation and water harvesting also play a major role in increasing easy access to water for gardens. According the study, farmers dig deep trenches around the community gardens to collect water during the rainy season. Sometimes they collect water from the river and store it in the pits and containers for everyday purposes, which reduce the number of times they have to walk to the river to collect water.

5.3.3 Access to inputs and services

At initiation, externally supported gardens obtain their starter inputs from the support institutions. Thereafter they source from local suppliers either individually or as groups. According to the research, most farmers provide for their own inputs and services. From Figure 5.5 below, it was concluded that the famers provide marketing and selling (48%), transport (67%), finance (75%) and inputs (72%) services on their own. There is not much support rendered to them for these services.

However extension and advisory services are mainly provided by the government and agricultural associations (48%). The government also plays a pivotal role in providing extension and advisory services. The respondents highlighted that each ward has its own extension worker who is actively involved in supporting and catering for the needs of the farmers. Non-Governmental Organizations (10%), in this case, CARE International and CARITAS International, also assist farmers in extension and advisory services. They normally play an active role of training farmers on farming methods like conservation farming and providing technical assistance in how to set up and manage a productive community garden.
The community garden members access finance on their own and mostly loan each other funds to continue with farming activities according to the agreements set up by the members. Famers do not get finance from financial institutions as they lack

collateral and most do not have knowledge on how to go about getting finance. They finance each other or get support from friends and family or in other instances get support from schools and churches.

Inputs are normally purchased at the agro-dealers at the nearest business centre or the nearest town. One or two members go and purchase inputs for the whole group which are then distributed according to the contribution paid by each farmer.

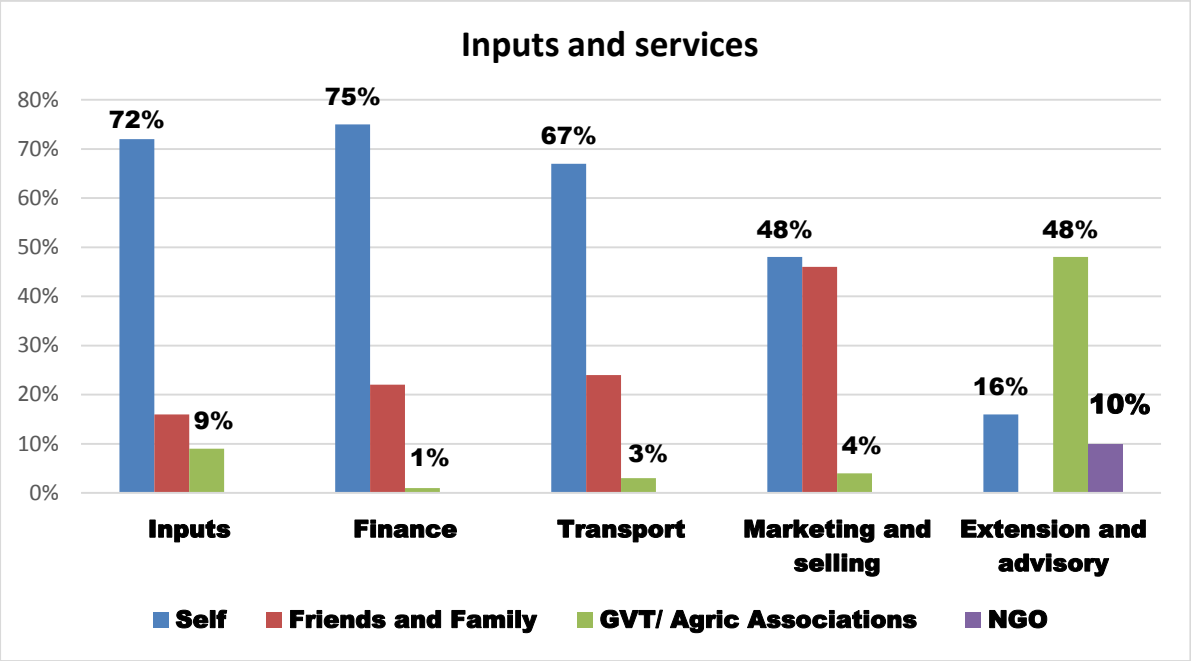

Figure 5.5: Access to inputs and services

5.3.4 Marketing and selling of products

Whilst some of these farmers are able to produce surplus food on their gardens, most of them are not fully equipped with how to get the most out of this surplus as they do not have marketing skills or even the market information. Product decisions, pricing strategies, promotional mix decisions as well as distribution strategies remain mystery on the part of the rural farmers especially those in Masvingo. This is because in some cases some rural farmers have never been to the major cities and towns hence they remain disconnected to markets that have the potential to absorb their products at lucrative prices. The rural farmers mainly rely on local customers found at growth points and the many intermediaries who come to buy produce at

very low prices to resell at competitive prices (Chokera, Ngwenya & Munodawafa, 2014).

5.3.4.1 Primary selling/ distribution points for harvested products

Table 5.2 below shows the various selling/ distribution points for the respondents produce. Findings indicate that 82% of the respondents sell their goods on a door-to-door basis or exchange products with neighbours and 13% also sell form home, especially if they have a homestead garden or when the community garden is nearby.

Table 5.2: Primary selling/ distribution point

Selling Point	% of Respondents
Market stalls	2%
Wholesalers and retailers	2%
Door to door/ neighbours	82%
Streets/ highway	1%
Sell from home	13%
Total	**100%**

5.3.4.2 Mode of Transport and distance to selling points

While Masvingo province is considered to be the oldest province in the history of human settlement in Zimbabwe, it is one of the least developed provinces especially in terms of road networks. Except for the highway, most roads are not tarred and this creates challenges to farmers in the rural communities as very few transporters ply the dusty and bumpy roads. The few transporters that sacrifice to ply these routes charge prices that are beyond the reach of many farmers thus farmers are forced to sell produce to the local buyers who buy at below market price. Community garden products are naturally perishable making it imperative for the distribution channels to be fast, reliable and efficient if the produce is to reach the consumers in the proper quality (Chokera et al, 2014).

According to the data collection, the majority (99%) of the farmers interviewed walk to and from their selling point in order to engage in their business while 1% said they

use a scotch cart to ferry goods to their market. The scotch carts are pulled either by cattle or donkeys.

5.3.4.3 Market Information

The majority (86%) of the farmers get their market information mostly from peers and fellow farmers, 10% have access to information through extension agents and 4% from research and development. According to the research, market prices are determined mainly by demand of the produce and not necessarily by supply. The fact that prices of agricultural products are normally determined by the market forces of demand and supply puts the rural farmers at a disadvantage, as the farmers lack market information or have sketchy information about the markets.

Supply of products is always high and selling price is always low as the majority of the community members all engage in the same type of farming and all produce the same crops and vegetables. Because of the need for cash, farmers sometimes resort to selling their crops at the lowest value possible so as to get rid of them as they cannot return home with the goods due to their perishability nature (Chokera et al, 2014).

5.3.5 Return on sales

Complete sale of crops and vegetables is not always guaranteed and because of the low prices that farmers charge, there is always little or no income incurred after sale. According to the data collection, a small plate consisting of 10 tomatoes will sell for only US$0.50. A bundle of rape vegetable also sells for US$0.50 each.
Results from Table 5.3 below show that:

- 53% of the respondents said they do not get any income from their community gardening. The produce is mainly used for household food consumption;
- 49% use their income to purchase food which comprises of the basic necessities like milk, bread, sugar and cooking oil;
- 35% save up on their income and eventually use it to pay school fees and cater for children's necessities like clothing and school item requirements;

Results from the Chi-square test showed that there was no significant association between age group and response to using income for school fees and children's necessities (p=0.295);

- 25% of the farmers plough back the money into the business. Chi-square test results also showed no significant association between age group and response to ploughing income back into the business (p=0.310); and
- 25% use their income to purchase more farm inputs and farming equipment for use in the community gardens.

Table 5.3: Use of income from sales according to responses

Income from sales	% of respondents
No income	53%
Plough back into the business	25%
Purchase food	49%
Purchase livestock	3%
Living and travel expenses	12%
School fees/ children necessities	35%

5.4 POSITIVE CHANGES BROUGHT ABOUT BY COMMUNITY GARDENS

According to FAO (2005), community gardens have the following advantages:

- assistance reaches more people;
- communal use of resources like dams;
- environmental management simpler;
- cheaper to monitor;
- community cohesion enhanced; and
- inputs can be acquired in bulk and cheaper and organized marketing of produce.

The participants indicated confidently that community gardens create links or networks between them through interaction with each other. This is defined as social capital.

5.4.1 Social capital

Social capital in Bikita fostered community cohesion within many villages which enabled the communities to withstand the effects of successive droughts. Community cohesion in this paper refers to the aspect of togetherness and bonding exhibited by the people of Bikita, the "glue" that holds a community together. This includes features such as a sense of common belonging or homogeneity. Community cohesion in Bikita is manifesting through the sharing of scarce resources such as water, wild fruits and food. It emerged that some community members with boreholes and wells would allow other members to fetch water free of charge. Thus, in this case, the author argues that social networks constituted a 'productive adaption resource' to the peasant farmers in Bikita since being embedded in webs of social relationships, peasant farmers gained access to niches of sustainable livelihoods. As a result social networks enabled them to be dynamic and highly adaptive in the face of livelihood threats like successive droughts and subsequent food insecurity.

Table 5.4 below shows some of the benefits of belonging to a community garden as collected from the survey.

Table 5.4: Benefits of being associated with community gardens

Benefit Categories	Number of Respondents	%
No benefits	30	24
More attention from service providers	18	14
Sharing of information and farm implements	42	33
Higher production	22	18
Easier access to services and resources	14	11
Total	**126**	**100**

According to the table above:

- 33% of the respondents mentioned the greatest benefit of belonging to a community garden is sharing of information and implements;
- 24% however, said they do not get any benefits from being a member of community gardens;
- 18% said they now have higher production mainly due to sharing of information, learning from others and collectivization;
- 14% also highlighted that, belonging to a community garden has the benefit of getting more attention from service providers; and
- 11% mentioned easier access to resources and services.

According to the survey, instead of each individual farmer travelling to the nearest town or city to purchase inputs, farmers bring their money together and send one or two members mainly in the management to purchase for all members. This is an advantage, enabling them to buy seed and fertilizers in bulk which will make it more affordable.

Agricultural associations also assist farmers preferably in groups than individually, because so that when one member suffers, it does not usually affect the rest of the community garden members as they are able to cover for each other in paying back short term loans or if they had purchased seed on credit.

An example is Masvingo Agro – Dealers Association (MADA) which is designed to encourage wholesalers to avail inputs to smallholder farmers through placing inputs in large quantities (consignment stock) in agro-dealer stores close to rural farmers (Dhewa, 2011).

5.4.2 Social benefits

Some social benefits of community gardens where also considered as an important factor affecting farmers' adoption of the gardening activities. Focus group discussions where mainly used as a platform to raise points on some of the social benefits associated with community gardens:

5.4.2.1 Development of farming skills

Community gardens serve as a platform where farmers learn how to produce different types of crops and vegetables. The training that farmers receive from Government and Non-Governmental Organizations is important because it enhances their knowledge as farmers and as individuals. They learn the different techniques that are involved when it comes to farming or gardening.

5.4.2.2 Collective Effort

Because there are community gardens, farmers rarely work on their own. Members easily assist each other and are always there to give a hand and take care of each other's crop and vegetables. Community gardens give a source of security for all members involved. Because every individual has unique skills and knowledge, these are shared amongst the members of the community. No member is left without some form of harvest or income from sales because garden members always make sure each member has exhausted and sold their produce and will assist each other whenever there is a need. Community members also share farm implements and equipment amongst themselves.

5.4.3 Economic benefits

5.4.3.1 Nutritious food

Nutritious food was the most important benefit mentioned by the community garden members. The gardens provide a variety of crops and vegetables which are used for household consumption. Farmers have a mixed choice and due to limited amount of meat available, there is wide substitute with crops like beans and round nuts, which provides the same nutrients that meat provides. Respondents said they are now able to put vegetables on the table without necessarily having to purchase them. By growing their own crops they are able to go to their gardens and gather a few fresh vegetables that would be cooked and eaten as a meal.

Secondly they identified that growing their own fresh, healthy and nutritious vegetables helped them with their achieving food security; they stated that being

able to produce for their own food helped them reduce their vulnerability to hunger. What is more appealing was that the farmers believe that they are not poor because they are able to produce food for themselves. The introduction of community gardens also meant the production of a range of vegetables that people did not grow. So to them, this means they have gained healthy foods, however this does not mean that their traditional crop was not healthy. This whole notion comes because they are able to supplement and complement what they had in their homestead farms.

5.4.3.2 Increased income

Sale of produce from the community gardens also provides a source of income for the members. After selling, members highlighted that they obtain income which they use mostly for purchase of basic necessities and children's school fees and their daily necessities. Although 53% of the farmers' as shown in Table 5.3, said they get no income from sale, the rest get income which has improved their daily lives as compared to before.

5.4.3.3 Formal employment and community based employment

A large number of the respondent's, 86% of them being women according to the gender results, are satisfied with community gardens because the gardens have become a source of formal employment for them. The respondents mentioned that they feel satisfied by the fact that they now wake up and go for work like normal employees. Community gardens have also enabled the women to take up the role of providing for the household and contributing food because they work and participate in at the gardens.

5.4.3.4 Improved quality of life

Due to participating in community gardens, the respondents said they are realising some great changes in their households and lives. Because of the fact that, mostly women are the ones participating in the gardens, they are now also able to contribute financially to their homes in addition to the income brought by their husbands and other family members. Farmers said they can now afford to buy their

children decent school clothing and stationery and can afford to take them to school because of the supplement income coming from gardens.

5.4.3.5 Education and training

Farmers have hands-on experience by taking part in community gardens and so they learn by doing. Furthermore they are taught and trained new knowledge and techniques by the extension officers in the community gardens, this then would align education to social benefit as well. Education does not only end there, but farmers also believe that since they use the income they get from the gardens to send their children to schools where they will get educated, they are also investing in their children's educational future. The community gardens also play a role in educating the children on how to grow their own food as a lot of the members' children take part in the gardening during holidays or after school.

5.4.4 Environmental benefits

5.4.4.1 Sustainable agriculture

Farmers participating in the community gardens also discussed how the community gardens have helped regain their soil's survival. Soil and land had been lying idle for many years due to little or no agricultural production. Now soil can be kept fertile due to the different types of crops and vegetables planted in the community garden. Farmers also mentioned that they practise crop rotation which is also an effective way of maintaining soil fertility.

CHAPTER 6:INSTITUTIONAL SUPPORT OF COMMUNITY GARDENS AND FARMERS CONSTRAINTS TO PRODUCTION

6.1 INTRODUCTION

A number of farmers argued that advice from both agricultural extension officers and NGOs that are involved in various food security activities in Bikita District have been of paramount significance to them in adapting to climate variability. The initiatives that the public and private sectors have taken in assisting farmers to cope with drought and climate shocks, has seen a great deal of improvement in the farmers' lives. Networks have been created between the rural poor and various stakeholders such as civil associations and NGOs that are assisting the people with adaptation and mitigation strategies such as new cropping systems introduced by NGO's such as Action Faim, CARITAS and CARE International in Bikita District and other surrounding districts like Zaka and Chivi.

The overall objective of this chapter is to further investigate and analyse the support services farmers in community gardens are receiving and their perceptions towards the support in terms of quality and frequency with emphasis mainly on the role of extension in the gardens. Institutions that are playing a major role in supporting the farmers will also be investigated. The chapter will also investigate the major constraints affecting the farmers in the community gardens of Bikita and how they desire for them to be addressed.

6.2 Extension services for community garden farmers in Bikita District

In Zimbabwe, agricultural extension was introduced in 1927 by Emory D. Alvord, who started with nine agricultural demonstration workers. Later, the Department of Conservation and Extension (Conex) and the Department of Agricultural Development (Devag) were established. The former had the institutional mandate to provide advisory services to white large-scale commercial farmers, while the latter

was meant to service native smallholder farming communities. At independence in 1980, the Department of Agricultural, Technical and Extension Services (AGRITEX) was formed as an amalgamation of the two departments (Hanyani-Mlambo, 2002).

Zimbabwe's agricultural extension service, AGRITEX, was the pride of Africa in the 1980s, before the ravages of structural adjustment hit in the 1990s. There were extension workers throughout the countryside, and a network of subject matter specialists, most highly experienced and qualified. The quality of the training and advice offered was unparalleled anywhere on the continent, and for a time the service was well resourced with extension workers reasonably paid and with transport and so able to move around (Scoones, 2014).

Today the extension service is a sorry reflection of past glories. Many qualified staff left or passed away (the ravages of HIV/AIDS hit many government services very badly), posts are unfilled, the transport capacity virtually non-existent and the ability to offer up-to-date advice severely hampered by the parallel decimation of government research services. Most farmers rely on private input suppliers, agrodealers and their neighbours for advice these days. Of course there are extension workers in the field, and they are usually extraordinarily committed and informed, despite the poor conditions of their posts. In the rural areas many get additional incentives from NGO programmes, often diverting their work to projects like conservation agriculture or community gardening (Scoones, 2014).

Within AGRITEX, there is little information on how many farmers it is actually reaching and servicing to date. The extension agency offers a blanket public good service, which farmers are expected to use. Large-scale commercial farmers perceive AGRITEX as generally not competent to provide advisory services to their subsector. The majority of these farmers rely on support services from private agro-based companies (Hanyani-Mlambo, 2002).

According to Dhewa, (2011), although they do not receive much recognition, Agricultural associations like agro-dealers are major economic drivers in rural areas. One of the most successful associations mentioned by the farmers is Masvingo Agro-Dealers Association (MADA), which comprises business membership

organisations from Masvingo province's seven districts, namely Bikita, Zaka, Chivi, Masvingo, Gutu, Mwenezi and Chiredzi. Masvingo Agro-Dealers Association (MADA) is demonstrating the capacity and potential of agro-dealers in availing inputs training, business knowledge to smallholder farmers.

Most members are agro-dealers, general dealers, flea market traders and rural artisans (carpenters and welders). Masvingo Agro-Dealers Association came into existence in 2005 as an offshoot from Care International Zimbabwe's Agribusiness Entrepreneur Network & Training (AGENT) programme which aimed to provide smallholder farmers in remote areas with agriculture inputs at affordable prices by establishing a network of agro-input dealers (Dhewa, 2011).

Inefficiencies in agriculture value chains had excluded smallholder farmers from local trade. The AGENT programme identified and facilitated market based solutions to handicaps that were preventing farmers from obtaining inputs. Agro-dealers networks were expanded through training rural traders and linking them with private sector suppliers and micro finance institutions to improve affordability and volumes of inputs for smallholder farmers. Some of the major skills agro-dealers provide include merchandising, marketing, record keeping, input handling, conflict management, leadership, cattle fattening, value addition as well as lobbying and advocacy. Demonstrations through field days are used by agro-dealers to show how their inputs work (Dhewa, 2011).

Over the years SNV International Zimbabwe and other partners have provided capacity building to MADA members such as Bikita Business Agro-Dealer Agents and Mwenezi Agro-Dealers Association. SNV focused on enhancing leadership and management skills, improving lobbying and advocacy competencies as well as strengthening product and service development capacities. Although MADA was affected by the economic meltdown, it was kept alive by activities at district levels where agro-dealers continued to function. They even surmounted economic hardships and record inflation in 2008 (Dhewa, 2011).

The Table 6.1 below shows the extension/ advisory service providers who are actively involved in assisting community garden farmers in Bikita district.

Table 6.1: Extension/ advisory service providers in Bikita District

Extension service provider	Number of respondents	Percent
No extension services	3	2
Government	20	15
NGOs	2	2
Private Organizations	4	3
Educational Institutions	7	5
Agricultural Associations	94	72
Total	**130**	**100**

As illustrated in Table 6.1 above, 72% of the respondents said they received extension services form agricultural associations in the district while 15% also mentioned that they received their extension services from the government.

According to the survey, 38% of the respondents said the extensions workers visit and consultants with them once a week; 37% responded saying, extension workers visit them every 2 weeks.

Table 6.2 below indicates how farmers rated the quality of extension services they receive from extension bodies.

Table 6.2: Quality of extension services rated by the respondents in the community gardens

Rating	Number of respondents	Percent
Poor	8	6
Average	71	55
Good	17	13
Excellent	34	26
Total	**130**	**100**

Table 6.2 above shows that, 55% of the respondents rated extension services received in their area as average while 26% on the other hand, rated extension services as excellent and 13% also rated the quality of extension as good.

A Chi-Square test was conducted to show the relationship between age groups and how they responded to rating the extension services in their area.

Table 6.3 below shows the statistical association between age groups and how they rated the extension services in the area.

Table 6.3: Statistical association between age groups and how they rated the extension services in the area

Question	Chi-square Test	P-value	Fisher's Exact Test	P-value
Indicate how you would rate extension services in your area	5.780	0.762	6.087	0.743

Results from Table 6.3 above show that there is no significant association between age group and how they rated extension services. (p=0.762)

6.2.1 Quality of support services

Both government and non-government institutions provide support to households in the district by providing food, seed, fertilizers and training. However, despite the existence of above institutions, farmers in the rural areas remain marginalized in terms of marketing their agricultural commodities, access to inputs, transport and finance.

The Figure 6.1 below indicates the quality of support services as perceived by the participants of the community gardens.

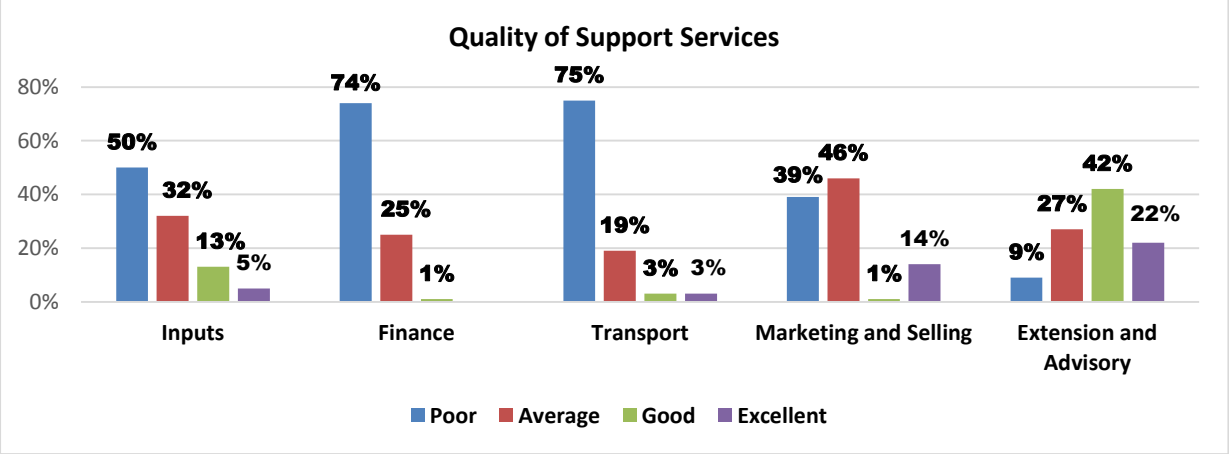

Figure 6.1: Quality of support services received

As seen in the Figure 6.1 above, farmers were asked to rate the quality of services they receive from service providers. The greater percentage of farmers all rated inputs (50%), finance (74%) and transport (75%) as poor. Marketing and selling (46%) was rated average and extension and advisory services (42%) were rated as good and even 22% rated the service as excellent. According to the research, farmers have a good and fruitful relationship with the extension officers in their wards because they do their best to attend to their needs as much as possible.

6.3 Major constraints indicated by farmers in community gardens

Being a member of a community garden is not an easy task, they are always faced with problems that are within their control, and some even extend beyond their control. Sadly, community gardens often blossom during the time when nobody keeps an eye on the livestock. Thus, they are always in jeopardy of being tarnished or interfered with. This section deals specifically with constraints that were identified by community garden members as hindering a lot of progress that would have been realised by farmers.

It is also imperative to be mindful of the fact that some of the community garden members are older people who find it difficult to complete the garden activities. They also find it difficult to walk from their households to the garden and to fetch and carry water to supply to their gardens.

However, community gardens also face management challenges, but these can be less effective. Gardens are expensive to set up and to maintain, they suffer vandalism from those who are not members, too many contributions may frustrate participants, internal disagreements can have negatives on development and too much bureaucracy in decision making.

6.3.1 Water supply

Despite the various water sources and methods of water storage, the majority of the farmers have stressed the fact that water is not sufficient enough to last the entire

production cycle. According to data collection activities, the river sometimes dries up or is very low in water levels, while demand is high, making it nearly impossible to continue with agricultural activities. Extreme circumstances of dry weather sometimes even force them to stop the gardening completely as vegetables require a constant supply of water. Figure 6.2 below show farmer's responses towards the sufficiency of water for gardening activities.

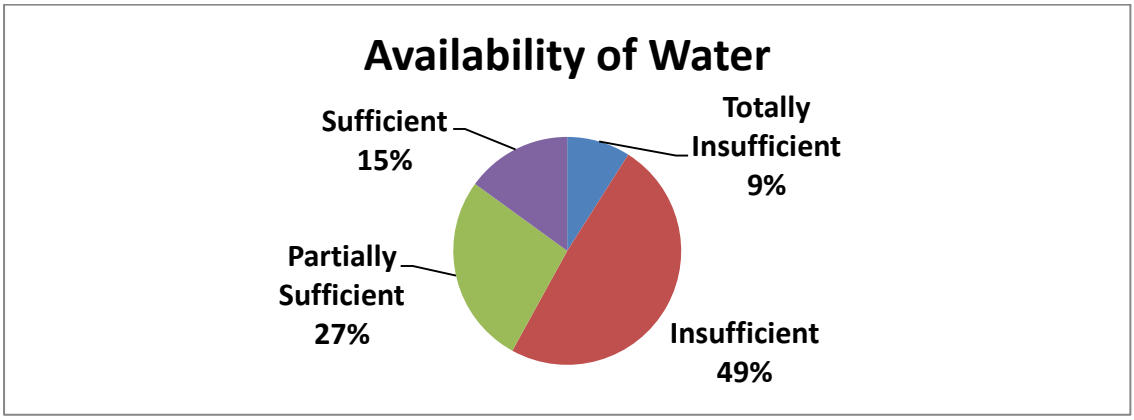

Figure 6.2: Water sufficiency as perceived by respondents

A total of 48% of the respondents indicated that water is insufficient for gardening purposes. As indicated in Figure 5.4 on page 83, the two major sources of water are the river and dam and they both rely on rainfall for water supply. Due to the high temperatures and the dry spell, the river is almost always dry as demand for water is high, not only for gardening purposes but also for domestic purposes by the local people. At least 28% of the respondents mentioned that water is partially sufficient and 15% noted that water is sufficient. This is due to the fact that, they reside near the river and have access to water at any time. Gardening, as mentioned by the respondents, is an activity that requires water on a daily basis as most of the vegetables and crops require water on a daily basis for them to thrive well. This makes the demand for water to rise while the quantity of water is low.

A Chi-Square test was conducted to analyse the association between age groups and how they responded to rating their source of water.

Table 6.4 below shows the statistical association between the age groups and how they rated the source of water for irrigation in their area.

Table 6.4: The Statistical association between age groups and how they rated the source of water for irrigation

Question	Chi-Square Test	P-value	Fisher's Exact Test	P-value
Rate the source of water used to irrigate crops.	25.430	0.003	21.203	0.007

The results from Table 6.4 above show that there is a statistically significant association between age group and how they rated the source of water at the 5% level (p=0.003).

Table 6.5 below, shows the crosstabulation of age groups and how they responded to rating the source of water for irrigation purposes.

Table 6.5: Crosstabulation of age groups and responses rating the source of water

Rating categories for source of water			VV5: Age groups				Total
			39 years and younger	40 - 49 years	50 - 59 years	60 years and older	
V106: Please rate the source of water used to irrigate crops / vegetables?	**Totally insufficient**	Count	2	1	6	2	11
		Expected Count	4.1	2.6	1.8	2.6	11.0
		Std. Residual	-1.0	-1.0	3.1	-.3	
	Insufficient	Count	22	23	6	12	63
		Expected Count	23.4	14.7	10.3	14.7	63.0
		Std. Residual	-.3	2.2	-1.3	-.7	
	Partly sufficient	Count	15	4	7	9	35
		Expected Count	13.0	8.1	5.7	8.1	35.0
		Std. Residual	.5	-1.5	.5	.3	
	Sufficient	Count	9	2	2	7	20
		Expected Count	7.4	4.7	3.3	4.7	20.0
		Std. Residual	.6	-1.2	-.7	1.1	
Total		Count	48	30	21	30	129
		Expected Count	48.0	30.0	21.0	30.0	129.0

To see which cells in the cross table contributed most to the chi square value, a standardised residual value of greater than or equal to 2 or less than or equal to -2 is used.

According to Table 6.5 above, six persons who were aged between 50 and 59 years rated the source of water for irrigation purposes as totally insufficient. However, under the null hypothesis of no association, an expected number of 1.8 was found. Therefore more than was expected in the age group 50 – 59 years rated the water source as totally insufficient.

Similarly, 23 persons who were aged between 40 and 49 years rated the source of water for irrigation purposes as insufficient but, under the null hypothesis of no association, an expected number of 14.7 were found. Therefore more than was expected in the age group 40 – 49 rated the water source as totally insufficient.
So it seems that those in the older aged groups were more negatively inclined towards the sufficiency of water supply.

Table 4.11 also indicated that 56% of the respondents highlighted that low rainfall is a major factor that is affecting their production at the moment and 18% also indicated that high temperatures are affecting their production as they cause high rates of evaporation of water in their already limited sources.

Farmers were asked to rank the 3 main shortcomings that they face (*in the order from 1= most important; 2= second most important to 3= most unimportant*) in the community/ nutrition production process.

Table 6.6 below indicates how farmers ranked the shortcomings.

Table 6.6: Respondents ranking of the main shortcomings experienced in the community gardens

Main Shortcoming	Most important %	Second most important %	Total %
Long distance to garden	55	25	80
Fencing	58	22	80
Birds and Predators	22	62	84
Limited Water	29	37	66
Lack of institutional support	19	30	49
Stress	6	13	19
Hatred and conflict		10	10
Gossip & stereotyping	14		14

A total of 29% of the respondent's ranked limited water as the most important shortcoming and 37% ranked it as second most important.

6.3.2 Long distance to gardens

Long distance to gardens was ranked the most important shortcoming by 55% of the farmers and 25% ranked it as second most important. Chi-square test results showed no significant association between age groups and how they rated long distance to gardens (p=0.351). According to the research, farmers, especially the elderly, find it hard to walk long distances to their allocated community gardens. This leaves them to be unable to attend to their gardens on a daily basis which is an important factor if one desires a good harvest, especially if vegetables are concerned. As women, (wives) are the greater percentage of members of the community gardens, travelling long distances to community gardens makes them insecure about leaving their households unattended for long periods of times. Due to the long distances, farmers are forced to spend long periods at the gardens, sometimes a full day so as to utilize the time efficiently, leaving their homes to be targets of burglars.

6.3.3 No fencing or protection of the community gardens

This remains the intractable challenge even in those community gardens that are surrounded by fence because it needs to be constantly changed and upgraded to face the animals. Some gardens do not have fence at all. The culture of keeping a close eye on the livestock has waned or dwindled so that is why animals have become the challenge. A total of 58% of the respondents ranked no fencing or protection as the most important shortcoming and 22% ranked it as the second most important problem. Chi-square test results showed no significant association between age groups and how they rated no fencing or protection (p=0.668).

6.3.4 Birds and predators

The birds and predators were ranked the most important shortcoming by 22% of the farmers and 62% ranked birds and predators as second most important shortcoming. Birds and predators were treated by most gardeners as unavoidable and daunting culprits. This is particularly so because they easily fly over the hedge unscathed or without being harmed and it is impossible to kill them. The most common predator mentioned is the baboons. According to the research they physically destroy the constructions and devour the crops and vegetables. Chi-square test results showed no significant association between age groups and how they rated birds and predators (p=0.665)

Scarecrow like human beings (made up of plastics), have been placed in community gardens to intimidate or to guard against the birds and baboons. However, one participant according to focus group discussions argued that "*the birds are rather clever and are now used to the immovable objects, thus they go ahead and make a meal of the vegetables*."

6.3.5 High supply but low demand of agricultural products

A major constraint mentioned by the farmers during data collection activities was high supply of crops and vegetables but low demand available. Because a lot of

members in the community are participating in community gardens, there now is high supply of the same types of crops and vegetables. With lack of proper markets and selling points being out of reach, farmers are forced to sell their produce through a door to door basis in the community. Most of the local people do not buy much from the farmers as they rarely have cash available to purchase fresh vegetables. Competition is also high from home gardens. Most households in rural areas have a homestead garden where they produce vegetables for household consumption. These vegetables are similar to the ones produced by community garden members, like tomatoes, leafy vegetables (kale, covo). This leaves them to have little desire to purchase the same products from community garden farmers.

6.3.6 Effects of some barriers to production for the community garden participants

Figure 6.3 below illustrates how respondents rated how serious the mentioned constraints are in coping with drought and other climate shocks.

A total of 55% of the respondents rated limited access to finance as a very serious barrier to production. Without finance, farmers are not able to purchase inputs, manage their community gardens and pay for labour. This can also be noted in Figure 5.3 on Page 82 where 66% of the respondents said they do not offer payment for labour and 29% said they pay their labour with non-cash items and only 5% pay using cash. According to the data collection activities, community gardens are high maintenance and need constant attention and without adequate finance/ credit, it is very hard for farmers to continue with practising community gardens.

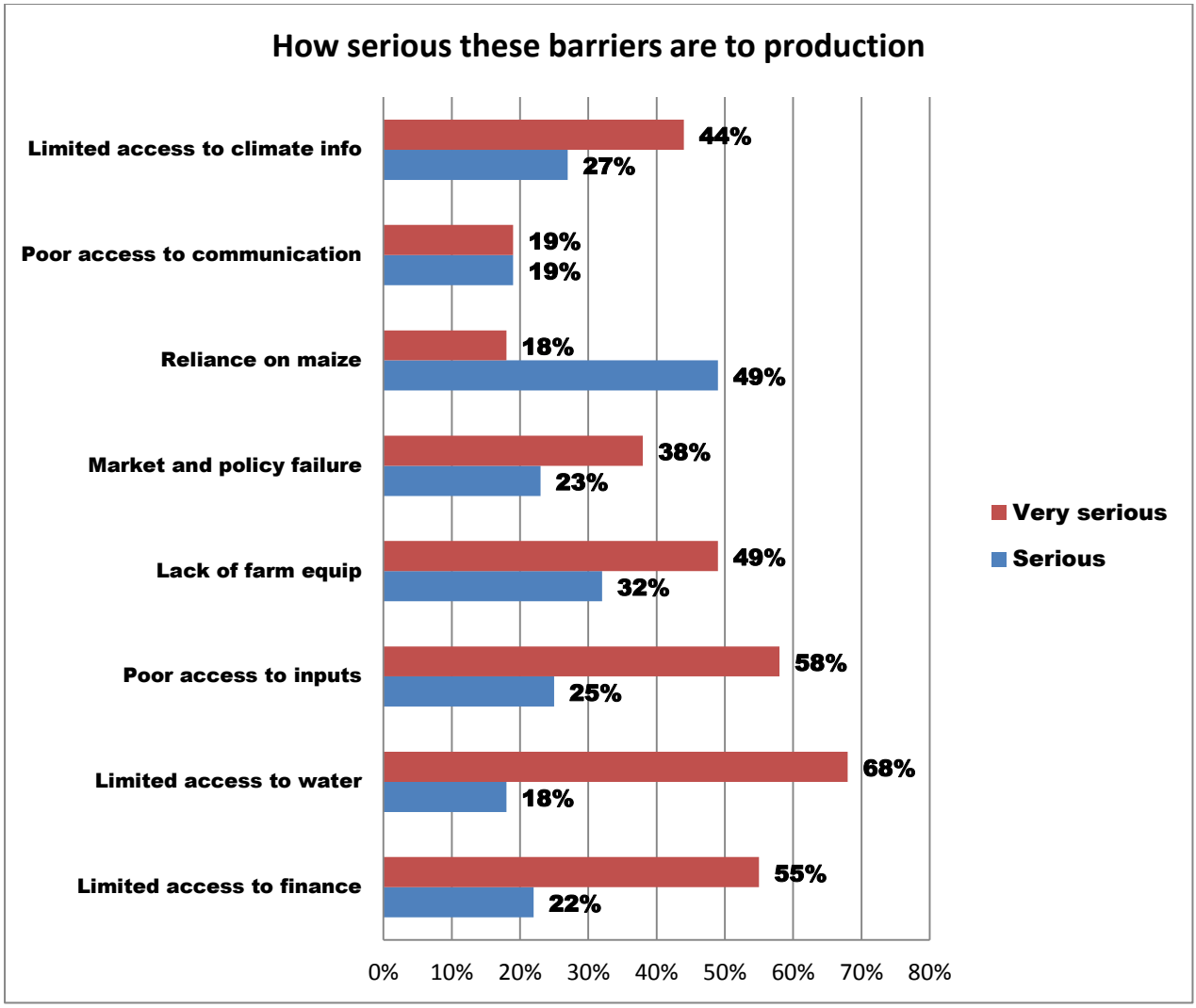

Figure 6.3: Respondents rating of how serious barriers are to production

As seen the Figure 6.3 above, 68% of the respondents said limited access to water is a very serious barrier to their production in the gardens. Vegetables need water on a daily basis and with demand of water being high while the sources are limited; production is affected as not all the farmers will have equal access to the same amount of water. As also seen in Figure 5.4, page 83, the most popular source of water is the river. A number of respondents illustrated that they live quite a distance from the river and find it hard to walk to the river and collect water and walk to the community gardens to water their vegetables. Respondents in the old age category complained highly of the distances to the river.

A total of 58% of the respondents rated limited access to production inputs as a very serious barrier to their production while 25% of the respondents also said it is a

serious barrier. Because there is almost always no guarantee of accessing inputs, it is hard for farmers to have a continuous cycle of production all year round. According to the respondents, this leaves them with some months of no production at all and thus no income in the household. Farmers mentioned that they cannot access inputs sometimes because they would have to travel long distances to the nearest town of Masvingo which they said they cannot afford to do most of the times.

Figure 6.3 above also indicates that 49% of the respondents also rated lack of farm equipment as a very serious barrier to production. Although Table 4.8 on page 63 shows that most farmers own their farming equipment, they highlighted how the farming equipment is not meeting the amount of production and size of land used for community gardens. As seen in the Table 4.9 none of the farmers own or have access to a tractor in their community and they use borrowed scotch carts or hire them at a price to carry their harvested produce. Respondents also highlighted how they still use hand labour and hand ploughs to till their land, which takes a lot of time and a lot of energy especially for the elderly when they do not have ready available labour to assist them. This however lowers their production levels and forces farmers to produce only what is adequate for the household to consume and none for resale due to limited equipment.

According to Figure 6.3 above, 44% of the respondents rated limited access to climatic information as a very serious barrier to trade. At one of the focus group discussions held, farmers highlighted how the weather used to be predictable and constant each year and they knew when the rainy season would arrive. Now with climate shocks, the weather has become so unpredictable and there is not much rain as before. Without climatic information, it has become hard for the farmers to predict the rainy season and the weather, which has caused a great threat on their production for many years. Figure 4.7 in Chapter 4 illustrates how 93% of the respondents mentioned they do not have a weather station in their area and 79% of the respondents said they do not know how to use the gadgets of the weather station. They have relied on indigenous information systems to predict the weather, but now due to great changes of the climate, it is rather almost impossible to predict the weather.

Figure 6.3 also shows that 38% of the respondents highlighted poor markets as a very serious barrier to production. Without markets, farmers cannot sell their produce from the gardens in order to obtain an income. In order for farmers to gain income, they have to have good sales. According to the study, farmers illustrated that they do not have viable markets to sell their goods. Markets are too far and with no transport available, they cannot make enough profits to keep the businesses alive. A number of the farmers are forced to sell their goods to neighbours and sell on a door- to-door basis in order to get rid of all the goods as shown in Table 5.2 on page 86.

From the above findings a conclusion can be made in the form of ranking the most serious factors affecting the farmers according to the number of responses. These are:

I.	Limited access to water	68%
II.	Poor access to inputs	58%
III.	Limited access to finance	55%
IV.	Lack of farm equipment	49%
V.	Limited access to climatic information	44%
VI.	Poor markets	38%

From the above results, it can therefore be concluded that, limited access to water had the most responses for being a very serious problem affecting production.

6.4 Social constraints involved in community gardens

Social constraints are also an important area that can be taken into consideration as they affect the farmers' well- being and their ability to join and stay participating in community gardens. Social constraints play an important role especially in rural areas and the focus group discussions held highlighted how the social factors affect farmer participation in community gardens.

6.4.1 Hatred and conflict

According to focus group discussion activities, the pace with which the community gardens grow differs from member to member depending on one's fortune. Other members are envious when one's food grows faster than it was envisaged. As a result, the extreme dislike of the member may be witnessed in various ways. For instance, other members change attitudes towards other members who seem to be producing more than others. A total of 10% (Table 6.6) of the respondents ranked hatred and conflicts as a second most important shortcoming to production. Chi-square test results showed no significant association between age groups and how they rated the importance of hatred and conflict as a shortcoming to production (p=0.498).

6.4.2 Gossip and Stereotypes

A total of 14% (Table 6.6) of the respondent's ranked gossip and stereotypes as the most important problem to their production. The community garden is perceived as a platform where neighbour-related matters are openly and surreptitiously discussed. Some members of the community (non- community garden members) have confessed that they are poor but they do not like to be associated with gardening because they will be blamed for gossiping. This is especially true when one member resigns from one group to join the other. According to the discussions held, a lot of squabbles and misunderstandings take place at the gardens which have resulted in some members of the community not willing to join gardening. Chi-square test results showed no significant association between age groups and how they rated the importance of gossip and stereotyping as a shortcoming to production (p=0.566)

Other community members tend to refrain from community gardens due to stereotypical ideas. According to focus group discussions, community gardening is often seen to be closely associated with females and older people. For example, one male participant argued that *"I can't enter into community gardening because it is for females and elderly people"* (non- community garden member). On a similar note,

some non-participants argued that community gardening is associated with poor people who are not educated enough.

Two participants rightly said that "*Community gardens are for poor people…how people are going to react when they see me, a man with a hand hoe while they know that I am educated*" (An educated young non- community garden member).

"*If you join community gardens people tend to think that you are living from hand to mouth. In other words, the community tends to undermine you*" (a non- community garden member)

6.4.3 Stress

When asked to rank how stress affects their production, the following findings were gathered:

- 6% most important
- 13% second most important
- 69% third most important

Some members of the community believe that where there is more sharing and partnership conflict is always a high possibility – particularly if it involves money. So, they decide to keep themselves away from the conflict. Respondents indicated how community gardening is believed to cause stress since you work under little support. Chi-square test results show a significant association between age groups and how they rated stress as an important shortcoming to production (p=0.090). Fishers exact test results show that seven (7) persons in the age group 60 and over rated stress as a most important factor that affects their production. However, under the null hypothesis of no association, an expected number of 3.3 were found. Therefore more than expected in the age group of 60 and over, rated stress as a most important shortcoming.

6.5 Farmers desired frequency of support services

After discussing and concluding the constraints that the farmers are facing during production, the respondents were asked how frequent they would desire the basic support services in order for their agricultural activities to thrive.

Figure 6.4 below illustrates the various responses that community garden participants gave on how often they would desire services for improvement of their community gardens.

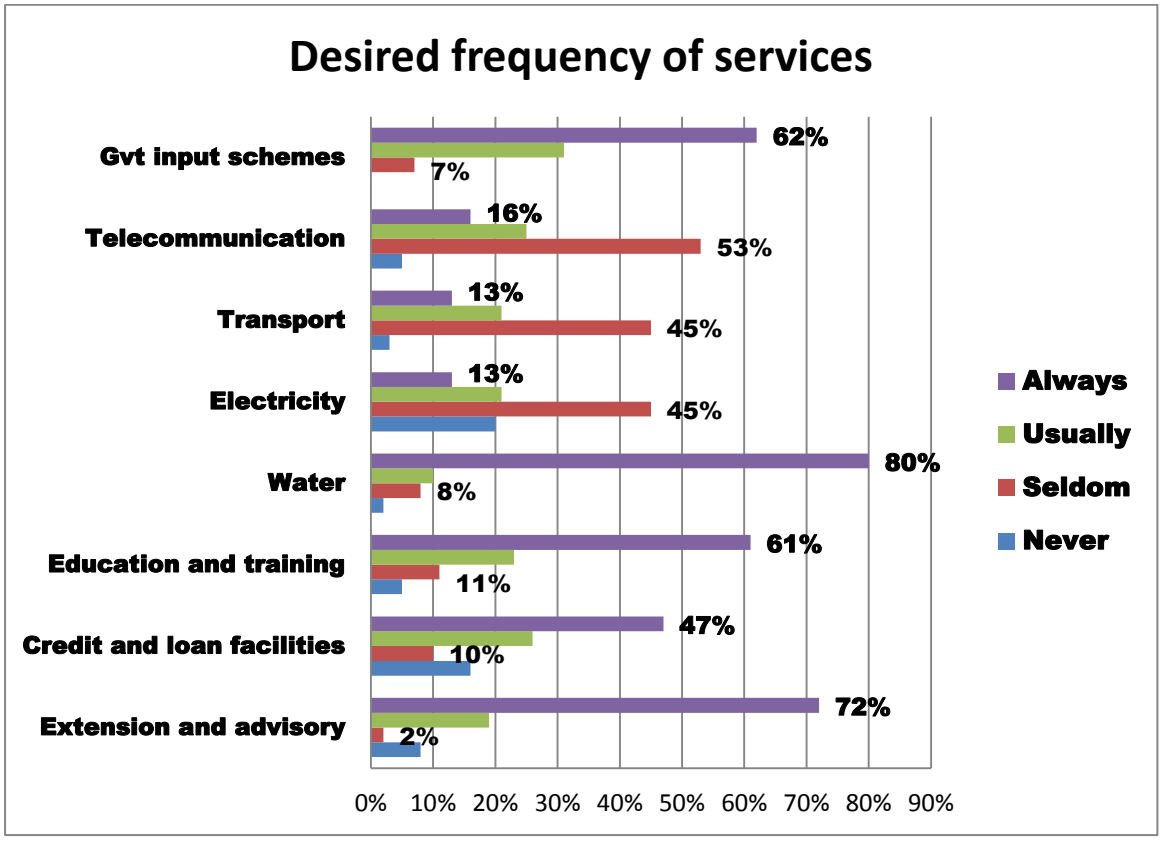

Figure 6.4: Desired frequency of support services according to respondents

According to Figure 6.4 above, water had the highest number of responses with 80% of the respondents saying they always need access to water as it is the major cause of concern because of its insufficiency.

Total of 72% of the respondents indicated that they would always desire extension and advisory services. They have faith in their extension workers because they argued that the extension workers are the ones that can mediate for them and carry

over their grievances and needs to the government. Extension workers are the ones that have access to telecommunication and information on market changes, climate shocks and have access to research and development which they can come back and relay to the farmers in their wards. The survey indicated that the farmers require an increase in the number of visits by extension workers to 2-3 times a month in order for them to always update them on what is happening in the market and general agricultural trends in the province.

At least 62% of the farmers said that they would prefer to always have access to government input schemes. Respondents argued that, the government inputs schemes seem to only target the established farmers and those farmers that are easily accessible to government workers, namely, those who are situated near the major routes or around business centres. They neglect those farmers who are deep inside the rural areas and do not have good roads to be accesses. At least 47% of the respondents said they would always require credit and loan facilities. The participants mentioned that these services are rendered usually according to farmers' status in the society and if the farmers are able to go and access the services themselves.

According to the survey, 61% of the respondents said they always require education and training as a source of information to assist on how to have more efficient and effective production in their community gardens. Even though there are numerous programmes being implemented by the government and non-governmental organizations, the farmers still highlighted that, these services are targeting certain groups of farmers as mentioned under the loan and credit facilities. Training helps farmers to have knowledge of practises that can improve their production, like use of hybrid seeds, planting of drought resistant crops, short season varieties to mention a few.

However, 53% of the respondents mentioned they seldom require telecommunication; 45% seldom require transport and 45% seldom require electricity. The major reasons mentioned for seldom requirement of these services was firstly because the respondents cannot afford telecommunication like cell phones. According to the respondents, they have survived many years without

electricity and it has not affected their production in any way, so they did not classify it as a priority at the moment.

However, 13% said they do always require electricity. A total 44% said they would require transport on a usual basis, while 33% highlighted that they would seldom require transport due to the fact that, even if made available, they would rarely afford to pay for travelling.

The Chi-square test was used to determine age group association and responses given with regards to importance of different services for the improvement of production in their community gardens. Table 6.7 below shows the summary of statistical results of the association of age groups and how they rated the importance of services in improving production.

Table 6.7: The Statistical association of age groups and how they responded to the importance of services for improving production

Rate the following services	Chi-square	p-value	Fisher's test	p-value
Extension and advisory services	13.862	0.003	13.069	0.001
Credit and loan facilities	1.537	0.674	1.651	0.652
Education and training	10.090	0.018	9.422	0.015
Water	3.061	0.382	3.129	0.377
Electricity	1.454	0.693	1.484	0.710
Transport	3.339	0.342	3.344	0.338
Telecommunication	7.463	0.059	7.239	0.064
Government input scheme	2.256	0.521	2.224	0.564

The results in Table 6.7 above show that:

- There is a significant association between age groups and importance of extension and advisory services to production (p=0.003).

  Six (6) persons aged 60 years and above rated extension and advisory services as not important to their production. However, under the null hypothesis of no association, an expected number of 2.7 were found. Therefore more than was expected in the age group 60 and above rated extension services as not important to their production.

  Similarly, four (4) persons aged between 50- 59 years rated extension and advisory services as not important but, under the null hypothesis of no association, an expected number of 1.6 was found. Therefore more than was expected in the age group 50 – 59 rated extension and advisory services as not important.

  Nine (9) persons aged 50-59 years rated extension and advisory services as very important to their production. However, under the null hypothesis of no association, an expected number of 13.6 were found. Therefore, less than was expected in the age group of 50-59, rated extension and advisory services as very important to their production.

  As a result, it seems that those in the older aged groups were more negatively inclined towards the importance of extension and advisory services in improving production.

  37 persons aged 39 and younger rated extension and advisory services as very important to their production. However, under the null hypothesis of no association, an expected number of 32.8 were found. Therefore more than was expected in the age group of 39 and younger rated extension services as very important to their production.

As a result, it seems that those in the youth age group were more positively inclined towards the importance of extension and advisory services in improving production.

- There is no association between age groups and rating of credit and loan facilities (p=0.674).

- There is an association between age groups and their responses to rating education and training as an important service to improving production (p=0.018).

  Seven (7) persons aged 60 years and above rated education and training services as not important to their production. However, under the null hypothesis of no association, an expected number of 3.2 were found. Therefore more than was expected in the age group 60 years and above rated education and training as not important to their production.
  As a result, it seems that those in the older age group were more negatively inclined towards the importance of education and training services in improving production.

  On the contrary, 42 persons aged 39 and younger rated education and training services as very important to their production. However, under the null hypothesis of no association, an expected number of 38.4 were found. Therefore more than was expected in the age group of 39 and younger rated education and training services as very important to their production.
  As a result, it seems that those in the youth age group were more positively inclined towards the importance of education and training in improving production.

- There are no significant differences between age group and how they rated the importance of water as a means to improve their production (p=0.382).

- There are no significant differences between age groups and how they responded to importance of electricity to production (p=0.693).

- There is no association between age group and how they rated the importance of transport to production (p=0.342).
- The Fisher's exact test shows that there is moderate evidence (p=0.064) of an association between age group and importance of telecommunication.

  10 persons aged 60 years and above rated telecommunication services as very important to their production. However, under the null hypothesis of no association, an expected number of 6.3 were found. Therefore more than was expected in the age group 60 years and above rated telecommunication as very important to their production.

  Similarly, 7 persons aged 39 and younger rated telecommunication services as very important to their production. However, under the null hypothesis of no association, an expected number of 3.5 were found. Therefore more than was expected in the age group of 39 and above rated telecommunication services as very important to their production.

  As a result, it seems that those in the older age group and the youth were more positively inclined towards the importance of telecommunication services in improving production.
- There are no significant differences between age group and responses to importance of government input schemes (p=0.521).

CHAPTER 7:SUMMARY AND RECOMMENDATIONS OF THE STUDY

7.1 INTRODUCTION

The purpose of this chapter is to summarise the study objectives and findings, and also to provide conclusions and recommendations drawn from the study. The chapter begins by presenting the study objectives and hypotheses and then presents the summary of the findings by objective. The conclusion and recommendations are then presented.

The study has sought to examine the significance of community gardening more especially in alleviating poverty and coping with the effects that have been brought about to agricultural production by drought and climate shocks in the rural area of Bikita District, Masvingo Zimbabwe.

7.1.1 Overall objectives of the study

The overall objective of the study was to assess the significance of community gardens in coping with climate shocks as well as, focusing on the direct significance of the gardens on the participating farmers' livelihoods in Bikita District, Masvingo that is; food security status, income and poverty.

The specific objectives were:

- An in-depth assessment of the community gardens, the local people who are engaging in community gardening in Bikita District and their socio-economic status, knowledge, perceptions and attitude towards drought and climate shocks.

- Successes, constraints and institutional support of community gardens in Bikita District and the overall significance of the activity as a drought and other climate shocks coping strategy.

- To analyse the needs and challenges of the community garden participants in Bikita so as to come up with an in-depth knowledge of how the activity can be supported and improved.

7.2 STUDY FINDINGS AND CONCLUSIONS BY OBJECTIVE AREA

Objective One: An in-depth assessment of the community gardens, the local people in who are engaging in community gardening in Bikita District and their socio-economic status, knowledge, perceptions and attitude towards drought and other climate shocks.

The study made use of participants from eight (8) community gardens. Under this objective, the study used descriptive analysis, mean and median variances, Chi-square and Fisher's exact tests to analyse and get a deeper understanding of the farmer's socio-economic status in order to determine the level of vulnerability to drought and climate shocks. Results from this analysis indicated that, the farmers in the rural area of Bikita are highly vulnerable to climate shocks. Firstly, 86% of the respondents interviewed were female and although they are married and not the head of the households, they are basically the ones running the day to day activities in the households making most of the households' female headed. The head of households are mostly the husbands who are not present in the house as they have left the rural areas to seek for better opportunities in the urban areas and the diaspora. Respondents highlighted that they do not obtain much income from them and have to make use of the few skills and knowledge they have in order to feed the household.

The study also illustrated that most of the respondents have basic education: 49% having primary education; 39% having secondary education and 11% having no formal education. This has resulted in them not qualifying for any form of employment (46% are not formally employed), making agriculture their only source of survival (77% of the respondents are self-employed farmers). With the changes brought about by climate shocks, most farmers are experiencing the worst drought and lowest yields ever experienced in decades. According to the study, the median

monthly income from all activities carried out by farmers being US$20 per month shows that they are living way below the poverty datum line and only proves to show that the average person living in rural areas of Zimbabwe is very poor and highly vulnerable to climate shocks.

Secondly, the study also revealed that a large number of farmers (52%) are not aware of climate shocks and the changes it has brought about especially to agricultural production. Due to lack of knowledge, educational qualifications and skills, they find it hard to be able to use and operate technical facilities that predict the weather like the thermometers and rain gauges. A total of 79% of the respondents do not have knowledge of how to use weather station gadgets. As a result, the farmers are almost always not prepared for the seasonal and rainfall patterns that climate shocks have brought about. Participants stressed on how they do not have weather stations or meteorological services to assist with weather patterns. 93% of the respondents also mentioned that there are no weather stations available in their areas.

Thirdly the study also assessed the community gardens in detail and held focus group discussions with the members to determine the history of the gardens and major reasons why they joined this activity. Results from the analysis showed that the main reason why the members joined community gardens was to produce food for household consumption (86%). Members have been practising community gardens from the period of 3 weeks to 25 years. Farmers argued that, yields obtained from the traditional dryland farming are very low and sometimes none at all is realised therefore not elevating poverty in the household.

Objective Two: Successes, constraints and institutional support of community gardens in Bikita District and the overall significance of the activity as a drought and other climate shocks coping strategy.

This objective sort to determine the significance the community gardens had on the farmers in Bikita District that is, individually and in their community as a whole. Analysis of the study has shown that community gardens are in fact reliable in terms of coping with the level of poverty to most of the households in rural areas. This is

reinforced by the growing number of elderly people partaking in community gardening (23% of the participants are in the age group of 60 years and over). Respondents varied from all age groups from young to old. A total of 39% are in the youth age group of 0-40 years and 38% are in the economically active age group of 41-59 years. According to the results community gardens participants ranged from the age of 16 to 88 years and had a mean age of 47years. This shows that most participants are in the economically active age group of 41 to 59 years. Even though 53% of the respondents highlighted that they do not obtain any income from community gardens, though a high number of respondents interviewed according to focus group discussions were of the view that community gardens are absolutely crucial in alleviating poverty and changing their lives. Indeed, most of the participants in the study have advocated for the use of community gardens regardless. This is so because of the social, economic, and environmental benefits associated with community gardens.

Firstly, social benefits were identified according to focus group discussions. These benefits included amongst other things, development of farming skills, collective effort; interaction with each other; survival; and coexistence. The involvement in community gardens allows one to be able to meet regularly with neighbours so as to work together and discuss the matters that affect the community together. In the process, knowledge is gained because the member gets to know the new skills that are useful in a community garden setting. Furthermore, a member of a community garden is able to fight against poverty which is largely seen as a pressing issue across rural communities. As a consequence, the individual is able to live a fairly sustainable life through active involvement in garden activities.

Secondly, economic benefits that are associated with community gardens were also identified, although all community garden members have agreed that their focus and aim is not mainly on making profit but rather alleviating poverty by producing their own food for household consumption. The economic benefits include: nutritious food, income generation; employment creation; and education, respectively. Those who partake in community gardens are able to generate income through selling the surplus. The income is used mainly to purchase food (49%); for children's necessities like school fees (35%); and purchase of seed and fertilizer for a new

season of production (25%). Community gardens have created employment opportunities for the women who were not employed at the time of joining them.

However, community gardens fail to deal with poverty in a sustainable way because they rely heavily on rainfall. If the rain has suddenly stopped, gardening becomes a difficult task. Analysis from focus group discussions also revealed that, the gardens are only managing to sustain the farmers over a short term period that is, only providing nutritious food. There is not much long term savings or investments that community gardens provide for the members that can see them growing and developing in terms of production. It can therefore be concluded that, community gardens are only managing to sustain the famers on a short term basis because most of what they produce is consumed in the household and not leaving much for resale. (53% do not get any income from gardening)

Objective three: To analyse the needs and challenges of the community garden participants in Bikita so as to come up with an in-depth knowledge of how the activity can be supported and improved.

This objective aimed to make a final analysis and definitive conclusions on whether indeed community gardens simply alleviate poverty or there is scope for serious economic development through these ventures. The results from this analysis showed that, community gardens cannot bring out the desired outcomes if they are not supported. All the community garden groups interviewed have stressed that they receive little to no support from the structures such as the government, finance institutions, traditional and local governance. A greater percentage of farmers rated: inputs (50%); finance (74%); and transport (75%) services as poor. However 46% rated marketing and selling services as average and 42% of the respondents rated extension and advisory services as good. More than anything, the biggest challenge stressed by the farmers that seems to stifle their growth and expansion has been the lack of water. A total of 68% of the respondents rated limited access to water as a great constraint to their production. Traditionally, water is the most important resource that community gardens need not only for their survival, but also for making sure that food produced is of high quality. According to observations by the researcher, none of the eight community gardens interviewed, had water taps. The

farmers (72%) make use of the river for irrigation purposes and have to travel long distances to fetch water. With the river's reliance on rainfall, supply is depleted very fast as demand for water is always high but supply very low.

Lack of fencing and protection was also largely labelled as an inhibiting factor to production. At least 58% of the respondents ranked it as a most important factor inhibiting production. The lack thereof according to focus group discussions has resulted in the closure of a number of community gardens due to destruction by birds and animals. It was dubbed as a serious problem because it is quite difficult to guard over them especially at night if they are on the loose and birds fly over the fence and devour of their vegetables.

Furthermore, community gardens are generally seen by respondents (55%) to be inaccessible because most of them have been located further away from most households. In fact, the main river is quite far from most members of community. The reason for this is that the river is the only source of water that is available for them to water their gardens. At least 23% members of community gardens are unfortunately in the old age group. Thus, walking to a community garden inevitably increases the chances of fatigue and exhaustion.

Thirdly, participants stressed the lack of support on most aspects of their agricultural production. They receive little support In terms of finance/ credit, and the government and non- governmental inputs schemes do not seem to target them as well. According to results 48% of the respondents highlighted that extension and advisory services are provided by government and agricultural associations. However: marketing and selling 48%; transport 67%, finance 75%; and inputs 72%, farmers illustrated that they access these services themselves and do not have support. According to focus group discussions, focus is mainly on already established farmers who are easily accessible to the services because they live around well-functioning roads or near business centres. Markets are also of no guarantee as farmers cannot afford to travel to the nearby town of Masvingo which is about 100km away. This forces them to sell the goods amongst themselves and with a lot of local people practising community gardens in the same area, there is high supply of the same products but low demand for it.

Lastly the objective also sorted to find out the desires that the farmers have in order to improve their production. Results from the analysis revealed that farmers highlighted that they always require: government input schemes (62%); water (80%); education and training (61%), credit and loan facilities (47%); and extension and advisory services (72%). However farmers also mentioned that they seldom require: telecommunication (53%); transport (45%); and electricity (45%).

However Chi-square test results indicated that the youth age group of 0-40 years and the elderly age group of 60 and above rated telecommunication services as a very important factor to production. Results from Chi-square tests also revealed that those in the older aged groups were more negatively inclined towards the importance of extension and advisory services in improving production and those in the youth age group were more positively inclined towards the importance of extension and advisory services in improving production. Chi-square test results also showed that the youth age group of 0-40 years were more positively inclined to the importance of education and training to production.

The farmers reiterated that gardening is an activity that has great potential for sustainable growth and food security for the local people living in rural areas but it requires a lot more attention. Even though a number of activities are taking place in Bikita, with regards to adaptation and coping with climate shocks, more needs to be done in terms of implementing the programmes and coming up with ways of assisting the participants to start up and progress in terms of production.

7.3 RECOMMENDATIONS

In light of the findings and conclusions from this study, one strong recommendation that can be suggested is that, community gardens do have the potential to improve if more work is done mainly in supporting the participants involved in community gardens. Support should mainly be in terms of all aspects that affect the agricultural production sector.

This can be made possible by adopting the following strategies:

- Implementing more possible avenues/sources of funding other than the already struggling government that can be used by members of community gardens to improve on production. Government, NGO's and private sector must work together (a coordinated approach) in order to establish more ways of coming up with finance to be able to run such programmes. Without available financial resources, only a few activities can be implemented as gardens require a large amount of funds to set up and for maintenance. Community garden members must be assisted in terms of credit in order to buy inputs and be assisted in accessing markets so as to be able to come up with quality produce to enable them to pay back the loans after yields have been sold at reasonable interest rates.

- Improvement on additional water sources to be made available especially near the community gardens, namely: the construction of water reservoirs, dams, boreholes and irrigation equipment that can provide sufficient water for gardening activities.

- It is also recommended that adult education programmes should be strengthened in the rural areas to reduce illiteracy among farmers. Extension agents in the area should also incorporate climate shocks information in their extension messages while government should intensify efforts in the area of integrated rural development. Development can be in the form of infrastructural facilities like better roads and telecommunication facilities to improve in communication amongst the agricultural stakeholders. What is also needed is a structured coordinated extension program to address farmer's needs effectively and efficiently.

- More support should be given to agricultural associations like the agro-dealers associations, as they are playing a vital role in supporting small holder farmers in the rural areas. Knowledge and dissemination of the importance of joining associations should be spread to the farmers involved in community gardens. Introduction of agro-dealers associations will support

and encourage group production rather than individual farming in the gardens. Associations will help farmers to produce goods in bulk and link them to wholesalers and retailers. Subscription fees and monthly membership fees can go a long way in maintaining the welfare of the gardens and transport of goods can be made possible by such funds.

REFERENCES

Abalu, G & Hassan, R., 1998. Agricultural Productivity and Natural Resource use in Southern Africa. *Food policy,* Issue 23, pp. 477-490.

Adger, WN., Dessai, M., Goulden, M., Hulme, S., Lorenzoni, DR., Nelso, C., Naess, LO., Wolf, J., Wreford, A., 2009. Are There Social Limits to Adaptation to Climate Change?. *Climate Change,* Issue 93, pp. 335-354.

AFRA, 1993. *Drought Relief and Rural Communities. Special Report.* Pietermaritzburg, Association for Rural Advancement.

Agrawal, 2003. "Indigenous Knowledge and the Politics of Classification. *International Social Science Journal,* 54(173).

Aguilar, E., Barry Azziz, A., Brunet, M., Ekang, L., Fernandes, A., 2009. Changes in temperature and precipitation extremes in western central Africa. *Journal of Geophysical Research:Atmospheres (1984-2012),* 114(D2).

Auret, D., 1990. *A Decade of Development in Zimbabwe 1980-1990,* Gweru: Mambo Press.

Babbie, E. & Mouton, J., 2001. *The practice of social research,* Cape Town: Oxford University Press.

Bebbington, A. J & Riddell, R., 1993. *New agendas and old problems: issues, options and challenges in direct funding of Southern NGOs,* London: Overseas Development Insitute.

Becker, L., 2002. Garden Money Buys Grain: Food Procurement Patterns in a Malion Village. *Human Ecology,* II(28), pp. 219-250.

Benson, C., Thomson, A., Clay, E., 1997. *The Macroeconomic Impact of Drought. In Proc. Highlevel Regional Drought Policy Seminar.* Gaborone, SADC.

Berkes, F., 1999. *Sacred Ecology: Traditional Ecological Knowledge and Resource Management,* London: Taylor andFrancis.

Bhalotra, Y., 1987. *The Drought of 1981-87 in Botswana.* Gaborone, Department of Meteorological Services.

Buckland, R; Eele, G; Mugwara, R, 2000. *Humanitarian Crises and Natural Disasters: A SADC Perspective,* London: Frank Cass Publishers.

Campbell, B., Jeffery, S., Kozanayi, W., Kuckert, M., Mutamba, M., Zindi, C.,, 2002. *Household Livelihoods in Semi-Arid Regions: Options and Constraints,* Jakarta: Center for International Forestry Research.

CARE International, 2006. *CARE Zimbabwe Projects Profile,* Harare: Care International.

Central Statistics Office, 2002. *Census 2002 – Provincial Profiles- Masvingo Province,* Harare: CSO.

Chambers, R., 1997. *Challenging The Profession Frontiers For Rural Development,* London: Intermediate Technology Publication.

Chamboko, T., 2007. *Assessment of Agricultural Information Needs in African, Caribbean and Pacific States,* Wageningen, The Netherlands: Technical Centre for Agricultural and Rural Cooperation.

Chazovachii, B., Mutami, C., Bowora, J., 2013. Community Gardens and Food Security in Rral Livelihood Development: The Case of Entrepreneurial and Market Gardens in Mberengwa Zimbabwe. *Russian Journal of Agricultural and Socio-Economic Sciences,* I(13), pp. 1-10.

Chenje, M, 2000. *State of The Environment in The Zambezi Basin,* Maseru, Lusaka and Harare: SADC, World Conservation Union(IUCN), Zambezi River Authority (ZRA) and Southern African Research and Documentation Centre.

Chikobvu, S; Chiputwa, B; Langyintuo, A; La Rovere, R; Mwangi, W, 2010. *Characterization of Maize Producing Households in Masvingo and Bikita Districts in Zimbabwe,* Nairobi: International Maize and Wheat Improvement Centre (CIMMYT).

Chino, T., 2010. *Poverty and Climate Change: Reducing the Vulnerability of the Poor Through Adaptation,* s.l.: DFID.

Chokera, F; Ngwenya, T; Munodawafa, N, 2014. The Role of Agricultural Marketing on Empowering Rural Farmers in Masvingo Province, Zimbabwe. *European Journal of Business Management,* VI(3), pp. 153-163.

Clarion University of Pennsylvania, 2013. Reclassification of Agro-Ecological Zones in Zimbabwe– The Rationale, Methods. *Journal for Sustainable Development in Africa,* I(15).

Community Gardening Toolkit, 2003. *The History of Community Garden,* Missouri: University of Missouri Extention.

Creswell, S., 2003. *Research design: qualitative, quantitative, and mixed approaches,* Carlifonia: Sage Publications, Inc..

Dhewa, C., 2011. *Masvingo Agro Dealers Association: Unsung Hero of Rural Economic,* Harare: SNV.

Dow C, 2003. *Benefits and Barriers to Implementing and Managing Well Rooted Community Gardens in Waterloo Region,* Ontanario: Together for life.

Dunn, J., 1979. *Western political Theory in the face of the future,* Cambridge: Cambridge University Press.

Eade, 2000. *Capacity Building: An Approach to people-centred Development,* Oxford: Oxfam.

Easterling, W., 2007. Food, Fibre and Forest Products. *Climate Change 2007: Impacts, Adaptation and Vulnerability,* pp. 273-314.

Ellis, F., 2000. *Rural Livelihoods and Diversity in Developing Countries,* Oxford: Oxford University Press.

Eshtayeh, I. & Earis, R., 2006. *Lessons Learned in How to Select Female Beneficiaries: Backyard agricultural production and Cottage Industry Activities for Women ,* Rome: FAO.

Esterhuizen, D., 2010. *Zimbabwe Corn and Wheat Update. Global Agricultural Information Network (GAIN) Report,* Harare: GAIN. www.gain.fas.usda/Recent%20Publications/Corn%20and%20wheat%20update_Pretoria_Zimbabwe_2-1-2010.pdf, access.

FAO, 1997. *Agriculture, Food and Nutrition for Africa: A Resource Book for Teachers in Agriculture,* Rome: FAO Information Division.

FAO, 2002. *The State Of Food Aid Agriculture In Africa,* Rome: FAO.

FAO, 2005. *The state of food and agriculture 2005.* Rome: Economic and Social Development Department.

FAO, 2012. *State of food and agriculture,* Rome: Food and Agriculture Organization.

FAO, 2013. *The State of Food and Agriculture.* Rome: Economic and Social Development Department.

Farmer, N., 2004. *Zimbabwe's Leading Voice of Agriculture,* Harare: Ministry of Agriculture.

Florian, K., 2006. The Use of Qualitative Content Analysis in Case Study Research. *Forum: Qualitative Social Research,* 7(21).

Food and Agriculture Organization, 2010. *FAO/WFP Crop and Food Security Assessment Mission to Zimbabwe,* Harare: Economic and Social Development Department.

Food and Agriculture Organization, 2011. *FAO/ WFP Crop and Food Supply Assessment Misson to Zimbabwe,* Harare: Food and Agriculture Organization.

Frost, P., 2001. *Zimbabwe and United Nations Framework Convention on Climate Change ,* London: Overseas Development Institute.

Gommes, R. & Petrass, F., 1994. *Rainfall Variability and Drought in Sub-Saharan Africa Since 1960,* Rome: FAO.

Grigg, D., 1974. *The Agricultural Systems of the World: An Evolutionary Approach,* New York: Cambridge University Press.

Hanyani-Mlambo, B., 2002. *Strengthening the Pluralistic Agricultural Extension Sysytem: A Zimbabwean case study,* Rome: Economic and Social Development Department.

IFAD, 2001. *Assessment of rural poverty. Western and Central Africa,* Rome: IFAD.

IFPRI, 2014. 2020 Vision for Food, Agriculture, and the Environment. *Building Resilience for Food and Nutrition Security*, December.

International Livestock Research Centre, 2004. s.l.: ILRI.

IPCC, 2007. *Determinants of Risk: Exposure and Vulnerability,* s.l.: Intercontinental Panel on Climate Change.

Kahinda, M., Rockstrom, J.A.E., Taigbenu, A., Dimes, J., 2007. *Rainwater harvesting to enhance water productivity of rainfed agriculture in semi-arid Zimbabwe.,* s.l.: Physics and Chemistry of the Earth.

Kapuya, T., Saruchera, D., Jongwe, A., Mucheri, T., Mujeyi, K., Ndobongo, LT., Meyer, F.H., 2010. *The Grain Industry Value Chain in Zimbabwe.,* s.l.: s.n.

Krueger, R. A. , 1997. *Analyzing and Reporting Focus Group Results..* Thousand Oaks: Sage.

Krueger, R. A., & Casey, M. A, 2009. *Focus groups: A practical guide for applied research.* 4th ed. San Francisco: Sage.

Kurukulasuriya, P. & Mendelsohn, R., 2006. Crop selection: adapting to climate change in Africa. *CEEPA Discussion Paper No. 26, Centre for Environmental Economics and Policy in Africa, Unoiversity of Pretoria.*

Leach, M., 1990. *ocial Organization and Agricultural Innovation: Women's Vegetable Production in Eastern Sierra Leone, Peasant Household System.* s.l., s.n.

Lovell, C. J; Batchelor, H; Waughray, D; Semple, A, 1996. *Small scale irrigation using collector pilot project,* Oxfordshire: Institute of Hydrology.

Makumbe, J., 2009. *The impact of democracy in Zimbabwe: Assessing political, social and economic developments since the dawn of democracy. Centre for Policy Studies (CPS) ,* Harare: University of Zimbabwe.

Manjate, A., 1997. *Drought Preparedness and Management in Mozambique. SADC Drought Policy Semina.* Gaborone, SADC.

Maroyi, A., 2009. Traditional Home Gardens and Rural Livelihoods in Nhema, Zimbabwe. *A Sustainable Agroforestry System,* XVI(1).

Marsh, R., 1998. *Building on traditional gardening to improve household security. Food, Nutrition and Agriculture,* Washington DC: World Watch.

Middleton, J., 2009. *Community Gardening,* Colombia: University of Missouri.

Moyo, S; Scoones, I; Cousins, B, 2009. *Livelihoods and Land Reform: The Poverty Impacts of Land Re-distribution in Southern Africa,* s.l.: s.n.

Moyo, S. & Tevera, D., 2000. *Environmental Security in Southern Africa,* Harare: SAPES Trust.

Mugabe, F. C. J. H. C., 2008. *Quantitative Assessment of the Effectiveness of Drip Irrigation Kits in Alleviating Food Shortages and its Success in Zimbabwe: A Case Study of Gweru and Bikita Districts ,* Pretoria: Food Agriculture, Natural Resources Policy Analysis Network.

Murwendo, T. & Munthali, A., 2008. The value of backyard trees to peoples lives in Masvingo City. *Zimbabwe Journal of Geographical Research,* II(1), pp. 24-37.

Mutekwa, V., 2009. Climate ChangeIimpacts and Adaptation in the Agricultural Sector: The Case of Smallholder Farmers in Zimbabwe. *Journal of Sustainable Development in Africa,* II(2), pp. 237-256.

NEPAD, 2013. *African agriculture, transformation and outlook,* Johannesburg: NEPAD.

Neuman, W., 2000. *Social research methods: qualitative and quantitative approaches,* Boston: Allyn and Bacon.

New Farmer, 2004. *Zimbabwe's Leading Voice of Agriculture,* Harare: Ministry of Agriculture.

Nhemachena, C. & Mano, R., 2007. Assessment of the Economic Impacts of Climate Change on Agriculture in Zimbabwe: A Ricardian Approach. *World Bank Policy Research Working Paper No. 4292,* Issue 11.

Nyong, A; Adesina, F; Osman Elasha, B, 2001. The Value of Indigenous Knowledge in Climate Change Mitigation and Adaptation strategies in the African Sahel. *Mitigation and Adaptative Strategies for Glaobal Change,* 5(12).

Office, Z. F., 2013. Zimbabwe Monthly Economic Review. Issue 11.

Otto, D., 1993. *Nongovernmental organisation in the United Nations system: The Emerging Role of the International Civil Society,* Oxford: United Nations.

Our Africa, 2011. *Agriculture and Famine,* s.l.: SOS Children's Villages Africa.

Pachauri, R. & Reisinger, A., 2007. *Fourth Assessment Report of the Intergovernmental Panel on Climate Change,* Geneva: IPPC.

Pretorius, C. & Small, M., 1992. Notes on the Macro-Economic Effects of the Drought. Issue 184, pp. 31-38.

Rangasamy, A., 2002. *Farming Systems in the Tropics,* New Delhi: Kalyan Publishers.

Reynolds, A, 2014. Weathershack: History of Weather Observing Tools. *National Weather Station Service Focus*.

Richardson, C. J., 2004. *The collapse of Zimbabwe in the wake of 2000–2003 land reforms,* Lewiston: Edwin Mellen Press.

Robertson, J., 2011. Statistics on the Zimbabwe Economy. *www.slidenet/Sokwanele/zimbabwe-economy*, 29 October.

Rosenzweig, C. & Parry, M., 1994. *Potential Impacts of Climate Change on World Food Security,* s.l.: s.n.

Rukuni, M., 2006. *Zimbabwe's Agricultural Revolution Revisited,* Harare: University of Zimbabwe Publications.

Sahaya Saila, T. & Chamundeswari, S., 2014. Developmet of Socio-economic Background Scale. *International Journal of Current Research and Academic Review,* II(12), pp. 78-83.

Scoones, I., 1998. Hazards and Opportunities. Farming Livelihoods in Dryland Africa: Lessons from Zimbabwe. *Sustainable Rural Livelihood a Framework for Analysis,* Issue 72.

Scoones, I., 2010. *African Issues: Zimbabwe's Land Reform: Myths and Realities,* Harare: Weaver Press.

Scoones, I., 2014. *Rethinking Agricultural Extension,* Harare: Zimbabwe Land.

Slater, R., Peskett, L., Ludi, E., Brown, D., 2007. *Climate Change,Agricultural Policy and Poverty Reduction - How Much Do We Know,* s.l.: Natural Resource Perspectives.

Smithers, J. & Smit, B., 1997. Human Adaptation to Climatic Variability and Change. *Global Environmental Change,* VII(3), pp. 129-146.

Sosibo, K., 2011. *Women at the Mercy of Climate Change.*

Sukume, C. & Guveya, E., 2009. *Improving input and output markets for smallholder farmers in Zimbabwe,* Harare: s.n.

The Zimbabwe Mail, 2014. *Mashonaland Tops in the Youth loan Uptake,* Harare: www.thezimmail.co.zw.

Thomas Fellmann, 2012. *The Assessment of Climate Change Related vulnerability in the agricultural sector: Reviewing conceptual frameworks,* Seville: University Pablo de Olavide Department of Economics.

UNDP/ GEF, 2009. *Cpoing with Drought and Climate Change,* Harare: UNDP.

UNDP, 2011. *Strengthening National Capacity for Climate Change in Zimbabwe,* Harare: UNDP.

United Nations, 2011. *It is Our World.*

UNEP, 2012. *Annual Report,* Stockholm: UNEP.

UNFCCC, 2007. *United Nations Framework Convention on Climate Change,* Bonn, Germany: UN Campus.

Unganai, L. & Murwira, A., 2010. *Challenges and opportunities for climate change adaptation among smallholderfarmers in Southeast Zimbabwe.* Ceara, Department of Geography and Environmental Science, University of Zimbabwe.

UNSO, 1999. *International Workshop on Coping with Drought: Best Use of Climate Information For Farmer Decision Making.* Kadoma, UNSO.

Vitoria, B; Mudimu, G; Moyo, T, 2012. *Status of Agriculture and Rural Finance in Zimbabwe,* Harare: FinMark Trust.

Wani, S., Rockstrom, J. & Oweis, T., 2009. Rainfed Agriculture: Unlocking the potential. *Comprehensive Assessment of Water Management in Agriculture Series,* vii(7), p. xiii.

WFP, 2008. *Fighting Hunger Worldwide.,* Rome: United Nations.

Wikipedia, 2012. *http//en.wikipedia.org Masvingo Province,* s.l.: Wikipedia.

Wikipedia, 2014. *Community Gardening,* s.l.: http://en.wikipedia.org/wiki/Community gardening.

Wikipedia, 2014. *Masvingo Province,* s.l.: www.wikipedia.com.

Wilhite, D. A., 2000. *Drought: A Global Assessment,* London: Routledge.

Wilhite, D. A. & Glantz, M. H., 1985. Understanding the Drought Phenomenon: The Role of Definitions. *Water International,* Volume x, pp. 111-120.

World Bank; Government of Zimbabwe, 2010. *Zimbabwe agricultural assessment study,* Harare: PricewaterhouseCoopers.

World Bank, 2000. *Poverty And Hunger Issues And Options For Food Security In Developing Countries,* Washington DC: World Bank.

World Bank, 2004. *Reaching The Poor A Renewal Strategy For Rural Development,* Washington DC: World Bank.

World Bank, 2007. *Delivering on the Pro-Poor Growth. Insights and Lessons from Country Experiences.,* Washington DC: Macmillan.

ZIMSTAT, 2014. *Zimbabwe Statistics.*

ZimVAC, 2009. *ZimVAC Urban Food Security Assessment,* Harare: ZimVAC.

ANNEXURE A:

Survey Questionnaire

Community Gardens as a strategy for coping with climate shocks in Bikita District, Masvingo, Zimbabwe

---

Interview Number ☐

General

Date of interview: **dd**……**mm**……**yy**……..

Ward..... **Village**.....

Name of Garden: ……..……

Name of Interviewee: …….. ……

Details of the Interviewee[1]

Socio-economic details

1. **Gender: of the respondent**

Male	1
Female	2

2. **Marital Status of the respondent**

Married	1
Single	2
Divorced	3
Widow	4
Living together	5
Never married	6

3. **Age of the respondent**

[1] The respondent must be the household head

4. **Highest level of completed education**

Non-formal schooling	**1**
Primary education	**2**
Secondary education	**3**
Tertiary certificate	**4**
Tertiary diploma	**5**
Degree	**6**
Post-graduate degree	**7**

5. **What is your household size?**

Resident	
Non resident	

6. **What is your main sector of employment?** (*Please give a single answer only)*

I am not employed	**1**
Public (government)	**2**
Private	**3**
NGO	**4**
Self-employed farmer	**5**
Self-employed small-business	**6**

7. **What percentage of your total income is provided by the off farm employment?**

8. **What is the main source of income in your household?*(one only)***

Rain fed agriculture	**1**
Pensioner	**2**
Off farm employment	**3**

Market gardening	**4**
Casual labour	**5**
Small Village Industries	**6**
Remittances from Urban and Diaspora workers	**7**

9. **What is your Net Monthly Income for all activities?**

Production Assets, Land use, Ownership, Holdings and Utilisation

10. **What is the total area of the following Land use System?**

Community garden	
Homestead Garden	

What percentage of that piece of land is currently in use?

Community garden	
Homestead Garden	

11. **What is the reason for underutilisation of the land?**

Lack of draught power	**1**
Lack of inputs	**2**
Shortage of labour	**3**
Old age	**4**
Lack of funds	**5**
Land partly unsuitable	**6**
Conflict with neighbours	**7**

12. **Indicate whether you possess the following farm implements:**

	Yes	No
Hand Equipment (*Watering cans, hose pipe, hoe, harrow, shovels etc.)*	1	2
Wheel Barrow	1	2
Knapsack Sprayer	1	2
Chicken House	1	2
Storage Barn	1	2
Scotch Cart	1	2

13. **How did/ do you access the farm implements?**

	Own	Community Shared	Borrow
Hand Equipment (*Watering cans, hose pipe, hoe, harrow, shovels etc.)*	1	2	3
Wheel Barrow	1	2	3
Knapsack Sprayer	1	2	3
Chicken House	1	2	3
Storage Barn	1	2	3
Scotch Cart	1	2	3

14. **What type of labour assists you in your garden activities?**

Self	1
Family	2
Hired	3

15. **How many males and females work on your garden?**

Male	

Female	

16. **What is the payment format that you normally use for your workers?**

No payment	**1**
Cash	**2**
Non cash/ Kind	**3**

17. **Which 2 main types of farming activities do you are predominantly engage in?**

Vegetables	
Fruits	
Grain Production	
Livestock Production	
Mixed Farming	

18. **Please indicate the number of following livestock which you may possess**

Broilers	
Layers	
Pigs	
Cattle	
Donkey's	
Goats	
Hens/ Road Runners	

19. **What is the main reason for keeping the above mentioned livestock?**

Cash	**1**
Draught power	**2**
Cultural Purposes	**3**
Payment for farm labourers	**4**
Wealth/ Investments	**5**
Food Security	**6**

Production and Support Services

20. **Please fill in crops and, or vegetables you grow (At least 5); on what plot sizes, what quantities of production inputs do you use and what amount do you harvest and sell.**

	Area Planted (m2)	Seed Quantity (g)	Fertilizer Quantity (g)	Amount Harvested (g)	Amount Sold (g)

21. **What type of irrigation do you mainly use for your gardening?**

Hand/ Can/ Bucket	**1**
Hose Pipe	**2**
Sprinkler	**3**
Furrow/ Flood	**4**

22. **What is the main source of water do you use for irrigating the crops/ vegetables?**

Dam/ Reservoir	**1**
River	**2**
Borehole	**3**
Well	**4**
Water Harvesting	**5**

23. **Is the above mentioned source of water sufficient for your gardening and domestic activities?**

Sufficient	**1**
Partially sufficient	**2**
Insufficient	**3**
Totally insufficient	**4**

24. **Please indicate how/ from where, you access the following:**

	Self	**Agro-dealers**	**Government funded schemes**	**Friends & Family**	**NGO's**	**Commercial Banks**
Inputs *(Seed, fertilizer, chemicals)*	**1**	**2**	**3**	**4**	**5**	**6**
Finance (cash, credit, loans)	**1**	**2**	**3**	**4**	**5**	**6**
Transport	**1**	**2**	**3**	**4**	**5**	**6**
Marketing& Selling	**1**	**2**	**3**	**4**	**5**	**6**
Extension and advisory service	**1**	**2**	**3**	**4**	**5**	**6**

25. **Please rate the quality of access/ support you receive from the above?**

	Poor	**Average**	**Good**	**Excellent**
Inputs *(Seed, fertilizer, chemicals)*	**1**	**2**	**3**	**4**
Finance (cash, credit, loans)	**1**	**2**	**3**	**4**
Transport	**1**	**2**	**3**	**4**
Marketing& Selling	**1**	**2**	**3**	**4**
Extension and advisory service	**1**	**2**	**3**	**4**

26. **What is the main distribution/ selling channel for your produce?**

Market stalls	**1**
Wholesalers and retailers	**2**
Institutions	**3**
Door to door/ Neighbours	**4**
Street/ Highways	**5**
Sell from home	**6**

27. **How long does it take for you to get to your selling point?**

28. **What mode of transport do you use to get to your selling point?**

Walk	**1**
Car	**2**
Truck/ Lorry	**3**
Taxi/ bus	**4**
Scotch Cart	**5**

29. **What is the main source of market information e.g. prices, demand**

Extension	**1**
R & D	**2**
Media *(TV, Radios)*	**3**
Peers/ Fellow farmers	**4**
Telecom *(cell phones)*	**5**
NGO's	**6**

30. **From the following, which ones are the 3 most important challenges you face when selling/ distributing your produce.**

Poor infrastructure (roads)	
Poor transport	
Poor market infrastructure	

Lack of finance	
High competition	
Long distances to markets	
Low prices	

31. **Who provides you with extension services?** *(Mention one major player)*

Government	**1**
NGO's	**2**
Private Organizations	**3**
Educational Institutions	**4**
Agric Associations	**5**
No extension services	**6**

32. **How often do they visit you?**

Never	**1**
Half the time *(0-1 visit per month)*	**2**
Usually *(every 2weeks)*	**3**
Always *(once a week)*	**4**

33. **How do you rate their services?**

Poor	**1**
Average	**2**
Good	**3**
Excellent	**4**

Climate Change

34. **Have you ever heard of the phrase "Climate Change"?**

Yes	**1**
No	**2**

35. **Have you noticed any long-term changes in the mean temperature over the last 10 years?** ***If too difficult to interpret: Has the temperature/hot days***

Increased	**1**
Decreased	**2**
Range altered	**3**
No Change	**4**
Do not know	**5**

36. **Have you noticed any long-term changes in the mean rainfall over the last 10 years?** ***If too difficult to interpret: Have the rainfall amounts/ rainfall days***

Increased	**1**
Decreased	**2**
Range altered	**3**
No Change	**4**
Do not know	**5**

37. **Do you have a rain gauge and thermometer that can confirm these changes?**

Yes	**1**
No	**2**

38. **Do you have a weather staion in your area?**

Yes	**1**
No	**2**

39. **Do you know how to use the gadgets at the weather station?**

Yes	**1**
No	***2***

40. **In what way(s) are changes in climate affecting you mostly?** *(mention at least 3)*

Not Affected	
Decrease in crop production	

Decrease in quality of produce	
Loss/ death of livestock	
Increase in pests of diseases	

41. **What adjustments in your farming have you made to these long-term changes in rainfall and temperatures** *(mention at least 3)*

No adjustments	
Early planting	
Dry planting	
Drought tolerate crops	
Staggering planting	
Use of wetlands	
Drip irrigation	
Diversified into non-agricultural activities	
Conservation farming	

Community gardening

42. **How long have you been practising Community gardening?** *(months)*

43. **What is the main reason for participating in the Community gardening?**

Home food consumption	**1**
Nutrition	**2**
Income/ Commercial Purposes	**3**
Social Cohesion	**4**
Preserving the tradition	**5**

44. **Who initiated this Community garden activities?**

45. **How is the above mentioned organisation/ institution assisting/ supporting the beneficiaries of Community gardens?**

Land preparation	**1**
Farm Inputs	**2**
Credit/ Finance	**3**
Training and advisory	**4**
Farm Equipment	**5**

46. **How were you selected to be part of a Community garden?**

47. **The income you get from the sales (crops from the garden), what is it mainly used for?** *(Mention at least 3)*

Do not sell	
Plough back into farming business	
Food& Basic commodities (Bread, milk, meat)	
Purchase livestock	
Living/ Travel expenses (rent, bills)	
School fees/ children's necessities	

48. **Please select the 3 most positive changes that Community gardening has brought into your life and your community that you did not have before.**

Increased income	
Development of farming skills	
Formal Employment	
Community based employment	
Nutritious Food	
Poverty Alleviation	
Improved quality of life	

49. **What is the primary benefit of belonging to an association of Community gardening?**

Not benefits	**1**
More attention from service providers	**2**
Sharing of information &farm implements	**3**
Higher production	**4**
Easier access to services and resources	**5**

50. **Are the climate change adaptation projects impacting/ helping you with regards to coping with the risks of drought and climate shocks?**

Not at all	**1**
Somewhat helpful	**2**
Helpful	**3**
Very helpful	**4**

51. **What are the 3 main shortcomings you are experiencing in your garden production?**

Long distance to garden	**1**
No fencing or protection	**2**
Birds and predators	**3**
Limited water for irrigation	**4**
Lack of institutional support	**5**
Stress	**6**
Hatred and conflicts	**7**
Gossip and stereotyping	**8**

52. **Which main factor can you say is greatly affecting your production at the moment?**

Low Rainfall	**1**
High Temperature	**2**
Pests & Diseases	**3**
Labour	**4**
No institutional support	**5**
Poor soil quality	**6**

Insufficient farming equipment	**7**
Lack of water for irrigation	**8**

53. **Please rate the following services in order of importance on improving your production.**

	Not Important	Moderately Important	Important	Very Important
Extension and Advisory Services	**1**	**2**	**3**	**4**
Credit and Loan Facilities	**1**	**2**	**3**	**4**
Education and Training	**1**	**2**	**3**	**4**
Water	**1**	**2**	**3**	**4**
Electricity	**1**	**2**	**3**	**4**
Transport	**1**	**2**	**3**	**4**
Telecommunication	**1**	**2**	**3**	**4**
Government Input Schemes	**1**	**2**	**3**	**4**

54. **How frequent would you want these services to be rendered to you?**

	Never	Seldom	Usually	Always
Extension and Advisory Services	**1**	**2**	**3**	**4**
Credit and Loan Facilities	**1**	**2**	**3**	**4**
Education and Training	**1**	**2**	**3**	**4**
Water	**1**	**2**	**3**	**4**
Electricity	**1**	**2**	**3**	**4**
Transport	**1**	**2**	**3**	**4**
Telecommunication	**1**	**2**	**3**	**4**
Government Input Schemes	**1**	**2**	**3**	**4**

55. **How serious are the following barriers affecting you in terms of coping with drought and climate shocks?**

	Not serious	Moderate	Serious	Very Serious
Limited access to credit	1	2	3	4
Limited access to irrigation	1	2	3	4
Poor access to production inputs	1	2	3	4
Lack of farming equipment	1	2	3	4
Market and policy failure	1	2	3	4
Reliance on maize production	1	2	3	4
Poor access to communication infrastructure	1	2	3	4
Limited access to climatic information	1	2	3	4

56. **Have you ever considered resettling or moving to a new area as a way of moving away from the risky climate and environment?**

Yes	1
No	2

ANNEXURE B:

Focus Group Discussion

Area/ Ward……

Name of Community Garden……

What was the primary or central motive for people to join this Garden project?

……

……

……

Who initiated the project?

……

……

How long has it been in existence?

……

Are there people in the community who are not participating in the project? What are some of the reasons?

……

……

……

Do you know about drought and climate shocks? (Expand)

……

……

How has it impacted your community in the past years?

……

……

……

What other activities/ measures are you engaging in, to adapt to drought and climate shocks?

……

……

……

……..

What is the value of these activities in adapting to drought and climate shocks?

……

……

……

……..

Benefits of Community Gardens

What are the tangible benefits that are involved in this type of gardening?

……

……

……

……

……

What are the intangible benefits that are involved in this type of gardening?

……

……

……

……..

What are the social benefits?

……

……

……

……..

What are the economic benefits?

……

……

……

The constraints/challenges facing community gardens

What are the major constraints to community gardening?

……

……

……

……

How is the organisation planning to overcome these constraints?

……

……

……

……

What can/ should be done to improve such projects and to further assist you in coping with drought and climate shocks?

Government……

……

Organizations……

……

Community……

……

THANK YOU

ANNEXURE C:

Questions for Government Official/Extension

Date of Interview……..
Name of Interviewee……..……
Organization…….
Position…….

1. What are the agricultural patterns within your area?

……
……
……
……
……

2. What are the dominant crops being planted?

……
……
……

3. What are the main sources of income for the local people in your district?

……
……..

4. Can you mention some of the challenges being faced by the farmers in your area?

……
……
……
……
……

5. What are your views on Climate Change? In terms of rainfall, temperature, seasons, rainfall patterns. Are there any changes?

……
……
……..
.....
.....

6. What initiatives have been done in your area to address these problems?

……
……
……

7. How many community gardens are operating in Bikita District at the moment?

……
……..

8. Which organizations are working with farmers in the community gardens in your area?

……
……
……..

9. How are they supporting the farmers?

……
……
……..

10. Is the support benefitting the farmers in the District?

……
……
……

11. Do you think community gardens are playing a significant role in assisting farmers to cope with drought and other climate shocks?

……

……

……..

12. What do you think can also be implemented to tackle climate shocks?

……

……

……

……...

13. Lastly, as government officials, what are you doing to support these projects/ interventions?

……

……

……

……....

THANK YOU!

ANNEXURE D

Questions to Community Garden Donor Organization (s)

Date of Interview……..
Name of Interviewee……..
Organization…….....
Position……..

1. When did you start this community gardening project strategy?

……..

2. Who is funding/ supporting these projects?

……...

3. Do you have other projects or programs that you are engaging with, in the same area?

……
……

4. Why focus on climate change adaptation projects?

……
……

5. When did you start looking at Climate Change issues and why?

……
……

6. How many gardens are you supporting and are operating in the area?

……
……

7. Why did you select Community Gardens as an intervention strategy?

……
……
……

8. What criteria did you use to select the sites and beneficiaries you are engaging with?

……

……

9. Where did you get information on the designing and the types of activities which can be varied out in the community garden projects?

……

……

……

……

10. How are you supporting them e.g. what particular activities are you assisting the farmers with? (Production; Inputs; marketing……)

……

……

……...

11. What other programs are you promoting in terms of coping with climate shocks shocks?

……

……

……

……

12. What are your views on the performance and opportunities that community gardens have brought about for the farmers since they started this activity?

……

……

……

13. What role does the local extension officer fulfil in these projects?

……

……

……

14. What are some of the challenges you are facing in implementing such projects?

Pre- Implementation challenges…….

……

……

Post……
……..……
……..

15. What are some of the challenges being faced by the farmers or beneficiaries of these projects?

……
……
……

16. What is your overall perception on the impact of the community gardens on:

a) Farmers……
……

b) Community……..……
……...

c) Non participants……...

17. What do you think can/ should be done to improve these projects of Community gardens?

……
……..

THANK YOU