EMPOWERING RURAL COMMUNITIES THROUGH COMMUNITY GARDENS AS A RESPONSE TO CLIMATE CHANGE: THE CASE OF SHURUGWI PARTNERS' CHITORA GARDENS INITIATIVE

BY

MARIA GUTI

R121623Y

MIDLANDS STATE UNIVERSITY

FACULTY OF SOCIAL SCIENCES

DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES

A DISSERTATION SUBMITTED TO THE DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES IN PARTIAL FULFILLMENT OF THE BACHELOR OF SCIENCE HONOURS DEGREE IN GEOGRAPHY AND ENVIRONMENTAL STUDIES AT MIDLANDS STATE UNIVERSITY

GWERU, ZIMBABWE

NOVEMBER 2015

EMPOWERING RURAL COMMUNITIES THROUGH COMMUNITY GARDENS AS A RESPONSE TO CLIMATE CHANGE: THE CASE OF SHURUGWI PARTNERS' CHITORA GARDENS INITIATIVE

BY

R121623Y

MIDLANDS STATE UNIVERSITY

FACULTY OF SOCIAL SCIENCES

DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES

A DISSERTATION SUBMITTED TO THE DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES IN PARTIAL FULFILLMENT OF THE BACHELOR OF SCIENCE HONOURS DEGREE IN GEOGRAPHY AND ENVIRONMENTAL STUDIES AT MIDLANDS STATE UNIVERSITY

GWERU, ZIMBABWE

NOVEMBER 2015

APPROVAL FORM

FACULTY OF SOCIAL SCIENCES

DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES

STUDENT: MARIA GUTI

REG NUMBER: R121623Y

TOPIC: EMPOWERING RURAL COMMUNITIES THROUGH COMMUNITY GARDENS AS A RESPONSE TO CLIMATE CHANGE: THE CASE OF SHURUGWI PARTNERS' CHITORA GARDENS INITIATIVE

The undersigned people certify that they have read and recommend Midlands State University to accept this dissertation by R121623Y in partial fulfilment of the Bachelor of Science Honors Degree in Geography and Environmental Studies

Student: …… ….Signature……...Date ……/……/2015

Supervisor: ……Signature…….Date ……/……/2015

Chairperson:……Signature……Date ……/……/2015

External Examiner: ……Signature……Date ……/……../2015

APPROVAL FORM

FACULTY OF SOCIAL SCIENCES

DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES

STUDENT:

REG NUMBER: R121623Y

TOPIC: EMPOWERING RURAL COMMUNITIES THROUGH COMMUNITY GARDENS AS A RESPONSE TO CLIMATE CHANGE: THE CASE OF SHURUGWI PARTNERS' CHITORA GARDENS INITIATIVE

The undersigned people certify that they have read and recommend Midlands State University to accept this dissertation by R121623Y in partial fulfilment of the Bachelor of Science Honors Degree in Geography and Environmental Studies

Student: …… ….Signature……...Date ……/……/2015

Supervisor: ……Signature…….Date ……/……/2015

Chairperson:……Signature……Date ……/……/2015

External Examiner: ……Signature……Date ……/……../2015

ABSTRACT

This research examined the Chitora gardens project implemented by Shurugwi Partners and how it has responded to climate change impacts while empowering rural communities in Chitora ward 1, Shurugwi District. Qualitative and quantitative methods of data collection were used. Collection of data was done through the use of questionnaire surveys, interviews, focus group discussions and observations. A total of 42 questionnaires were administered to project members where respondents who had been divided into strata according to gender were selected through the simple random sampling technique. A hypothesis was suggested to prove if there is an association between increase in income of smallholder farmers and establishment of the Chitora gardens project. Data analysis was accomplished through content analysis and Statistical Package for Social Sciences (SPSS) using descriptive statistics and chi-square test. Findings from the research revealed that the project has empowered rural communities economically and socially through income being acquired, training given and capacity building skills gained. Research also showed that the project is sustainable since in addition to horticultural production there are other viable activities done including aquaculture, apiculture and development of a fruit orchard within the community garden. Climate change impacts on the most vulnerable in rural communities have therefore been minimized. The study also indicated that utilization of the wetland by smallholder farmers is environmentally sustainable as it is conserving biodiversity particularly in wetlands around the ward. Previously degraded wetlands now show signs of improvement since the start of the project. However, there is need to complement available sources of water for use in the dry season when water is scarce and with irrigation equipment that is less labour intensive. Climate smart agriculture should be adopted by smallholder farmers for long-term sustainability of the project.

DEDICATION

This dissertation is dedicated to my siblings, Nyashadzashe Guti and Moffat Kudakwashe Guti. This is a standard for you to follow and with you being a part of my life, I set out to do the best academically and to inspire you to do better.

ACKNOWLEDGEMENTS

I would like to express great appreciation to the following people for all the support, inspiration, lessons and advice they have shown me throughout my academic experience. My sincere appreciation goes to my supervisor Dr. M. Matsa for his tireless mentorship throughout the preparation of this project and pushing me to be a better student. Special thanks goes to Shurugwi Partners' management and staff for letting me carry out this research within their area of jurisdiction.

I also extend my gratitude to my parents, Mr. and Mrs. Guti as well as my aunt and uncle Mr. and Mrs. Mudenge for all the love and support throughout my studies. Taurai Malcolm Manyenga, Sandra Chido Dzimiri and Tanyaradzwa Munouya I am grateful for having you in my life. Above all I want to thank the Lord God for the gift of life and being my guide in my academic experience and bringing me to this stage in my life.

TABLE OF CONTENTS

CONTENTS

CHAPTER TWO: LITERATURE REVIEW

CHAPTER 3: RESEARCH METHODS

CHAPTER FOUR: RESULTS PRESENTATION AND ANALYSIS

LIST OF FIGURES

LIST OF TABLES

LIST OF PLATES

LIST OF APPENDICES

ACRONYMS

AGRITEX	Agricultural Extension Services
CBOs	Community Based Organizations
GEF SGP	Global Environment Facility Small Grants Program
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
NGO	Non-Governmental Organization
TRDC	Tongogara Rural District Council
UNDP	United Nations Development Program
USD	United States Dollar
ZOPPA	Zimbabwe Organic Producers and Promoters Association

CHAPTER ONE: INTRODUCTION

1.1.Background of the study

Climate change effects cause an alteration in the rate of economic growth and directly impacts poverty through reduced income opportunities (Boko, et al, 2007). Gradual climate changes and extreme weather events generally have a negative impact on overall development efforts (Karfakis et al, 2013). Major changes in rainfall in terms of extreme events like floods and droughts, increased temperatures and sea level rise are a few of the potential and actual effects of climate change. These changes have threatened the natural and social systems hence the persistent problem of food insecurity especially in Africa which is the most vulnerable continent.

Tadesse (2010) affirms that several climate models have predicted negative impacts of climate change on agricultural production and food security in large parts of sub-Saharan Africa. According to IPCC (2007) by the year 2020, yields from rain-fed agriculture could be reduced by up to 50% in some African countries, thereby severely compromising agricultural production. Small-scale farmers will be the most affected by these climate change impacts and it will adversely affect food security in Africa and worsen malnutrition (IPCC, 2007). According to Gukurume (2012) climate change has presented overwhelming challenges to both the agricultural sector and agricultural sustainability in many developing countries including Zimbabwe. Climate change therefore poses a threat on efforts made on poverty reduction.

As a community-based adaptation strategy in coping with the challenges posed by climate change, community gardens have been designed. Community-based adaption identifies that knowledge on the environment and adapting to climate impacts lies within societies and cultures (Mitchell and Tanner, 2006). Grigg (1974) points out that the existence of community gardens around the world has been dated back to the 18th century. Community gardens have been a positive tool towards achieving different goals (Hallberg, 2009). According to Wormsbecker (2008) community gardens offer several benefits and serve different groups of people in a community. Community gardens are the offspring of two social movements which are intertwined namely urban agriculture and community food security (Hallberg, 2009). Community gardens furthermore lessen the vulnerability of communities to climate change by enhancing their capacity to cope with the

negative impacts like less predictable rainfall, frequent droughts or different diseases and weather hazards.

The purpose of a community garden might depend on the society (Chazovachii, et al, 2012). According to Taylor and Francis (2009) since prehistoric time, community gardens in Africa involved irrigation in home gardens and providing of vegetables for household consumption. Different functions of community gardens involve planting of food crops, vegetables, fruit trees, herbs, flowers or even for physical exercise. According to Rukuni, et al (2006) in Zimbabwe community gardens are more often started by non-governmental organizations and are well-known for providing smallholder farmers and communities with access to vegetables and fruits, thereby contributing to their social and economic welfare. Through community gardens, low-income earning households can get a sense of independence, food security, skills development and economic savings (Wormsbecker, 2008). Some of the community gardens in rural areas utilize wetlands as a source of water for their crops and vegetables (Rukuni et al, 2006). An example of sustainable wetland utilization by community gardens in Zimbabwe is in Mwaonazvawo village in Mutasa District. A study conducted in the Mwaonazvawo wetland established that the activities (production of vegetables, fruits, sugarcane, fish farming and cattle rearing) undertaken by farmers paved way for both economic sustainability for the farmers and protection of the wetland (Svotwa, et al, 2007).

This study therefore seeks to examine the level of empowerment reached by rural communities in Zimbabwe as they get involved in community gardens projects. It will examine the sustainability of such projects and at the same time assess the social and economic benefits. It will moreover determine what has been done by smallholder farmers in conserving the biodiversity in the wetlands they are working in. To make the findings of this research more valid, the study is going to be based on an ongoing project in a local village of Chitora in ward 1 of Shurugwi District where three community gardens namely Faquar, Simbaravanhu and Tugwi-Dekete were designed by a local NGO, Shurugwi Partners as an action to adapt to climate change impacts. This was done by equipping the project members of the Chitora community gardens with capacity building skills and intensive farming to improve household food security and reduce the level of poverty.

1.2 Problem Statement

Climate change in Zimbabwe has been identified to be the leading cause of a human and environmental crisis. Rainfall variability has especially affected agriculture in the country since most smallholder farmers depend on rain-fed agriculture. Some of the adverse effects felt include a negative change in food availability, food stability and living standards especially in rural communities. Shurugwi District which falls in agro-ecological region 3 is semi-arid and is therefore not an exception to these impacts and as a result social and economic problems have been felt. As an attempt to reduce the negative impacts of climate change in Shurugwi district, a local NGO, Shurugwi Partners, came to the rescue in Chitora village in ward 1 of the district and introduced community gardens projects. The use and practice of community gardening in Africa is a response to an economic and social crisis caused by climate change (Matsa and Dzawanda, 2014). In their gardens, smallholder farmers have so far had capacity building training on leadership, biodiversity conservation, farming as a business, market linkages training just to name a few. Shurugwi Partners also provided smallholder farmers with vegetable seedlings. This study therefore seeks to examine the level of empowerment that the project members have reached since the start of the Chitora gardens project as they respond to climate change related challenges.

1.3 General Objective

To examine Shurugwi Partners' Chitora community gardens initiative in ward 1 of Shurugwi District as a response to climate change

1.3.1 Specific Objectives

- To assess the social and economic benefits of the Chitora gardens project to the smallholder farmers
- To examine the sustainability of the Chitora gardens project
- To determine conservation of biodiversity by smallholder farmers in the wetlands where the Chitora gardens project is being implemented

1.3.2 Hypotheses

- H_O- There is no relationship between increase in income of smallholder farmers and establishment of the Chitora gardens project
- H_1- There is a relationship between increase in income of smallholder farmers and establishment of the Chitora gardens project

1.4 Justification of the study

Community gardens projects have now become a common adaptation strategy to climate change used by local communities in Zimbabwe. The question however is the contribution that such projects have on livelihoods, how empowered they are and to what extent and moreover how such projects improve the lifestyle of smallholder farmers. The findings from this research will help in giving information on the social and economic benefits that can be obtained by individuals if they engage themselves in community garden projects. The study can be used at a local or even national scale on a quest to find the best ways to adapt to climate change. Impact of community gardens on livelihoods can be realized at a closer spectrum because of the study.

The research will thus help rising Community Based Organizations (CBOs) like Shurugwi Partners in maintaining or adding valuable input towards empowering communities, improving food security and alleviating poverty through their projects. This study will improve understanding on how community garden projects contribute to the empowerment of local communities particularly in Chitora. Information obtained from this study will furthermore be useful to local agencies particularly the Environmental Management Agency in sustainable management of wetland areas used by the local communities for agricultural related projects. With results from this research, AGRITEX can also be able to make informed decisions on the good agricultural practices that can be adopted in order to benefit the locals and the environment at large. Tongogara Rural District Council can make plans for more community gardens to be adopted in order to benefit more livelihoods in Shurugwi District.

1.5 Location and description of the study area

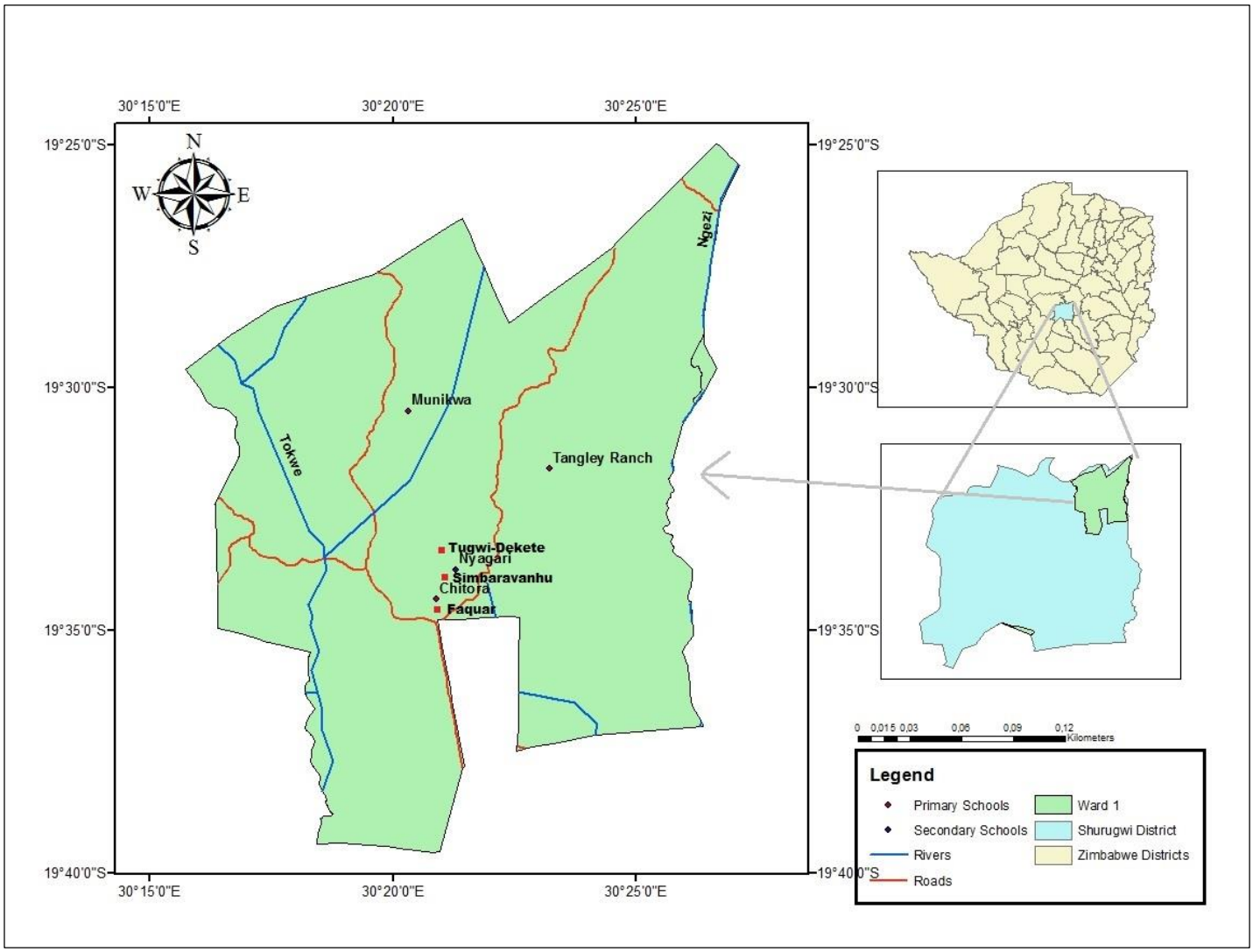

Figure 1.1 Location of Chitora Ward 1: Shurugwi District

Source: Primary Data

1.5.1 Physical characteristics of the study area

Chitora ward is located in Ward 1 of Shurugwi District in the Midlands Province of Zimbabwe. The district is located about 30km South-East of the city of Gweru (Matsa and Muringaniza, 2010). It lies in the agro-ecological region 3 and average rainfall received is between 650-800mm annually. The mean altitude is 1450m above sea level. Maximum temperatures in the district in

summer can be as high as 37ºC while winter can be very cold with temperatures dropping to 0-6ºC (Ministry of Water Resources Development, 2004). According to Madebwe and Madebwe (2005) the vegetation type is the bush savannah with digitaria and hyperrania as the major grass types dotted with brachystegia, terminalia and julbernadia tree species. The area is characterized by the dendritic type of drainage. Chitora River and Tugwi River are the two main rivers that flow through Chitora village from the northwest to southeast. There are various wetlands that are scattered around the ward including the three community garden project areas. Granite is the main parent rock and soils range from sandy to loamy textures (Madebwe and Madebwe, 2005).

To access the project sites from Gweru one drives towards Mvuma up to the 58km peg commonly referred to as Downlands. One then has to take a right turn into Mashava road off the Gweru-Mvuma highway. The first garden, Faquar, is located about 5km from the turnoff on the left side along the Mashava road. The second garden, Simbaravanhu, is located a further 9km from Faquar along the same road. The third and last community garden is Tugwi-Dekete, located about 8km from Simbaravanhu. Mashava road to Chitora can also be accessed from Chachacha in Shurugwi.

Socio-Economic description of the study area

Chitora ward 1 is an old resettlement area with a total population of 3 511, 1 804 females and 1 707 males. There are 704 households in the ward with an average household size of 5.0 (Zimbabwe National Statistics Agency, 2012). There are three primary schools namely Chitora Primary, Munikwa Primary, Tangle Ranch Primary and one secondary school, Chitora which was established after 1980. Chitora clinic is the only health facility in the ward and it is owned by the government. In addition, major land uses in the ward are settlement and agriculture. Subsistence to intensive crop and animal farming are the dominant activities. There is access to grazing land in Chitora ward for the domestic animals owned by the Villagers.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview on community gardens

A community garden as described by Baldwin et al (2009) is a portion of land gardened by a group of people. McDonald and Newton (2005) add that a community garden is not only a piece of land as it usually has the element of cooperation, often runs educational programs and has a neighborhood attached to it. According to Lyson (2004) community gardens are considered to be the most visible form of urban agriculture and production of food. All community gardens differ in shape, size and sometimes each member has their own plot in the garden while in some community gardens everyone shares the work, harvest and proceeds all depending on how the members decide to run their garden (Dow, 2006). According to Hallberg (2009) ownership patterns of community gardens differ and may be operated by municipalities, community nonprofits, institutions, land trusts or even private citizens.

Community gardeners are a diverse population which includes men, women, ethnic groups and immigrants (Kearney, 2009). Members that participate in community gardens projects are usually further involved in food security issues and the development of the community leading usually to a comprehensive long- term positive change (Fulford and Thompson, 2013). In this ever changing environment, community gardening addresses economic, social and environmental challenges.

According to Chevrette (2011) various priorities and goals lead to the development of community gardens and these include community improvement, improving community food security, crime reduction, neighborhood greening, environmental education or sustainable urban design among others. However, the objectives of the creation of community gardens differ in developed and developing countries. According to Mougeot (2005) in many of the developing countries food is grown as a strategy for survival and supplementing income. On the other hand, in developed countries, community gardens can be described as social projects with the purpose of improving health of project members, production of organic food, community development or protecting green space in cities (Cameroon et al, 2010). Hallberg (2009) adds that community gardens are created by organizations to gain social, environmental, economic and health benefits. The initiative to form a community garden therefore varies according to the location of the garden.

2.2 The role of community gardens in empowering rural communities

Beck (2001) describes a community as a group of persons sharing a mutual territory or ecology. Focus on empowerment of communities in community gardens has been a general trend from the 1970's (Wang, 2006). Community gardens thrive because of community members, organizations and municipal governments that are inspired to give support and initiative (Chevrette, 2011). Community gardens therefore give a positive perception to local communities and encourages them to be involved in community activities and furthermore give them a sense of community pride while they have a fresh supply of vegetables and fruits. According to Kearney (2009) community gardens are perceived as a tool for community empowerment and therefore there is a continual increase of these gardens in towns and cities all across USA.

The success of a community garden is often determined by the role played by the participants of the garden and gardens are particularly successful when project members play the leading role in the garden's development (Abi-Nader et al, 2005). Youths, the elderly, the working poor can all be empowered by participating in community gardening and individuals can be able to better their own lives and the environment around them.

An opportunity for community youth development is even offered by community gardens (Fulford and Thompson, 2013). Some projects offer trainings in entrepreneurial activities to youth and vulnerable groups empowering them with business and job skills while at the same time they get proceeds after sales. In 2011, SNV Netherlands Development Organization partnered with some Ugandan organizations in creating a program on community empowerment in Uganda. This was done through parent-led school gardens where rural communities specifically were able to take charge, improve agricultural productivity in their households and improve livelihoods (SNV Netherlands Development Organization, 2011).

2.3 Climate change adaptation through community gardens

Climate change as defined by IPCC (2007) is a change in the state of climate usually identified by alterations in the mean and or the variability of its properties persisting for long periods typically decades or more. Climate change has affected agricultural production in sub-Saharan Africa and a study done in Liberia showed that 96% of smallholder farmers had been affected by climate change in terms of agricultural productivity and the length of entrepreneurship and as a result less farmers sold rice after the harvest as compared with harvesting seasons (Tarway-Twalla, 2013). In

Zimbabwe, climate records have also shown how the country is experiencing climate change particularly in terms of variability of rainfall and extreme events. This is expected to increasingly reduce land for agriculture and therefore pose a major threat to livelihoods and the economy given the fact that Zimbabwe is dependent on rain-fed agriculture (Brown et al, 2012).

Responses to climate change began in 1979 at the first world climate conference in the form of seminar conferences, workshops and meetings to help develop strategies and interventions for undertaking programs to respond to climate change (Pender, 2008). Community based adaptation is a way in which local communities are responding to climate change risks with assistance from NGOs (Rahman, 2009). Climate change adaptation is the adjustment in natural systems as a response to expected or actual climatic stimuli or effects controlling the harm and exploiting the opportunities that are favorable (IPCC TAR, 2001a). This adaptation strategy is made possible through community based development projects which help communities understand the main climate risks, impact on livelihoods and how they can best respond to the situation (IUCN et al, 2004).

Efforts put on agricultural production in Zimbabwe are inadequate because of climate variability which affects especially those in semi-arid areas of the country (Chikobvu, 2011). Community gardens are being formed in the areas affected most by climate change as an adaptation strategy in order to reduce the vulnerability of communities to climate change. According to Matsa and Dzawanda (2014) in Zimbabwe's vulnerable communities, community gardens have been a tool for fighting poverty in the face of climate change.

2.4 Socio-economic benefits of community gardens

Community gardens offer several social and economic benefits to local communities. According to Hallberg (2009) gardeners often share their produce with family and friends while some sell the fruits of their labour but either way, access to fresh vegetables and fruits is increased within the communiity through community gardening.

2.4.1 Social benefits offered by community gardens

According to Robinson-O'Brien et al (2009) community gardens projects are frequently created to counter a host of contemporary social problems. The establishment of community gardens has been found to offer infinite social benefits to participating members and the community as a whole.

According to Bremer et al (2003) unique opportunities for the establishment of relationships within and across social and physical barriers are offered just by establishment of community gardens. Community gardens do not only offer a location for the growth of plants but the deepening of relations within a community. Community members additionally benefit from community gardens because the rate of crime is decreased and the neighborhood is beautified while community pride is enhanced (Tellshcow, 2012).

Besides being places for food and flowers, community gardens are social and cultural sites where people of all ages meet family, friends or neighbours to relax and share what is going on in the community (Salvidar-Tanaka and Krasny, 2004). Some community gardens for instance have been established by immigrant groups like the Bangladeshi women in East London as a way in which they can reconnect with their cultural heritage and simultaneously supplementing their supply of food (Warner 1987). In addition, Cooper-Marcus and Barnes (2001) documented that some refugees are part of community gardens and these have been a place where they can be able to share their upheaval experiences like fleeing their countries resulting in improved psychological serenity. Participation in community gardens has also been found to offer health benefits to project members in different gardens. According to Hancock (2001) community gardens provide therapeutic stress relief and improved mental wellbeing for members participating.

2.4.2 Economic benefits of community gardens

Community gardens have been found to yield a high return, be cost efficient and profitable in some communities. As pointed out by Kurtz (2001) the community garden today serves as an economic function where in low income communities financial pressure is lessened through the provision of cheaper sources of food and at the same time promoting independence and self-respect among the poor. Substantial economic benefits are offered by community gardens including raising nearby property values and encouraging economic development (Perch, 2011). According to Salvidar-Tanaka and Krasny (2004) input of plants worth about USD 5-10 in a community garden in New York City can yield up to between USD 500-700. The creation of community gardens in some of the communities is because of the economic benefits that these gardens provide. According to New farmer (2004) some Villagers resort to community gardens as a way of acquiring income to obtain inputs which they use for farming during the main farming season.

Communities may be able to increase their disposable income when they are involved in community gardening. As noted by Kearney (2009), more income and employment may be created if community gardens become retail ventures and an example is in New York City where local restaurants buy produce like vegetables and herbs from community gardens.

2.5 Sustainability of community garden projects

Environmental education on sustainable agriculture, capacity building trainings and local economic development are often opportunities offered to participants of community gardens projects (Keeney, 2000). Public gardens play an important role in ensuring sustainable practices by cities and towns and contribute to the advancement of knowledge and appreciation of crops while simultaneously offering opportunities for education, research and leisure activities (Gough and Accordino, 2011). According to Clavin (2011) the design and implementation of community gardens providing organic produce where there are few resources is both a sustainability and literacy skill and a community can be able to survive in challenging conditions by making use of resources efficiently. Conservation agriculture practiced in community gardens are the heart of sustainability as they provide solutions to increasing the production of food without depleting natural resources or the ecosystem for future generations (CropLife International, 2005).

However, Chazovachii et al (2012) argue that community garden projects do not necessarily mean sustainability and adds that since establishment of community gardens in Mberengwa ward 27 food insecurity has been persistent which has disrupted the sustainability of other livelihood activities.

2.6 Conservation of Biodiversity in community gardens projects

Community gardens have led to biodiversity conservation and improved waste management in communities where such projects have been implemented. According to Clavin (2011), by developing community gardens, a self-contained space that is ecologically designed is created where project members realize the human and environmental limits and similarly the intrinsic value of the environment in its natural state. However, before being enveloped in matters of sustainability, community gardens in North America were originally for addressing immediate problems of hunger and alleviating poverty (Seto, 2011). Community gardens are now seen as an ecological movement which is combined with the current food movements.

2.6.1 Wetlands use and conservation by smallholder farmers

According to UNESCO (1987) wetlands are areas which are either permanently or temporarily marshy with water that may be static or flowing. Wetlands are often a potentially valuable resource in agriculture due to the need for flat and fertile land with a supply of water that is readily available particularly in arid and semi-arid regions where cultivation is widespread because of the capacity of wetlands to preserve moisture for long periods (McCartney et al, 2005). Madebwe and Madebwe (2005) state that in the performance of an ecosystem and functions, wetlands are important as they provide products and have attributes that benefit almost all forms of life.

According to MacCartney et al (2005), throughout history wetlands have had an important role in human development where they have given a variety of tangible and intangible benefits and at the same time brought problems to people. Currently many wetlands are subject to extensive land uses where production of food is regularly combined with other functions like enhancement of water quality, biodiversity or flood detention (Verhoeven and Setter, 2009).

Sustainable utilization of wetlands through community gardening in Zimbabwe is being practiced in Chebvute wetland which is 9 hectares in size and is located in Zvishavane district. According to Maramabanyika, Mutsiwegota and Muringaniza (2012) community members were empowered through the project as they are the primary users and preservers of the wetland and results obtained showed restoration and increase in size of the wetland and it shows evidence of abundant flora and fauna in the wetland achieved because of the community garden project.

2.7 Role of NGOs and CBOs in community projects

Non-Governmental Organizations (NGOs) play a vital role in providing a place for development of the community. As noted by Dezendorf (2013) these organizations offer a physical, economic, social and cultural forum for community members in realizing their potential individually or as groups and are therefore an example of how grassroots organizations can promote social and food justice. Various NGOs aim to address issues of food security, environmental conservation or community development through community gardens. In USA, the Community Food Security Coalition is the largest non-profit making organization which addresses food security issues and one strategy is through community gardens (Ogawa, 2009). As argued by Birch and Wachter (2008) with the help of NGOs, greater self-reliance is usually built by communities because of the

shift in power given to the locals through community gardens resulting in communities having control over their lives.

To implement community gardens, organizations always operate differently. According to Ninez (1984) strong and active communities are created when NGOs encourage a sense of belonging to the local people where they end up getting involved in their community through an extensive social action. According to Chazovachii et al (2012) in ward 27 of Mberengwa, assistance was given to Imbahuru community garden by an NGO known as CARE Zimbabwe in the year 2006 as a way to alleviate poverty in rural areas and accommodate vulnerable groups. The Global Environmental Facility Small Grants Program (GEF SGP) which funded the Chitora gardens project through Shurugwi Partners is an organization which has been in existence in Zimbabwe since 1993 and it provides funding for community projects under different focal areas including community gardens projects.

2.8 Critical Analysis of Literature and Establishment of knowledge gap

The general benefits of community gardens projects including the contribution to household food security, health benefits or nutritional benefits have all been investigated before. However a gap still remains to be explored on how communities are empowered after participating in community gardens projects, how sustainable these projects are and benefits that are offered to the environment. The social and economic benefits of such projects in Zimbabwean communities also need to be explored for better understanding. Golden (2013) particularly states that community gardens that are the most geographically researched are in larger cities and therefore this study will focus on gardens that are found in a small village in Shurugwi District where there is miniature study done in the area on such issues.

CHAPTER 3: RESEARCH METHODS

3.1 Research design

Research design is a process concerned with the creation of a blueprint of activities that are taken in an attempt to answer the identified research questions satisfactorily as well as specifying at least three processes namely data collection process, the process of instrument development and the sampling process (Bhattacherjee, 2012). Research design is of utmost importance as it gives room for information needed to be acquired with minimum time, effort and money. The triangulation research approach was used for the study. According to Hussein (2009) triangulation is combining two or more methodological approaches, sources of data, perspectives in theories, investigators and methods of analysis to study the same phenomenon. For this study both quantitative and qualitative research approaches were used. By using both methods, valid and reliable results were obtained because flaws of one method were better neutralized while benefits of the other method were strengthened.

The quantitative research technique is characterized by the collection of data that focuses on precise measurements that are objective through the use of numerical and statistical analysis to support or contradict a hypothesis (Campbell, 2014). The use of quantitative research in this study provided for data that was precise, standardized and could be altered into statistics. According to Patton and Cochran (2002) qualitative research is known by its aims which lean to understanding some characteristics of the social life and methods used generate words, instead of numbers, as data for analysis. Qualitative research as identified by Denzin and Lincoln (2005) enabled the researcher to study phenomena in their natural settings while attempting to make sense of and interpret phenomena in terms of the meanings people bring to them.

Using both quantitative and qualitative methods enabled the research to fulfill the different objectives. Since qualitative methods generally aim to understand the attitudes and experiences of a population, it was used to answer questions like how livelihoods have changed because of the project, what methods were employed to conserve biodiversity or why certain farming methods were being applied in the gardens. On the other hand, quantitative methods answered questions like how many people in the household are benefiting from the project or how much income smallholder farmers are making from the project.

3.2 Target population

Target population is the complete aggregation of respondents that meet the selected set of criteria (Burns, 1997). The research targeted a population of 116 people as they were the project members and direct beneficiaries of the Chitora wetlands conservation and integrated livelihoods project in the three community gardens. Stakeholders that served as key informants in the research include Shurugwi Partners Project Officer, Agricultural Technical Extension (AGRITEX) Officers, Tongogara Rural District Council, Shurugwi District Administrator's office and the officers from the Ministry of Youth Development, Indigenization and Economic Empowerment. It was important for the research to include these stakeholders as they were involved in the project directly from the first day of community mobilization, selection of project members, preparation of the Wetlands Management plan, training of farmers, production and selling of produce. These key informants therefore had first-hand information on the project and it was important for the researcher to attain data from them.

3.3 Sampling Procedure

Webster (1985) describes a sample as a finite part of a statistical populace where properties are studied to obtain information about the whole. Sampling is the collection of data from selected representatives of the population and using it as research information (Latham, 2007). According to Yount (2006) the steps in sampling include identifying the target population, identifying the accessible population, sample size determination and selection of the sample. The stratified random sampling was employed by the researcher in all the three gardens to obtain accurate data which encompasses the entire population under study. Project members from each garden were subdivided into strata based on gender in order to represent views from both the males and females involved in the project. According to Fox et al (2007) stratified random sampling ensures that particular strata or groups of individuals are represented in the process of sampling. In the different strata, simple random sampling was then used in order to select beneficiaries in the gardens and this ensured that each person in the gardens had the same probability of being selected for the study.

3.4 Sample size determination

Sample size is the quantity of sample units that will be measured in the inventory (Castillo, 2009). The researcher used random sampling which made all project members have an equal chance of being selected. All three gardens for the research study namely Faquar 1, Simbaravanhu and Tugwi-Dekete were therefore included in the sample. Stratified random sampling was further used in each garden where project members were divided into strata according to gender. This was done to ensure the whole population was represented in the sample and therefore be able to decrease the error in estimation where both male and female views were taken into account. From each strata, 7 people were chosen using the simple random sampling technique and this was done using each of the community gardens registers. Every individual in the register was allocated a value which was put in a hat. In each strata the first 7 people who picked even numbers of between 2 and 14 were used as the sample for questionnaires. Therefore, a sample total of 14 people per garden, 7 for either gender was used. The sample size chosen was therefore 36% and represented 42 out of the targeted 116 project members who had questionnaires administered to them.

3.5 Sources of data

Both primary and secondary data sources were used to attain results. Data that has been observed, experienced or recorded by the researcher is called primary data while written sources interpreting or that record primary data are the secondary sources (Walliman, 2011). The research therefore generated both qualitative and quantitative data. The use of both primary and secondary data sources is necessary to complete a given research.

3.5.1 Primary data sources

A research instrument is a tool used to collect data (Parahoo, 1997). Primary data was collected through research instruments such as questionnaires, semi-structured interviews, focus group discussions and observations. The ultimate goal of primary research is to come up with something new confirmed by others and at the same time eliminating the bias that one may have as a researcher (Driscoll, 2011). The use of primary data collection allowed for original data to be obtained and therefore reach new conclusions rather than relying on predictions put forward by other researchers.

3.5.2 Primary data collection tools

3.5.2.1 Questionnaire Survey

Written responses were obtained from the project members through questionnaires. According to Key (1997) a questionnaire is a way of eliciting the feelings, experiences, beliefs, perceptions or attitudes of a sample of individuals. A questionnaire was used to gather responses from smallholder farmers involved in the project and enabled the researcher to answer certain research objectives that include the social and economic benefits and the sustainability of the Chitora gardens project. A total of 42 project members were the selected sample for questionnaires. Respondents were made aware of the purpose of the research by explaining to them the topic and objectives of the study before they answered the questionnaire. This was done to make respondents comfortable to answer questions knowing that it was for academic purposes only. The researcher self-administered both open-ended and close-ended questionnaires. The open- ended questions allowed the respondents to use their own words and therefore had the freedom of expression to say what they felt. However, because of the low literacy level in the community, the questionnaire was interpreted into vernacular so that project members would not have difficulty responding. Close-ended questions on the other hand were faster to answer and results were easier for the researcher to analyze.

3.5.2.2 Interviews

An interview is a type of research instrument used to supplement and extend knowledge about thoughts, behaviors, feelings, meanings or interpretations of an individual. It is a direct face to face attempt to acquire valid and reliable measures in the form of verbal responses from one or more respondents (Key, 1997). The researcher used semi- structured type interviews in order to obtain data on how rural communities are being empowered through community gardens. Purposive sampling was used in selecting the interviewees as they had better knowledge on the project and therefore enabled research objectives to be answered without difficulty. These interviewees were representatives from the Tongogara Rural District Council, AGRITEX, Ministry of Youth Development, Indigenization and Economic Empowerment, Shurugwi Partners, District Administrator's office, Village Heads and the projects' chairpersons and secretaries. Using interviews for data collection was essential as verbal communication gave more data than written

responses would have given. During the course of the interviews questions that were not understood by respondents were clarified and elaborated while the interviewer simultaneously observed the subjects at a personal level. The informants were contacted in advance to get the specific time and place each interviewee would be comfortable undertaking the interview. The researcher made an audio recording of the interviews so that she would be able to directly quote the obtained information rather than relying on her memory. Notes were also taken during the interview.

Table 3.1 ***Personnel and reason for the interview***

Personnel to be interviewed	**Reason for Interview**
Shurugwi Partners' project manager	• To get information regarding the objectives of the project and what has been achieved so far • To know the future goals of the organization concerning the project
AGRITEX Officers	• To acquire information on trainings given to smallholder farmers and agricultural methods applied by project members concerning conservation of biodiversity in the wetlands • To find out what strategies have been used to protect wetlands • To acquire information on the role of AGRITEX officers in the Chitora gardens project
District Administrator's Office	• To find out how livelihoods in the ward have changed since the start of the project
Ward Councilor	• To determine any change in the social and economic livelihoods of project members • To get information on the day to day activities of the smallholder farmers
Ministry of Youth, Development, Indigenization	• To get information on how the youths involved in the project are being empowered

and Economic Empowerment Officers	• To find out how this project accomplishes the objectives of the ministry.
Chairperson and Secretaries of the gardens	• To identify what smallholder farmers have gained from being part of the project

3.5.2.3 Focus group discussions

A focus group discussion (FGD) as described by Kumar (1987) is a rapid assessment, semi structured method of collecting data where a set of participants are purposively selected to discuss issues based on a list of key areas drawn up by the facilitator. Conducting FGDs for the study was important as it created a comfortable environment where project members could give in-depth information on different perspectives and experiences concerning the project like their economic gains or their impression of the project. FGDs which are well run uncover real feelings and issues along with non-verbal information (excitement, stress, doubt) which therefore provides more profound information that personal interviews or surveys can give (Office of Quality Improvement, 2007). Three FGDs were carried out for the study, one for each garden where each group had 8 discussants. The facilitator used a FGD guide for gathering data through questions asked.

3.5.2.4 Observations

According to Taylor-Powell and Steele (1996) observation is important when a researcher wants direct information on activities, physical settings and behaviours of the research area and population without having to depend on the ability or willingness of the next person to respond. Observations are an important tool in data collection because sometimes people demonstrate a better understanding of a concept through actions than through a verbal explanation (Walliman, 2001). The researcher made observations in the three gardens of the crops being grown, methods adopted by smallholder farmers to protect the wetland area and the general activities of the project members. This was done in order to determine the extent of biodiversity conservation by smallholder farmers and at the same time examining the sustainability of the project. Data was

also captured through photography as a technique for observation. A summary of the observations made was recorded as notes and later documented on the observation guide.

3.5.3 Secondary data

The use of secondary data is for the continued in-depth analysis of previous data sets for the purpose of studying additional subsets of original data and to describe contextual characteristics of societies and populations (Fielding, 2004). Hox and Boeije (2005) describe secondary data as data collected originally for a different purpose and is reused for another research question. The author used research papers, scholarly journals, books, official statistics, institutional data and reference books for her research. Secondary data was used to gain an in-depth understanding of the research question and to extend views on the study topic through interpretations and conclusions developed by others. The researcher also used project documents from Shurugwi Partners which included the project proposal, quarterly reports, annual reports, bulletins and newsletters. Using secondary data was a cheaper and more accessible way of collecting data.

3.6 Data analysis and presentation

Shamoo and Resnik (2003) describe data analysis as a systematic process of applying statistical or logical methods in describing, illustrating, summarizing, recap and evaluation of data. Content analysis was used to analyze data collected through interviews and observations. The researcher additionally used descriptive statistics to summarize obtained data. Statistical Package for Social Sciences (SPSS) was used to analyze some of the data obtained from questionnaires for effective management of data, elimination of errors and to save time. Nominal data (gender and marital status) and ordinal data (age group, monthly income) were coded and inputted through SPSS. The Chi-Square test was additionally used to compare the income of project members before and after setting up of the community gardens. The analyzed data was then further presented in form of tables, bar graphs, line graphs, pie charts and photographs.

CHAPTER FOUR: RESULTS PRESENTATION AND ANALYSIS

4.1 Socio- demographic characteristics of respondents

A total of 42 questionnaires were administered to the three community garden project beneficiaries in Chitora. This was done to solicit data on the social and economic benefits of the Chitora gardens project, training received, activities done in the project, its sustainability and biodiversity conservation (particularly in wetlands). The rate of response for the questionnaires by project members was 100%. The data also comprises of sex composition of respondents, their age, marital status and household size.

4.1.1. Sex composition and age of respondents

Of the 42 questionnaires administered both males and females were equally represented. Each garden had 7 males and 7 females making them 21 of either gender for all the three gardens. The youth (18-30 years) had the highest involvement (52.4%) which can be attributed to the high unemployment rate, low level of education and child headed households. The 50 years and above age group were 23.8 %. These are the most vulnerable since they can no longer be involved in formal employment because of their age and therefore opt for the community garden as a means for survival. The middle aged 31-50 also constituted 23.8% possibly because they are the ones who have families and have to take care of them thereby involving themselves in such projects to get some income and food from the community gardens

4.1.2 Marital status

Of all the respondents from questionnaires, the highest percentage 54.8% were married and this is because they are the ones responsible for bringing food for consumption in their households. 31% of the sample were single who are probably found within the 52.4% of respondents who were between the ages of 18 and 30. Widows and widowers constituted 11.9% of the respondents. There is a very low divorce rate and this can be attributed to the African culture and Christianity which do not encourage divorce thus only 2.4% of the population were divorced. Figure 4.1 shows the marital status of respondents in percentage form from the three gardens:

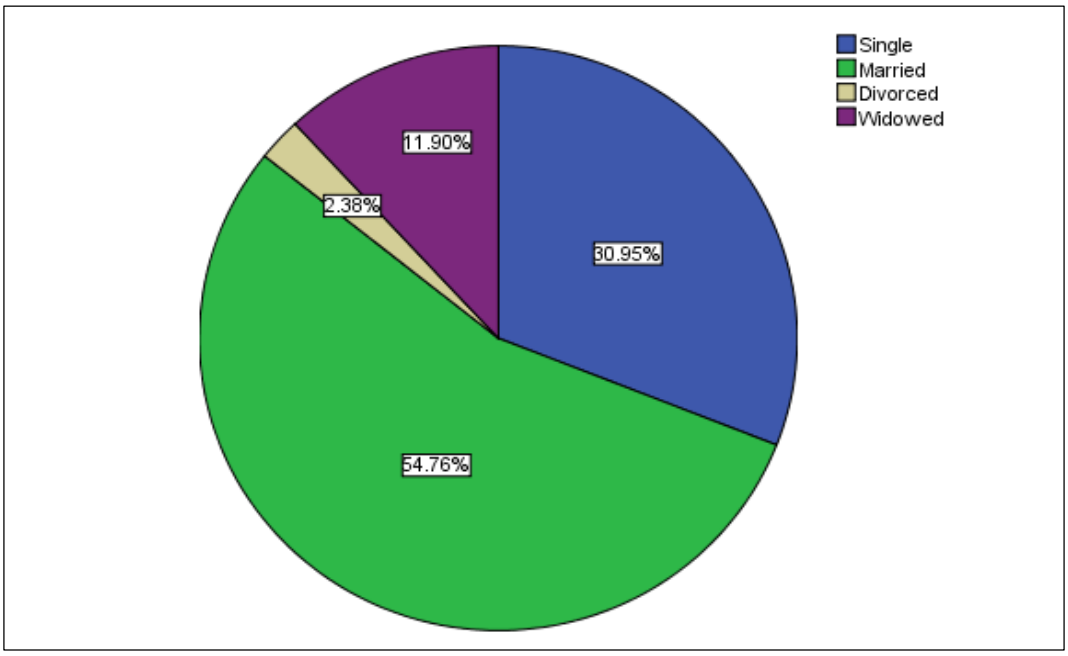

Figure 4.1: Marital status of project members of the Chitora gardens project

4.1.3 Household size

Household size was an important determinant for the researcher understanding that as the household size increases so does the need for more income and food. Out of 42 questionnaires, 23 (54.8%) project members had a household size of 4-8 people. 23.8% had household sizes of between 1-4 while 21.4% of the households had more than 8 people.

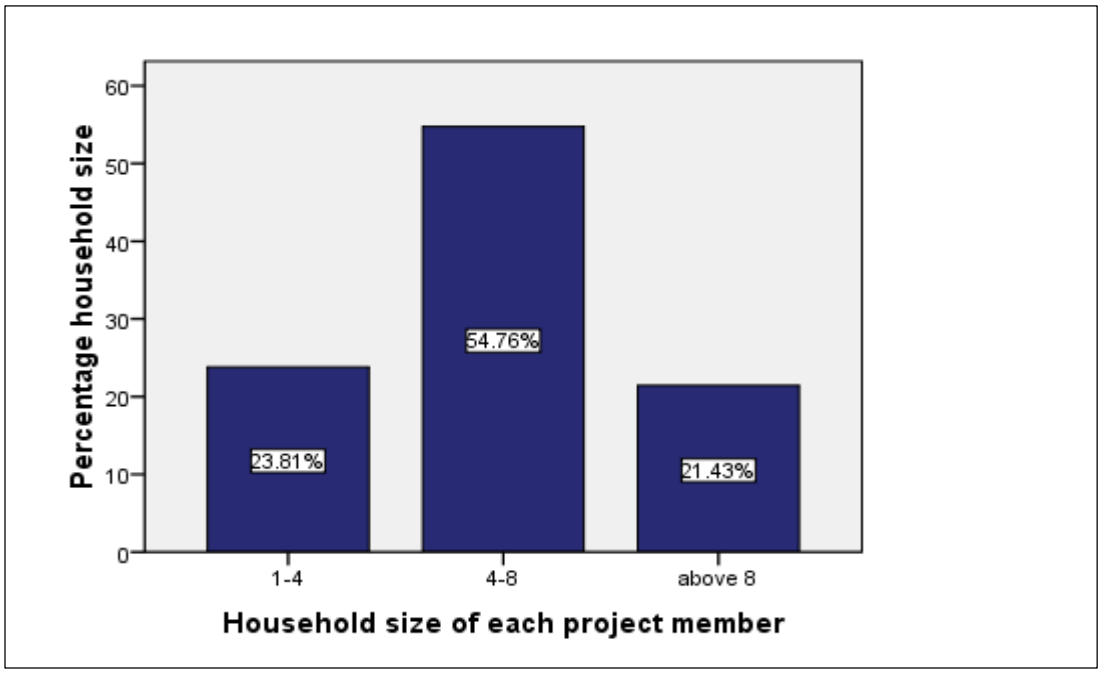

Figure 4.2: Nature of household size of project members

4.2 Social and economic benefits of the Chitora gardens project to the smallholder farmers

4.2.1 Social and economic strong points of the project

The project has provided an opportunity for community members in Chitora to work together. In the questionnaires administered, project members revealed that the community is more united now than before because of the project. The researcher observed that project members seemed to be working together in the community garden amicably. The Councilor for Chitora ward 1 opined that because of the project, there has been improved social interaction among community members. She added that crime rates have decreased and there are no longer cases of theft in gardens since most people have their own plots in the project and therefore most of the community has some food. This therefore conforms to a study by Wakefield et al (2007) on their study on community gardening in South-East Toronto where they concluded that community gardens foster social inclusion and thereby encouraging conversation and problem solving to the community. Food availability and living standards have positively altered because of the Chitora gardens project. The project chairperson for Simbaravanhu garden revealed that there are some people whom he would never have interacted with, but because of the Chitora gardens project they now share knowledge, advice and have a strong relationship with. The project members are the center of planning and decision making and they decide whether or not to do a particular activity or when to do it. Women play a leading role in the community garden as they have positions in the project committee and are leading farmers in the garden. In a focus group discussion, the project secretary for Tugwi-Dekete who is a woman confirmed in confidence that as women they are now empowered enough to conduct training to fellow project members, be wetland scouts and conduct sales to the external market. Women participation has therefore been strengthened through this project. The project chairperson of Simbaravanhu also highlighted that effective time management is a strong suit which project members have. Project members balance their time in the community garden, their personal fields and their homes and have specific days during which they work in their community gardens.

4.2.2 Income and employment status in households before the establishment of the garden

100% of the respondents indicated that before the Chitora gardens project, income from activities done by project members was not sufficient to depend on for survival. This is because the source of income came from part time employment *(maricho*), horticultural home gardens, farming in

personal fields, selling of livestock, food for work, selling milk, making and selling sweeping brooms. Among the respondents from questionnaires, 80.95% of households had no one employed in the formal sector. This explains why they opted for community gardens as a source of income. In an interview, an officer from Ministry of Youth Development, Indigenization and Economic Empowerment disclosed that because of high levels of unemployment in the country, the Chitora gardens project has caused improvement in the social and economic lives of the youth in the ward who are involved in the project as they benefit from the project as much as any of the other project members. Figure 4.3 shows the percentage number of people that are formally employed in each of the households of the respondents.

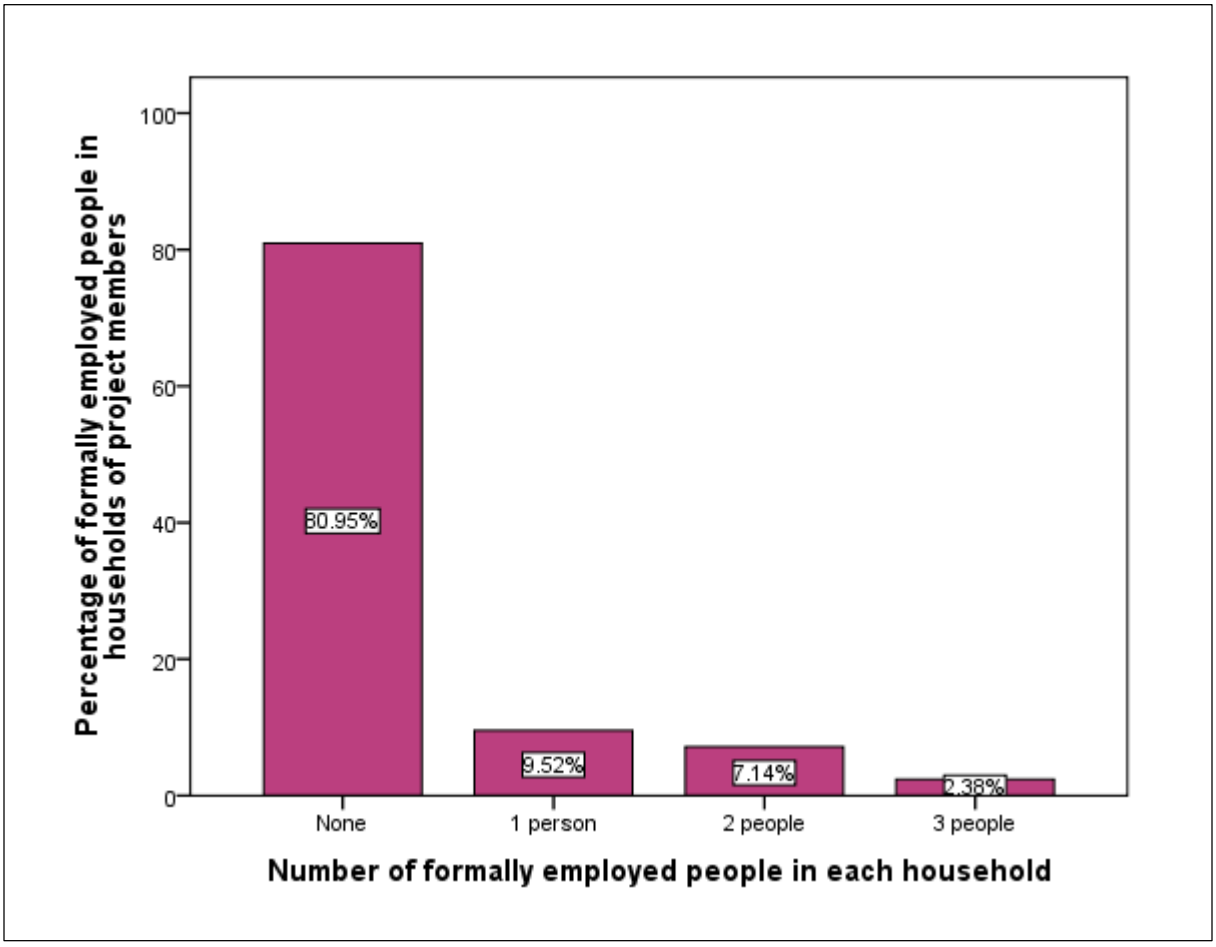

Figure 4.3: Employment status of project members

Before the establishment of the 3 community gardens, smallholder farmers' income was very low. 26 out of 42 (62%) respondents revealed that before the Chitora gardens project they made less

than USD 10 per month while 11(26%) members said they would make between USD10-50 per month. Only 5 (12%) of the respondents made between USD 50-100 before the Chitora gardens project.

4.2.3 Income after establishment of garden

95% of the respondents from questionnaires indicated there was an increase in income of project members of the Chitora gardens project. Project members get income from the project and 71.4% of respondents get between USD 10- USD 30 every week. This money according to some project members has helped them to buy household groceries and pay tuition fees for children. Table 4.1 below shows the weekly income that smallholder farmers get from the project:

Table 4.1 Smallholder farmers' weekly income from community garden sales

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than or equal to USD10	10	23.8	23.8	23.8
	USD10-USD30	30	71.4	71.4	95.2
	USD30-USD50	2	4.8	4.8	100.0
	Total	42	100.0	100.0	

Chi-square test was used to calculate through SPSS if there was an association between increase in income of smallholder farmers and establishment of the Chitora gardens project. The null (H_0) and alternate hypothesis (H_1) is shown below:

H_o -There is no relationship between increase in income of smallholder farmers and establishment of the Chitora gardens project

H_1- There is a relationship between increase in income of smallholder farmers and establishment of the Chitora gardens project

Formula of Chi-square: $\mathbf{X^2 = \sum \frac{(O-E)}{E}}$

Where: X^2 is Chi-square test

O is the Observed frequency

E is Expected frequency

Expected Value = $\frac{\text{Row total} \times \text{Column total}}{\text{Grand total}}$

Table 4.2: Chi-Square Tests as calculated by SPSS

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.488[a]	4	0.166
Likelihood Ratio	6.240	4	0.182
Linear-by-Linear Association	.009	1	0.924
N of Valid Cases	42		

a. 5 cells (55.6%) have expected count less than 5. The minimum expected count is .33.

The test showed that the project has a positive effect on income of project members. The value of Pearson Chi-square obtained was 6.488 and P value is 0.166 thus acceptance by the researcher of H_1 and rejection of H_0 because P value is less than 0.5. It can therefore be argued that the Chitora gardens project provides economic benefits to smallholder farmers. However, an interview with the project chairperson of Simbaravanhu revealed that the amount each project member gets weekly depends on the season and level of crop maturity.

4.2.4 Training offered to project members

Project members of the Chitora gardens project went through several training since the start of the project. The training has helped in the successful implementation of the Chitora wetlands conservation and integrated livelihoods project. The training has made it possible for the objectives of the project to be fulfilled. Results from questionnaires showed that smallholder farmers have gained knowledge in aspects to do with climate change adaptation, their social lives, how to obtain income from their gardens or conservation of biodiversity. Smallholder farmers are now empowered enough because of training to do the things they wouldn't have done or reach places

they would never have gone to if not for the project. The training offered to each of the project members included:

- ✓ Training on organic farming
- ✓ Group leadership training
- ✓ Wetlands conservation training
- ✓ Beekeeping training
- ✓ Market linkages and value addition training
- ✓ Soil and water conservation training
- ✓ Integrated Pest Management
- ✓ Land use planning
- ✓ Wetland scouting

The training has therefore helped in achieving the overall objective of the project which is the conservation of wetlands in Chitora ward 1 and provision of environmental conservation strategies and training. This has changed livelihoods of the local community members of Chitora. Plate 4.1 shows members of Faquar garden after a beekeeping training with the Kenyan top bar beehives which they made.

Plate 4.1: Project members of Faquar garden after beekeeping training

Source: Field data

4.3 Sustainability of the Chitora gardens project

4.3.1 Annual production calendar for the community gardens

Project members of Faquar, Simbaravanhu and Tugwi- Dekete gardens all have a variety of crops which they grow in their community wetland gardens. The gardens have proved to be sustainable as they provide food and income to smallholder farmers throughout the year. Members revealed that gardens add to the quantity and nutritional value of food that they consume in their households. Below is the annual production calendar of vegetables grown in the community gardens on a quarterly basis:

Table 4.3: Annual production calendar for the community gardens

January-March	**April-June**	**July-September**	**October-December**
Rape Carrots Onions Covo Cucumber Pepper	Onion Beetroot Garlic Tomatoes Cabbage Okra	Potatoes Cucumber Watermelon Rape Eggplant Broccoli Spinach	Sugar beans Onion Carrots Okra Rape Covo Butternut

Source: Field data

There are variety of vegetables available in the three community gardens throughout the year. One of the youth in a focus group discussion revealed that because of the garden they now consume some vegetables like broccoli, eggplant, lettuce and cauliflower which they had never tasted in their lives. During an interview, the District Administrator of Shurugwi mentioned that Shurugwi Partners have done a very good job in setting up these comm unity gardens as it is benefiting the local community and therefore will continue to support such livelihood projects. The Ministry of Youth Development, Indigenization and Economic Empowerment Officer who plays a role of monitoring in the project stated in an interview that the goals of the ministry is for the youth to be

empowered enough and be self-employed, therefore the project is in line with their goals since the project provides employment for the youth.


Plates 4.2 and 4.3: Production of rape, spinach and king onion in the community garden plots

Source: Field data

4.3.2 Source of market for smallholder farmers

95% of respondents within the three community gardens indicated that they have a stable market for their vegetable produce. Shurugwi Partners connected smallholder farmers to markets where they can sell their horticultural produce. There are several markets available for the vegetables produced in the community gardens including Servcor Catering Company at Unki Platinum Mine located about 123 km from first garden Faquar. Servcor Catering Company buys mainly vegetables like rape, carrots and lettuce from the three gardens. In an interview with the Director of Shurugwi Partners he mentioned that Servcor at Unki mine even went on to sign a Memorandum of Understanding with the smallholder farmers of the community gardens that they would buy vegetables from the smallholder farmers as long as the supply is consistent and the vegetables are organically produced. However, the project members in a focus group discussion agreed that transport from their community gardens to the market which may be further than the local is still a problem and therefore this problem has to be addressed. Table 4.4 shows a list of markets where project members of the Chitora gardens project have sold their produce to, location of the market

and mode of transport used. Distances provided are from the three gardens (Faquar, Simbaravanhu and Tugwi-Dekete) to the market.

Table 4.4: Regular market for produce from the Chitora gardens project

Market	**Location**	**Distance from gardens project**	**Mode of transport used**
Servcor Catering Company at Unki	Unki Platinum Mine, Shurugwi	116 km-Faquar 125 km-Simbaravanhu 133 km-Tugwi-Dekete	Shurugwi Partners' vehicle
Servcor Catering Company at Tadabi	Shurugwi Chrome Club	95 km-Faquar 104 km- Simbaravanhu 112 km-Tugwi-Dekete	Shurugwi Partners' vehicle
Servcor Catering Company at Todal Mine	Shurugwi	145-Faquar 154-Simbaravanhu 162-Tugwi-Dekete	Shurugwi Partners' vehicle
Midlands Spar	Gweru	65km- Faquar 74km-Simbaravanhu 82km-Tugwi-Dekete	External aggregator
Kombayi market	Gweru	68km- Faquar 77 km- Simbaravanhu 85- Tugwi-Dekete	External aggregator
Hanke Mission	Shurugwi	125km-Faquar 134km- Simbaravanhu 142 km- Tugwi- Dekete	External aggregator
Café Exquisite	Gweru	66km-Faquar 75 km- Simbaravanhu 83km- Tugwi-Dekete	Shurugwi Partners' vehicle
Local		-	Personal transport

Source: Field data

The main produce that has to date been transported to the above markets is rape though vegetables like spinach, carrots, tomatoes, cabbage and onion are taken on a regular basis. Shurugwi Partners

covers all transport costs involved when they transport smallholder farmer produce to the market. When vegetables are taken to the market by an external aggregator, project members use the money they get from community garden sales to cover transport. The cost of paying the transporter ranges between USD 10-USD 60 depending on the location of the market. Farmers can afford to pay the transporter since they each contribute at most USD 1.50 for a trip in each garden. The sale can generate every member up to USD 6 and therefore giving each smallholder farmer a profit of USD 4.50 after paying the transporter.

4.3.3 Additional activities done in the Chitora gardens

Besides production of vegetables, the community gardens are also practicing aquaculture (fish farming) where fish ponds were constructed within each of the three gardens. This will add to household food security and nutritional value of the food they eat. Additional income will furthermore be generated where project members will be able to sell their fish when mature. The project members are also involved in apiculture (beekeeping). Some of the members of the community gardens mentioned beekeeping as one of the activities which they take part in when in the Chitora gardens project. The researcher observed Kenyan Top bar beehives within the community gardens. This is another way which the project members are conserving tree species within their community garden as forest areas are a basic requirement for beekeeping while it is a sustainable source of income when selling honey giving smallholder farmers economic self-reliance. This therefore falls in line with what was discussed in a study by Messner et al (2014) when they established that beekeeping aids in pollination of plants and may also provide some extra income where each hive may yield up to USD 200 per year. A fruit orchard was developed in all the three community gardens and currently the fruits that were grown are oranges and naartjie. The fruit orchard garden is also a way to control climate change impacts where it will play a role as a carbon sink and sequestration for the ward.

Project members during a focus group discussion revealed that their aspirations would be to continue with the project on a long term basis and upscale production so that they would get more income and food from the project. Plate 4.4 is a fish pond constructed by project members in one of the project gardens.

Plate 4.4: Fish pond for aquaculture constructed by project members in Faquar garden

Source: Field data

4.4 Biodiversity conservation by smallholder farmers in Chitora wetland gardens

4.4.1 Impact of climate change

Climate change has been found to be affecting agriculture by smallholder farmers in community gardens. During the questionnaire survey, 92.8% of project members mentioned that they are suffering from the shock of climate change where yields are affected since they depend on rain fed agriculture. The AGRITEX officer in an interview mentioned that climate change impacts affect agriculture in the ward and the district as a whole since the area is semi-arid. The officer added that agriculture is highly affected by seasonal variability which causes poor timing by smallholder farmers resulting in earlier planting or late planting. There are more agricultural droughts and hydrological droughts that have been experienced and smallholder water resources are negatively affected. The study also revealed through the questionnaire survey that wetlands were highly degraded before project implementation. High degradation was because of community members who utilized these wetlands for agriculture because of their ability to store moisture avoiding their vulnerability to climate change effects but methods used were not environmentally friendly. The Chitora gardens project has however helped in reviving the wetlands that had been degraded. Forest areas are being regenerated especially on fields that are no longer being used since more people are now concentrated in the community gardens. The project members are moreover responding to climate change by practicing afforestation and avoiding deforestation in the gardens.

4.4.2 Training on biodiversity conservation

Project members were severally trained during project implementation in relation to the conservation of biodiversity. In the questionnaire survey conducted, 95% of project members revealed that they had gone under training which include wetland conservation, land use planning, soil and water conservation, Integrated Pest Management (IPM) and organic farming. According to an interview with an Officer from Ministry of Youth, Development, Indigenization and Economic Empowerment who is actively involved in the project, before production in the three wetlands, all the project members participated in a biodiversity species inventory carried out. At the end of the biodiversity species inventory each garden assigned wetland scouts who had been trained. These wetland scouts are project members who play the role of monitoring and evaluation to ensure proper utilization of the wetlands, monitoring the change in species composition and therefore they can tell a story of change that is occurring in their wetland gardens. The AGRITEX Officer also highlighted that smallholder farmers were trained on organic farming and certified as

organic producers by the Zimbabwe Organic Producers and Promoters Association (ZOPPA) through SNV Netherlands. This not only helps to conserve species within the wetland but is a healthier option for those that consume the vegetables. The training help to ensure that utilization of wetlands by smallholder farmers is done in a sustainable and non- degradable manner.

Plate 4.5: Perennial pool within Tugwi- Dekete wetland

Source: Field data

4.4.3 Level of degradation of the wetland

92.9% of respondents from the Chitora gardens project disclosed that before implementation of the Chitora gardens project the wetlands were highly degraded. 4.8% of project members who participated in the questionnaire survey responded that the wetlands were partially degraded before project implementation while 2.4% revealed the wetlands as not degraded before implementation of the project. These responses are shown in table 4.5:

Table 4.5: Responses from project members on the level of wetland degradation before project implementation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not degraded	1	2.4	2.4	2.4
	Partially degraded	2	4.8	4.8	7.1
	Highly degraded	39	92.9	92.9	100.0
	Total	42	100.0	100.0	

Responses from questionnaires showed that the wetlands were now improved, revived and healthy in comparison with before implementation of the project. Some of the project members in a focus group discussion at Simbaravanhu garden mentioned that some of the grass species that were no longer growing within the wetland can now be noticed since implementation of the project. During an interview, the AGRITEX Officer revealed that the Chitora gardens project is promoting the recovery of threatened species, performing as a natural store for biodiversity and simultaneously acting as an important resource for smallholder agriculture. The wetlands are being conserved in a sustainable manner and being restored to good physical state while livelihoods benefit. Plate 4.6 below shows a pool within Simbaravanhu wetland which has now been protected because of the Chitora gardens project:

Plate 4.6: Protected pool within the Simbaravanhu garden

Source: Field data

4.4.4 Strategies being used to conserve biodiversity

During an interview, Director of Shurugwi Partners pointed out that to ensure conservation of biodiversity, a biodiversity species inventory had been undertaken after the fencing stage of the project to identify buffer zones to put livelihoods projects for horticultural production and development of the fruit orchard. He added that the survey helped in identifying the sensitive areas where the garden plots were not be placed and will furthermore be used as a baseline to measure change in species composition after project implementation. The project is rehabilitating degraded areas in Chitora ward particularly wetlands. Water harvesting is a technique being used to utilize the water within the wetland, conserve water and increase water availability. This is done through water harvesting weirs, some of which are still under construction by project members.

Organic farming is a major strategy which was adopted in the Chitora gardens project in all three community gardens where all farmers are certified to produce organic crops. The project chairperson of Faquar garden explained that there are standards, rules and policies which apply in the gardens when it comes to organic farming and conservation of biodiversity particularly in the wetlands. Failure to comply with these standards by a project member will result in a particular sanction which was agreed upon by all project members and this may include dismissal from the garden or paying a fine depending on the severity of incompliance. Plate 4.7 shows a list of standards observed by the researcher which is displayed at one of the community gardens and the sanction given when a project member does not comply.

Plate 4.7: Standards of organic certification and sanctions at Faquar 1 community garden

Source: Field data

Rehabilitation of degraded wetlands was done through fencing of the wetland as a strategy to conserve biodiversity. 100% of questionnaire respondents specified fencing as the help they received from Shurugwi Partners through GEF SGP UNDP to protect the wetland and conserve biodiversity. One of the project members in a focus group discussion revealed that there is minimal traction by humans in wetland gardens except on work days.

Livestock and domestic animals like dogs are also not allowed beyond the fenced area of the garden. Not killing any animal species they come across within the wetland is another strategy mentioned to preserve the biodiversity that is still available within the wetlands.

Other approaches being used by smallholder farmers to conserve biodiversity include not allowing deforestation and practicing afforestation in the gardens. Fires are not permitted within the community garden. This lessens the rate of veld fires in the ward. This leads to less emissions of particulate matter and pollutants into the atmosphere, therefore reducing greenhouse gases and responding to climate change related problems.

As a result of these strategies being applied by smallholder farmers in the wetland, community gardens questionnaire surveys reveal that there has been restoration of the three wetlands. There is abundant flora and fauna species which are available now in the wetlands and grass species which had almost gone extinct can now be observed. During field observations, the researcher observed species like the Ardeidae, Typha Latifolia specifically the Capensis, hyparrhenia dregeana and hyparrhenia hirta within the wetlands. Interviews with the projects chairpersons also revealed that wetland pools which had almost dried up have now been recharged and more water is available than before implementation of the project. However the water available is still not enough for use in agriculture especially in the hot season. Smallholder farmers use the bucket system for watering their plants and this is not conducive especially for the elderly that work in this garden.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

Findings from this research showed that rural communities particularly smallholder farmers have been negatively affected by climate induced problems in Shurugwi district since dependence is on rain-fed agriculture. The Chitora gardens project nevertheless has responded to this problem and livelihoods in the ward have been enhanced. Garden plots in the community gardens compliment produce from personal fields which most project members have. By utilizing water from the wetlands, smallholder farmers are now able to produce food for their families whilst surplus produce goes to the market. Within the different villages, there is more access to vegetables now than before. Through the Chitora gardens project, smallholder farmers have become food secure. Community members who are part of the project have benefited economically and get substantial weekly income from proceeds of sales of different vegetables which they grow in their community garden plots. The hypothesis test done using chi-square also proved that there is an increase in the income earned by project members of the Chitora gardens project. The income that project members get cushions them and enables them to support other relatives outside the community, meet household expenses and pay tuition fees for their children. Social lives of project members and relationships have also been strengthened through this project. Project members have gained vast knowledge and capacity building skills not only in agriculture and biodiversity conservation but personal development because of training offered during project implementation.

The research also perceived that the Chitora gardens project is a sustainable initiative by Shurugwi Partners in rural areas and on a long term basis may benefit more communities. Smallholder farmers in the Chitora gardens project have been efficiently utilizing the very few resources available and therefore have gained more from the garden. The Chitora gardens project has also contributed to a larger extent to the management and conservation of biodiversity specifically wetlands. Since the start of the project and protection of the wetlands, there has been a positive change noticed in all three gardens in terms of increase in performance functions and services provided by wetlands. There is indication of more water available in the three wetlands now than before. Availability of more water in the wetland therefore means revitalization of some flora and fauna species including the Typha Latifolia and Hyparrhenia dregeana.

Therefore, the study concludes that community gardens projects are an effective way of reducing climate change impacts on rural communities and empowering them to improve their livelihoods. These projects are also sustainable to smallholder farmers and have a positive impact on the environment.

5.2 Recommendations

Basing on the data obtained and the conclusion drawn, for the project to remain sustainable, provide more benefits to smallholder farmers and the whole district of Shurugwi and continue to sustainably conserve biodiversity, the following recommendations should be taken into consideration:

- ✓ Stakeholders including partners, donors and government departments should continue to work with and support organizations like Shurugwi Partners in the implementation of such projects in rural areas to assist them where they may need help.
- ✓ There is need to complement the available water sources by project members or through a funding donor since there is still water stress particularly in the hot season where farmers ration the little water available. A solar borehole would be ideal especially if there is going to be up-scaling in terms of production in the community gardens.
- ✓ The bucket system of watering crops being used in community gardens can be supplemented by the donor (GEF SGP) through setting up of proper irrigation equipment like the syphon or trench irrigation method. This can be quicker and less labor intensive especially to the most vulnerable like the elderly that are part of the project.
- ✓ Climate change adaptation strategies by adopting smart climate change agriculture should be considered by project members by using minimum water for maximum food production.
- ✓ Smallholder farmers should get a reliable transport aggregator for stable transportation of produce to the market.
- ✓ Community members including current project members should continue to be involved in the community gardens for projects to continue being sustainable in terms of climate change adaptation, empowering communities and providing livelihoods with socio-economic benefits.
- ✓ Shurugwi Partners should continue to provide consistent capacity building workshops to smallholder farmers so that they continue to improve their gardens for long term sustainability.

REFERENCE LIST

Abi-Nader, J., Dunnigan, K. and Markley, K. (2005) Growing Communities Curriculum: Community Building and Organizational Development through Community Gardening.

Baldwin, K., Beth, D., Bradley, L., Dave, N., Jakes, S. and Nelson, M. (2009) Eat Smart, Move More North Carolina: Growing communities through gardens. [Online]. Available from http://nccommunitygarden.ncsu.edu/ESMMGardens-LoRez.pdf. [Accessed on 24 August 2015]

Beck, F. D. (2001) Introduction to the Special Section, 'Struggles in Building Community.' *Sociological Inquiry* 71(4). Pgs. 455-458

Bhattacherjee, A. (2012) Social Science Research: Principles, Methods and Practices. Textbooks Collection, Book 3. Accessed on http://scholarcommons.usf.edu/oa textbooks/3 on 08/07/15

Birch, E. and Wachter, S. (2008). *Growing Greener Cities: Urban Sustainability in the 21st Century*. Pgs 194-206

Boko, M. et al (2007) Impacts, Adaptation and Vulnerability. Contribution of Working Group 2 to the fourth assessment report of the Intergovernmental Panel on Climate change, Cambridge University Press, Cambridge UK, Pgs. 433-467

Brasch, A. Kershner, J. and Mello, N. (2010) *Community Gardens: Governance and soil quality in Madison*, WI. Department of Geography, University of Wisconsin-Madison

Bremer, A., Jenkins, K. and Kanter, D. (2003) *Community gardens in Milwaukee: Procedures for their long-term stability and their import to the city-Milwaukee*. Department of Urban Planning, University of Wisconsin

Brown et al (2012) *Climate change impacts, vulnerability and adaptation in Zimbabwe*. International Institute for Environment and Development (IIED) Climate change working paper, no. 3

Burns, R. B. (1997) *Introduction to Research Methods*. 2nd edition. Melbourne: Longman Cheshire

Cameroon, J., Manhood, C. and Pomfrett, J. (2010) *Growing the community of community gardens.* Research contributions, paper submitted to the community garden conference, Canberra

Campbell, S. (2014) What is Qualitative Research? *Clinical Laboratory Science; Volume 27, Pg1: ProQuest Central, Pg* 3. Available at http://search.proquest.com.access.msu.ac.zw:2048/docview/1530677717?accountid=145056. [Accessed on 16 July 2015].

Castillo, J. J. (2009) Research Population. Available from http://explorable.com/research.population. [Accessed on 31 July 2015]

Chazovachii, B., Mutami, C. and Bowora, J. (2012) Community gardens and food security in rural livelihood development: The case of Entrepreneurial and market gardens in Mberengwa, Zimbabwe. *Russian Journal of Agricultural and Socio-Economic Sciences*. 1(13). pgs. 8-17

Chevrette, L. A. (2011) *Community gardening: Exploring motivations, benefits and gardener experiences.* Northern Environments and cultures, Lakehead University, Canada

Clavin, A. (2011) *Community gardening: skills for building and working within environmental limits.* Leeds School of Architecture, Landscape and Design Leeds. Metropolitan University

CropLife International, (2005) Conservation Technologies and the plant science industry: Managing Natural Resources Sustainably [Online] Available at http://www.croplife.org. [Accessed on 5 July 2015].

Columbus, OH: The American Community Gardening Association. [Online] Available from http://www.communitygarden.org/acga-store.php#gcurriculum. [Accessed on 31 August 2015]

Cooper Marcus, C. and Barnes, M. (2001) *Healing Gardens: Therapeutic benefits and design recommendations*. New York, John Wiley

Denzin, N. and Lincoln, Y. (Eds.). (2005). *Handbook of qualitative research* (3rd ed.). Thousand Oaks, CA: Sage

Dezendorf, C.F. (2013) *Agriculture, Diet, and Empowerment: Understanding the role of community gardens in improving the health of Oregon's urban Latino community.* Department of International Studies and the Graduate School, University of Oregon

Dow, C. L. (2006) *Benefits and barriers to implementing and managing well rooted community gardens in Waterloo Region, Ontario*. School of Urban and Regional Planning, Queen's University Kingston, Ontario, Canada

Driscoll, D. L. (2011) Introduction to Primary Research: Observations, Surveys and Interviews. *Writing Spaces: Readings on Writing*, Volume 2, pgs. 153-174. Available from http://writingspaces.org/essays. [Accessed on 27 July 2015]

Fulford, S. and Thompson, S. (2013) *Youth community gardening programming as community development: The youth for EcoAction Program in Winnipeg, Canada*. Canadian Journal of Nonprofit and Social Economy Research, Vol. 4, No 2; pgs. 56-75

Golden, S. (2013) *Urban Agriculture Impacts: Social Health, and Economic: A Literature Review*. UC Sustainable Agriculture Research and Education Program Agricultural Sustainablity Institute at UC Davis. University of California Agriculture and Natural Resources. Available at http://asi.ucdavis.edu/resources/publications. [Accessed on 30 August 2015]

Gough, M. and Accordino, J. (2011) *The role of public gardens in sustainable community development.* National planning grant, Institute for Museum and Library Services (IMLS) project. Available at. [Accessed on 30 August 2015]

Grigg, D.B. (1974) The Agricultural systems of the world: An evolutionary approach, New York, Cambridge University Press.

Gukurume, S. (2012) Climate change, variability and sustainable agriculture in Zimbabwe's rural communities. Russian Journal of Agricultural and Socio-Economic Sciences, 2(14), pgs. 89-100

Hallberg, B. (2009) Using Community Gardens to Augment Food Security Efforts in Low-Income Communities. Masters of Urban and Regional Planning, Virginia Tech, USA

Hancock, T. (2001) People, partnerships and human progress: building community capital. *Health Promotion International.* Vol. 16. Pgs. 275-280

Fielding, N. (2004) Getting the most from archived qualitative data: epistemological, practical and professional obstacles. *International Journal of Social Research Methodology, Volume 7 (1), pgs. 97-104*

Fox, N., Hunn, A., and Mathers, N. (2007) Sampling and sample size calculation. The NIHR for the East Midlands/ Yorkshire & the Humber

Hox, J. J. and Boeije, H. R. (2005) Data Collection, Primary vs Secondary. *Encyclopedia of social measurement*, Volume 1, pg. 593-599. Utrecht: Utrecht University

Hussein, A. (2009) The use of Triangulation in Social Sciences Research: Can qualitative and quantitative research be combined? *Journal of Comparative social work*. Volume 1, pg. 1-12

IPCC, (2007*) Contribution of Working Groups I, II and III to the fourth Assessment Report on the Intergovernmental Panel on Climate Change*. Eds. Pachauri, R.K. and Reisinger, A. IPCC, Geneva. [Online]. Available from http://www.ipcc.ch/ipccreports/ar4-syr.htm. [Accessed on 02 September 2015.]

IPCC, (2007) Summary for Policy Makers; Chapter 11 of the 4th IPCC Report on Regional Climate Projections; & Chapter 9 on Africa. Fact Sheet Climate Change in Africa- What is at stake? Excerpts from IPCC reports, the Convention, & BAP, compiled by AMCEN Secretariat

IPCC TAR, (2001 a). *Climate Change 2001: Impacts, Adaptation and Vulnerability. IPCC Third Assessment Report*. Cambridge: Cambridge University Press

IUCN, IISD, SEI-B and Interco-operation (2004) *Sustainable Livelihoods and Climate Change Adaptation. Outputs of Working Group 1, LCA Climate Adaptation Challenges for Africa Workshop, Nairobi*. [Online] Available from www.linkingclimateadaptation.org. [Accessed on 16 July 2015.]

Karfakis, P., Lipper, L. and Smulders, M. (2013) The assessment of the socio-economic impacts of climate change at household level and policy implications. Agriculltural Development Economics Division, FAO, Rome

Kearney, S. C. (2009) The Community Garden as a Tool for Community Empowerment: A study of Community Gardens in Hampden County

Keeney, G. (2000) *On the nature of things: contemporary American landscape architecture*. Basel: Birkhauser

Key, J. P. (1997) *Research Design in Occupational Education*. Oklahoma State University. Available on www.okstate.edu/ag/.../newpage16.htm. [Accessed on 30/07/15]

Kumar, K. (1987) Conducting focus group interviews in developing countries. A.I.D. Program Design and Evaluation Methodology, Repot no. 8. Washington D.C.: U.S. Agency for International Development

Kurtz, H. (2001) Differentiating multiple meanings of garden and community. *Urban Geography.* 22 (7). Pgs. 656-670

Latham, B. (2007) Sampling: What is it? Quantitative Research Methods. Available at webpages.acs.ttu.edu/rlatham/coursework/5377(Quant))/Sampling_Methodology_Paper.pdf. [Accessed on 23/07/15]

Lyson, T. (2004) *Civic agriculture: Reconnecting farm, food and community.* Medford, MA: Tufts University Press

MacDonald, S. and Newton, G. (2005) Kitchener working centre: Building community gardens manual. Available from http://www.Theworkingcentre.org/ct/urban_agro/resources/resources.html. [Accessed on 15 August 2015].

Madebwe, V. & Madebwe, C. (2005) An Exploratory Analysis of the Social, Economic and Environmental Impacts on Wetlands: The Case of Shurugwi District, Midlands Province, Zimbabwe. *Journal of Applied Sciences Research 1 (2): 228-233*.

Marambanyika, T., Mutsiwegota,C. and Muringaniza, K. C. R. (2012) Importance of community participation in sustainable utilization of wetlands: case of Chebvute in Zvishavane district of Zimbabwe. *Journal of Environmental Science and Engineering, pgs. 832-844*

Matsa, M. and Dzawanda, B. (2014) Dependency Syndrome by Communities or Insufficient Ingestion Period by Benefactor Organizations? The Chirumanzu Caritas Community Gardening Project Experience in Zimbabwe. *Journal of Geography and Earth Sciences, Vol 2, No. 1, pgs. 127-148*

Matsa, M. and Muringaniza, K. (2010) Rate of Land-Use/ Land-Cover Changes In Shurugwi District, Zimbabwe: Drivers for Change. *Journal for Sustainable Development in Africa, Vol 12:3, pgs.107-121*

McCartney, M., Masiyandima, M. and Houghton-Carr, H. A. (2005) *Working Wetlands: Classifying Wetland Potential for Agriculture.* Research Report 90. International Water Management Institute (IWMI). Colombo, Sri Lanka

Messner, R., Strange, J. and Brain, R. (2014) Backyard beekeeping. USDA-ARS Pollinating Insect-Biology, Management, and Systematics Research Unit, Department of Environment and Society, Utah State University.

Ministry of Water Resources Development, (2004) *Trends in Zimbabwean Temperatures, Harare: Longman*

Mitchell, T and Tanner, T. (2006) Adapting to climate change: challenges and opportunities for the development community. Institute of Development Studies. www.ids.ac.uk/ids

New Farmer (2004) Zimbabwe's Leading Voice of Agriculture. Vol. 9, no. 4. Harare, Ministry of Agriculture

Ninez, V. K. (1984) Household gardens: theoretical considerations on an old survival strategy. Lima, International Potato Center,

Pender, J. S. (2008) *What is Climate Change? And How Will It Affect Bangladesh.* Briefing Paper. Final draft. Dhaka: Church of Bangladesh Social Development Programme.

Office of Quality Improvement, (2007) Focus Groups: A guide to learning the needs of those who serve. University of Wisconsin System Board of Regents, Madison

Ogawa, T. (2009) Looking at community gardens through neoliberal lenses. *Digital Repository at Iowa State University.* Graduate Theses and Dissertations, Paper 11125.

Parahoo, K. (1997) *Nursing research: principles, process and issues*. Basingstoke, Macmillan

Patton, M. Q. and Cochran, M. (2002) A Guide to Using Qualitative Research Methodology. London: MEDECINS SANS FRONTIERES

Perch, S. R. (2011) Community Garden Barriers: A grounded theory study of Gainesville, Florida. Masters of Arts in Urban and Regional Planning, University of Florida.

Rahman, K. M. M. (2009) *River Erosion and Flooding in Northern Bangladesh.* Sterling. VA: Stylus Publishing Robinson-O'Brien, Ramona, Story, Mary, Heim and Stephanie (2009) Impact of garden-based youth nutrition intervention programs: A review. Journal of the American Dietetic Association. Vol. 109, pgs. 273-280

Rukuni, M. et al (2006) Zimbabwe's Agricultural Revolution Revisited. Harare, University of Zimbabwe Publications

Salvidar- Tanaka, L. and Krasny, M. (2004) Culturing community development, neighborhood open space, and civic agriculture: The case of Latino community gardens in New York City. *Agriculture and human values,* Volume 21, pgs. 399-412 Available from http://krasny.dnr.cornell.edu/doc/Saldivar&Krasny.pdf. [Accessed on 27 August 2015]

Seto, D. (2011) Diversity and engagement in alternative food practice: Community gardens in Vancouver, B.C. Faculty of Graduate Studies, Resource Management and Environmental Studies, University of British Colombia, Vancouver

Shamoo, A. E. and Resnik, B.R. (2003) *Responsible Conduct of Research*. Oxford: Oxford University Press

SNV Netherlands Development Organization, (2011) Empowering Communities Through-Led School Gardens. Smart Development Works. [Online] Available from www.snvworld.org/uganda. [Accessed on 02 September 2015]

Svotwa, E., Manyanhaire, I.O and Makombe, P. (2007) Sustainable use of wetlands: A case for Mwaonazvawo Village in Mutasa District of Manicaland Province of Zimbabwe. *Journal for Sustainable Development in Africa, Vol 9: 9, pgs. 20-36*

Tadesse, D. (2010) The Impact Of Climate Change In Africa. Institute for Security Studies 220. Accessed on www.makepeacehappen.net on 05/05/15

Tarway-Twalla, A. K. (2013) *Agricultural Productivity, Climate Change and Smallholder Farmer's Entrepreneurship: A case study of the Central and Western Regions of Liberia*. University of Liberia. Monrovia, Liberia

Taylor and Francis (2009) Traditional Home Gardens and Rural Livelihoods in Nhema, Zimbabwe: *A sustainable Agro forestry System*, volume 16, Issue 1, 2009, pgs.1-8

Taylor-Powell, E. and Steele, S. (1996) Collecting Evaluation Data: Direct Observation. Program Development and Evaluation; University of Wisconsin- Extension, Madison

Tellschow, J. Z. (2012) Community Gardening: Benefits Focused Strategies. University Libraries, University of Nevada, Las Vegas. Available from http://digitalshoolarship.unlv.edu/thesesdissertation. [Accessed on 25 August 2015].

UNESCO (1987) Ramsar Convention on Wetlands. Available at http://www.ramsar.org/key_conv_e.htm. [Accessed on 11 September 2015]

Wakefield, S., Yeudall, F., Taron, C., Reynolds, J. and Skinner, A. (2007) Growing urban health: Community gardening in South East Toronto. Oxford University Press

Walliman, N. (2011) *Research Methods: The Basics.* New York: Routledge

Warner Jr. S. B. (1987*) To dwell is to garden: A history of Boston's community gardens.* Boston: Northeastern University Press

Webster, M. (1985) *Webster's ninth new collegiate dictionary*. Springfield: Meriam, Webster Inc.

Wormsbecker, C. (2008) Benefits of Community Gardens to the Built Environment. Online: www.together4health.ca. Accessed 08/05/15

Yount, R. (2006) Populations and Sampling. Research Design and Statistical Analysis for Christian Ministry 4th edition.

ZIMSTATS (2012) Zimbabwe 2012 Census Preliminary Report, Harare, Zimbabwe National Statistics Agency.

APPENDIX I

QUESTIONNAIRE FOR PROJECT MEMBERS **#.....**

Garden ……

Date……/……./2015

My name is Maria Guti. I am an undergraduate student doing Geography and Environmental Studies at Midlands State University. I am requesting for your participation in this survey by answering the scheduled questions below on the study on **Empowering rural communities through community gardens as a response to climate change: The case of Shurugwi Partners' Chitora gardens initiative**. Data collected will be strictly for academic purposes and will be treated with utmost confidentiality.

Your cooperation is appreciated

- **Tick in appropriate box and fill in details in the spaces provided**

Section A: Demographic data

1. Gender

MALE	FEMALE

2. Age

18-20yrs	21-30yrs	31-40yrs	41-50yrs	+ 50yrs

3. Marital status

Single	Married	Divorced	Widowed

4. Household size

1-4 people	4-8 people	above 8 people

RESEARCH QUESTIONS

SECTION B

Objective 1: To assess the social and economic benefits of the Chitora gardens project to the smallholder farmers

5. What vegetables do you grow in the garden?.....
   ...……..
   .....
6. What was your household's source of income before the Chitora wetlands conservation and integrated livelihoods for biodiversity conservation project?……..
   ……..……..
7. Was the income sufficient for all the needs of the household to depend on for survival?

YES	NO

8. How many people were formally employed in your household before the community garden?

None	**1 person**	**2 people**	**3 people**

9. How much was your household income before establishment of gardens by Shurugwi Partners?

≤ USD 10	**USD 10-50**	**USD 50-100**	**≥ USD 100**

10. Is the garden bringing income to your household?

YES	NO

11. If yes, how much income do you get from the garden weekly in USD?

≤ USD 10	**USD 10-30**	**USD 30-50**	**≥ USD 50**

12. Have you received any kind of training in the project?

YES	NO

13. If, yes please specify the training you have received……
    ……
    ……

SECTION C

Objective 2: To examine the sustainability of the Chitora gardens project

14. Please give a summary of your annual production in the community garden

January-March	**April-June**	**July-September**	**October-December**

15. Do you have a stable market to sell your produce from the garden?

YES	NO

16. If yes, list your sources of market……..
……
…….

17. What change has occurred in the ward since the start of the project?……
……
……

18. Besides income, what else do you get by being a member of the community garden?
……
…….....

19. In addition to production of vegetables, what other activities do you do in your community gardens?……
……
…….....

SECTION D

Objective 3: To determine biodiversity conservation by smallholder farmers in the wetlands where the Chitora gardens project is being implemented

20. Are you aware of any disturbances that have occurred because of climate change in your village?

YES	NO

21. If yes, how have the climate change impacts affected agriculture in your ward?.....
.....
.....
22. How have you tried to adapt to these climate change problems?.....
.....
.....
23. On a scale of 1-3 (not degraded, partially degraded, highly degraded) how would you rate the state of the wetland before implementation of the project?

1-not degraded	2- partially degraded	3-highly degraded

24. How would you describe the state of the wetland now? ……
…….
25. What help have you received from Shurugwi Partners to protect your wetland?……
…….....
26. Have you received any training on conservation of biodiversity?

YES	NO

27. If yes, what training have you received concerning biodiversity conservation……
28. Would you say this project is conserving biodiversity in the Chitora ward especially the wetlands?

YES	NO

29. If yes, what strategies are being used by the project members to conserve biodiversity? ……
……..

THANK YOU FOR PARTICIPATING IN THIS SURVEY

APPENDIX II

INTERVIEW GUIDE FOR SHURUGWI DISTRICT ADMINISTRATOR

Good day! Thank you for taking your time to participate in this interview. My name is Maria Guti and I am a student at Midlands State University doing my undergraduate study in Geography and Environmental Studies. The purpose of this interview is to gain knowledge on how rural communities have been empowered through community gardens as a response to climate change focusing particularly on Shurugwi Partner's Chitora Gardens.

Name:

Position in office:

Objective 1: To assess the social and economic benefits of the Chitora gardens project to the smallholder farmers

1. What was the status of livelihood in Chitora before Shurugwi Partners established community gardens?
2. How has change in climate affected agriculture in the district?
3. What adaptation measures have you taken to reduce impacts of climate change on the vulnerable livelihoods in your district?
4. How has the project improved the livelihoods of the community of Chitora and Shurugwi District as a whole?
5. Has the community been socially empowered because of the Chitora gardens project?
6. If yes, how have the communities been empowered?

Objective 2: To examine the sustainability of the Chitora gardens project

7. Were there any similar projects in the ward before the Chitora gardens project?
8. Are there any changes that have occurred in the district since the start of the project?
9. If yes, what are the changes that have occurred?
10. Has the project helped you overcome any problems in the district, if yes what exactly
11. How sustainable are these three gardens in improving the livelihoods in Chitora

Objective 3: To determine conservation of biodiversity by smallholder farmers in the wetlands where the Chitora gardens project is being implemented

12. What is the state of wetlands in your district?
13. Is the Chitora community gardens project helping in conserving wetlands in the district?

APPENDIX III

INTERVIEW GUIDE FOR COUNCILLOR OF TONGOGARA RURAL DISTRICT COUNCIL

Good day! Thank you for taking your time to participate in this interview. My name is Maria Guti and I am a student at Midlands State University doing my undergraduate study in Geography and Environmental Studies. The purpose of this interview is to gain knowledge on how rural communities have been empowered through community gardens as a response to climate change focusing particularly on Shurugwi Partner's Chitora Gardens

Name:

Position in office:

Objective 1: To assess the social and economic benefits of the Chitora gardens project to the smallholder farmers

1. What is the role of the TRDC in the Chitora gardens project?
2. How do you assist Shurugwi Partners in their implementation of the project?
3. Have the livelihoods of project members improved since Shurugwi Partners established the community gardens in Chitora Village?
4. If yes, how have the livelihoods of the people in Chitora ward 1 enhanced since the start of the project?

Objective 2: To examine the sustainability of the Chitora gardens project

5. What community livelihood projects does your office have in implementation at the moment?
6. Would you say the Chitora garden's project is bringing development in the District?
7. If yes, how is the project bringing development in Shurugwi particularly Chitora ward 1?
8. Is the Chitora gardens project sustainable to the community?
9. If yes, in what ways is the project sustainable?

Objective 3: To determine conservation of biodiversity by smallholder farmers in the wetlands where the Chitora gardens project is being implemented

10. Has the district been affected by climate change impacts?
11. If yes, how has the community managed to adapt to climate change effects especially in agriculture?
12. Does your office have any goals to conserve biodiversity, particularly wetlands
13. If yes, how is the Chitora gardens project helping you to achieve these goals?

APPENDIX IV

INTERVIEW GUIDE FOR AGRITEX OFFICER

Name:

Position in office:

Good day! Thank you for taking your time to participate in this interview. My name is Maria Guti and I am a student at Midlands State University doing my undergraduate study in Geography and Environmental Studies. The purpose of this interview is to gain knowledge on how rural communities have been empowered through community gardens as a response to climate change focusing particularly on Shurugwi Partner's Chitora Gardens

Objective 1: To assess the social and economic benefits of the Chitora gardens project to the smallholder farmers

1. How does AGRITEX assist in the Chitora gardens project?
2. What do project members get from being part of the project?
3. How has climate change affected agricultural practices by smallholder farmers in the village and how has the Chitora Gardens project responded to such a crisis?
4. What crops are grown in the gardens and why those crops specifically?
5. Please give details the annual production calendar of vegetables for each of the three gardens

Objective 2: To examine the sustainability of the Chitora gardens project

6. Would you say this project is environmentally viable?
7. Would you say these gardens are sustainable on a long-term basis
8. Elaborate your answer in 5

Objective 3: To determine conservation of biodiversity by smallholder farmers in the wetlands where the Chitora gardens project is being implemented

9. What was the state of the wetlands before implementation of the community gardens?
10. What strategies have been used to protect wetlands?
11. What agricultural practices are being employed in the community gardens to ensure proper conservation of biodiversity?
12. Is there any training that was given to project members to ensure biodiversity conservation in the wetland? If yes, what training was given?

APPENDIX V

INTERVIEW GUIDE FOR MINISTRY OF YOUTH DEVELOPMENT, INDIGENIZATION AND ECONOMIC EMPOWERMENT OFFICER

Good day! Thank you for taking your time to participate in this interview. My name is Maria Guti and I am a student at Midlands State University doing my undergraduate study in Geography and Environmental Studies. The purpose of this interview is to gain knowledge on how rural communities have been empowered through community gardens as a response to climate change focusing particularly on Shurugwi Partner's Chitora Gardens

Name:

Position in Office:

Objective 1: To assess the social and economic benefits of the Chitora gardens project to the smallholder farmers

1. What are the duties of your office in this project?
2. Have the livelihoods of the youth in Chitora ward 1 improved since the start of the project?
3. If yes, how have the lives of the youth who are part of the project improved?
4. Are the youth benefiting economically from this project?
5. If yes, how much income do the youth who are part of this project get monthly?

Objective 2: To examine the sustainability of the Chitora gardens project

6. How many youths are involved in the project?
7. Is the project in line with the community development goals that you have as an office?
8. If yes, what goals have been achieved through this project?

Objective 3: To determine conservation of biodiversity by smallholder farmers in the wetlands where the Chitora gardens project is being implemented

9. What assistance do your officers provide in the implementation of this project when it comes to biodiversity conservation?
10. What is being done to prevent degradation of the wetlands during agricultural activities in the community gardens?

APPENDIX VI

INTERVIEW GUIDE FOR DIRECTOR OF SHURUGWI PARTNERS

Good day! Thank you for taking your time to participate in this interview. My name is Maria Guti and I am a student at Midlands State University doing my undergraduate study in Geography and Environmental Studies. The purpose of this interview is to gain knowledge on how rural communities have been empowered through community gardens as a response to climate change focusing particularly on Shurugwi Partner's Chitora Gardens

Name:

Position in office:

Objective 1: To assess the social and economic benefits of the Chitora gardens project to the smallholder farmers

1. What motivated you to come up with the Chitora wetlands conservation and integrated livelihoods project?
2. Have you had any similar projects before?
3. Who was targeted by the project and how many people have benefited from the Chitora livelihoods project
4. What agricultural inputs and project material did you provide to smallholder farmers?
5. Do the project members have a market for their produce? If yes, who do they sell to?
6. How is this project responding to problems of climate change vulnerability in the district?

Objective 2: To examine the sustainability of the Chitora gardens project

7. Where does the funding for the projects come from
8. Do you get assistance from any other departments or organizations when it comes to implementation of the project? If yes, who has been helpful in the implementation
9. Did you encounter any challenges since the start of the project, if yes what are the challenges and how did you deal with them?
10. Do you have any long term plans for the project?
11. How do Shurugwi Partners' garden projects differ from those by other NGOs like CARE and MASO?

Objective 3: To determine conservation of biodiversity by smallholder farmers in the wetlands where the Chitora gardens project is being implemented

12. What strategies did you take to protect the three wetlands from degradation?

13. What training has been offered to the project members specifically on biodiversity conservation and precisely why that training?
14. Have you had success in conserving wetland areas during the implementation of this project? If yes, please explain further.

APPENDIX VII

INTERVIEW GUIDE FOR THE PROJECT CHAIRPERSON AND SECRETARY

Good day! Thank you for taking your time to participate in this interview. My name is Maria Guti and I am a student at Midlands State University doing my undergraduate study in Geography and Environmental Studies. The purpose of this interview is to gain knowledge on how rural communities have been empowered through community gardens as a response to climate change focusing particularly on Shurugwi Partner's Chitora Gardens

Name:

Position in garden:

Objective 1: To assess the social and economic benefits of the Chitora gardens project to the smallholder farmers

1. What motivated you to be part of this project?
2. What crops do you grow in the community garden?
3. Do you get any vegetables or fruits for consumption in your household from the community garden?
4. Are you benefiting financially from the project?
5. If yes, how much money does each project member get from the community garden weekly?
6. How do you balance work in your community garden with work on your dry land farms/plots during the cropping season?
7. Has your life changed since you joined the project?
8. How have you benefited socially by being a project member of the Chitora gardens' project?
9. What is the role of women in the project and how empowered are they by being part of the project?
10. Are there any seasonal variations in vegetable production? If yes, what type of crops do you grow each season?

Objective 2: To examine the sustainability of the Chitora gardens project

11. Are you able to maintain or improve the activities of the community garden after Shurugwi Partners has left?
12. What valuable training programs have you received as a project member of the community garden?
13. Do you have a market for your produce?
14. If yes, where do you sell your produce from the community garden?

Objective 3: To determine conservation of biodiversity by smallholder farmers in the wetlands where the Chitora gardens project is being implemented

15. What have you learnt when it comes to biodiversity conservation?
16. What strategies are you employing in your community garden plot to protect and conserve biodiversity?

APPENDIX VIII: OBSERVATION CHECKLIST

What to observe	**Comment**
Objective 1: To assess the social and economic benefits of the Chitora gardens project to the smallholder farmers	
Crops grown in the community gardens	
How the project members are working together and interacting	
Expression of emotions and feelings by project members	
Objective 2: To examine the sustainability of the Chitora gardens project	
Water sources for the community gardens	
Size of community garden and each project member's garden plot	
Objective 3: To determine conservation of biodiversity by smallholder farmers in the wetlands where the Chitora gardens project is being implemented	
How far are the crops from the wetland source	
Agricultural methods used in the community gardens	
Signs of land degradation	

APPENDIX IX: FOCUS GROUP DISCUSSION SCHEDULE

Good morning! Thank you all for taking your time to participate in this focus group discussion. My name is Maria Guti and I am an undergraduate student at Midlands State University doing Geography and Environmental Studies. The purpose of this group discussion is to talk about how rural communities have been empowered through community gardens as a response to climate change, particularly focusing on Shurugwi Partners' Chitora Gardens. My role is to facilitate the proceedings of this discussion.

Objective 1: To assess the social and economic benefits of the Chitora gardens project to the smallholder farmers

1. How did you get involved in the project?
2. What kind of activities do you undertake in your community gardens?
3. List the crops that you grow in the community gardens
4. Has the project helped you overcome any problems in your households?
5. Do you get sufficient food from your garden for consumption in your households?
6. Do you get any income from the community garden?
7. How much income do you make monthly from the community garden?

Objective 2: To examine the sustainability of the Chitora gardens project

8. Do you have a market for your produce?
9. If yes, where do you sell your produce from the community garden?
10. Are you going to continue working in the community gardens after project handover by Shurugwi Partners?

Objective 3: To determine conservation of biodiversity by smallholder farmers in the wetlands where the Chitora gardens project is being implemented

11. Have you received any training on biodiversity conservation
12. What have you learnt when it comes to biodiversity conservation?
13. What methods are you employing in your community garden plot to protect and conserve biodiversity?