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FACULTY OF ARTS

DEPARTMENT OF DEVELOPMENT STUDIES

**A STUDY ON THE IMPACT OF CLIMATE CHANGE AND CLIMATE VARIABILITY
ON RURAL WOMEN: A CASE OF WARD 22 AND 28 OF CHIVI DISTRICT,
ZIMBABWE**

BY

SARAH CHANAKA (R104195Y)

SUPERVISOR: MR C MUNHANDE

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requirements of the Bachelor of Arts in Development Studies Honors Degree*

SUPERVISION ACKNOWLEDGEMENT FORM

The undersigned certify that they have read and recommended to the Midlands State University for acceptance, as a dissertation entitled, A study on the impact of climate change and climate variability on rural women: A Case of ward 22 and 28 of Chivi District, Zimbabwe.

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(Signature of Student) Date

..... /...../...../.....
(Signature of Supervisor) Date

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(Signature of the Chairperson) Date

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(Signature of the Examiner (s)) Date

DECLARATION

I Sarah Chanaka hereby solemnly declare that this research is my own work and is not a reproduction of someone else's effort, unless where otherwise acknowledged.

Signature

Date

DEDICATION

This academic presentation would have never been possible without the love, caring and support that was shown to me by my parents. Mum, dad, thank you for believing in me and you never gave up on me. You have been my pillars of strength throughout. My Friends, I love you dearly, you encouraged me till the end and I appreciate it. To God, I have never had a faithful friend like you, I will always praise your name, and draw my wisdom from you.

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ABSTRACT

The thrust of this study was to investigate the impact of climate change and climate variability on rural women. It identifies the reasons why women are more vulnerable to climate change as compared to men and adaptation strategies implemented by women to adapt to the vagaries of climate change. The researcher selected women in ward 22 and 28 using random sampling. During the study, a structured questionnaire consisting of both closed and open-ended questions will be administered to the selected households. Interviews were conducted and each woman from a selected household will be asked the same series of questions and responses are organized so that conclusions can be drawn. Personal observations were also used to see the environment from which the women derive their livelihoods. The research findings show that women are at the frontline of climate change impacts due to the existing gender disparities. These include lack of access to and control of resources, lack of freedom of actions, reproductive role burden, and lack of access to technology as a result of their illiterate as well as lack of participation in decision-makings in climate change interventions. The research findings also depicts that climate change undermines development efforts due to food insecurity resulted from drought and it also widen the gap between the poor and the rich. Therefore, the study recommends economic empowerment of women since the effects of climate change on women are not gender neutral and also to carry out gender analysis in all climate policies, programs, budgets and projects. This helps to address the differing ways in which climate change affects men and women thereby creating gender-sensitive policies. The government should chip in and help to build and strengthen women's experiences, knowledge and coping capacities in adaptation policies and ensuring that women's needs and interests are incorporated in livelihood adaptation strategies.

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ACRONYMS

BHASO	Batanai HIV and AIDS Service Organization
CTDT	Community Technology Development Trust
FGDs	Focus Group Discussions
FAO	Food and Agriculture Organization
GHGs	Green House Gases
IPCC	Intergovernmental Panel on Climate Change
UNDP	United Nations Development Program
UNFCCC	United Nations Framework Convention on Climate Change
UNFPA	United Nations Population Fund
VIDCOs	Village Development Committees
ZIMSTAT	Zimbabwe National Statistics Agency

1.0 Introduction

The history of climate change began in the early 19th century when ice gases and other natural changes in Pale climate were first suspected (UN Global Climate Change Research 2009). The Global Climate Change Research pinpoints that, in the late 19th century scientists first argued that human emissions of Green House Gases (GHGs) could change the climate but calculations were disputed. This is the period when human activities began to have a greater influence on climate change as a result of the industrial revolution.

By the 1990s, due to advanced technology and observational work confirming the Milankovitch theory of the ice gases, a consensus was passed that GHGs were deeply involved in most climate change. This makes choices and investment made in climate change mitigation and adaptation vital for ensuring sustainable and inclusive growth (World Bank Group Experience Phase III 2005)

Moreover, the signing and ratification of the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol in 1992 considered climate change a serious issue. Hence countries pledged themselves to reduce their GHGs so as to mitigate the average global temperatures. This indicates that effective climate change mitigation and adaptation measures require global collaboration since the impacts are not discriminatory.

Furthermore, Chikova et al (2013) argues that, the government of Zimbabwe acknowledges that climate change is a serious issue and the country is a signatory to the UNFCCC and it has obligations to implement the provisions of the convention. The country actively participates in the technical bodies of the UNFCCC and the Intergovernmental Panel on Climate Change with the chief representative.

Therefore, the study seeks to highlight the impacts of climate change on women in Chivi. Though the effects of climate change are not discriminatory it has been argued that women are at the front line of climate change impacts because of gender roles they performed. They face social, economic and political barriers that limit their coping capacity.

Problem statement

Women heavily depend on climate sensitive sectors that are threatened by climate change. The Eco-Feminism theory argues that women and nature are inseparable. Besides women have no access to and control over resources. They have less access to financial resources such as credit facilities which paves a way for their economic diversification. Rural women also experience lack of access to technologies, they have lack of education. United Nations Development Program (UNDP 2004) argues that women constitute 70% of the world's poor. Mitchell et al (2007) postulated that women will suffer most simply because they are women and women are poorer thereby less able to cope with the effects of climate change.

Significance of the study

The study is significant in that it will assist the policy makers and implementers to consider the voice of women in the implementation of an effective climate change response. This is because the thrust of this research is to establish the impacts of climate change on women. The research also creates an interface for women to raise awareness campaigns including issues in relation to climate change and climate variability that affecting them.

Furthermore, the research can help the public at large especially rural women to lobby for national climate change policies and adaptation actions that incorporate the needs and interests of women. This might uplifted the status of women. It hoped that, the findings will assist the

women with appropriate interventions in the participation of local climate change discussions. More so, the study also contributes to knowledge building and it will be a spring board for further researches.

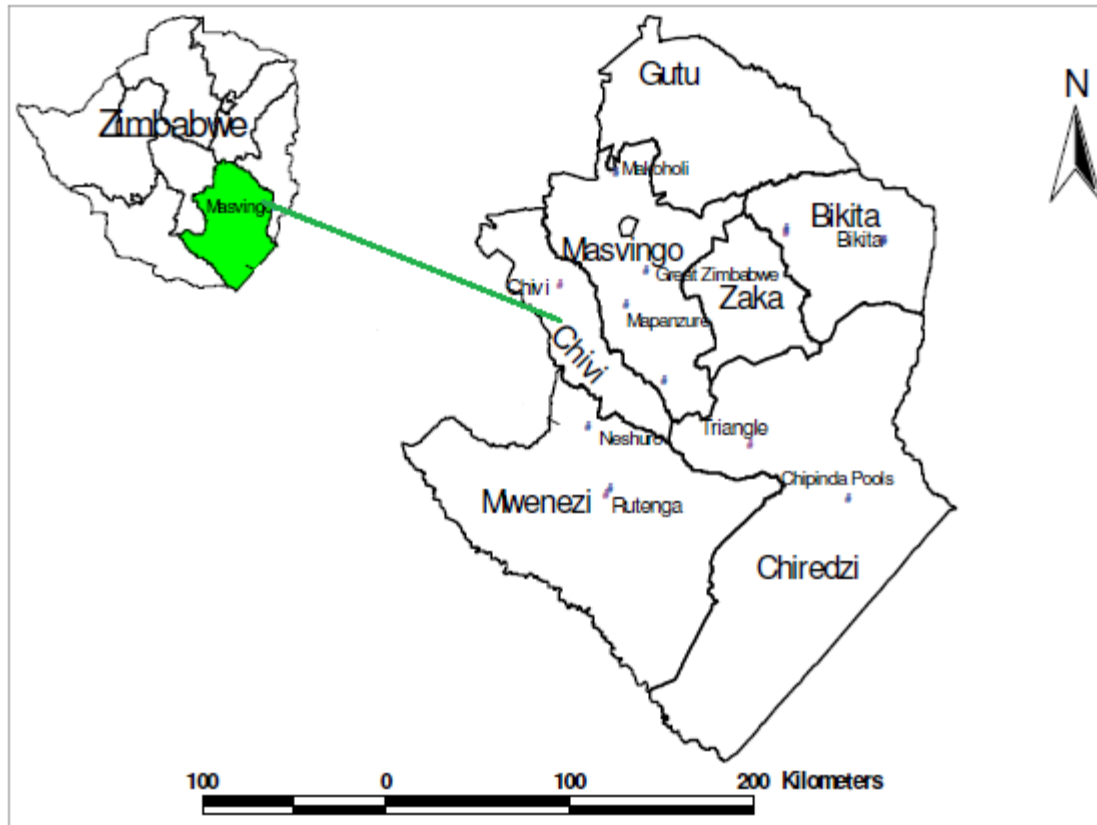
Study area

The study was undertaken in Masvingo Province in Chivi district as shown in Figure 1. There are three chiefs in the district namely Chivi, Gororo and Nemauzhe. It is located at the elevation of 811 meters above sea level. The district is a semi arid area which falls in agricultural regions 4 and 5. In addition, the district is located in the drought prone area of the country, north of Mwenzi district because region 4 in general receives low rainfall. The district covers an area of 3534km²(ZIMSTAT 2012)

The area receives rains which are not dependable but the area is fertile with several irrigation schemes for the populace to supplement their meager harvests. It receives the average annual rainfall of 545mm (Chikova et al 2013).The soils in Chivi district is mainly sandy. Sandy soils are characterized by low water retention and therefore need a lot of water for crops to grow well.

The district has a population of 166 049 (ZIMSTAT 2012).Chasi in Mudzonga (2011) concurs that, communal farming is the back born of their livelihood in the district but the rain fed agriculture is highly vulnerable to the effects of climate change. Chikova et al (2013) argues that agriculture is vulnerable to climate change due to the fact that Chivi is an agricultural marginal area and has a fragile ecosystem.

Figure 1: Map showing the location of Chivi district



Source: Sacha Journal of Environmental studies

Aim of the study

- To establish the effects of climate change and climate variability on rural women.

Objectives

- To establish the effects of climate change and climate variability on Chivi women
- To discuss the adaptation measures taken by the rural women in order to adapt to the effects of climate change
- To explore the evidence of climate change in Chivi district.

Research questions

The research will endeavor to answer the following questions:

- Which evidence shows that the climate has changed in Chivi district?
- What are the effects of climate change on rural women?
- Which strategies implemented by Chivi women to adapt to the negative impacts of climate change?
- What challenges do they face in the implementation of adaptation strategies?

De-limitation of the study

The study focused on Chivi women in ward 22 and 28 of the district. Therefore, this set a limit on the overall magnitude of the study. The research does not create room for the participation of men on climate change issues in relation to women. Therefore the behavior of one person may not reflect the behavior of the majority. As a result one does not know the perspectives of men in the field of climate change and climate variability issues in relation to women.

Definition of terms

Key terms

Climate change, climate variability

Climate change

The phenomenon of climate change is one of the most fiercely contested and debated concept globally. Therefore, no single definition can be used to understand what climate change really is.

Intergovernmental Panel on Climate Change (IPCC, 2007) defines it as a change in the state of the climate that can be identified for example by using statistical tests for an extended period typically decades or longer. Put another way, Manyatsi et al (2010) in Gukurume asserts that, climate change refers to the long-term significant change in the average weather that a given area experiences over a periods of time that range from decades to millions of years. Chikova et al (2013) pinpoints it is a change of climate which is attributed directly or indirectly to human activity that alters the composition of global atmosphere and which in addition to natural climate variability observed over a long period of time. However, Oxford English Dictionary defines climate change as a change in the earth's weather including changes in temperature, wind patterns and rainfall, especially the increase in the temperature of the earth's atmosphere that is caused by the increase of particular gasses especially carbon dioxide.

However, distinguishing the core and the relevant scope of the definitions can provide a working definition. Therefore, the definition of climate must reflect statistical properties of weather patterns, a prolonged period of time typically decades or longer, a specific given area and its effects to human activities.

Climate variability

There are myriad definitions of climate variability. According to a paper by Prof. Robert Oglesby (University of Nebraska, Lincoln) climate variability refers to the climatic parameter of a region varying from its long-term mean. IPCC (2001) alludes that, it is a way climate fluctuates yearly above or below a long-term average value. In short climate variability is a year-to- year variation. Thus, every year in a specific time period, the climate of a location is different. For example the average annual rainfall of Chivi district is 545mm and we are not assured of getting

the same amount every year. More so, unlike weather variability, climate variability is not noticeable.

According to Christy et al (2006), climate variability refers to variations in the mean state and other characteristics (standard deviation, the occurrence of extreme events) on all temporal and spatial scales beyond those of individual weather events. The distinction between climate change and climate variability is that the impacts of climate variability is being felt while the effects of climate change will be felt in the long run.

Theoretical framework

The research is anchored on the Eco-Feminism theory which was also known as ecological feminism. It is the branch of feminism that examines the connections between women and nature. The theory was propounded by Rosemary etal (1975). It states that women and nature rely on each other and women have got more to lose in comparison to men as a result of the environmental degradation. In other words, they are the natural custodians of the environment. The theory also blames capitalism for the degradation of the environment. This is because capitalism is the root cause of women's oppression. This theory is closely linked to this study because women depend on climate sensitive resources such as local water and food supplies that are threatened by climate change. Therefore, they suffer from a gender perspectives.

Research Methodology

Research Design

This section presents methodological approaches that were employed in carrying out the study. It outlines the approach that was taken in gathering relevant data and information for this study. It also presents the analytical tools that were employed in analyzing the data in line with the objectives of the research. Therefore, this research is grounded in qualitative methodology and its research design is case study. According to Parker in McQueen et al (2002) qualitative research demands the greater involvement of the researcher. Dawson et al (2002) defines a research as a structured enquiry that utilizes acceptable scientific methodology to solve problems that create new knowledge that is generally applicable. Irny et al (2005) pinpoint that research methodology is a way to systematically solve the research problem. Ragin in Uwe (2004) asserts that, research design is a plan for collecting and analyzing evidence that will make it possible for the investigator to answer whatever questions he or she posed. The strengths of using qualitative methods are that they generate rich, detailed data that leave the participants' perspectives intact and provide a context for their behavior. Respondents provide their own explanations in a participatory exchange with interviewers. According to Creswell (2009) qualitative believes in words and open-ended questions and it is a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem.

Targeted Population

The research will be conducted in Chivi south district, which is located in Masvingo Province. Each district is divided into political and administrative boundaries called wards. These wards are subdivided into VIDCOs or villages. Therefore, the study is carried out in ward 22 and

28. According to Central Statistical Office, ward 22 has a population of 7 426 whereas ward 28 has 7 604 and only 10 women from each of these wards are included in this research. (Central Statistics office). Thus every 10 women represent 50 women.

Sampling design and sample size

A sample refers to a smaller proper subset of the population and sampling therefore refers to the systematic selection of cases for inclusion in the study or this is a process of choosing participants for the performance of the study. The sample size depended on the total number of the target population from which the sample was drawn. Sampling is the inclusion or exclusion criteria for certain components from a population. Punch (1998, p193) argues that sampling size is very important because one cannot “study everyone everywhere doing everything”. Sampling can be used as a method that can limit the amount of data collected to achieve the aims of the study. This is because of time frame and financial constraints. Therefore, the targeted sample size was 10 women in ward 22 and 10 in ward 28. Every 10 women represent 50 women of the selected household.

Sampling Technique

Random sampling technique was used to select women from each household for interviews. The researcher picked women at a regular interval. According to Panneerselvan (2004) random sampling is a form of probability sampling whereby each unit of the population has a probability of being selected as a unit of sampling. The researcher used random sampling because it can give the most reliable representation of the whole population and it is free from bias (Williman 2005). Random sampling was also used by the researcher because the population is very large and it is homogeneous whereby all targeted women are more vulnerable to climate change as they

perform similar gender roles. Therefore, not all women in Chivi district was chosen but those from ward 22 and 28.

Research Techniques

These are steps taken in administering instruments and collection of data from subjects under study. Data collection is the gathering of information needed to address a research problem (Chiromo, 2004).The researcher used household interviews, focus group discussions, questionnaires, interviewing key informants such as Chiefs and Headman and personal observations. Personal observations are used to see the lands from which women derive their livelihoods.The survey can also provide detailed demographic profiles to shed further light on some grey areas. The researcher will be an instrument for data collection, via methods such as household interviews.

Interviews

Primary data was obtained from household interviews. The advantages of using interviews are that, they can provide in-depth information, inexpensive and they are good for measuring attitudes and most other content of interest. Since qualitative research requires greater involvement of the researcher hence personal interviews is one of the main data collection tool because it can give room for the participation of the researcher. The researcher used interviews because they paved a way for accessing respondents' perceptions, meanings, and definitions of situations and constructions of reality. Each woman from a selected household will be asked the same series of questions and responses are organized so that conclusions can be drawn from them. Key informants will be interviewed such as chiefs and headman who had observed

climatic transformation over the years they lived in Chivi so as to generate information on the practice.

Focus group discussions

One Focus Group Discussion was conducted in each ward. According to Modell (2007) focus group discussion refers to a group of similar respondents who engage in discussion about a specific topic under the direction of an interviewer. Each FGD consisted of 5 participants. In these FGDs the researcher facilitates, moderates, monitors and recording the responses and less act as an interviewer. Focus Group Discussions take place between the researcher and groups of individuals selected from wards under the research. The discussion was directed by questions and topics posed by the researcher. They allow the study of how participants react to each other (Teddlie 2009). The importance of FGDs is that they bring up a spirit to open up and share their information, according to Schilderman, (2002). Besides they can assist in bringing to the surface aspects of the situation which might not otherwise be explored. According to Punch (1998) FGD stimulate people in making explicit their views, perceptions, motives and reasons. She also pinpoints that they are also inexpensive, data-rich, flexible, stimulating, recall-aiding, cumulative and elaborative.

Questionnaires

A questionnaire survey was used in the study to solicit information related to rural women's perceptions on climate change and variability. Goode and Hatt in Raj (2005) defines a questionnaire as a device for securing answers to questions by using a form which respondent fills in himself. The survey was targeted the selected wards in Chivi district. Household members targeted were women who suffer more from climate change. A structured questionnaire

consisting of both closed and open-ended questions will be administered to the selected households. The researcher ensured that each and every respondent to the questionnaire will represent one household. The purpose of using questionnaires is to obtain information on how women affected by climate change and variability and what adaptation measures they implemented as well as which challenges they face in trying to cope with and quickly recover from climate change impacts. To ensure the best possible data quality the researcher issued each questionnaire as one on one interview since the goal of the study was to establish the effects of climate change and variability on rural women.

Secondary sources

The researcher used a wide range of data sources namely the internet, electronic journals, text books and research papers. Many studies or researches on the impact of climate change on rural women have been carried out, and many are still mandatory for the researcher to consult such a wide range of literature sources. Such data are cheaper and more quickly obtainable than the primary data. Jewel (2001) defined Secondary data as the data that have been already collected by and readily available from other sources.

Ethical considerations

The Researcher shall uphold confidentiality of participants through promoting anonymity like not writing their names on the questionnaire. There will not be any sharing of any participant to a third person. All information will be collected in confidence and will be reported in anonymity, with no direct reference to respondents' identities. The researcher also respects the privacy of respondents by upholding their autonomy. This is because the invasion of privacy can lead to the infringement of individual's autonomous right to protect what is personal to them, according to

Kelman in Hammersley et al (2012). Permission to carry out the study will be sought from the councilors, Headman and District Administrator.

Literature Review

In this literature review, the researcher's main interest is to acquaint herself with previous findings made by other researchers on the area of climate change and climate variability issues related to rural women. The researcher indicated the gaps in knowledge concerning the theoretical and pragmatic literature written by other scholars. The researcher also reviewed the existing literature to accrue evidence which indicates that there is climate change in Chivi district. Literature was retrieved using key objectives and research questions of this research. There is a lot of literature that has been documented on climate change and climate variability and an evaluation of the views given by scholars discloses a number of interesting arguments.

A variety of literature postulated that women are at the front line of climate change and variability impacts. Eco-Feminism theory (Rosemary1975) concurs that women and nature are intricately related or are inseparable hence they depend on climate- sensitive sectors that are threatened by climate change. IPCC (2007) argued that,".....those in the weakest economic position are often the most vulnerable to climate change". UNPD (2004) asserted that women constitute 70% of the world's poor. Mitchell argued that, the fact that they are women they are poor and poverty is the underlining cause of vulnerability. Babagura (2010) pinpointed that,' women face challenges in preparing for climate change impacts due to their socially constructed roles and responsibilities and even Chagutah (2010) alludes that, there are possible knock-on effects on women as a result of the implementation of adaptation measures to climate change. Therefore, this study adds to these analyses by identifying the reasons why women are more vulnerable to climate change impacts. This is because several literatures put a lot of emphasis on the effects of climate change on women without mentioning the reasons why they are more vulnerable.

In addition, the study also tries to bridge the gap left by the previous writers by indicating that men also suffer from climate change and climate variability. This is because impacts of climate change are not discriminatory. Basing on our African traditional cultures whereby men are viewed as household heads or bread winners such that no matter what challenges experienced by the family they are supposed to endure and be in a position to rescue their families. This point stumbles over the idea of masculinity whereby gender stereotypes that being a man breed 'heroism' thus men feel compelled to put themselves at risk so as to serve their female counter parts.

Dhilwayo (2007, p1) quoted one of Chivi Headman, Madyangove saying, "I used to rely on farming to send my seven children to school but now I cannot afford to send them anymore". This shows that, apart from providing food, food production is also a source of income that enables children from those male headed household to go school in rural areas. Therefore, climate change and variability also affect men. More so, Dressa etal (2010) argued that the unskilled migrated men are unable to take up work in the urban areas and have few resources to pay for living expenses in towns. He also pinpoints these men may be ill-prepared to deal with the challenges posed by migration such as hunger.

Furthermore, writers often discuss about climate change and climate variability impacts on women in general term without looking at the specific given area. As a result little has been done to understand the impacts of these climatic transformations on women especially in marginalized communities like Chivi. Therefore, the fundamental endeavor of this study is to conceal this knowledge gap through an in-depth exploration of the effects of climate change and climate variability on Chivi women. Thus the research has given Chivi women to air out their views about issues affecting them in relation to climate change. This is important because what exactly

applies in a certain area does not also apply on a specific given area. For example the way urban women suffer from climate change effects is different from those who are rural based. Such knowledge will help in policy formulation that enhances the status of rural women.

More important still, there is a voluminous literature emphasizing that women are less able to cope with the negative impacts of climate change and climate variability. However, it seems that there is a gap between the rate at which climate is changing and the response to reduce its impact (Mudzonga 2011) In spite of this, challenges that hinder women's adaptation strategies in Chivi area are not known. Therefore, this study seeks to investigate these challenges.

Nevertheless, many previous literatures put a lot of emphasis on why women are more vulnerable to climatic transformation. There is a need to study the effects of gender on climate change. As a result this research seeks is to highlight gender inequalities so as to unfold the differing ways in which climate change affects both sexes.

More so, previous literature discussed challenges faced by women in the implementation of their adaptation strategies mentioning the existing gender roles such as lack of freedom of actions and access to credit facilities and lack of participation. Abbas in Ellis (2000) argued that women do not have access on decision making about cropping patterns, Ellis (2000) asserted that women do not have rights to cultivate their own crops without being given permission by their husbands. Besides, Ellis (2000) also concurs that they also do not have rights to be engaged in their own – account farming activities and income generating projects without the consent of their husband. Gbetibouo, Dressa etal and Fosu-Mensah etal in Mudzonga (2011) showed that access to credit significantly influences the farmer to adapt to climate change. As a result the researcher will

indicate this gap in knowledge by discussing challenges emanating from the adaptation strategies they implemented.

CHAPTER 1: CLIMATE CHANGE AND CLIMATE VARIABILITY

1.0 Introduction

The thrust of this section is to look at climate change and climate variability scenarios in rural Zimbabwe. It has been generally argued that climate change and climate variability is a risk in the rural communities of Zimbabwe. It increases a variety of livelihood threats and vulnerabilities rather than being an isolated specific risk (Ndaruzaniye 2012). This is because rural people do most of the agricultural work and rely on natural resources that are threatened by climate change and climate variability. It has been noted that climate change worsening the existing level of poverty in rural Zimbabwe thereby affecting development efforts. Therefore, it has a negative bearing on the local economies and local food security. Besides, climate change and climate variability affects capital formation through undermining rural people's entitlements.

1.1 Climate Change and Climate Variability in Rural Zimbabwe

Zimbabwe is a developing country and depends on agriculture as the corner stone of its economy. Gukurume (2013) asserts that since 1980, communal land in Zimbabwe has been characterized by massive land degradation due to soil erosion. This resulted in low food production. A report by Zimbabwe Red Cross Society presented by Maonde (2007) document that raising temperatures and decreasing rainfall make life an uphill battle for Maboto farmers in the southern part of Zimbabwe. Matthew Sibanda (one of Maboto farmers) said, "for a long time, my piece of land was considered a fertile wetland which always gave me good yield to feed my family but this is now history". Maonde also concurs that most rivers and wetlands have dried up thereby reduced livestock production. This shows that Zimbabwe is facing and experiencing the adverse impacts of climate change.

In addition, failure of agriculture tends to ruin farmers' source of livelihood where they get income to send their children to school. Besides that raising temperatures which led to crop failure became a push factor which forced able-bodied young men from rural areas in Zimbabwe to move to the cities and beyond the borders in search of employment and better living conditions. They left the elderly women and children to face climate change's trail of destruction. Therefore, this changes the demographic structure of the rural Zimbabwe.

Moreover, according to IPCC Third Assessment Report (2007) in Chiredzi rural district, droughts are a common feature. The Report also pointed out that in 2005, 60% of the rural households in 13 wards of Chiredzi were found food insecure. As further revealed by the same report, rural households depend on food handouts in most years. This shows that climate change in rural Zimbabwe poses a great threat.

Climate change and climate variability threatens the sustainability of subsistence agriculture in rural Zimbabwe. This is because it destabilizes farmers' source of food and income thereby making them less able to adapt to new climatic conditions. Thus vulnerability manifests itself in rural communities due to lack of resources or entitlements as climatic conditions would have devastated their entitlements (Gukurume 2010). Mugabe (2012) argued that Zimbabwe is getting more vulnerable to climate change and its impact affecting various sectors from economic activities, health and physical infrastructure. According to Mugabe (2012) climate change anticipated economic impacts which include increased food prices and loss of employment thereby undermining people's standard of living. Chagutah (2010) for example asserts that the increase in temperature by 1⁰C in 2005 led to the reduction of kapenta fish yields. This undermines the entitlement of those who rely on kapenta production thereby affecting the attainment of Millennium Development Goal (MDG) number 1(eradication of extreme poverty).

This also increases malnutrition diseases which have a negative bearing on the growth and development of a child.

1.2 Evidence of climate change and climate variability in Zimbabwe

Zimbabwe like any other country in the world has not been spared by climate change and variability. This is because agriculture is the economic backbone of a country and agriculture in Zimbabwe is extremely vulnerable to climate change and variability. According to Manyeruke et al (2013), climate change and variability destabilizes food production of Zimbabwe. This causes a country to operate on a shoestring budget as it is forced to import food from other countries to feed its population. In 2011/12 the country was forced to import over 50% of maize from other countries in order to meet the needs of its citizens (Manyeruke et al 2013). This has been largely attributed to low rainfall received annually which led to the plunging of agricultural productivity. The results resonate with Manyeruke et al (2013). This evidence clearly indicates that the country is affected by the vagaries of climate change.

According to Unganai (1996) recent studies have shown that, climate is changing in Zimbabwe. He observed that the annual rainfall in Zimbabwe had declined by 10% between 1900 -1994. According to Chikova et al (2013), Zimbabwe has been experiencing droughts every ten years since 1992. For example it affected the country in 1982, 1991/2, 2001/2002 and 2007. He also pointed that, past evidence and future projections has shown that climate has changed in the whole world including Zimbabwe. However, many scholars give evidence of climate change basing on future predictions, hence there is still a lot of uncertainty in scientific predictions. This point stumbles on the idea that the future is uncertain and unpredictable.

Zimbabwe Department of Meteorological Service stresses that, the country is now experiencing more hot days and fewer cold days and the amount of precipitation it receives is deviating from the mean more frequently than it used to be before 1950 (Mudzonga 2011) This further emphasize that climate has changed in the country. Additionally, decline of the country's export is also evidence showing that climate change has changed. This was the case with the decline in the country's maize export from 51% in 2000 to 13% in 2007 (Mudzonga 2011). Zimbabwe also experienced a decline in the national maize production in the 1990s due to failure of agriculture. This was caused by climate change in terms of changes in precipitation patterns, high temperatures and extreme weather events. All these have coagulated to impinge on agricultural productivity thereby resulting in food shortages. Also failure of agriculture have left many people joblessness especially women, as Mudzonga (2011) argues that agriculture employed 74% of labor force of which the majority of them are women.

More so, FAO (2003) postulated that average annual rainfall in Zimbabwe is expected to decline by between 5-20% by the year 2080 and river flow rates are predicted to decrease by 70% by the year 2050 due to soil erosion. Zimbabwe's yield from rain- fed agriculture is also mostly likely to decrease by 50% by the year 2020. Hence the country will continue suffering from climate change and variability. Chasi in Mudzonga (2011) argues that an increase in temperature by 2⁰C results in wet zones in the country to decrease from 9% to 2, 5% of the total land area. This resulted in the shrinkage of some areas which are suitable for agriculture and smallholder farmers in the marginal areas will be the most vulnerable.

More important still, Manyeruke etal (2013) argues that about hundred and fifty million people in Zimbabwe lack adequate food for a health and active life as a result of high food prices and drought. Therefore, inadequate food has four ramifications on food security namely food

availability, food accessibility, food utilization and food systems. She also argued that by 2050, there will be 250 million in Zimbabwe people who would vote with their feet to flee their homes due to drought, desertification, extreme weather events and climate related conflicts. They would seek for employment and better living conditions in some other countries. Again over reliance on foreign aid in the form of food hand-outs also indicates climate change and variability in Zimbabwe.

More so, shift in the rainfall patterns is an indicator of climate change in Zimbabwe. This point is supported by Manyeruke et al (2013). She argued that climate change and climate variability have resulted in a shift in the rainfall patterns in many parts of the world. She concludes that Zimbabwe has not been spared of these drastic changes in the rainfall patterns. Therefore, the shifting of natural regions' boundaries observed in Zimbabwe strongly points to climate change and variability. As a result it is generally accepted that climate change and climate variability are among the greatest challenges facing mankind in the 21st century (Manyeruke et al 2013). This point cannot be over looked because there is long-lasting effects of Green Houses Gases (GHGs), hence those already passed GHGs into the atmosphere will continue to warm the earth such that even if industries stop emitting additional gases today, the earth is committed to some amount of future climate change.

1.3 Evidence of climate change and climate variability in Chivi district

Chivi is one of the districts that have been greatly affected by climate change because communal farming is the back born of the livelihood in the district and the rain fed agriculture is highly vulnerable to the effects of climate change (Mudzonga 2011). This is aggravated by the fact that Chivi is an agricultural marginal area that has a fragile ecosystem. Therefore, increasing

temperatures and variations in rainfall patterns over time, coupled with frequent mid seasonal droughts and cyclones are clear evidence that climate change is happening in Chivi (Mudzonga 2011). This led to the failure of agriculture thereby deteriorate farmers' livelihood. Hence their life became an uphill battle for them because they can no longer produce food that could sustain them for the whole year.

Drought affects peoples' household food security as it changes food choices to less expensive and often less nutritious food. It also reduced the intake of food within the household level which has a negative bearing on the health of people. Dhilwayo (2007, p 3) quoted one of Chivi local people who said that, " My Grandson, I am confused perhaps our ancestors are not happy. Long ago, we used to take three meals per day but because of drought, this is now history and we can only afford one meal per day". This shows that climate change is really occurring in Chivi as evidenced by human suffering.

In addition, shift in the rainfall pattern depicts climate change in Chivi as argued by Dhilwayo (2007) that, in the past years people were used to receive early rainfall known locally as the Gukurahundi or bumharutsva in the late September or early October. Nowadays, however, this is no longer happening because the area receives the first rains around December, that is, if it receives rainfall at all. This point is also supported by Mawere et al (2012) who quoted the response given by one of the Agritex officer that, Chivi area was used to receive three groups of rainfall namely Bumharutsva (August), Gukurahundi (September) and Munakamwe (November) per year but this is no longer happening as the district can only receive one rainy season (Munakamwe) which is not predictable. Besides, most of their farms are no longer in use because of shift in the rainfall patterns which dwindled farming seasons by shortening the

growing season. Therefore, the shift in the rainfall patterns is the clear indication that climate has changed in Chivi district.

More so, water scarcity as a result of drought is another clear indication of climate change in Chivi district. The Tugwi and Runde rivers are the main water source for Chivi people and their animals. Dhilwayo (2007) argues that boreholes that are 42 meters deep are now dry and this forces people to travel about 25km in search of water. This was the case with ward 22 whereby out of 36 boreholes that were drilled, 7 have dried up. This increases the reproductive role burden on women and girls for ensuring proper sanitation and the availability of clean water for household consumption from a gender perspective. It has been noted that water sources in Chivi are now seasonal due to variations in rainfall patterns. Thus even though Chivi district is a predominantly dry area, there has been marked decrease in rainfall levels over the past years which led to water scarcity.

Furthermore, the recurrent droughts in Chivi district destabilizes peoples' source of income. This means apart from providing food, food production is also a source of income that enables children to go to school in rural areas. This point is emphasized by Dhilwayo (2007, p1) who quotes one of Chivi Headman, Madyangove saying, "I used to rely on farming to send my seven children to school but now I cannot afford to send them anymore". As a result people engage in off farm activities like vending and gold panning to try to make ends meet. Thus engaging in gold panning is an alternative that Chivi people have resorted to as a source of income since most of their farm became helpless due poor fertility. Basing on the personal communication with Chief Gororo in Dhilwayo's work that, "Over the past 10 years we have actually resorted to gold panning for survival since our farms are not helping us anymore". However, gold panning is illegal because it contributed to land degradation, soil erosion and siltation of rivers which then

explains the deterioration of some rivers. Hence, gold panning will go a long way helping people to secure household food security and generate income for fostering educational facilities of their children.

Loss of biodiversity is another negative impact of climate change and variability. Dhilwayo (2007) argues that some animals like hippopotamus are no longer common. They have either died or migrated to areas where they can find water or they were killed by people to supplement their diet. (Dhilwayo2007). Trees like baobab which are known to be drought resistant are also deteriorated. The area is developing into no tree zone except only small thorn trees which are not helpful to the survival of people are thriving as illustrated by the picture below.

Figure 2: Evidence of loss of biodiversity in Chivi district



Source: Field Observations

More important still, wildlife conflict also indicates climate change in Chivi. According to Dhilwayo (2007), with the shortage and poor grazing land, animals are competing for fruits like matamba and chakata and some animals have resorted to staying near highways so that they can eat things falling from trucks like maize and sugar cane. He further argued that sometimes these animals might cause a great danger at night as some of them are overrun by trucks. Some animals have competing for scarcity water in Runde and Tugwi rivers. Therefore, these in human wildlife conflicts can be traced back to climate change and variability impacts.

Deterioration of wetlands is an evidence of climate change in Chivi. Ramsar Convention (1971) defines wetlands as areas of marsh, fern, peat land or water whether natural or capital, permanent or temporary with water that is static or flowing. In Zimbabwe wetlands are generally referred to mapani or matore. According to Hove et al (2013) wetlands are very important because they recharge rivers and serve as reservoirs for dry water supply. Bowden and Smith in Hove (2013) argued that they provide habitats for many bird and animal species. Generally degradation of wetlands has been a result in human activities. For example ground water extraction, cultivation, overgrazing and housing development. Mawere et al (2012, p19) quoted one of the respondents from the Focus Group Discussion conducted during his study that, “We used to have wetlands and wells in the area including Magwenzi wetland but all these are no more as they have dried up. Because of these wetlands we used to grow crops throughout the year. We could grow twice per year, that is, winter crops and summer crops”. This indicates that, the deterioration of wetlands could not only lead to water scarcity and loss of animal species but also affect the agricultural sector.

However, the abstraction of water from the wetland for watering the garden could be seen as heavily depleted underground water in Chivi. This is because there is no doubt that gardening is

one of the adaptation strategy implemented by Chivi women. This point is supported by Kling et al in Hove (2013) that the abstraction of water if done excessively can lead to the depletion of wetland ecosystem. Hove et al (2013) asserts that excessive grazing has been resulted in the depletion of specific gramineae species in the wetland. This is because animal tracks caused habitat fragmentation which significantly alters some species interaction in the wetlands as their ecological niche is disturbed.

Moreover, disappearance of natural signs is another sign that indicate that climatic conditions have changed in Chivi. This is evidenced by Mbuya Esnath Makuvisa in Mawere et al (2012,p20) that, “In the past, Mt Mupfure used to have wind storm signifying coming of heavy rains but this is no longer happening”. She went on said that storms are used to signify rainfall as well as animals such as birds like haya. However, these animals are no longer found in Chivi, probably they have killed or migrated to other areas in search of food. Natural signs help people to predict the coming of rains by observing the signs around them. This could determine what type of crops could they plant and also whether to plant or not. Therefore, the deterioration of natural signs could simply mean the disruption of indigenous knowledge systems that are helpful in the agricultural sector.

In conclusion, climate change and climate variability affects the livelihoods of people in the communal areas of Zimbabwe. It affects food security, agriculture, health, water sources and economic activities thereby undermining development efforts. It also caused human suffering as a result societies must take the necessary steps to adapt

CHAPTER 2: IMPACT OF CLIMATE CHANGE ON WOMEN IN CHIVI

2.0 Introduction.

This chapter presents and discusses major findings of this study. The major sections of this chapter include a description of the impacts of climate change and climate variability on women in Chivi and why women are more vulnerable to climate change. LeCompte and Shensul (1999) define analysis as the process a researcher uses to reduce data to a story and its interpretation. Put another way, it is the process of reducing large amounts of collected data to make sense of them.

2.1 Impact of climate change and climate variability on women in Chivi

Basing on six climate change impacts, it has been noted earlier that climate change affects women more than men because of their dissimilar roles. Follow up questions that were made on the reasons why women are vulnerable to climate change, in the study, gender roles are taken as reference because it was reported by the majority of women. According to IPCC (2007, p45), “those in the weakest economic position are often the most vulnerable to climate change....they tend to have limited adaptive capacities and are more climate dependant on climate sensitive resources such as local water and food supplies” This means women suffer more from the negative impacts of climate change due to existing gender inequalities such as their role and position in society, access to resources and power relations. There are so many variables that can be used to explain why women are more vulnerable to climate change. These variables include agriculture, water scarcity, health, energy and migration to mention a few.

2.2 Agriculture

The researcher revealed that climate change in terms of low rainfall tends to ruin the livelihoods of rural women. This is because over 80% of African women depend on agriculture as a form of livelihood (Wakhungu 2010). Chasi in Mudzonga (2011) concurs that the agricultural sector employed 74% of the labor force of which the majority of them are women. Therefore, the decline in agricultural productivity can simply mean that the majority of women were left unemployed. From the household interviews conducted in ward 22, there is evidence that there is a shift in the rainfall pattern in Chivi as postulated by Mrs. Anna Paradza who lives at Magwari village(ward 22) noted that, “In the past, we used to receive three groups of rainfall per year”. She went on to say that, the first rains called Bumharutsva used to be received in August followed by Gukurahundi of September and lastly Munakamwe received in November. The area now received only one rainy season around December (household interviews, 04/04/14). These findings have been corroborated by Dhilwayo (2007) who argued that nowadays Chivi community receives rainfall that is, if it receives at all around December.

Additionally, the rainy season in Chivi does not last for the expected duration. This means the rains come late and went before any crop could fully mature thereby lead to drought due to crop failure. The recurrent droughts in Chivi district meant that women will be affected. Therefore, the effects that climate change will have on agriculture will present an increase in the reproductive role burden on women. This is because they bear more household food responsibility and this explains why the majority of women are engaged in the informal sector. In Chivi most women are involved in off- farm activities like selling vegetables, fruits and airtime at Growth Points. Failure of agriculture due to climate change and climate variability impacts has serious ramifications in four dimensions of food security. These include food availability, food

accessibility, food utilization and food systems. This changes food choices to less expensive and often less nutritious food and sometimes reducing food intake especially for women and older girls which then perpetuates the cycle of ill health. This explains the effects of climate change on women.

In addition to the above, effects of climate change on agriculture undermine the sustainability of women's livelihoods. During interviews, the researcher asked women to estimate how much they harvested and how much they have stored in their granaries as food and seed sources. It was surprisingly that the majority said they have harvested nothing because of poor rainfall they used to receive. They emphasized that they have three consecutive years without harvesting. In fact, most of the harvests households get did not sustain them for the whole year. This finding is consistent with arguments made by Miguel et al (2008) who posited that in Zimbabwe yields from rain fed agriculture are also mostly likely to decrease by 50% by the year 2020 .This indicates that agriculture is prone to climate change and climate variability. This observation is in tandem with the general observations made by Chasi in Mudzonga (2011) who acknowledged that agriculture in Zimbabwe is extremely vulnerable to climate change and variability. She argued that an increase in temperature by 2⁰C results in wet zones in the country to decrease from 9% to 2, 5% of the total land area. From the questionnaire distributed, one woman argued that, "We used to have wetlands here (pointing) and wells but now they deteriorate because of climate change, with these wetlands we used to grow crops throughout the year, but this is now history". This resulted in the shrinkage of areas which are suitable for agriculture thereby affecting women's source of livelihoods.

More so, food production is a source of income that enables children to go to school especially those from female household- headed families. From a questionnaire survey, the respondents

noted that, children especially girls withdraw from school when a family experienced drought so as to reduce family expenses. This point can be traced back to African Traditional cultures whereby there are son preferences. This often results in an increase in child labour for off farm income generation which contradicts Article 15 of the African charter which states that, “every child should be protected from all forms of economic exploitation and from performing any work”. This depicts that women are more vulnerable to climate change and climate variability.

Furthermore, the withdrawal of girls from school as a result of climate change also undermines Article 11 of the African charter which postulates that, “every child has the right to education”. This explains why the majority of women are illiterate. As a result women are on the front line of climate change and variability impacts. This tends to deny women from being employed in some type of formal sector jobs. For example in most cases, women are employed in secretarial and clerical occupation while men employed for senior management (Ellis 2000). This creates unequal payment between women and men.

Furthermore, from household interviews conducted in ward 28, there is no doubt that lack of education and access to information that would allow women to manage climate-related risks to agriculture explains why they are more vulnerable to climate change. Ms Shongamiti responded that, “lack of education has denied my right to contribute in decision making on the cropping patterns, every rainy season I wait for my husband who worked in Mutare to come and make decisions on the cropping patterns” (interviews conducted on 04/04/14). This shows that women’s decision-making on cropping patterns is negligible. Men also determine sell of produce. These results are supported by Abbas in Ellis (2000) who found that men have decision making on cropping patterns. Thus the ability of women to respond to the improved cultivation

practices is limited. Therefore, in future when the family experienced drought, women should manage household food security.

2.3 Food security

It has been noted that women bear more responsibility for household food security than men; hence the recurrent droughts in Chivi district mean that women will be affected. UNDP (2004) argues that women produce 80% of food production. Therefore, the decline in local food production presents an increase in the reproductive role burden on women. From a questionnaire distributed, one woman argued that, “I sell vegetables, fruits and airtime at Growth Points and even alongside the road in trying to make ends meet”. She went on argued that, “I spend my cash I obtained from vending to buy food stuffs for my household consumption.”Therefore, vending helps women to secure household food security in times of drought. As a result women are more vulnerable to climate change.

During the research, the researcher asked women why they are more vulnerable to climate change as compared to men. The majority responded that lack of freedom of actions as a result of lack of empowerment over their own lives has made them more vulnerable to the effects of climate change. Empowerment is defined by Castaneda et al (2008) as the process through which women gain increasing power and control over their lives. One of the women asserted that, “if I had freedom of actions to engage in my own-account farming and income generating activities, I would have created my cash streams that helps me to invest in climate change adaptation”. (from a questionnaire survey on 04/04/14). According to our own African traditional cultures, women do not have permission to cultivate their own crops and even being engaged in income generating projects without the consent of their husbands. These results resonate with Ellis

(2000) who found that women do not have rights to engage in their own account farming or other income generating activities without the consent of their husbands. As a result this set a limit to the possibility of their adaptation due to lack of money thereby continuing suffering from climate change impacts.

2.4 Migration and conflict

Focused Group Discussion conducted in ward 28 revealed that Chivi has been greatly affected by labour migration because of drought and the district's proximity to South Africa. This is supported by Miguel et al (2008) who estimated that by 2050, two hundred and fifty million people would be forced to flee their homes due to drought, desertification, extreme weather events and climate related conflicts. This means climate change impacts on population dynamics. From a gender perspective, it is the responsibility of women to ensure that the family remains intact during times of distress. As men migrate towards greener pastures leaving women as household heads by default and this can be viewed as an additional oppression on women. One of the interviewed woman argued that, "My husband migrated to South Africa in 2008, joined the bandwagon in search of employment to send remittances to his family". Considering the findings of ZIMSTAT 2012 Census that, in Chivi district, there are 1047 female headed households under the age group of 24-29 years whereas 752 male headed households by the same age group, there is no doubt that climate change is a push factor. Hence men migrated because of drought and this will increase the reproductive role burden on women.

Furthermore, Babagura (2010) stresses that women face challenges in preparing for climate change impacts due to their socially constructed roles and responsibilities. They are primary care-givers therefore; they are less likely to migrate because they are supposed to remain at home

to care for children and elderly or sick family members. Generally the male migrants engaged in unprotected sex outside the marriage while they are away from their wives and this contributed to the spread of HIV and AIDS to their wives. As a result climate change and climate variability is an additional stressor for women or in other words it is an additional oppression on women.

From a FGD conducted Mrs. Rutendo Chamananzva who lived in ward 22 said that, "child bearing increases our vulnerability. We are regarded as primary care-givers and we are less likely to migrate during the time of distress. Men may be able to migrate for economic opportunities and for greener pastures leaving us to look after the family". This means women are supposed to remain at home to care for children and elderly or sick family members and to make sure that the family remains intact during the time of distress.

2.5 Poverty

Moreover, poverty is also a variable which explains why women are more vulnerable to climate change. Poverty is exacerbated by the recurrent droughts. According to UNDP (2004) women make up 70% of the world's poor. More daunting is the fact that rural women are marginalized and have lower incomes and are more likely to be economically dependent than men. Through household interviews, the majority responded that, "when drought threatens agriculture production, men can use their savings and economic independence to invest in alternative income sources or otherwise adapt". However, women will often give their priority to their husbands and sometimes their husbands meet their nutritional first before their wives'. This ultimately limits their ability to cope with and quickly recover from shocks.

2.6 Energy

According to Holdrige et al (2001), a shift in vegetation zones is mostly likely to occur in sub-saharian Africa at the present moment. IPCC (2007) asserts that forests occupy about 21% of the land in Africa and this coverage is mostly likely to decrease to about 9% as a result of shifts in vegetation zones by the year 2050. This is because with population growth, natural resources become depleted. Holdrige et al (2001) argues that in sub-saharian Africa, less than 10% of the rural population has access to electricity. Hence the majority depends on wood, charcoal and dung as energy sources. This presents an increase in the reproductive role burden on women by acquiring energy sources for domestic roles like cooking. Research findings reveal that time constraints is a challenge faced by women. Therefore the time dedicated for searching wood fuels could be used for other valuable activities like watering vegetables, helping their kids with school homework or simply doing other business that could generate some income for their households. This shows that climate change affects women.

2.7 Water scarcity

Water scarcity can be defined as the lack of available water resources to meet the demands of water usage within a region (UEA 2013). Data gathered in ward 22 through interviews revealed that most of water sources are seasonal. This means that when the rainy season had passed people travel long distances in search of water. This finding is supported by Chief Gororo who lived in ward 28. He said that, their cattle were used to drink water at wells and wetlands but that was no more as they were now drive their cattle, travelling long distances to get the Tugwi and Runde rivers(key informants interviews 04/04/14) These rivers are the main water sources for Chivi people and their animals. Boreholes and wells that are 42 meters deep are dry and this

forces people to travel long distances to a nearby dam to get water. This was the case in ward 22 whereby out of 36 boreholes 7 were dried up. In ward 28 there were 27 boreholes thus Ms Razi who lived in Madzivire village concurs that, "an additional of 16 boreholes is needed because we are still travelling long distances in fetch of water as these boreholes are sparsely located". Water scarcity increases reproductive role burden on women and girls for ensuring proper sanitation and the availability of clean water for household consumption. Rosen et al (2009) it is estimated that women in sub-saharian Africa spend one hundred and thirty-four minutes a day collecting water for household purposes. This clearly indicates that climate change is a threat multiplier 'thus it increases a range of livelihood threats and vulnerabilities rather than being an isolated specific risk.

Data gathered in ward 22 through interviews depicts that water crisis resulted from water scarcity affects one of the adaptation strategy that women were used to implement long ago. It affects the practice of intensive gardening. This is because the available water sources within the study area in question are less than the demand. Therefore, this also affects household food security thereby undermines people's balanced diet which then perpetuates a cycle of ill health.

In addition, water scarcity in Chivi caused water stress, water shortages and water crisis. Water stress is the difficulty of obtaining sources of fresh water as evidenced from the FGD conducted in ward 28 whereby one of the participants argued that, "we spend the whole day in queues in trying to fetch water" Researcher's observations revealed that most water used by women often comes from open holes dug in the sand of dry riverbeds as shown by the picture below.

Figure 3:A woman in ward 28 fetching water from an open hole dug in the dry sand of riverbeds in Runde river



Source: Field Observations

2.8 Knock-on effects

During FGD most participants expressed that, there are possibly knock on effects as a result of drought and water scarcity. These include an increased possibility of sexual assault during the process of fetching water and also an increased in HIV as a result of survival sex especially to those female headed household as they are trying to make ends meet. These findings resonate with Chagutah (2010) who found that they are possible knock-on effects on women as result of climate change. Chagutah also talked of increased alcoholism as a result of the implementation

of indigenous knowledge system like beer brewing (mukwerera) which may lead to an increase in domestic violence thereby affecting women.

2.9 Gender disparities and climate change intervention

Several studies pointed out that climate change intervention creates gender inequality because it has been largely driven by the elite hence men make up the elite in international climate governance. Household questionnaire distributed in ward 22 revealed that women have less access on decision making on climate adaptation programs and projects, for example participating in education programs initiated by the government that are aimed at adapting to climate change through land use management. This means that their needs and interests were failed to be considered in the programs. This was the case with conservation agriculture whereby the training of this practice is mostly accessed by men. In most cases projects that are designated for women ended up benefiting men because men have the rights over the use and management of natural resources. Therefore, women are more vulnerable to climate change as compared to men.

Considering the above findings, it has been argued that women are more vulnerable to the vagaries of climate change from a gender perspective.

CHAPTER 3: ADAPTATION STRATEGIES

3.0 Introduction

Several studies have confirmed that climate change is happening and societies must take the necessary steps to prepare for and adjust to the impacts. Thus from the beginning of climate negotiation, it has been accepted that adaptation has some role to play in countries' responses to climate change. Therefore, this chapter looks at the adaptation strategies implemented by women in Chivi and factors that influence women's decisions to adapt to climate change as well as challenges they face in their coping strategies.

3.1 Adaptation strategies climate change implemented by women in Chivi

Intergovernmental Panel on Climate Change in Chikova et al (2013) postulated that climate adaptation is an adjustment in ecological, social or economic systems in response to actual or expected climatic stimuli and their effects. Put another way, adaptation measures are short-term and immediate response to climate change (Chikova et al 2013). He also pinpoints that there are two different forms of adaptation namely autonomous and planned adaptation whereby autonomous are on-going implementation of the existing knowledge and technology in response to the changes in climate experienced. For example growing of drought resistant crops, early and late planting and growing of short season crop varieties. Planned adaptation is the increased adaptive capacity by mobilizing institutions and policies to establish or strengthen conditions that are favorable to effective adaptation and investment in the new technologies and infrastructure (FAO 2003)

It has been noted that effective adaptation to climate change requires community participation especially those who are victims of climate change impacts. This is because sometimes they might be in a position to overthrow their misery. Although the government of Zimbabwe put in place adaptation methods in Chivi, the women in this district still suffer from the vagaries of climate change. However, there is a gap between the rate at which the climate is changing and the adaptation methods being employed. In spite of this, there are political, social and economic barriers that limit the possibilities of adaptation to climate change by women. In addition, these barriers also influence women's decision to adapt to climate change.

The researcher observed that growing of drought resistant crops like sorghum, millet and rapoko is one of the most significant adaptation strategies implemented by Chivi women but this method is commonly used by those women who do not practice conservation agriculture. Many women in ward 22 argued that lack of resources hindered them to choose other adaptation measures like irrigation due to lack of joining fee. This is because women do not have access to financial resources such as credit facilities. These results resonate with Chikova et al (2013,p15) who asserts that, "The burden of climate change are felt more by the poor in the communal areas as they have limited adaptation capacity due to limited resources".

From the interviews and questionnaires it is clear from the respondents that due to unreliable rainfall that the district received women can no longer produce enough food for household consumption every season. The district receives an average annual rainfall of 545mm (Chikova et al 2013). More daunting is the fact that the soils in Chivi district are mainly sandy. Sandy soils are characterized by low water retention and therefore need a lot of water for crops to grow well. Therefore, they grow crops like rapoko, millet and sorghum and these drought resistant crops can cope with low rainfall thereby reduces chances of total crop failure. From a Focused Group

Discussion conducted in ward 28, they said that climate change variables determine the growing of drought resistant crops. Thus, as precipitation decreases, women will shift towards drought tolerant crops.

Through a questionnaire survey, the researcher noted that most women adopted intensive gardening as a way of adapting to climatic conditions. Then, for a successful intensive gardening, women from the community should come together around a community garden where there is a water source and each household member allocated a portion of land in that garden where she grow various crops for subsistence and surplus for sell. This strategy will go a long way helping the affected women to adapt to the changing climatic conditions in Chivi because mostly women have full ownership and control of the produce from the gardens thereby securing and sustain their livelihood. During interviews, the researcher observed that this strategy is implemented by those women whose age ranges from 40-50. This is because they do not have any formal or reliable source of income for their survival due to lack of education.

Conservation agriculture also engaged in as a copying strategy. Conservation agriculture is defined by Community Technology Development Trust as the method of producing crops whereby time, energy, soil and moisture are conserved. However, lack of draught power pushed women to undertake conservation agriculture principles which emphasize zero tillage and encourage use of hoes in the digging of planting basins. Lack of access to and control of means of production can explain why women have experienced lack of draught power. Women explained that it is not easier to balance the two that is purchasing expensive agro -chemical inputs and hiring of draught power from neighbors considering their low income levels. From the FGD conducted in ward 22 Mrs. Museva who lives at Mhonde village argued that, 'It is ideal for us the poor who have limited access to inputs such as fertilizers, chemicals and labour to adapt to

the effects of climate change by conservation farming”. Sometimes they get capital from their working children and relatives. Therefore lack of draught power and financial constraints left women in this area in question without options except adopting conservation farming.

In addition to the above scenario, women in ward 22 also argued that, “organic agriculture can increase agricultural productivity”. They emphasized that with the use of locally available and appropriate technologies and without causing environmental damage, conservation farming was a blessing to them. Furthermore, evidence shows that organic agriculture can build up natural resources, strengthen communities, and improve human capacity, thus improving food security by addressing many different causal factors simultaneously (CTDT 2009). These results resonate with Nhodo et al (2013). It has been noted that conservation farming associated with early planting every season and this boosted productivity while at the same time reduces crop failure due to timing thereby enhancing food security. Therefore, women plant early with first effective rains. From a FGD conducted in ward 28 women indicated that they are no longer struggling to access synthetic fertilizers because they make use of available resources and appropriate technologies.

However, data gathered in ward 22 during interviews indicated conflicting perceptions about conservation farming. Some women called it, 'Diga ufe' (euphemistically meaning dig and die) whereas others aptly called, 'Diga udye' meaning dig and survive. These results are in support with Gukurume et al (2010) who found that conservation agriculture has been called 'Diga ufe' while in some instances it can be called 'Diga udye'. The majority of women called it Diga ufe. This is because they take into account the incongruence of the investment they put in this farming method in line with the benefits and outcomes of this practice. Therefore, conservation agriculture would often out- weigh benefits. As a result, the researcher noted that such

conflicting perceptions are having negative repercussions on the effectiveness and sustainability of conservation farming in Chivi area. To buttress the above analysis, the practice of conservation agriculture in the area in question has been aggravated by the fact that Chivi south district is one of the districts that has been severely affected by labor migration due to its proximity to South Africa.

Nevertheless, during the research, the researcher also noted that conservation farming in Chivi though it was viewed by many women as a blessing to them as postulated by one of Chief Gororo's wife in ward 28 who said that, ' I'm confident that by using conservation agriculture I will harvest more with limited farming inputs' while others viewed it as an additional burden to them because of its labour intensive. However, though it was an adaptation measure being implemented by women, the fact that the majority of men migrated to South Africa in search of greener pastures leaving the elderly, women and children explains why the majority of women in ward 28 failed to adapt to the vagaries of climate change by using conservation agriculture. This is because this labor migration leaving elderly and children who cannot bear the demands of conservation agriculture.

Furthermore, crop diversification is another strategy that women in Chivi can use. According to Miguel et al (2008) crop diversification is an important farm strategy for managing production risk in small farming systems. Thus depending on only one or two kinds of crops considerably increases the vulnerability of farming households. The researcher asserts that crop diversification is the panacea to climate variability challenges. This strategy has proved to be successful in Chivi with a number of respondents highlighting that they have moved to new crop varieties that are relatively drought resistant and hence can withstand the long dry spells that are rampant in Chivi. From the questionnaire distributed, the researcher observed that diversification of crops in

Chivi helped vulnerable communal women secure food and at least some income, even in the case of extreme events. Hence women cultivate a wide range of traditional and new cereals and pulses to spread the risk of crop failure.

In addition, a number of respondents said that farm size determined the practice of crop diversification in ward 22. Again the majority of women agreed that diverse crops bring diverse benefits. This is because crop diversification reduces the chances of total crop failure and sometimes they diverse growing short season crop varieties. Women responded that household size influenced them to adapt to climate change through crop diversification. Therefore, the increased the household size, the increased the possibility of adapting to climate change is needed.

More important still, irrigation is also an adaptation strategy implemented by Chivi women. Through a questionnaire survey, the researcher noted that climate change variables influence women's decision to adapt to climate change. This was the case with the shift in the rainfall patterns. Dhilwayo (2007) argues that in the past people were used to receive early rainfall known locally as the Gukurahundi or bumharutsva in the late September or early October. Nowadays however, this is now history because the area used to receive the first rains around December, that is, if it receives rainfall at all. This shortens the growing season and therefore, pushed women to adapt to climate change through irrigation. However, from a FGD conducted in ward 22 many women argued that irrigation helps them to cope with climate change because it exceeds the growing season thereby boosting their agricultural productivity.

Women in Chivi also adapted to climate change through engaging in off-farm activities. This involves participating in income generating projects, for example Batanai Soap Making. This

gender project was implemented by Batanai HIV and AIDS Service Organization (BHASO). From household interviews conducted, the researcher noted that women also involved in vending whereby they sell vegetables, tomatoes, fruits and airtime at Growth Points so as to secure household food security.

However, data gathered in ward 28 indicated that to some extent this adaptation measure failed to secure women's livelihood. This is because the majority of men interpreted this opportunity (diversification) to reduce or withdraw their financial contributions to the household budget. These results are in line with Ellis (2000) who found that when women diversify and create new streams of cash flows, then men can interpret this opportunity to reduce or withdraw their financial contributions to the domestic budgets. Therefore, women have continued bear household food security burden and this is a clear indication that women are at the front line of climate change impacts.

3.2 Challenges faced by women in Chivi in their coping strategies

Several studies have indicated that women suffer more from the effects of climate change as compared to men. United Nations Population Fund (UNFPA) published a book in 2009 emphasizing that women have the power to mobilize against climate change, but this potential can only be realized through policies that empower them. Therefore, challenges faced by women in trying to adapt to climate change are explained in terms of gender. Research findings revealed that out of 5 members from a FGD conducted in ward 22, 4 members responded that lack of financial resources is a challenge faced by women in climate change adaptation. This was traced back to lack of access to credit facilities due to lack of title deeds. Sometimes women depend on

remittances from their working children and relatives. This limits their coping capacity due to inadequate money for investing in other adaptation measures like vending.

Basing on Eco-Feminism theory which pinpoints that women are the natural custodians of the environment that is, they rely on natural resource that are threatened by climate change and variability. Data collected in ward 22 have indicated that the lands from which women derive their livelihoods have poor fertility due to soil erosion and degraded from heavy use and deforestation. These results are supported by Chikova (2013) who found that Chivi area has a fragile ecosystem due to loss of biodiversity. During FGD, participants expressed that land degradation hindered climate change adaptation. Thus the area has left with only thorn trees and shrubs that are of no use to the human survival. These findings are in line with Dhilwayo (2007) who found that there is loss of biodiversity in Chivi as a result of climate change. Loss of biodiversity set a limit on women's adaptation to climate change. One of the participants said that, "we are now keeping food for our cattle and feed them like children because most of the grasslands are no longer existent." Land degradation lead to the deterioration of fertile grazing lands as you can see. (FGD conducted in ward 22 on 04/04/14)

Figure 4: Evidence of loss of biodiversity in ward 22 of Chivi district



Source: Field Observations

In addition, some of the challenges that women may face are emanating from the adaptation strategies they implemented. During the research, the researcher observed that growing of drought resistant crops is also engaged in as coping strategy. From the questionnaire distributed in ward 28, one of the women argued that, “processing of small grain crops into food may be difficult and it is labour intensive.....considering the fact that the life style of nowadays promotes laziness”

More so, reproductive roles also set a limit on women’s coping capacity. Women are generally regarded as primary care-givers within the household level. They are responsible for securing

food, water and energy within the household level. FGD conducted in ward 28 confirmed that women bear more household food responsibility as argued by Mrs. Agnes Dare who lives in Dare village that, ‘we play a much stronger role than men in the management of household food security’. This means that whenever household food security got threatened, women should be in a position to make sure that it is secured. For example in terms of water scarcity, they travelled long distances for a longer time to fetch water for domestic purposes thereby exposing them to health risks and limiting their prospects for engaging in high-return ventures such as education, politics and business. This argument is supported by Anderson in United Nations Development Program’s report (2002)

Additionally, since climate change is a stressor for women, the dedicated time for searching wood fuels and water could be used for other valuable activities like watering vegetables or doing other business that could generate some income needed to deal effectively with climate change. This undermines the social capital formation for women.

Furthermore, through household interviews conducted, it is clear that most women continue suffer from climate change due to lack of access to credit facilities for preparing to and adjust to climate change. Access to credit eases the financial constraints faced by Chivi women as a result availability of credit facilitates the possibility of an individual to adapt to the vagaries of climate change. These results are consistent with findings of Mudzonga (2011) who found that availability of credit enhances probability of a farmer to adapt strategies that reduce the negative impact of climate change to his/her household. Findings by Gbetibouo, Dressa et al and Fosu-Mensah et al in Mudzonga (2011) also showed that access to credit significantly influences the farmer to adapt to climate change. As a result this explains why women are more vulnerable to climate change despite measures being put in place by them.

More important still, lack of freedom of actions and power by women also explain challenges faced by women in their coping strategies. From questionnaires and interviews, the researcher observed that many women got permission from their husbands to engage in their own-account farming activities or other income generating activities. During the interviews, the researcher asked one of the women in ward 22 about her freedom of actions and she said, ‘I do not have any right to engage in my own –account farming or other income generating activities without the consent of my husband’. These income generating activities help them to generate cash streams needed to adapt to climate change. Besides that women do not have rights to cultivate their own crops (chitseu) without being given permission by their husbands. As a result this set a limit to the possibility of their adaptation due to lack of money.

Furthermore, lack of participation when it comes to climate change intervention also hinders the successes of adaptation measures being implemented by women. It has been noted that women are at the frontline of climate change impacts hence, sometimes they may be in a position to overthrow their misery but their participation is negligible. Women have no access on decision-makings about cropping patterns; men are the ones who decide the cropping patterns. These results resonate with Abbas in Ellis (2000). As a result their participation on improved cultivation is undermined.

3.3 Recommendations

Considering the research findings discussed in this study, there is no doubt that a lot is desired to be done especially in the semi-arid areas of Zimbabwe such as Chivi. The following recommendations should be put in place to improve the status of women in climate change issues.

- Building on and strengthening women's experiences, knowledge and coping capacities in adaptation policies and ensuring that women's needs and interests are incorporated in livelihood adaptation strategies. This can be done through provision of training organizations for women and support groups where they can share knowledge and experiences about climate change issues.
- The researcher also recommends the carrying out of gender analysis in all climate policies, programs, budgets and projects. This helps to address the differing ways in climate change affects men and women thereby creating gender-sensitive policies.
- There is need for acknowledging full participation of women in all decisions related to climate change and in the use and management of natural resources.
- From the above research findings, it has been noted that the effects of climate change on women are gendered and hence there is need for the economic empowerment of women. This helps women to gain increasing power, freedom of actions and control over their lives (Castaneda et al 2008). By so doing that, this helps to cut their economic dependency over their husbands.
- Improve women's livelihoods and strengthen adaptation by ensuring women's access, control and ownership of resources for example, land, livestock and income opportunities. Women should be also given free access to development resources such as credit facilities so as to ease the financial constraints they face thereby pave a way for women to invest in climate change adaptation measures.

Conclusion

Climate change and climate variability is a pertinent issue affecting the livelihoods and food security resulted in human suffering due to the destruction of natural resource base upon which many livelihoods depend. However, though climate change impact touches the lives of all people in a society, women are at the frontline because they have dissimilar roles. What make rural women to be more vulnerable to climate change are the existing gender disparities and this explains why effects of climate change on women are not gender neutral. Women depend on climate sensitive sectors that are threatened by climate change and they have no access to and control over resources. They have limited financial, natural, physical and social capital needed for climate change adaptation. Therefore, Zimbabwe needs to focus on extensive research and development programmes to facilitate swift responses to climate change.

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Appendix 1: Questionnaire for Household

A study on the impact of climate change and climate variability on rural women: A Case of ward 22 and 28 Chivi district, Zimbabwe.

Introduction

I am Sarah Chanaka, a fourth year student at Midlands State University doing Development Studies Honors Degree. It is prerequisite for final year students to undertake research project. I am asking your contribution by providing relevant information regarding to the impacts of climate change and climate variability on rural women. The aim is to understand your knowledge, perception and experience of climate related issues. The information that you are going to provide will only be used for the purposes of this survey.

Demographic Data

Fill in the table below

Place	Name
Province	
District	
Ward	
Village	

1. Age Group

- a) Below 18
- b) 19- 29
- c) 30- 39
- d) 40- 49
- e) Above 50

2. Level of Education

- a) No formal education
- b) Completed primary school education
- c) Completed secondary school education
- d) College or University

3. What is your source of income?

- a) Farming
- b) Basket making
- c) Vending
- d) Pottery making
- e) Other.....

4. What is your average family income per month?

- a) \$10- \$20
- b) \$21- \$30
- c) \$31- \$40
- d) \$41- \$50
- e) >\$51

-

Climate change and Climate variability

5. What do you understand by the term climate change?.....

.....

6. What is climate variability?.....

.....

7. What is the evidence (indicators) that shows that climate is changing in your area?

.....
.....
.....

8. How does climate change and climate variability affects your

a) Household food security.....

b) Local food security.....

c) Entitlements.....

9. How does climate change affects your climate-sensitive sectors?

a) Water sources.....

b) Forests.....

c) Gardens.....

d) Fields.....

10. Why women are more vulnerable to the effects of climate change and climate variability?.....

.....

11. Are there any situations in your area whereby girls may have to drop out of school to reduce family expenses caused by climate change? Yes No

a) If yes what are the problems.....

.....

Adaptation measures to climate change and climate variability

12. What do you understand by the word climate adaptation?.....

.....

13. What adaptation measures are you implementing in your area?

- a) Growing of drought resistant crops
- b) Irrigation
- c) Conservation agriculture
- e) Off-farm activities
- f) Early and late planting
- g) Gardening
- h) Growing of short season crop varieties
- i) Crop diversification

14. How does your adaptation measure(s) you have chosen above helps you to cope with the negative effects of climate change?.....

.....

15. How sustainable is your adaptation strategy (ies)?.....

.....

16. What determines climate adaptation measures you have chosen above?

- a) Education
- b) Household size
- c) Farm size
- d) Soil fertility
- e) Access to credit
- f) Access to extension services
- g) Wealth
- h) Climate change variables

17. What challenges are you facing in your area in trying to cope with climate change impacts?

- a) Lack of education
- b) Lack of access on decision-makings
- c) Lack of ownership and control of resources
- d) Lack of access to financial resources
- e) Lack of power and freedom of actions
- f) Poverty
- g) Economic dependency
- h) Gender roles.

18. Can you explain how each of the challenges you have chosen above affects your possibility of adapting to climate change.....
.....

19. What are the possible knock-on effects on women as a result of the implementation of adaptation measures in your area?

- a) Child betrothal
- b) Forced marriages
- c) Withdrawal of children from school especially girls
- d) Increased HIV as a result of survival sex
- e) Increased domestic violence as a result of beer brewing (mukwerera)

20. What awareness and/or education programs do you participate in, initiated at local government level on adaptation to climate change through land management?
.....

.....
21. In your own opinion, explain the effectiveness of these programs if they do exist

.....
.....

22. In your opinion, what can be done to improve the status of women in relation to climate change issues?.....

.....

Thank you for your time and for agreeing to respond to this questionnaire

Appendix 2: Interview guide for Household

Interview date..... (Interviews done after consent by respondents)

Age.....years

1. What are the indicators of climate change in your area?
2. How does climate change affects your household food security?
3. How does climate change affects your climate-sensitive sectors?
4. Why women are more vulnerable to climate change and climate variability?
5. What adaptation strategies are you implementing in your area?
6. What challenges are you facing in trying to cope with the effects of climate change?
7. What determines climate adaptation measures are you implementing in your area?
8. What awareness or education programs do you participate in, initiated in your community on adaptation to climate change through land management?
9. What is the effectiveness of these programs?
10. What can be done to improve the status of women in climate change related issues?

Appendix 3: Interviews guide for key informants

Interview date..... (Interviews done after the consent by the respondents)

Age.....years

1. What are the indicators of climate change in your area?
2. How does climate change affects climate-sensitive sectors in your area?
3. Why women are more vulnerable to climate change and climate variability?
4. What adaptation strategies are women implementing in your area?
5. What challenges faced by women in trying to cope with the effects of climate change?
6. What determines climate change adaptation measures implemented by women?
7. What awareness or education programs do women participate in, initiated in your community on adaptation to climate change through land management?
8. What is the effectiveness of these programs?
9. What can be done to improve the status of women in climate change related issues?

Appendix 4: Focus Group Discussion guide

FGD date..... (FDG done after the consent by the respondents)

1. What are the indicators of climate change in your area?
2. How does climate change affects your household food security?
3. How does climate change affects your climate-sensitive sectors?
4. Why women are more vulnerable to climate change and climate variability?
5. What adaptation strategies are you implementing in your area?
6. What challenges are you facing in trying to cope with the effects of climate change?
7. What determines climate adaptation measures are you implementing in your area?
8. What awareness or education programs do you participate in, initiated in your community on adaptation to climate change through land management?
9. What is the effectiveness of these programs?
10. What can be done to improve the status of women in climate change related issues?