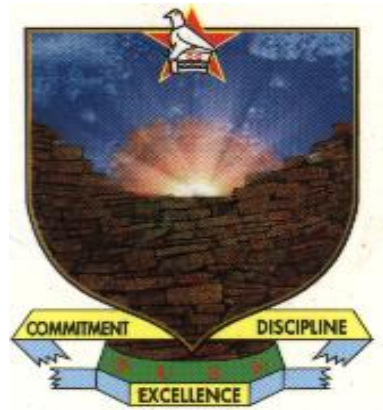


BINDURA UNIVERSITY OF SCIENCE EDUCATION
FACULTY OF SOCIAL SCIENCES AND HUMANITIES
DEPARTMENT OF SOCIAL WORK

**THE CLIMATE CHANGE ADAPTATION STRATEGIES IN RURAL COMMUNITIES OF
ZIMBABWE. A CASE OF GUTSA WARD SIX (6) IN MUZARABANI NORTH.**



BY

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**A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS OF THE BACHELOR OF SCIENCE HONOURS DEGREE IN
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Approval form

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ABSTRACT

The study sought to look into the climate change adaptation strategies in Gutsa ward 6 of Muzarabani district in Mashonaland Central. The negative impacts of climate change have remained an outstanding hindrance in the survival of the majority particularly the rural populace in Zimbabwe rural communities who heavily depend on rain fed agriculture to sustain their livelihoods. A case study research design was used and a sample size of 43 study respondents was utilised to generalise findings from the study. The study utilised simple random and convenience sampling techniques to determine the sample size. Among the respondents were the residents of Gutsa ward 6 in Muzarabani district, operating local Non-Governmental Organisations as well as members from the AREX and Social services departments. The researcher used interviews and focus group discussions to obtain data from respondents and the findings were presented in the form of tables and graphs. From the findings the researcher concluded that climate change has posed a number of challenges to human livelihoods in Gutsa ward as it had culminated in food insecurity and loss of livestock. The researcher also found out that people of Gutsa ward in Muzarabani district have not remained passive victims to the negative impacts of climate change but have responded with great commitment to these shocks. They have managed to come up with a number of climate change adaptation strategies and among them; the growing of drought resistant crops and livestock production. The study also established that most respondents lacked the resources such as capital as well as productive assets which were the means to successful adaptation. The researcher therefore recommended the need for livelihood diversification through growing of drought resistant crops as well as, intensification of livestock production in all communities which are susceptible to the negative impacts of climate change. The researcher also recommended further research to focus on the role of the government in climate change adaptation in Gutsa ward 6 in Muzarabani north.

DEDICATION

This study is dedicated to my parents Mrs Munzara, L and Masarakufa, F and my friend Jonathan Mapanda.

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I would like to pay special gratitude to Mr Masuka my supervisor for his patience, interest and commitment in helping me out throughout the course of this research. I would like also to reserve special mention to friends Jonathan and Charles for their guidance in making this research a success I would like to pay special tribute to my parents. My grateful thanks lie within God from Whom I draw the inspiration and strength to go through difficulty life experiences. Last but not least I would like to thank my dearest friend Tino, my classmates, friends and colleagues among those who have played part whatsoever in the accomplishment of the entire project with constructive suggestions, criticisms and taking interest in the progress of this project.

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DEFINITION OF KEY TERMS

Climate change – refers to a change in the state of the climate that can be identified by changes in the mean and the variability of its properties that persists for an extended period, typically decades or longer (Intergovernmental Panel on Climate Change (IPCC), 2007).

Adaptation – denotes a process through which societies increase their ability to cope with an uncertain future, which involve taking appropriate action and making the adjustments and changes to reduce the negative impacts of climate change, (UNFCCC, 2007).

Mitigation - Structural and non-structural measures undertaken to limit the adverse impact of natural hazards, environmental degradation and technological hazards (UNFCCC, 2007).

Strategies - All measures taken to counter and reduce disaster risk. They most commonly refer to engineering (structural) measures but can also include non-structural measures and tools designed and employed to avoid or limit the adverse impact of natural hazards and related environmental and technological disasters (IPCC, 2007).

Disaster - A disaster is a condition or an impulsive event of significant distraction, disruption or distress to the normal functioning of a community, causing widespread human, material or environmental loss which exceeds the ability of the affected community to cope using only its own resources. The geographical location, climate and the type of the earth surface influence the mental, social, political and cultural state of the affected area (Civil Protection Department, 2009).

Vulnerability - A set of conditions and processes resulting from physical, social, economic, and environmental factors, which increase the susceptibility of a community to the impact of hazards.

List of Acronyms

IPCC	Intergovernmental Panel on Climate Change
UNFCCC	United Nations Convention Framework on Climate Change
UNDP	United Nations Development Programme
SADC	Southern African Development Committee
NEWU	National Early warning Unit
FEWSNET	Famine Early Warning Systems Network
WFP	World Food Programme
ZIMVAC	Zimbabwe Vulnerability Assessment Committee
AGRITEX	Agricultural Rural Extension Services
CPD	Civil Protection Department
SSA	Sub Saharan Africa
PRA	Participatory Research Approaches
SPSS	Statistical Package for Social Science
CC & V	Climate change and variability
MONRE	Ministry of Natural Resources and Environment
ZNCRS	Zimbabwe national Climate Change Response Strategy
UNCCD	United Nations Convention to Combat Desertification
UNCBD	United Nations Convention on Biological Diversity

Zimstat	Zimbabwe National Statistics Agency
MeDRA	Methodist Development and Relief Agency
SAT	Sustainable Agriculture Technology

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CHAPTER ONE

INTRODUCTION TO THE STUDY

1.0 Introduction

The purpose of this study is to look into the climate change adaptation strategies being implemented in rural communities of Zimbabwe, a case of Gutsa ward of Muzarabani district. This chapter is going to focus on the background to the study, statement of the problem, aim and objectives of the study, research questions and assumptions as well as justification of the study. At the end of this chapter there is the synopsis of the discussed issues.

1.1 Background to the study

Climate change has been referred to as a phenomenon that denotes a change in the state of the climate that can be identified by changes in the mean and the variability of its properties that persists for an extended period, typically decades or longer (Intergovernmental Panel on Climate Change (IPCC), 2007). The term adaptation has also been defined as, the process through which societies increase their ability to cope with an uncertain future, which involve taking appropriate action and making the adjustments and changes to reduce the negative impacts of climate change, (United Nations Convention Framework on Climate Change (UNFCCC), 2007).

Thus as can be noted from the aforementioned definitions, climate change perceived as a phenomenon that poses serious threats to human livelihoods thus its diabolic effects cannot be

overlooked hence appropriate measures, actions and strategies should be put in place to guard against its bedeviling and devastating impacts. This is further buttressed by (United Nations Development Programme (UNDP), 2005) that, The magnitude of climate change risks on development is so large and pervasive, hence mainstreaming current and future climate vulnerabilities into development is an urgent prerequisite for sustainable development for developed and developing countries alike.

Some of the effects of climate change as noted by IPCC (2007) include; water stress, decreased yields from rain fed agriculture thus leading to food insecurity and malnutrition as well as an increase in arid and semi-arid land. Frost (2001) substantiates this notion by affirming that, In a situation whereby a significant proportion of the population is largely dependent on exploitation of environmental resources for their livelihoods, climate change ultimately culminates in a number of negative impacts which include but not limited to the following; pronounced increases in temperature, recurrent droughts and unpredictable rainfall patterns all of which have exacerbated suffering among the people of Zimbabwe especially in the rural areas, where majority of the population resides.

Zimbabwe is largely affected mainly due to its heavy dependency on rain fed and climate sensitive resources (crops) such as maize and wheat (Chagutah, 2010). Extreme weather events namely; floods, drought, and tropical storms are also expected to increase in frequency and intensity across the continent and these projections are in consistence with the recent climatic trends in Southern Africa and Zimbabwe is not an exception (IPCC, 2007). This therefore implies difficult times ahead for local people that depend directly on natural resources for their livelihoods and have few assets or technologies to cope with the changes to come (ActionAid, 2005). Therefore from the above mentioned viewpoints it is clearly speculated that climate change is indeed a global menace and challenge that need to be addressed with great concern as it is life threatening.

On the regional and global arena, major strides have been made and are still being made to address the undesirable and catastrophic impacts of climate change. It is apparently clear that Zimbabwe cannot fight climate change on her own, given that the effects of climate change are affecting the whole region and the whole wide world at large. The regional and global concerted efforts have culminated in the facilitation and implementation of the (2004) Dar-es-Salaam Declaration and Action Plan on Food Security and Coordination on Transfrontier Conservation Areas. This declaration is part of SADC's climatic change adaptation and mitigation measures which will see all countries in the region adopting measures aimed at minimizing the effects of climate change (Manyeruke, Hamauswa and Mhandara, 2013). Global concerted efforts to fight climate change have been made with the enforcement of treaties such as the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) of 1992 which came into force on the 16th of February 2005 (Manyeruke et al, 2013). The Kyoto protocol aims to reduce greenhouse gas emissions and minimize the impact of climate change. Therefore it can be noted that major strides are being made nationally, regionally as well as globally in their endeavour to effectively address the challenges of climate change.

At national level Zimbabwe has shown its commitment in addressing the negative effects of climate change in a multi-sectoral approach. (Hove, Echeverria and Parry, 2011) posited that, In Zimbabwe there is the existence of a functional platform with a wide cross-sectional representation from Government, UN Agencies as well as local and International NGOs. They further added that this is complemented by the existence of a government department of civil protection which also has functional civil protection committees both at Provincial and District levels under the Ministry of Local Government, Rural and Urban Development. This department has the overall responsibility of disaster Risk management in collaboration with other cooperating partners such as United Nations and Non Governmental Organisations where they provide various emergency preparedness and response assessments and recovery

assistance to the government of Zimbabwe (Shumba, 2005). These therefore work in combination in addressing the affected community concerns by giving them aid and capacitating them to develop sustainable climate change adaptation strategies.

There is also the meteorological Office, National Early warning Unit (NEWU, Famine Early Warning Systems Network (FEWSNET), World Food Programme (WFP), and ZIMVAC Assessments, Agricultural Rural Extension Services (AGRITEX) who help extensively in information sharing, promoting conservation agriculture through the growth of drought tolerant crops, water harvesting and irrigation schemes. These also provide social support mechanisms to protect vulnerable groups through drought relief, cash transfers and promoting food for work programmes (Shumba, 2005). Therefore as substantiated by the above sentiments, it is clearly spelt out that the Government of Zimbabwe together with collaborating partners are making gigantic efforts and notable strides in their endeavour to curb and address the ravages of climate change.

1.2 Statement of the problem

Despite concerted community efforts complemented by the government and various stakeholders, the impacts of climate change have remained an outstanding hindrance in the survival of the majority particularly the rural populace in Zimbabwe rural communities who heavily depend on rainfed agriculture. This study therefore looked into the strategies that people of Gutsa ward of Muzarabani have put in place as climate change adaptation mechanisms and how effective are these strategies in addressing the adverse effects of climate change. Ngigi (2009) suggested that, there should be appropriate refining, augmentation and deployment of options that exist as a matter of urgency to address the negative impacts of climate change.

1.3 Aim of the study

This aim of this study was to examine climate change adaptation strategies being implemented in Gutsa ward of Muzarabani North.

1.4.0 Objectives of the study

This study sought to address the following objectives:

1.4.1 To identify the negative effects of climate change in Gutsa ward, Muzarabani North.

1.4.2 To explore ways being used to mitigate the negative impacts of climate change in Gutsa ward, Muzarabani North.

1.4.3 To assess the outcomes of the strategies being used to mitigate climate change in Gutsa ward, Muzarabani North.

1.5.0 Research questions

1.5.1 What are the negative effects of climate change in Gutsa ward, Muzarabani North?

1.5.2 What are climate change adaptation strategies being utilized in Gutsa ward, Muzarabani North?

1.5.3 What are the outcomes of the climate change adaptation strategies that have been employed in Gutsa ward, Muzarabani North?

Sub-questions

1.5.4 What is the role of non-governmental organizations towards climate change adaptation?

1.5.5 What are barriers in climate change adaptation?

1.5.6 Is the community committed to the climate change adaptation efforts?

1.6.0 Assumptions of the study

1.6.1 The researcher assumes that the data to be provided by the respondents will be accurate

1.6.2 The sample is a representative of the population

1.6.3 The researcher will get enough support from all respondents

1.7 Justification of the study

The results from this study will hopefully assist government departments such as the civil protection department and various non-governmental organizations with reliable information on understanding the climate change phenomenon. This in turn will result in formulation of policies and provision of goods and services that strengthen resilience of the rural communities towards the adverse impacts of climate change.

Ross (2004) cited in Zastrow (2008) epitomizes that community social work is based on and is related to certain fundamental assumptions that communities of people can develop the capacity to deal with their own problems (Farley, Smith and Boyle, 2010). Therefore guided by this line of thinking, this study served as a way of equipping people to take a collective action in addressing the negative impacts of climate change.

These findings will also aid to the knowledge base of the social work profession as they greatly inspire processes involved in rural development such as empowerment of rural people through projects and knowledge for adaptation. Rural development entails the process of improving the quality of life and economic well-being of people living in relatively isolated and sparsely populated areas (Chigbu, 2012). This in the long run will improve the wellbeing of the rural populace who bear the shocks of climate change.

Furthermore the study was carried out among rural communities where the poorest reside hence the concept of social work also comes into play as it aims at attaining the highest standards of living among the rural poor and also having a deeper understanding of the community's felt needs. The social worker assumes the primary role in community social work of working within the network of human services to increase their effectiveness in meeting human needs (Morales, Scheafor and Scott, 2010).

The study focused largely on building communities which are more resilient to climate change anomalies thus capacitating them to actively participate in addressing problems that affects them as a community. This will therefore promote community development which implies helping local people to decide, plan and take action to meet their own needs with the help of available outside resources (John, 2007). This is supported by the community development model which sought to use discussion and communication among different factions to reach consensus on which problems to focus on and which strategies or actions to use to resolve these problems (Zastrow, 2008).

1.8 Chapter summary

This chapter looked at the background to the study, statement of the problem, aim of the study, research objectives, research questions, assumptions under which the research will be carried out and finally justification of the study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter reviews literature from other scholars on how communities were adapting to the negative impacts of climate change befalling them. The review shall be conducted under a number of headings with the view of identifying linkages and knowledge gaps which the study aimed to cover. Saunders, Lewis and Thornhill (2007), explains literature review as the foundation for the research that is being carried out. The chapter has accomplished three important tasks. First, it discusses the conceptual framework of the study. Secondly, it reviews past studies on the phenomenon. Finally, it defines the existing knowledge gap the study is designed to fill.

2.1 Conceptual framework on climate change adaptation

Adaptation refers to the adjustments in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts. It also refers to changes in processes, practices and structures to moderate potential damages or to benefit from opportunities associated with climate change (Winters, 2012). Adaptation therefore depends greatly on the adaptive capacity or adaptability of an affected system, region, or community to cope with the impacts and risks of climate change (Action Aid, 2005). The adaptive capacity of communities is determined by their socio-economic characteristics. The enhancement of adaptive capacity represents a practical means of coping with changes and uncertainties in

climate, including variability and extremes. In this way the enhancement of adaptive capacity reduces vulnerabilities and promotes sustainable development (IPCC, 2007). This therefore conceptualises climate change adaptation as a broad, comprehensive and multidimensional process that should be carefully practised.

Stuczyński, Demidowicz, Deputat, Górski, Krazowicz, and Kus (2000) have identified two types of adaptation which are; anticipatory and reactive adaptation. Anticipatory adaptation has the potential to reduce vulnerability and realize opportunities associated with climate change. The implementation of adaptation policies, programs, and measures usually will have immediate benefits as well as future benefits. Adaptation measures are likely to be implemented only if they are consistent with or integrated with decisions or programs that address climatic stresses. The costs of adaptation often are marginal to other management or development costs (IPCC, 2007). UNFCCC (2007) reiterated that anticipatory adaptation to climate change requires both public and private institutions to plan their strategies and take action in advance. This has been illustrated in the example where coastal authorities were aiming at addressing sea level rises by building dykes and housing authorities that want future constructions to withstand climate changes were urged to introduce appropriate building codes (UNFCCC, 2007). This shows that adaptation in this case is done in anticipation of climate related hazards.

Reactive adaptation on the other hand entails taking quicker and remedial actions in an effort to address an anomaly. The actions can take form through the practise of migration to wetlands, changes in ecosystems, food handouts, buying air conditioning systems among others. These are usually short term measures (UNFCCC, 2006).

It is also important to note that, the capacity to adapt varies considerably among regions, countries, and socioeconomic groups and will vary over time. The most vulnerable regions and

communities are those that are highly exposed to hazardous climate change effects and have limited adaptive capacity. Countries with limited economic resources, low levels of technology, poor information and skills, poor infrastructure, unstable or weak institutions, and inequitable empowerment and access to resources have little capacity to adapt and are highly vulnerable. These have been identified as the determinants of climate change adaptation which should be considered when finding out sustainable adaptation strategies (IPCC, 2007).

2.2 Literature review

2.2.1 Negative effects of climate change

Climate change affects various facets of life. This has been supported by various schools of thoughts who confirmed that climate change is well known for its negative effects on the livelihoods of the majority of the rural populace in Zimbabwe as well as world over. The Intergovernmental Panel on climate change (IPCC) (2001) notes that; the impacts of climate change are broad; they touch on a number of areas for instance, crop production, livestock production and health among other areas. These negative impacts of climate change are as outlined and explained below:-

2.2.1.1 Drought

Drought has been identified as one of the negative impacts of climate change; droughts occur more frequently in Zimbabwe most probably due to climate change. They occur usually when the rainfall is below average or when mid season dry spells are experienced (Chifamba and Mashavira, 2011). These periodic droughts have a negative impact on crops, livestock and

livelihoods of the people particularly those residing in drought prone communities as well as the nation at a larger scale. This is because the country is strongly dependent on rain fed agriculture which in this case is a vulnerable sector in terms of the climate related hazards (IPCC, 2001). Egeru (2012) also echoes on the same sentiment by stipulating that droughts have also culminated in higher crop losses due to extreme weather events.

Gukurume (2010) adds that drought causes a number of losses that include but not limited to failure of crops, death of livestock, and low crop yields all of which have led to declining agricultural productivity. This sentiment has also been echoed by Makumbe (2009) who noted that, once known as the breadbasket of the Southern African Development Community (SADC) region, Zimbabwe is now characterised by chronic food insecurity and is entirely dependent on international aid, particularly food aid.

Thus drought has been identified as one of the negative impacts of climate change which has culminated in a number of losses to human livelihoods. According to Phillips (2009), the harsh climatic conditions due to climate change have resulted in women playing a central role in food security and they are the first to stop eating but their well-being is often the key for maintaining access to and the supply of food to families hence they face a double jeopardy as food supply diminishes. The extinction of wetlands and decrease in vegetation cover has also been noted as another negative impact of climate change (Action Aid, 2005). It has also been reported that drought has caused catastrophic losses in livestock. This combined with the failure of agricultural crops, severely increased vulnerability of rural communities who depend on rainfed agriculture thus leading to food insecurity (UNDP, 2005).

2.2.1.2 Floods

Floods pose a number of negative challenges to the livelihoods of the majority globally. These floods have long term impacts to human survival and they are mainly caused by unseasonal

rains and extreme events which created enormous developmental challenges for developing countries and the poorest communities due to their dependence on climate-sensitive economic sectors, such as rainfed agriculture, and their limited economic, technological and human capacities (IPCC, 2001). ActionAid (2005) noted that some of the challenges brought by floods include; increases in livestock deaths, declining yields of the staple maize crop. As a result, developing countries and poor communities experience disproportionately high levels of death, social disruption and economic damage. Therefore as can be noted from the above noted explanation, one may add that floods are a direct negative impact of climate change which inturn causes a number of untold sufferings on the masses residing in rural communities who usually lack the necessary means to mitigate the shocks of climate change befalling them.

2.2.1.3 Disease outbreaks

The increase in frequency of floods, storms, fires and droughts changes to the range of infectious disease vectors, including the geographical range of malaria and other mosquito-borne diseases, such as dengue; increases in the burden of diarrhoeal diseases, and of water-borne pathogens such as cholera; and an increase in cardio-respiratory morbidity and mortality associated with ground level ozone (Károly, 2003). Zimbabwe is also vulnerable to having perennially high cases of malaria (Chigwada, 2009). It has also been further added that disease epidemics in addition to food insecurity, chronic malnutrition and HIV/AIDS are eroding the resilience of households rendering them less resilient and more vulnerable to hazard shocks (IPCC, 2007). Climate change therefore may culminate in disease outbreaks hence mitigatory measures need to be taken to address their negative impacts.

2.2.1.4 Siltation of rivers

The traditional and local authorities identified clearing of riparian vegetation as a major factor increasing soil erosion and siltation of rivers and this has eventually reduced stream flow.

However in an effort to remedy the situation they have adopted a number of measures that include among others; creating awareness of the effects of deforestation around water bodies, sensitising the communities about prevention of bush fires, promoting community-based management of forests and imposing fines on those who indiscriminately set fire to the forests, clear riparian vegetation or violate other measures designed to protect the environment (Zvigadza, Mharadze and Ngena, 2010).

Therefore drawn from the above perspectives one may be of the opinion that, climate change is a real menace and a hindrance to human endeavours in eking out a living through practising rainfed agriculture and this has affected Zimbabwe's social, bi-modal and economic structure (Chaguta, 2010). In a broader perspective the negative impacts of climate change are diverse capturing all issues to do with agriculture productivity, animal health and health at large (Boardman, 2006). Thus it is essential for vulnerable communities be provided with adequate technological and economic resources to capacitate them in designing sustainable climate change adaptation measures in their localities (Civil Protection Department, 2009).

Egeru (2012) noted that in the Teso sub-region of Uganda climate change has also caused a number of untold sufferings in the area and these include but not limited to, higher malaria incidence, cases of water borne diseases such as typhoid, have become common as well as diarrheal, higher crop losses due to extreme weather events such as drought and flood, damaged infrastructure such as roads, schools and protected water springs as well as occasional displacement in the event of flood, drying up of wet lands. Gukurume (2010) adds that some of the impacts of climate change in Bikita included; failure of crops, death of livestock, and low crop yields all of which have led to declining agricultural productivity. Therefore as underscored in the above sentiment, it is clearly indicative that the impacts of climate change are a serious threat to human livelihood and social development hence more safeguarding and sustainable measures needs to be put in place in response to these shocks of climate change.

However it should be critically noted that disasters like flooding have rarely had direct costs such as loss of human lives in Zimbabwe. Costs have mostly been confined to damaged livelihoods, hence responses to such disasters have largely been reactive than proactive (Musarurwa and Lunga, 2012). It has also been noted that the available literature shows that much data on the impacts of climate change has been left out as more focus was being put on the short term impacts without giving much attention to the long term impacts of climate change such as poverty, conflicts within communities, political functionalism among others (Gukurume, 2010). Mutsau (2010) posited that the revealed climate change responses placed much emphasis on the curative responses rather than looking on the measures which are long term and more sustainable.

Mutsau (2010) noted that there is a gap in literature where he underscored that some of the suggested responses to climate adaptation were macro based rather than micro based hence the principal beneficiaries were in some instances left out without being attended to. Thus the fundamental endeavour of this research is to conceal these gaps in literature by devising micro and macro ways of combating these anomalies which are being brought about by climate change in a bid to buttress community resilience and capabilities in the face of these shocks and stresses of climate change. It has also been indicated that disasters like flooding have rarely had direct costs such as human lives in Zimbabwe. Costs have mostly been confined to damaged livelihoods, hence responses to such disasters have largely been reactive than proactive (Leena and Luna 2012).

2.2.2 Climate change adaptation strategies

The ills of climate change can be addressed in a number of ways but the extent of this is highly dependent on human input. The Civil Protection Department (2009) cited that disasters are

caused by or induced by humans or they occur naturally, therefore in this instance it must be carefully noted that the ability to come up with sustainable and appropriate climate change adaptation strategies is dependent upon human input together with national, regional and global efforts and initiatives in addressing the challenges of climate change. The ability to forecast drought occurrence will help in giving an alarm to farmers as well as protecting the economy and ensure reliable production by enhancing and facilitating the use of appropriate climate change adaptation strategies (Action Aid, 2005).

In response to the shocks of climate change, notable strides have been made in coming up with climate change adaptation measures at Global, Regional as well as National level. In this respect, the following efforts were made to complement climate change adaptation strategies by the affected communities.

2.2.2.1 Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC)

Global concerted efforts to fight climate change have been made with the enforcement of treaties such as the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) of 1992 which came into force on the 16th of February 2005 (Kyoto protocol, 2012). The Kyoto protocol aims to reduce greenhouse gas emissions and minimize the impact of climate change. This therefore shows that the negative impacts of climate change are not only a national, regional responsibility but also a global responsibility.

2.2.2.2 Dar-es-Salaam Declaration and Action Plan on Food Security and Coordination on Transfrontier Conservation Areas

On the regional arena, Manyeruke, Hamauswa and Mhandara (2013) expressed the opinion that major strides have been made and are still being made to address the undesirable and

catastrophic impacts of climate change. They noted that it is apparently clear that Zimbabwe cannot fight climate change on her own, given that the effects of climate change are affecting the whole region and the whole wide world at large. The regional concerted efforts have culminated in the facilitation and implementation of the (2004) Dar-es-Salaam Declaration and Action Plan on Food Security and Coordination on Transfrontier Conservation Areas. This declaration is part of SADC's climatic change adaptation and mitigation measures which will see all countries in the region adopting measures aimed at minimizing the negative effects of climate change.

2.2.2.3 Civil Protection Department

Zimbabwe as a nation has also shown its commitment in addressing the negative impacts of climate change through ensuring the existence of a functional platform with a wide cross-sectional representation from Government, UN Agencies as well as local and International NGOs (Civil Protection Department, 2009). This is complemented by the existence of a government department of civil protection which has also functional civil protection committees both at Provincial and District levels under the Ministry of Local Government, Rural and Urban Development.

Still on the same note, this department has the overall responsibility of disaster Risk management in collaboration with other cooperating partners such as United Nations and Non Governmental Organisations who provide various emergency preparedness and response assessments and recovery assistance to the government of Zimbabwe (Hove, Echeverria and Parry, 2011). These therefore work in combination in addressing the affected community concerns by giving them aid and capacitating them to develop sustainable climate change adaptation strategies.

Hove et al (2011) further articulated that in Zimbabwe there is also the meteorological Office, National Early warning Unit (NEWU, Famine Early Warning Systems Network (FEWSNET), World Food Programme (WFP), and ZIMVAC Assessments, Agricultural Rural Extension Services (AGRITEX) who help extensively in information sharing, promoting conservation agriculture, drought tolerant crops, water harvesting and irrigation schemes. They also provide social support mechanisms to protect vulnerable groups through drought relief, cash transfers and promoting food for work programmes (Shumba, 2005). Therefore as substantiated by the above sentiments, it is clearly spelt out that the Government of Zimbabwe together with collaborating partners is making gigantic efforts and notable strides in its endeavour to curb and address the ravages of climate change.

2.2.3 The outcomes from the climate change adaptation strategies

The climate change adaptation strategies which have been employed by communities to cope with the negative impacts of climate change are numerous. These included the growth of small scale cash crops which are drought tolerant such as cotton, ground nuts, round nuts, livestock production, sorghum, cross border trading among others (Zim Vac, 2009). This therefore goes in tandem with what has been postulated by Gukurume (2010) that; crop and livelihood diversification serves as a way to climate change adaptation among drought prone communal areas as can be proved by his study which he had conducted in Bikita.

Manyeruke, Hamauswa and Mhandara (2013) further added that impressive climate adaptation practices include, diversification of income by adding livestock operations, a shift to drought resistant crops, use of shallow tube wells, rotation method of irrigation during water shortage, construction of water impounding basins, construction of fire lines and controlled burning, adoption of soil, water conservation measures for upland farming, rainwater harvesting.

Scheffran, Marmer and Sow (2012) postulated that cash remittances contribute to resilience and innovation in climate adaptation and it enhances livelihoods and build the resilience of the original home communities.

However the sustainability of these climate change adaptation strategies is compromised by a number of barriers which include but not limited to; lack of financial resources, lack of adequate information on climate change characteristics, institutional barriers, technological barriers as well as socio-cultural barriers (Agyei, Dougill and Stringer, 2013). These barriers act interdependently in restricting the ability of the households to effectively adapt to the negative impacts of climate change.

Financial resources are largely related to budget deficits experienced in many economies (Agyei et al, (2013). Every form of adaptation entails some direct or indirect financial costs for instance the use of improved varieties of crops which are drought tolerant may be prohibitive in terms of pricing thus not all communal farmers have access to such crops. Thus farmers more often resort to the use of their own saved seeds. Lack of credit facilities has also been highlighted as another obstacle hindering the implementation of the climate change adaptation strategies by farmers (Agyei et al, 2013). Thus the outcomes from the climate change adaptation strategies can be negatively affected by lack of financial resources.

Jones and Boyd (2011) contends that socio-cultural barriers which denote the belief system of a particular group of people can constitute one of the greatest barriers to the implementation of climate adaptation strategies by households. They added that; strongly held beliefs, cultural practices and value systems and the world views of individuals and groups greatly influence the ways they perceive climate change and thereby their subsequent adaptation strategies. Culture is central to the decision to adapt and thus the identification of risk and the subsequent implementation of appropriate adaptation strategies.

Access to information on climate change characteristics is a very powerful tool that can be used to enhance the adoption and implementation of adaptation strategies by households. This is particularly important for Africa where there are few climate projections due to lack of appropriate climate data (IPCC, 2007). This is crucially important considering that farming systems in Sub-Saharan Africa are rainfed agricultural systems. Hence lack of appropriate climate information could be critical for food security, thus information and awareness on climate change could potentially serve in the implementation of successful climate change adaptation strategies. It should therefore be ensured that data on climate change is not only confined to the central parts of the country but should reach the most peripheral parts of the country which are at high risk of bearing the shocks of climate change.

The climate change adaptation outcomes could also be negatively influenced by institutions barriers. These are defined as the social cement which link stakeholders to access capital of different kinds to the means of exercising power and so define the gateways which they pass on the route to positive and negative adaptations (Agyei et al, 2013). These institutions play a crucial role in enhancing the capacity of local communities to cope with climate change and providing mechanisms that help to shape the social and individual interactions within the society (Agrawal and Perrin, 2009).

They further stated that adaptation policies in Sub-Saharan Africa (SSA) tend to be top down driven by the central government that has often constrained adaptation strategies at the regional and local levels, for instance in many farming communities in SSA extension officers are supposed to be the link between the scientific community and the farmers by facilitating the flow of scientific ways of farming including the innovative ways of farming to farmers but on the contrary not all the needs of the farmers are attended as the extension officers may be overwhelmed by the number of the communities they serve.

Therefore it is equally important that the institutional barriers are well attended for communities to be well prepared and equipped in their endeavour to address the negative impacts of climate change.

Technological barriers are also considered as one of the key barriers to climate change adaptation in SSA (Kithiia, 2011). Households can only employ the adaptation tools and options that have been developed and which are applicable to their local contexts. Technological developments including the development of new crop varieties, early warning systems as well as the development of irrigation techniques are critical to climate adaptations.

However in SSA where the level of technological development is quite limited, households may not have the full range of adaptation options that may be available in developed countries (IPCC, 2007) Therefore in this regard lack of advance technologies across SSA may constrain the adaptation opportunities and capabilities of households to employ some of the more advanced technologies that could enhance food security and related livelihoods through the development of early warning systems. Thus it is vitally important for SSA to develop ways of dealing with these technological barriers.

The aforementioned barriers to climate change have been identified as the key players in hindering the successful implementation of the climate change adaptation strategies as community participation is limited by these barriers. This therefore further compromises the sustainability and effectiveness of the climate change adaptation strategies devised by the communities as well as collaborating partners.

2.3 Case studies

2.3.1 Uruguay

In the study by World Bank (2009) on the response strategies to climate change in agricultural systems in Uruguay, South America, it was found out that, Uruguay experiences climate related hazards such as droughts and floods along with frost, heat waves and hail storms. The study described a “bottom-up” approach to identifying and prioritizing agricultural adaptations to climate change among rural stakeholders and local decision-makers in Uruguay. It utilized a formal priority-setting methodology to generate local response options to climate change in agriculture.

These response options addressed different sources of uncertainty in local agro-ecosystems stemming from climate changes principally in temperature, precipitation and the frequency of extreme events and their expected effects. In each case, a series of workshops were conducted and participants were involved by the local country project teams in a bid to achieve the following outcomes; to understand expected climate changes and identify possible response options, prioritize the response options, and develop a climate change Action Plan based on the prioritized response options that addresses agricultural adaptations to climate change.

The study also sought to accomplish a number of objectives which included; to develop and apply a methodology for assessing agricultural vulnerability to climate change and for formulating response strategies to inform private and public sector decisions in the South American region as well as formulating recommendations for investments in each of the selected agro-ecosystems in a range of areas including: agricultural technology adaptation, infrastructure investments, public and private sector support activities, complementary off-farm income-generating activities, mitigation strategies, and institutional and policy changes

and finally to disseminate the study results in the South American region and other parts of the world to increase understanding of the impacts of climate change and the costs and benefits of adaptation and mitigation response strategies.

The study found out that farmers and households are already responding to existing climatic variation and longer-term climate changes by making significant behavioural and management changes. The study focussed on identifying relevant climate changes in selected agro-ecosystems in South America, and formulating adaptive response options that can be used to develop local Action Plans that will in turn support informed responses in the future. It was also found out that many of these options were in fact consistent with improved mitigation strategies, but the primary focus was on adaptation.

The study adopted a “bottom-up” approach in a series of three workshops and intervening work by local teams that comprise local stakeholders farmers, farmer organization representatives, agronomists and technical experts, extensionists and other stakeholders were closely involved in identifying current climate changes and their implications for local agricultural systems, rural livelihoods, and local people; identifying possible response options technical, institutional, policy to support local adaptation strategies to climate change; and prioritizing these possible response options in the form of activities and initiatives that form local Action Plans.

2.3.2 Tanzania

A study was carried in two villages of Kamenyanga and Kintinku of Manyoni District, central Tanzania. The overall objective of this study was to understand local communities’ perceptions on climate and variability issues and establish its impacts and adaptation strategies within agricultural sector. The study employed both secondary and primary data were used to gather data. Primary data were obtained using different Participatory Research

Approaches (PRA) including, focus group discussions and household questionnaires. To summarise findings, in each village, a sample size of 10% of all use holds was interviewed (Mary and Majule, 2009).

Secondary sources included of data that were used included, published research papers and relevant reports, rainfall and temperature data kept at Meteorological department, internet search and other relevant sources. Primary data were collected using multiple approaches including both quantitative and qualitative data collection methods. (PRA) methods were also used to collect primary data from the study area. The methods used included key informant interviews, focus group discussion with a total number of 20 participants per village, household interviews to 10% of the total number of households per village, historical mapping of different climate related events over the past years that could be remembered, wealth ranking of different social economic groups based on local criteria they use and then direct field observations through transect walks.

Four household interviews were conducted using a stratified random sampling procedure based on the locally perceived wealth categories. Kothari (2004) contends that, stratified sampling involves dividing the population into homogeneous groups containing subjects with similar characteristics. Qualitative data from various sources were examined and presented in different forms. Quantitative were edited, coded and entered in a computer and the Statistical Package for Social Science (SPSS) software version 11.5 spread sheet was used for the analysis. Descriptive statistics were run to give frequencies and then cross tabulation was undertaken. Multiple response questions were analyzed so as to give frequencies and percentages. Tables and bar charts were used to present different variables.

The results of the research showed that local people perceived changes in rainfall and temperature. It was also established that, farming was the major economic activity for

(61.8%) of the respondents in Kamenyanga and (56.9%) in Kintinku. Although livestock is the second major economic activity in Kamenyanga (35.3%) and Kintinku(25.0%), all livestock keepers are also farmers and none of the respondents was keeping livestock alone. Petty business ranked as the third economic activity. However the activity appeared to be of less importance to Kamenyanga (2.9%) as compared to Kintinku (18.1%). This was attributed to the differences in the levels of urbanization in these two villages. Since Kintinku is more urbanized than Kamenyanga that means petty business opportunities are also higher. This implies that villagers in Kintinku stand a better chance of coping with the impacts of CC & V because they can diversify economic activities more easily than villagers in Kamenyanga. Given that, farming and livestock keeping are the main economic activities in both villages this implies that CC & V will have a far-reaching effect on the livelihoods of these communities.

Other minor economic activities included selling of local brew, which was common in Kamenyanga and was mainly done by women. According to interviews this activity has increased recently. In addition, currently there has been an increase in the number of women involved in the production of charcoal and the collection and selling of firewood. This is unlike in the past when these activities were only undertaken by men. Also in Kamenyanga, there were few people involved in bee keeping. It was observed that most of these emerging activities are non -farm activities. However, the raw materials for preparing local brew depend on the availability of crops, whereas charcoal and firewood was harvested from the natural forest, which is also affected by the CC & V.

It was found out that the changes have affected crops and livestock in a number of ways resulting in reduced productivity. Empirical analysis of rainfall suggest decreasing rainfall trend between 1922 and 2007 whereas mean maximum and minimum temperature increased by 1.9 and 0.2° C respectively. The average annual temperature increase of

0.7° C between 1984 and 2004 was realized. The study realized that there were different wealth groups namely the rich, the middle and the poor and these were differently vulnerable to climate change. The study also concluded that, the wealth of knowledge on coping and adaptation that a farmer has should form a foundation for designing agricultural innovation systems to deal with impacts of climate change and variability. Further, the study suggested that the development initiatives at community level in semi arid areas should put more emphasis on water harvesting to ensure water storage for crops and livestock production.

The study indicated that, in Sub-Sahara Africa, agriculture plays a very important role in providing food and income for the majority of the population. In Tanzania the agricultural sector is a key to economic development (Majule, 2008). He further posited that , over 70% of the population in Tanzania depend on subsistence agriculture which is almost entirely rain fed and it accounts for an average of 50% of Gross Net Product (GNP) and about 66% of total export earnings. This therefore depicts climate as a stumbling block towards the promotion of sustainable human livelihoods.

This has also been supported by IPCC (2007) who articulated that, climate change and variability (CC & V) is rapidly emerging as one of the most serious global problems affecting many sectors in the world and is considered to be one of the most serious threats to sustainable development with adverse impact on environment, human health, food security, economic activities, natural re-sources and physical infrastructure.

According to Tanzania NAPA (2006), agriculture has been identified to be the second most vulnerable sector to the impacts of climate change. Also a study on vulnerability and adaptation to climate change impacts on other sectors in Tanzania clearly indicated that forestry, water, coastal resources, livestock and human health are also likely to be

vulnerable to climate change. This therefore shows the magnitude of the negative of climate change on national development hence this calls for effective measures and strategies to cope with the challenges of climate change.

In response to the negative impacts of climate change and variability, communities in study villages were implementing different adaptation measures in ensuring soil fertility improvement management practices. Farmers in Kamenyanga and Kintinku ensured proper timing of different farming activities. Preparation of land for planting (locally known as kubelega) starts early enough (mid of July) to avoid unnecessary competition for labour during the peak period which normally occurs soon after the onset of rains. Some farmers bury crop residues in the field so as to replenish the fertility of the soil while others burn the residue to enhance quick release of nutrients.

2.3.3 Thailand

The study that was carried out in Lao-oi district of Thailand focussed on how climate change could be mainstreamed into a local community development plan. The case study focussed on how adaptation was incorporated into the plan to address risks and vulnerabilities related to the main source of livelihoods in the community that is; rice farming. In an attempt to produce accurate results; a paradigm shift in adaptation planning was used at the Sub-district Administration Organization level (Chinvanno and Kerdsuk, 2013)

The study found out that the study area consisted of 12 villages with approximately 1,000 households and a total population of 4,700 people. In this study it was also highlighted that the community's main livelihood is rain-fed, wet-season rice farming, particularly of a high-priced variety with a high market demand called KDML 105, commonly known as jasmine rice. This variety is photosensitive and matures for harvesting slightly after the rainy season. Lao-oi district is located in the flood-prone lowland area between the Lum-pao and Chi rivers

hence it is highly vulnerable to major climate change threats. According to the Lao-oi SAO, Lao-oi district has experienced flooding in eight of the past ten years. On average, flooding has destroyed approximately 40% of the total rice production area of 3,200 ha over a decade. This therefore shows that climate change poses serious negative consequences on human livelihoods.

The study also found out that, as responsive measures to negative impacts of climate change the SAO and the community have discussed how to reduce the risk of flooding. A dyke system along the riverbank was proposed to protect rice paddies and the village. The community, however, preferred to switch from growing vulnerable wet-season rice to dry-season rice production. In response, the SAO proposed expanding the existing irrigation system, which pumps water from the river through underground pipes to the rice fields. A small area along the riverbank, approximately 25-30% of the rice paddy area of the district, is currently irrigated; the community development plan proposes irrigation piping to all rice paddy areas in the sub-district.

At the national level in Thailand, climate change comes under the jurisdiction of the Office of Natural Resources and Environment Policy and Planning (ONEP) in the Ministry of Natural Resources and Environment (MONRE). MONRE was responsible for launching Thailand's first climate change policy plan, 'The Thailand National Climate Change Strategy 2008-2012', which was followed by the 'National Master Plan on Climate Change 2011-2050'. This master plan clearly stated that the short-term focus would be project integration; the medium-term focus programme integration; and the long term focus policy integration. This therefore shows that the negative impacts of climate change are being attended to in Thailand through various efforts which are being made by the government in supporting community development strategy and sectoral planning with an institutional structure to provide climate change knowledge.

2.4 Strategies and programmes to mitigate the negative impacts of climate change in Zimbabwe

Zimbabwe has shown its commitment in addressing the negative impacts of climate change through the adoption and implementation of various policies and programmes. In this respect, Zimbabwe managed to come up with the climate change response strategy which was aimed at helping the country to adapt to and to mitigate the negative impacts of climate change which became famously known as the Zimbabwe national Climate Change Response Strategy (ZNCRS). This strategy was based on discussions with key stakeholders and climate change related studies that have been undertaken in the past (Zimbabwe National Climate Change Response Strategy, 2013).

The strategy endeavours to achieve the goal of mainstreaming climate change adaptation and mitigation strategies in economic and social development at national and sectoral levels through multi-stakeholder engagement. Also among its objectives the strategy aimed to promote resource use efficiency and less carbon intense pathways in all economic activities and develop a climate change resilient energy infrastructure that is not carbon intense, promote sustainable development, management and utilization of water resources under changing climatic conditions among others (Zimbabwe National Climate Change Response Strategy, 2013). Thus in line with this objectives, it is clearly indicated that this strategy is among the programmes undertaken by Zimbabwe's in finding proper ways to mitigate the negative impacts of climate change.

The Zimbabwe National Climate Change response Strategy (2013) posited that Zimbabwe, through the Ministry of Environment and Natural Resources Management launched a National Environmental Policy and Strategies in 2009 that compliments the Environmental Management

Act [Chapter 20:27], and other legislation pertaining to environmental protection, monitoring and sustainable management. Hove et al (2013) also added that Zimbabwe is a signatory to the following environmental agreements, among others: the Montreal Protocol on Substances that Deplete the Ozone Layer; United Nations Convention to Combat Desertification (UNCCD); the United Nations Convention on Biological Diversity (UNCBD) and its Cartagena Protocol on Biosafety; Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the United Nations Convention on the Law of the Sea, in addition to the UNFCCC and its Kyoto Protocol. This brings to the fore the fact that notable efforts are being made in Zimbabwe to mitigate the negative impacts of climate change.

In Zimbabwe there is also the National Environmental Management Policy that addresses climate change issues including environmental education. This is complemented by the climate change awareness and dialogue workshops which were held throughout the country targeting various groups of people who included farmers, scientific and technology community, local communities business and industry, banks and indigenous (Ministry of Environment and natural resources management, 2013).

Therefore on this note one may safely conclude that, Zimbabwe is sensitive to the negative impacts of climate change. This is reflected through various ways by which these shocks of climate change are attended to nationally. Zimbabwe has shown its commitment in tackling the negative impacts of climate change through making a number of changes legislatively by affiliating to the United Nations Convention on Climate Change among and other protocols which culminated in a number of national Acts of parliament and policies.

2.5 Chapter summary

This chapter has reviewed the climate change conceptual framework and literature related to climate change adaptation exposing areas where gaps exist and subsequently the gap to be filled by this research was noted.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This section elucidates the research design, target population, sample size, sampling procedures and data collection methods. It also sought to look at presentation and analysis, feasibility of the study, ethical considerations as well as limitations of the study, while the chapter summary concludes this section.

3.1 Research design

A research design is the plan and structure of investigation of information so as to obtain answers to research questions (Sunders, 2005). Kothari (2004) identified four basic research designs in the social sciences as action research, case studies, experiments and surveys.

This study focused on climate change adaptation strategies being employed in rural communities of Zimbabwe. In line with the focus of this study, a case study design was preferred because the research focused at a single entity that is Gutsa ward 6 in Muzarabani district. The approach has been considered by Cohen, Manion and Morrison (2000) as to be advantageous since data is drawn from people's experiences and practices and so it is seen to be strong in reality. In addition, the case study design was employed because it also enabled the researcher to have closer analysis of issues by observing and recording events. It also uses different instruments to collect data namely, interviews and focused group discussions which makes it advantageous to the researcher in the sense that the researcher is free to use the most

suitable instrument that suit the given condition or situation and this adds to reliability and validity of findings.

3.2 Location of the study

The research was carried out in Gutsa ward 6, Muzarabani District in Mashonaland Central Province that lies in agro-ecological region 4 and 5 which receives very little rainfall annually (Zim Vac, 2009). The predominant livelihood in Gutsa ward is mixed farming and the main crops grown include maize, sorghum, groundnuts, cotton, round nuts, and other activities such as cross border trading and livestock production which are also common in the area (Zim Vac, 2009). However due to the nature of the study area, numerous cases have been reported and heard on the death of livestock, flooding resulting in household displacements, loss of lives, destruction of property and low crop yields due to high temperatures. Therefore, it makes the area more appropriate for the study to be undertaken since the main thrust of the study was to look on how the community is responding to the shocks of climate change.

3.3 Target population

Target population refers to the total quantity of things or cases of the type which are the subject of the study, it can consist of certain types of objects, organizations, people, events among others within which there will probably be only certain groups that will be of interest to the study (Walliman , 2011). The target population for this study are going to be all households of Gutsa ward six (6). Muzarabani district has a total population of 120 728 (Zimstat, 2012). According to Zimbabwe National Statistics Agency (Zimstat) (2012), Gutsa area is home to 2154 people with a minimum of five (5) members per household. Therefore given the Zimstat

statistics, for the purpose of this study a target population from which a sample was drawn amounted to a total of 2154 people who are residents of Gutsa ward 6 in Muzarabani district.

3.4 Sample size and sampling procedures

Sampling refers to the process of selecting just a small group of cases from out of a large group which can be representative or typical of all the rest (Walliman, 2011). Thus in this context a sample of 43 households was drawn from the given total population of 2154 (average of 5 people per household) residents of Gutsa ward as provided by (Zimstat, 2012). This constitutes 10 percent of all households in Gutsa ward and was computed as follows:

$$\text{Total number of households} = \frac{2154}{5} = 431$$

$$\text{Sample size (households)} = \frac{10}{100} \times 431 = 43$$

A 10 percent sample size was chosen because it is not always practical to gather data on every element of the population hence there is need to deduce the findings to a certain percentage (Swetnam, 2000). The 10 percent sample size was therefore chosen so as to generalise findings from the study.

The sample was determined through probability and non-probability sampling procedures techniques where the researcher employed simple random and convenience sampling technique where subjects were selected because of their convenient accessibility and proximity to the researcher. The researcher used simple random sampling (lottery system) to select three villages from a cluster of thirteen (13) villages followed by convenience sampling to select the

(43) households from the three selected villages at an average of fourteen households per village. The study also targeted three (3) key informants who comprise government department (Agriculture Extension Services), Social services department and one non-governmental organization official operating in climate change adaptation programming (World Vision) in Gutsa ward 8 of Muzarabani district using purposive sampling technique. These were selected because of their vast experiences on climate change adaptation.

3.5 Data collection methods

The researcher made use of the interviews to gather data from respondents as well as in imploring for expert opinion from government departments and NGO personnel who are key informants in this study as well as Focus Group Discussions (FGDs) to connect the responses from interviews and key informants.

3.5.1 Interviews

Interviews were the main method used for data collection by the researcher under the instrument called interview guide. This is a face-to-face interaction with respondents and probing them on a particular subject matter (Walliman, 2011). Interviews involve a set of questions pre-pared for various interviewees. Personal interviews were used to collect data from the study respondents and 43 interviews were done. Appointments were made and interviews conducted. This method was preferred as it enabled the researcher to probe respondents deeper for richer and more elaborate responses to understand their experiences in coping with the negative impacts of climate change. It also enabled the researcher to adjust or

rephrase some of the questions to seek clarity. Lastly this method was a faster method of data collection.

The researcher also conducted key informant interviews through the use of an interview guide was prepared and designed using different questions in order to collect as much information as possible from different professionals. Three (3) out of five (5) interviews were conducted by appointment at properly designated venues with the AREX department Officer for Centenary, department of social services officer for Centenary and one World Vision Officer for Muzarabani district. Interviews were conducted face to face with key informants. The method proved effective in catering for information that cannot easily be gathered through observations and questionnaires. It was easy to obtain quick feedback and accessing personal insights regarding the climate change adaptation strategies being employed by residents of Gutsa ward to survive the negative impacts of climate change.

Borg and Gall (2005) postulated that interviews allow great flexibility in the questioning process. It has also been further added that, as contrasted with questionnaire, which provides no immediate feedback, the interviews permit the research worker to follow up leads and thus obtain more data and greater clarity (Borg and Gall, 2005). However it should also be noted that interviews have a number of disadvantages. Saunders, Lewis and Thornhill noted that the interviewer bias can be misleading and they also need careful management as a lot of time can be lost on issues that are not relevant to the research. They also consume a lot of time and may therefore be difficult to use for every respondent in a large sample size.

3.5.2 Focus Group Discussions

Welman (2005) postulates that focus group discussions refer to interviews with a relatively small number of individuals drawn together to express their opinions and perceptions on a set of open questions. One focus group discussions were conducted with the aid of an FGD guide (See appendix C). The discussion was done with the participants from Gutsa ward who had varying ages ranging from 25-44 years who were residents of Gutsa ward in Muzarabani district. They were 15 and were of both sexes. This was done to allow interactive feedback with a small group as opposed to individual responses on surveys. The researcher was the facilitator. This was done so as to probe and assess the community's capacity in addressing the challenges brought by climate change in the area.

Walliman (2011) stipulated that, one the advantages of FDGs is that the brainstorming and discussion among group members leads to different ideas than would be generated by any one individual. In addition FDGs allow for broader and deeper insights into the brand and related topics and are rich in detail and this is different from quantitative studies which limit respondents. On the other hand FDGs have the disadvantage that it leads to groupthink that is, those with strong influence such as the moderator and vocal group can sway the conversation and make it seem one-dimensional from less vocal participants (Walliman, 2011). Also the response accuracy is compromised; participants may feel less comfortable speaking out against that brand in front of the moderator.

3.6 Data gathering tools

Three data collection tools were employed in this research and these are key informant interview guides, semi-structured interview guide and focus group discussions guide. Therefore, in this regard, these tools were prepared by the researcher and they have helped extensively in determining the research outcomes.

3.7 Data presentation and analysis

Coolican (2004) notes that, data analysis brings sense to large amounts of raw data. It gives an understanding of spatial processes and is one of the most important parts of the research. In analyzing the qualitative data from the interviews and discussions, thematic content analysis was used in analysing the interviews and focus group discussions whereby themes emerged from what the information gathered was revealing and the data was put in categories and subcategories for easy interpretation.

3.8 Feasibility of the study

The term feasibility entails the achievability of the desired outcomes of an initiative (Coolican, 2004). The area of study as alluded to in the preceding paragraphs is geographically located in region 4 which receives little or no rainfall thus this gives the researcher the opportunity to look critically and closely into what the communities are doing to survive the negative impacts of climate change. This therefore makes the study more feasible. Furthermore, the researcher

sought permission from the local authority to conduct the research in the area and was granted such permission, thus making the study feasible to be conducted in the area.

3.9 Ethical considerations

The term ethics is used to refer to what is considered right or wrong, good and bad (Cohen, Manion and Morrison, 2007). The American Psychological Association (2010) also echoed the same sentiment by stipulating that, ethical considerations are those issues to do with respecting legal boundaries of research and credibility of research. Therefore for the purpose of this research, the researcher made the following ethical considerations:

3.9.1 Anonymity

The research respected the right to privacy that is the freedom of the individual to participate in the research and whether his or her opinions, attitudes, beliefs and values can be made public.

3.9.2 Confidentiality

The research took in to account the right to protection against physical or emotional harm of the participants that is, the researcher was not going to reveal any information that will embarrass the participants or endanger their life, the lives of their families or any form of harm or damage to their property.

3.9.3 Informed consent

The researcher took into consideration voluntary participation of respondents such that only those willing to participate in the research were considered. Respondents were issued with consent forms at the inception of data collection which they were asked to duly sign and return to the researcher.

3.10 Limitations of the study

Time was a biggest challenge in conducting the interviews as well as carrying out the focus group discussions. This was due to the fact that the bad road networks resulted in delays in the conducting of the interviews with the respondents in time. There was also a bias to the response as most households thought the research was meant to provide humanitarian assistance and when they realised that it was not for humanitarian assistance, their cooperation was not forthcoming.

3.11 Chapter summary

This chapter has presented the research methodology used for this research by looking at the research design, location of the study, target population, data gathering tools and techniques, data presentation and analysis, limitations and the ethical considerations that guided the researcher in carrying out this research. The next chapter presents, analyzes and discusses data gathered from the study area.

CHAPTER 4

DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.0 Introduction

This chapter is going to present, analyze and discuss the findings on climate change adaptation strategies being implemented by rural communities of Zimbabwean in Gutsa ward (6), Muzarabani District. The intention is to draw conclusions on the research findings made. The findings obtained will also be linked to the research questions and objectives of this research project as outlined in chapter one of the study.

4.1 Demographic Profile of the study

Table 1: Age and gender of study respondents

Demographic	Frequency
Gender	
Male	16
Female	27
Age in years	
25 - 29	10
30 - 39	19
40 - 44	14

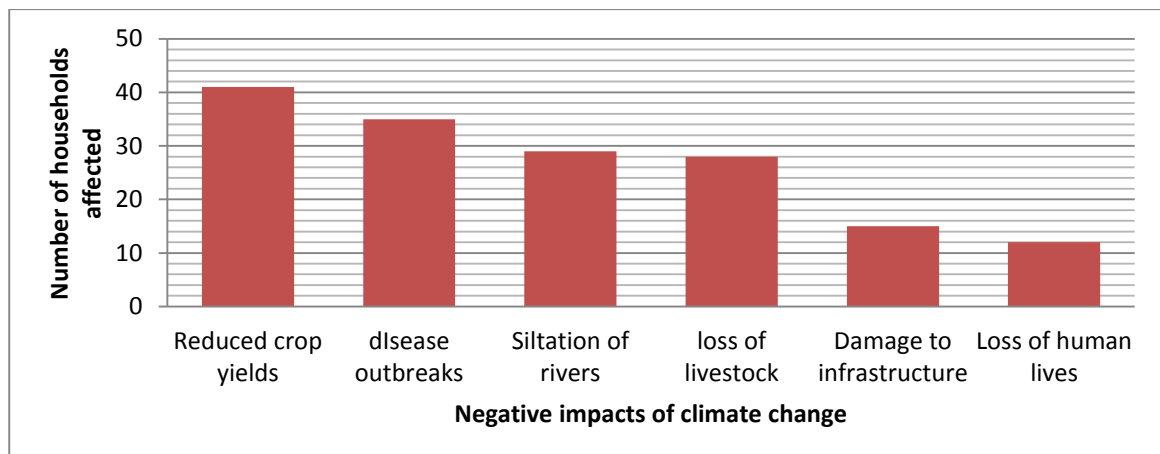
N=43

The above table presents demographic characteristics of the participants in Gutsa ward (6). Male participants were (n=16) while their female counterparts were (n=27). Participants aged between 25 -29 years were (n= 10). The age categories 30-39 and 40-44 were (n=19) and (n=14) respectively. Analysis on gender also showed that male participants were fewer than

their female counterparts. This may be due to the fact that females are more inclined to reproductive roles such as agriculture and gardening thus showing gender disparities in the family division of labour. The harsh climatic conditions due to climate change have resulted in women playing a central role in food security and they are the first to stop eating but their well-being is often the key for maintaining access to and the supply of food to families therefore they face a double jeopardy as food supply diminishes (Phillips, 2009). With regards to age, the majority of respondents fell into the 30-39 age categories whilst the least number of participants were within the age category 25-29 age category.

4.2 The Negative impacts of climate change in Gutsa ward 6 in Muzarabani north district.

Fig.1 Negative impacts of climate change



N= 43

As can be inferred from the findings in fig.1 above, it is indicated that households in Gutsa ward 6 of Muzarabani district are confronted with numerous negative impacts resulting from climate change and these are as presented and analysed below:-

4.2.1 Reduction in crop yields

When asked about the negative effects of climate change in Gutsa ward, (n=41) study respondents said that climate change had greatly reduced their crop yields in Gutsa ward. This

has been attributed to frequent droughts which occur in the area which have led to unreliable rainfall amounts thus leading to food insecurity. This viewpoint has also been substantiated by data collected from the social services department where it was noted that yields are decreasing due to the fact that crops in Gutsa ward are destroyed by pests such as crickets and armyworms which are multiplying due to climate change.

This study has found out that households in Gutsa ward rely largely on rainfed agriculture which provides the bulk of their food supplies; climate change has therefore resulted in induced food shortages, reduction in soil moisture content which the crops rely on for growth as well as malnutrition. This correlates with Egeru (2012)'s speculation that, climate change has led to higher crop losses due to extreme weather events. This also has a negative bearing on the country's economic production largely because the country is strongly dependent on rain fed agriculture which in this case is a vulnerable sector interms of the climate related hazards (IPCC, 2001). This is also confirmed by a study conducted by Mary and Majule (2009) in Tanzania where it was posited that climate change has affected crops and livestock production in a number of ways resulting in reduced productivity. On the same sentiment Gukurume (2010) noted that climate change has led to food insecurity among rural communities who extensively depend on rainfed agriculture.

4.2.2 Loss of livestock

Livestock production is also among the strategies that many households in Gutsa ward have adopted to cushion themselves from the stresses of climate change. As indicated in fig.1 (n=24) study respondents have lost many of their livestock as a result of climate change. When asked about how climate change has affected livestock production in Gutsa ward one of the study respondents noted that *"We have lost a number of our livestock in this ward due to shortage of pastures for grazing and shortage of water to drink"*. In this way, climate change has resulted

in a number of losses in livestock production largely due to water shortages and pastures for grazing due to droughts as there has been a reduction in the forage available for livestock grazing and water which are important ingredients for livestock growth. Thus water stresses have also led to high incidence of tick borne diseases which have caused an increase in livestock deaths in Gutsa community. This view has also been echoed by Action Aid (2005) who articulated that drought has caused catastrophic losses in livestock production.

4.2.3 Siltation of rivers

Siltation of rivers in Gutsa ward has been indicated as an already existing challenge in the area due to soil erosion. Climate change has however worsened this challenge as it had resulted in people engaging in illegal farming practises such as stream bank cultivation. Siltation of rivers has also been exacerbated by animal movement due to water stresses. When asked about the negative impacts of climate change in Gutsa ward, one of the key informants explained that; *“Floods and stream bank cultivation have led to siltation of rives in this community and this has resulted in reduced agricultural productivity”*. This therefore provide evidence that siltation of rivers as exacerbated by climate change had negatively affected livelihoods in Gutsa ward. This is similar to the study carried out in Mutyawiri ward of Goromonzi district on climate change which revealed that traditional and local authorities identified some of the negative effects of climate change as siltation of rivers resulting from clearing of riparian vegetation which has eventually reduces stream flow (Zvigadza, Mharadze and Ngena, 2010).

4.2.4 Infrastructural degradation

Environmental degradation was noted as one of the negative impacts of climate change by respondents in Gutsa community. It had affected (n=13) study respondents in Gutsa community. In response to the question on the negative impacts of climate change in Gutsa ward, one of the respondents said that *“climate change had left many roads and bridges in our*

ward in a bad and undesirable state and this has been largely caused by illegal agricultural practises such as stream bank cultivation that people engage in". On the same note one of the key informants also supported this sentiment by saying that *"There are many potholes created on the road that leads to Gutsa ward and bridges were eroded by floods"*

Responding to a question on the negative impacts of climate change on the environment, it was said in the focus group discussions that *"climate change had resulted in many family displacements as houses were destroyed by violent winds and floods and also classrooms were carried away by floods"* This is in tandem with the findings of the study that was carried out in Uganda on climate change adaptation which found out that climate change has posed much damage to infrastructure such as roads and schools (Egeru, 2012).

This therefore leads to the conclusion that environmental degradation in Gutsa ward was attributable to undesirable illegal practices that the members of Gutsa community were engaging in as a result of their increased vulnerability to climate change for instance stream bank cultivation where they were trying to utilize wetlands to grow maize which they term *"mudzede"* which do very well in wetlands. This therefore has a negative consequence in that it has led to the extinction of wetlands in the area as well as siltation of many rivers.

4.2.5 Loss of human lives

A total of (n=11) study respondents indicated that; harsh weather events such as floods and violent winds have posed some serious threats to human lives. On this subject responses from the focus group discussion confirmed that when one of the participants said *"The floods that took place in the last season and violent winds have resulted in the destruction of our houses, livestock and to make matters worse we had lost some of our family relatives and friends"*. This confirms the fact that climate change had resulted in a number of losses including loss of human lives in Gutsa ward of Muzarabani district. In line with these findings IPCC (2001)

noted that floods as had resulted in high levels of death, social destruction and economic damage. In support with this view, Action Aid (2005) noted that some of the challenges brought by climate change are; increases in livestock deaths and destruction of infrastructure which also pose a serious threat to human livelihoods.

4.2.6 Diseases outbreaks

The study findings indicate that climate change has resulted in higher rates of disease incidences and it as affected (n=33) study respondents in Gutsa ward. This is supported by the household interviews conducted which showed evidence that climate change has resulted in higher malaria incidence and cholera resulting from poor water supplies in the area. People tend to depend on unprotected and unsafe water sources which they call “mufuku” as can be confirmed by one household interviewee who said *“During the times of water stresses in this ward we resort to open sand wells “mufuku” to quench our thirst and water from these wells is safe for drinking”* This therefore increases their vulnerability to water born diseases as the water is very unsafe for them to drink as it is not well protected. This therefore goes in agreement with the view made by Karoly (2003) that climate change in the form of floods has resulted in water borne diseases such as dengue, diarrhoeal, cholera and cardio-respiratory morbidity and mortality. Chigwada (2009) posited that Zimbabwe is also vulnerable to having perennially high cases of malaria.

4.3 Household level climate change mitigation strategies

Table 2, Household climate change mitigation strategies

Climate change mitigation strategies	Frequency
Drought relief	39
Drought resistant crops	35
Bee keeping	3
Livestock production	26
Cash remittances	5
Piggery	3
Cattle fattening	3
Cross border trading	5

N=43

The study found out that drought relief is the most common climate change mitigation strategy used by households in Gutsa ward. A total of (n=39) respondents cited drought relief as a climate change adaptation strategy. The growing of drought resistant crops was cited by (n=35) respondents as a drought mitigation strategy. The selling of livestock was practised by (n=26) respondents, remittances (n=5) respondents, cross border trading (n=5) respondents, cattle fattening (n=3) respondents and piggery (n=3) respondents. Table 2 above show the results obtained from the interviews conducted with 43 households in Gutsa ward. The results demonstrate that drought relief is the most used mitigation strategy having being selected by most of the respondents. The community gets relief from the various groups like Non-Governmental Organisations which include World Vision, Red Cross Society, Help Germany and Christian Care. Relief is provided in the form food, tuition fees, groceries and at times clothing. The government also provides relief in times of droughts.

4.3.1 Drought relief

The people of Gutsa ward depend on drought relief as a mitigation strategy to cushion themselves against the negative impacts of climate change. This strategy as cited in table. 2 is being used by the majority of the population in Gutsa ward as evidenced by the increased number of (n=39) study respondents resorting to drought relief against the negative impacts of climate change. Food relief in this ward is usually provided by operating local Non-Governmental Organisations (NGOs) in Gutsa ward which are; World Vision and Christian Care. Fourteen (14) of the respondents reported that they receive food aid from World Vision 25 respondents alluded that they received relief from the Methodist Drought and Relief Agency (MeDRA). All respondents also alluded that at times they receive relief from the Government in form of food, farming inputs in the form of drought resistant crops such as rapoko, millet and short season maize crops and fertilizers.

Similarly the key informant from the Department of Social Services avowed that there are two vibrant Non-Governmental Organizations that are operating in Gutsa area. These are MeDRA and World Vision and are supplying people with food handouts and facilitating and funding income generating projects. The DSS key informant also alluded that the Government through the food relief programme has issued Gutsa residents with food handouts. Zimbabwe is now characterized by chronic food insecurity and is entirely dependent on international aid, particularly food aid (Makumbe, 2009). According to Anseeuw, Kapuya and Saruchera (2012), there have been several emergency-related programmes, from food relief to input support schemes, funded by the government. In the same vain the key informant also echoed the same sentiment and emphasised that World Vision Muzarabani ADP is currently funding projects such as borehole drilling, nutritional gardening and distributing small grain drought resistant crops.

Findings from the Focus Group Discussions (FGD) discussions also harmonize with both the finding from the key informant interviews and household interviews where one of the respondents from the (FGD) claimed that *“our yields have been negatively affected by poor rainfalls, heat wave and mid season dry spells and this has led to drought at household levels. However the government and local operating NGOs such as MeDRA, World Vision and Sustainable Agriculture Trust (SAT) have greatly lessened the impacts of this condition through the provision of seeds and financing food security oriented projects”*.

4.3.2 Drought resistant crops

The community members in Gutsa ward are also growing drought resistant crops to survive the negative impacts of climate change in the area. The people in Gutsa ward make use of short season maize varieties such as, sorghum and special varieties of beans called *“hungudza and chiriri”* which do well in arid regions as well as during times of droughts. A total of (n=35) study respondents have access to drought resistant crops which are provided by Agritex and local NGOs such as Sustainable Agricultural Trust (SAT). Shumba (2005) also shared the same sentiment by postulating that, the growing of drought tolerant crops in Zimbabwe rural areas is also promoted by the Agricultural Rural Extension Services (AGRITEX) who help extensively in information sharing.

4.3.3 Livestock production

Selling livestock is a herd management practice that was mentioned as one of the strategy being used to cushion the negative effects of climate change in Gutsa ward. A total of (n=26) study respondents resort to this strategy to survive the shocks of climate change. A key informant from World Vision confirmed selling of livestock as a key strategy for climate change adaptation where she stated that *“the residents of Gutsa ward sale mainly the older beasts and*

leave the heifers and steers". The key informant from the AREX office also affirmed that most households in Gutsa engage in herd management practices such as early weaning of calves and slaughtering for beef and paddocking. This has also been reflected in the focus group discussions where it was said that *"Selling livestock in this ward has become one of our sources of income since our main sources of livelihoods have been negatively affected by the changing rainfall patterns which are now highly unreliable"*.

4.3.4 Cross border Trade

When asked about how they were coping with the negative impacts of climate change in Gutsa ward, one of the respondents said *"We have since resorted to cross border trading to meet our socio-economic needs given this harsh environment caused by climate change"* A total of (n=5) study respondents have engaged themselves in cross border trading to supplement their livelihoods mainly during the off the farming season. When the rain season starts they return back to farm in their fields. This activity is mainly common with women and hence this livelihood is seasonal in Gutsa ward. The cross border trading was also reckoned in the FGDs as one of the strategies used by the residents of Gutsa ward to buffer themselves against the negative impacts of climate change. The key informant from World Vision also reiterated that some people in Gutsa ward have resorted to illegal cross border trading where Kairezi has become their exit and entry point.

4.3.5 Income generating projects

From the households interviews that were carried out in Gutsa ward income generating projects were referred to as one of the strategies employed by residents of Gutsa ward, where (n=3) study respondents are into piggery, some households (n=3) are into cattle fattening while other households (n=2) specialize in bee keeping so as to safeguard themselves against the negative

impacts of climate change. These projects are being supported by the local NGOs in the area namely; the Methodist Drought and Relief Agency (MeDRA), Sustainable Agriculture Trust (SAT) and World Vision. The key informant from AREX reiterated that income generating projects have become an option for Gutsa community where such projects are being funded and administered by World Vision and MeDRA. Similarly the key informant from World Vision alluded that World Vision is currently funding and administering the nutritional garden project sinking boreholes while MeDRA engages in funding and administering bee keeping and goat rearing projects. The same responses were also reflected in the FGDs where one of the respondents speculated that *“livelihoods income generating projects have become our major sources of income helping us to realize food security following the shocks of climate change”*.

4.4 Outcomes from the climate change mitigation strategies

Table 3, The effectiveness of drought mitigation strategies

Rating scale on the effectiveness of drought mitigation strategies

Comment	Poor	Fair	Good	Better	Excellent
Rating score	1	2	3	4	5

Strategy	Strategy success rating frequency				
	1	2	3	4	5
Drought relief	0	0	0	5	38
Drought resistant crops	0	0	2	39	2
Bee keeping	0	27	14	0	2
Livestock production	0	0	4	37	2
Cash remittances	40	0	1	1	1
Piggery	1	5	20	15	2
Nutritional gardens	0	0	1	35	7
Cross border trading	0	10	28	3	2

n=43

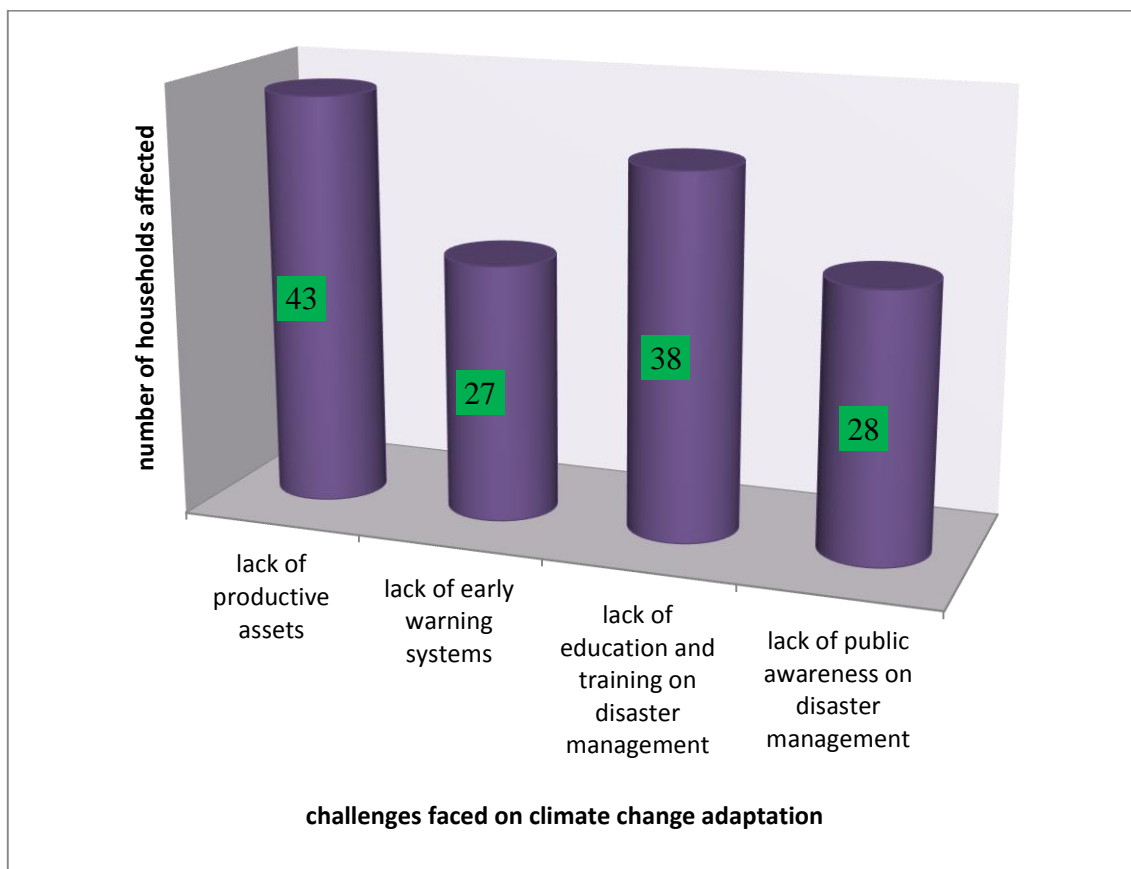
Table 3 above shows the effectiveness of drought mitigation strategies in Gutsa ward. The interviews conducted with the respondents required them to rate the various climate change mitigation strategies on a scale of 0 to 5 to determine their effectiveness. The strategies that were to score higher ratings were those that greatly reduced the effects of droughts on the households whilst those that were to score lower ratings were those that were not effective in mitigating the negative impacts of climate change. From the data analysis the researcher constructed the above table to show the effectiveness of the various strategies that have been employed to mitigate the negative impacts of climate change in Gutsa community.

Drought relief as can be noted from table 3 above demonstrates that it is the most effective mitigation measure as it was rated 5 by (n=38) study respondents thus indicating that the majority of the households in Gutsa ward have witnessed its effectiveness. Nutritional gardening also proved to be an effective measure as it was rated 4 by (n=35) study respondents, cash remittances are the least effective mitigation measure since it was rated at 1 by (n=40) study respondents indicating that it is not very effective in mitigating the shocks of climate change. This however goes in contrast with Scheffran, Marmer and Sow (2012)'s claim that remittances build the resilience of the original home communities. This may be due to varying economies. Strategies such as, growing of drought resistant crops which received a rating of 4 by (n=39) study respondents and selling livestock which received a rating of 4 by (n=37) study respondents were the other frequently used strategies to mitigate the negative impacts of climate change in Gutsa ward.

The other strategy adopted was cross border trading, this was the second from the least rated strategy as it had received a rating of 2 by (n=28) study respondents. Bee keeping was also employed as another strategy against climate change by a number of households and it received

a rating of 3 by (n=27) study respondents. When asked about the viability of the bee keeping project, the key informants from AREX said *“this project was going on well since the project members got assistance such as funding from MeDRA. However the project is not very flourishing due to poor market”* hence people in Gutsa ward usually depend on other strategies which do not require much capital such as food for work.

Fig.2 Challenges faced in adapting to climate change



n=43

Fig. 2 above indicates that lack of productive assets has affected (n=43) households indicating that it is the main challenge that households in Gutsa ward are confronted with in their effort to implement various climate change mitigation strategies against climate change. Another challenge reported was lack of early warning systems which have affected (n= 27) study respondents. The interviewed households in Gutsa ward also highlighted that lack of public

awareness and disaster education and training were also among the challenges they were facing in coping with climate change in this community and this has affected (n=28) study respondents and (n=38) study respondents respectively. As such the locals are not informed on how to handle the inevitable disasters befalling them due to climate change by devising effective measures against the negative impacts of climate change.

4.5 Chapter summary

This chapter has presented, analysed and discussed data collected from the field through interviews and focus group discussions. The purpose of the presentation, analysis and discussion was to give an insight on climate change adaptation strategies devised by rural communities of Zimbabwe to cope with the negative impacts of climate change in Gutsa ward 6 in Muzarabani district. Data was presented in the form of tables and graphs. The next chapter is going to outline the summary, conclusion and recommendations.

CHAPTER FIVE

CONCLUSIONS OF THE STUDY

5.0 Introduction

This chapter focuses on study findings, the study objectives, how data was solicited to meet the objectives, presented and analyzed. The chapter also makes a summary, conclusions and recommendations that will address the current problem as well as improve the quality of future studies to be carried out.

5.1 Summary of study findings.

The study established that climate change has culminated in a number of negative impacts in Gutsa ward 6 in Muzarabani district. These impacts included but not limited to declining agricultural yields, environmental degradation, disease outbreaks and loss of livestock. This has greatly affected people's livelihoods in Gutsa ward who depend on rainfed agriculture and livestock production for their livelihoods and they have suffered enormous consequences due to climate change. Therefore climate change has negatively affected the socio-economic life of people in Gutsa ward.

The study also established that, due to the devastating nature of climate change in Gutsa ward many people in the ward have developed a number of mitigation strategies to cushion themselves from the appalling impacts of climate change hence they engage themselves in such activities as cross border trading, food for work, growing of drought resistant crops such as groundnuts, sorghum and millet together with other initiatives such as bee keeping, cattle

fattening and Selling of livestock and other activities such as carpentry were also other strategies that have been employed to counter the effects climate change in the ward. Thus from this note, it can be said that people in Gutsa ward have not remained passive victims to the negative impacts of climate change but have collectively and effectively responded to them.

Analysis has shown that the livelihood strategies that the communities have adopted in their collective and individual efforts to counter the negative effects of climate change were met with mixed results. Through the practice of these strategies, success was registered as people succeeded in coming up with useful mitigatory measures against the negative impacts of climate change. However the sustainability of these measures was compromised by a number of factors that included; lack of productive assets, lack of education and training on disaster management as well as lack of early warning systems. These factors have been found out to be outstanding barriers to successful and effective adaptation and if addressed may result in climate change adaptation measures which are effective and sustainable.

5.2 Conclusions of the study

The research managed to accomplish its aim of examining climate change adaptation strategies being implemented in Gutsa ward 6 in Muzarabani district. Conclusions that were made in this study are as follows:

5.2.1 Food insecurity

The study found out that climate change has greatly contributed to food insecurity in Gutsa ward. This has been attributed to unreliable rainfall amounts, destruction of crops by pests such as crickets and armyworms which are multiplying due to climate change.

5.2.2 Loss of livestock

Climate change was noted to be associated with livestock losses in Gutsa ward. This was reported to be a result of water shortages and pastures for grazing due to droughts as there has been a reduction in the forage available for livestock grazing and high incidence of tick borne diseases which have caused an increase in livestock deaths in Gutsa community.

5.2.3 Drought resistant crops

The study results show that the growing of drought resistant crops is the dominant livelihood strategy being utilized by the majority of households in Gutsa ward to cushion themselves against the negative impacts of climate change.

5.2.4 Livestock production

The Gutsa people are engaging in livestock production to buffer themselves against the negative impacts of climate change. Most households in Gutsa engage in herd management practices such as early weaning of calves and slaughtering for beef and paddocking and they have also resorted to use donkeys for draught power to reduce livestock loss.

5.2.5 Scarce resources

The results of the study indicate that the climate change mitigation strategies employed by the residents of Gutsa ward have been met with little success to a greater extent. This has been particularly due to limited resources such as capital and productive assets needed for education and training on climate change risk management.

5.2.6 Livelihood diversification.

The study established that various climate change mitigation strategies employed by the residents of Gutsa ward have greatly improved their living standards as they were managing to

meet their basic necessities. Thus livelihood diversification results in improved living standards of the people exposed to the negative impacts of climate change.

5.3 Recommendations of the study

The researcher recommends that;

- 5.3.1** The growing of drought resistant crops in the form of small grain crops such as millet, rapoko and sorghum should be emphasised because they are drought resistant and they require little rainfall to mature than maize which is the dominant crop in Muzarabani district. Zimbabwe is largely affected mainly due to its heavy dependency on rain fed and climate sensitive resources (crops) such as maize and wheat (Chagutah, 2010). Therefore the growing of drought resistant crops can serve as an effective way of promoting food security among the climate change vulnerable communities.
- 5.3.2** Livestock production as a climate change adaptation strategy should be intensified as it results in improved livelihoods and food security among the affected communities. Furthermore there should be training of people on herd management practices such as early weaning of calves and paddocking. This strategy has been confirmed to be effective in mitigating the negative impacts of climate change as reflected by (n=26) study respondents who resorted to the use of this strategy to survive the shocks of climate change. A key informant from World Vision also reiterated that, selling of livestock is a key strategy for climate change adaptation in Gutsa ward when she said that *“the residents of Gutsa ward sale mainly the older beasts and leave the heifers and steers*

5.3.3 Diversification of livelihoods should be prioritised as a climate change mitigation strategy as reported by a number of respondents and key informants to have greatly improved Gutsa people's living standards thus capacitating them to meet their basic necessities. Manyeruke, Hamauswa and Mhandara (2013) shared the same sentiment by stipulating that, diversification can be an impressive climate change adaptation practice and it should include, diversification of income by adding livestock operations, a shift to drought resistant crops, use of shallow tube wells, rotation method of irrigation during water shortage, construction of water impounding basins among others.

5.3.4 There should be harnessing of resources by the district stakeholders so as to ensure that the affected populations have access to the needed resources in time. Agyei, Dougill and Stringer (2013) noted that, the sustainability of the climate change adaptation strategies is compromised by a number of barriers which include but not limited to; lack of financial resources, lack of adequate information on climate change characteristics, institutional barriers, technological barriers as well as socio-cultural barriers. Thus there is need to promote the linking of people with scarce resources to complement their efforts in mitigating the negative effects of climate change.

5.4 Recommended areas for further study

The researcher feels that there is need to research further on;

5.4.1 The role of the Government in climate change adaptation in Gutsa ward 6, Muzarabani north.

5.4.2 The challenges faced in climate change adaptation in gutsa ward 6, Muzarabani north.

5.5 Chapter summary

This is the final chapter of the study and it has looked at the summary of the study and its findings, conclusions of the study as well as recommendations that resulted from the study.

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Appendix A

Interview guide for the households

My name is Richmore Masarakufa; I am an undergraduate student at Bindura University studying for the Bachelor of Science Honours degree in Social work. As part of the requirements of the Social Work degree programme a student is expected to carry out an academic research study. Hence I am carrying out a study entitled “An investigation into the climate change adaptation strategies in rural communities of Zimbabwe, A case of Gutsa ward six (6) of Muzarabani District of Mashonaland Central”. This interview will take approximately 20 minutes.

1. What is your understanding of climate change?
2. What are your main sources of livelihoods in this community?
3. What are the negative impacts of climate change are you experiencing in your area?
4. How has climate change affected infrastructure in this community?
5. In your own view how do you think climate change is leading to food insecurity in this community?
6. How has climate change affected health in this community?
7. Do you think climate change has any negative effects on livestock production in this community? Explain.
8. How has climate change affected your sources of livelihoods in this area?
9. What climate change adaptation mechanisms have you employed to survive the negative impacts of climate change in your area?
10. Are these climate change adaptation strategies of any benefit to your livelihoods?
11. What challenges are you facing in the coping strategies you have adopted?

12. What role can the government play in addressing the challenges you are facing due to climate change?
13. Apart from the government, who are the other major actors who provide you with some form of assistance to complement your efforts to adapt to climate change?
14. What in your view should be done by the government in future to come up with effective policies and programmes to combat the negative impacts of climate change?

Appendix B

Interview Guide for Key Informants

My name is Richmore Masarakufa; I am an undergraduate student at Bindura University studying for the Bachelor of Science Honours degree in Social work. As part of the requirements of the Social Work degree programme a student is expected to carry out an academic research study. Hence I am carrying out a study entitled “An investigation into the climate change adaptation strategies in rural communities of Zimbabwe, A case of Gutsa ward six (6) of Muzarabani District of Mashonaland Central”. This interview will take approximately 20 minutes.

1. Is climate change a major challenge in your district? Yes No
2. How is climate change affecting food security, livestock, water availability and infrastructure in your district?
3. What are the major factors that increase people’s susceptibility to the shocks of climate change in this district?
4. What are the current climate change mitigation strategies being implemented by rural communities in this district?
5. What are the strategies being used by the government to assist people in coping with climate change?
6. What is the role of Non-Governmental Organisations in assisting people with coping with climate change?

Appendix C

Focus group discussion guide

My name is Richmore Masarakufa; I am an undergraduate student at Bindura University studying for the Bachelor of Science Honours degree in Social work. As part of the requirements of the Social Work degree programme a student is expected to carry out an academic research study. Hence I am carrying out a study entitled “An investigation into the climate change adaptation strategies in rural communities of Zimbabwe, A case of Gutsa ward six (6) of Muzarabani District of Mashonaland Central”. This interview will take approximately 20 minutes.

1. What is your understanding of climate change?
2. What are your main sources of livelihoods in this community?
3. What are the negative impacts of climate change are you experiencing in your area?
4. How has climate change affected infrastructure in this community?
5. In your own view how do you think climate change is leading to food insecurity in this community?
6. How has climate change affected health in this community?
7. Do you think climate change has any negative effects on livestock production in this community? Explain.
8. How has climate change affected your sources of livelihoods in this area?
9. What climate change adaptation mechanisms have you employed to survive the negative impacts of climate change in your area?
10. Are these climate change adaptation strategies of any benefit to your livelihoods?
11. What challenges are you facing in the coping strategies you have adopted?

12. What in your view should be done by the government in future to come up with effective policies and programmes to combat the negative impacts of climate change?