Midlands State University

Established 2000

FACULTY OF SOCIAL SCIENCES

DEPARTMENT OF LOCAL GOVERNANCE STUDIES

BIOLOGICAL DISASTERS MITIGATION STRATEGIES IN RURAL COMMUNITIES. THE CASE OF CHIMANIMANI DISTRICT

BY

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SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS OF A BACHELOR OF SCIENCE HONOURS DEGREE IN LOCAL GOVERNANCE STUDIES.

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DECLARATION

I Linaster Nyengeterai declare that this study is my creative work that has not been surrendered to any other University. The sources I used have been acknowledged.

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DEDICATION

The study is dedicated to my family members and friends who supported me during the hard times of the study.

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ABSTRACT

The study is entitled “Biological disasters mitigation strategies in rural communities. The case of Chimanimani district.” Biological disasters are impacting negatively on nations and communities. Chimanimani district is at risk of biological hazards among other districts in Zimbabwe. Various organisations in the district which constitute the District Risk Reduction Committee sought out ways to limit the incidences of biological disasters through mitigation approaches. However, there are challenges that are being faced by the DRRC and the community to lessen the impact of these disasters on communities. Chapter one is the roadmap of the study which start by revealing the background of the study globally, regionally, nationally and locally in Chimanimani. The objectives of the study were to assert the main causes of biological disasters in Chimanimani district, to assess the effectiveness of the mitigation strategies to curb the impact of disasters in the district, to identify the challenges that are being faced in lessening the impact of biological disasters , to suggest possible solutions and recommend to the Disaster Risk Reduction Committee on the measures that can be employed to ensure effectiveness of the mitigation strategies that are in place. Chapter two brought to light the views of different scholars, defines key terms, reveals the causes of biological disasters in general and the challenges that are being faced in reducing the incidences of disasters, these are economic meltdown, inadequate resources, dependency syndrome, little community participation and decision making, lack of data base, weak co-ordination on activities among stakeholders, lack of clear cut policies, lack of capacity to limit the impact of hazards. It also shows the solutions to the challenges as proposed by other scholars. Chapter three reveals research methodology where different sampling techniques such as judgmental sampling, simple random and snowball sampling techniques were used. The research was targeted at one hundred at fifty eight participants from the District Risk Reduction Committee and the community members. To collect data the researcher used research tools which include questionnaires, interviews and focus group discussions. Chapter four presented, interpreted and analysed data gathered from the field through questionnaires, interviews and focus group discussions. The findings in chapter four helps to draw conclusions and recommendations in chapter five. The conclusions are that, lack of human, financial and material resources can hinder effectiveness of disaster mitigation measures, if communities are not fully engaged in disaster risk reduction activities, disaster reduction measures will not be effective. Less Civil Protection meetings can hinder effectiveness of biological disaster mitigation approaches. The researcher recommended that, the district should enhance community participation and involvement, revive district risk reduction structures, ensure effective resource mobilisation, strengthen co-ordination among various government ministries, enhance training and ensure effective education to all health workers, partnership with the private sector and inclusion of the local institutions in the national budgets to curb the impact of lack of resources. Thus, there is need for the district to implement the proposed solutions so as to ensure effectiveness of biological disaster mitigation strategies.

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May God bless you all.

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ACRONYMS

ARI	-	Acute Respiratory Infections
CBOs	-	Community Based Organisations
CRDC	-	Chimanimani Rural District Council
DRRC	-	Disaster Risk Reduction Committee
ENT	-	Ear Nose and Throat
UMCOR	-	United Methodist Committee On Relief
HFA	-	Hyogo Framework of Action
IDNDR	-	International Decade for Natural Disasters Reduction
IDSR	-	Integrated Disease Surveillance and Response
IRS	-	Indoor Residual Spraying
MoHCW	-	Ministry of Health and Child Welfare
MSU	-	Midlands State University
NEPAD	-	New Partnership for Africa's Development
NGO	-	Non-Governmental Organisations
RDNS	-	Rapid Disease Notification System
UNISDR	-	United Nation International Strategy for Disaster Reduction
WASH	-	Water Sanitation and Hygiene
WHA	-	World Health Assembly
WHO	-	World Health Organisation
ZIMASSET	-	Zimbabwe Agenda for Sustainable Socio-Economic Transformation

CHAPTER I

INTRODUCTION

1.0 Introduction

Disaster preparedness and management is a global, regional, national and local priority. It focuses on a number of factors namely, prevention, mitigation, preparedness and response. Mitigation strategies to disasters reduce the impact of disasters to communities. They are also part of preparedness plans and they can prevent disasters at large.

This chapter is the roadmap to the study of disaster mitigation strategies in Chimanimani. The district continues to be affected by number of hazards, among are biological, resulting in disasters in which many lost their lives. Biological disasters are diseases and pest epidemics. This research will focus on the mitigation strategies to lessen the occurrence of disease epidemics only. Strategies have been put in place to curb the impact of these biological disasters. However, there are challenges that the district is facing in minimising the impact of disasters. This chapter seeks to provide the background of the study globally, regionally, nationally and locally. It will reveal the statement of the problem, research objectives and questions. It also reveals the significance of the study to the student, to the institution and to the area under study. The chapter presents study assumptions, limitations, delimitation, and definition of key terms. It then summarises the major components of the chapter.

1.1 Background of the study

1.1.1 Disaster Prevention and Mitigation globally

Globally disasters have been viewed as barriers to the attainment of millennium development goals. Internationally biological disasters mainly occur after natural disasters such as floods,

earthquakes, hurricanes, tsunami and other disasters. These disasters increase cases of diarrhoeal diseases, acute respiratory infections, malaria and snake bites. This is due to the fact that, after natural disasters occur people will stay in overcrowded temporary settlements where water and sanitation conditions are poor. Also in other underdeveloped countries biological disasters occur due to poor health systems, poor water and sanitation conditions.

Worldwide, the concept of disaster preparedness and management globally started in 1984 by Dr. Frank Press when he wanted to address the 8th World Conference on Earthquake Engineering through the International Decade for Natural Disasters Reduction (IDNDR). In 1985 twenty five organisations accepted and implemented IDNDR. It was then adopted by United Nations throughout the world by all those nations engaged in disaster mitigation in 1990 following the resolution 44/236 of December 1989. The focus of the health sector by that time was on emergency and response. It then moved to a more proactive approach and the United Nations International Strategy for Disaster Reduction (UNISDR) was established to uphold efforts of IDNDR. The body included the principles stated in number documents for natural disaster risk management.

In terms of reduction of health disasters World Health Organisation (WHO) plays a part. WHO assists nations to establish measures in reduction of risks and disaster preparedness as well as to support the health system to lessen the cost and damage to health sections emanating from disasters and other crisis. WHO supports countries so that they develop strategies and implement them for the purposes of preparedness and planning considering that they are not separate bodies but they intersect with one another.

To effectively reduce disasters related to health World Health Assembly Resolution (WHA) 64.10 came out with a resolution in 2011. It also aimed at sustaining the efforts of WHA 58. 1. The resolution proposes that, member should reinforce their disaster management systems

though developing proper laws, policies and building sufficient capacities in the health sector from a health sector stand point. It also states that, principles to building hospitals should be adhered to so as to create safe communities, to build community resilience, to strengthen preparedness and develop country principles for response thereby strengthening knowledge for management of disasters. This therefore ensures that, health systems provides adequate health services and reduce the possibilities of emergencies that can emerge into disasters.

In 2005 the United Nations established the Hyogo Framework of Action (HFA) (2005-2015) to address the loopholes of the UNISDR. The framework focuses on building resilience of countries and societies to disasters. The framework also supports governments, with the help of United Nations organs and civil society organisations to take active preventive strategies to reduce the possibility of disasters at all levels. It has five priorities for action towards strengthening community and country resilience to disasters. The priorities have been applied to the health and the health sectors by the World Health Organisation (WHO) (2011). These are the priorities that have been adopted by many countries in preventing and mitigating biological disasters and they are as follows:

- **Priority 1:** Disaster risk management for health as a national priority and local priority.

This entails that the health sector should develop and implement health policies and legislation so as to provide a roadmap disaster risk management, particularly at grass root levels. This also includes that health sector and non-health sectors should work hand in glove on risk reduction response and recovery. Thus, this focuses on commitment of all actors at both national level and local level.

- **Priority 2:** Health risk assessment and early warning.

The second priority focuses on identification of risks through risk assessment in health systems. It also include surveillance and monitoring of all threat especially from biological and natural sources to pave way for early warning actions by the health sector and non-health sectors. .

- **Priority 3:** Education and information to build a culture of health, safety and resilience at all levels.

This entails education and training to strengthen the knowledge and skills of health workers involved in the management of health risk disasters. This also includes providing information, education, risk communication and training to communities at risk to raise awareness, reduce risks, plan and prepare for disasters.

- **Priority 4:** Reduction of underlying risk factor to health and health systems.

This entails construction and protection of health infrastructure to ensure that health care is strengthened and remain functional especially in emergency situations.

- **Priority 5:** Disaster preparedness for effective health response and recovery at all levels.

Priority five includes disaster preparedness for response and quick recovery. This includes planning and training for health care workers to increase performance of the health sector in response to health disasters.

1.1.2 Disaster Prevention and Mitigation Regionally

Kalambay et'al (2013) reveals that, the African region is attacked every year by natural and manmade disasters which result in death of many people. He states that, 2010 disaster affect about 9.9 million. Again 2011 disasters affected over 13 million lives and killed about 50 000 – 100 000 people, in 2012 and early 2013 a total of 17 significant events were reported

including drought, floods, disease outbreaks, in 33 countries in Africa that affected over 60 million people. Thus, the African region is one of the regions that are being affected negatively by these disasters.

In relation with the Hyogo Framework of Action, the African Union‘s Regional Strategy for Disaster Risk Reduction 2005- 2015, adopted a ten year strategy for management of disaster risks for the Health sector. The new strategy focus on averting disasters through reinforcing country’s’ risk management in relation with the new adopted resolution. The strategy also reveals disaster risk management for the health sector aimed at leadership, governance and building resilience on health services. Thus, the health sector will also be strengthened even outside emergency times.

1.1.3 Disaster Prevention and Mitigation Nationally

Zimbabwe among other countries in the region is vulnerable both natural and human caused disasters. Hydro- meteorological disasters such as cyclones, floods and drought always affect the country. Biological disasters in the country include malaria, cholera, typhoid and HIV/AIDS have resulted in morbidity and mortality in the country. Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZIMASSET) under the Social Services sector also reveals that there are diseases that are the causes for the highest morbidity and mortality in the country namely diarrhoea, Acute Respiratory Infections (ARI), malaria, malnutrition, injuries, hypertension, diabetes, pregnancy related and maternal prenatal complications and mental health disorder. These hazards have been attributed to poor and water sanitation, economic hardship, environmental deterioration, breakdown in vector control programs as well as a poor access to health care services.

Betera (2011) revealed that, the Zimbabwean government is committed in disaster management as evidenced by the presence of statutes which pave way for the enabling environment for disaster risk reduction plans that include the Civil Protection Act No. 5 of

1989. The department of Civil Protection is under the Ministry of Local Government Public Works and National Housing. It is responsible for the overall organisation of all disaster management departments. The Civil Protection Unit in Zimbabwe starts from the top up to the grassroots level that is at the top there is the National Civil Protection Committee, followed by Provincial Civil Protection Committee to the District Civil Protection Unit. The National policy for Civil Protection shows that, every person in Zimbabwe should supposed assist where ever possible to avoid or reduce the effects of disasters as revealed by the Civil Protection Act of 1989. Thus, the government of Zimbabwe abide by his statute to mitigate hazards in the country. The government delegated the functions to different sectors to curb health hazards. The Ministry of Health and Child Welfare (MoHCW) adopted and adapted WHO Integrated Disease Surveillance and Response (IDSR), the National Malaria Control Program Unit is in place and the National AIDS Council coordinates activities to reduce the impact of HIV/AIDS. Zimbabwe strategies also emanates from the global and regional policies such as the Hyogo Framework of Action and the African Union‘s Regional Strategy for Disaster Risk Reduction.

1.1.4 Disaster Prevention and Mitigation locally

Chimanimani district has all natural regions that is from region 1 to 5. Natural regions 1, 2, 3 form the eastern part of the district and region 4 and 5 form the western part of the district. The western part of the district is vulnerable to disasters like droughts and floods. The eastern side of the district is vulnerable to disasters such as rock falling, tree falling, mudflow, frost and traffic accidents as a result of terrain in the district. In line with the national framework Chimanimani Rural District Council (CRDC) and other members of the District Risk Reduction (DRR) Committee adapted mitigation strategies to limit the impact of these disasters. The measures include establishment of irrigation schemes, water harvesting,

encouraging the community to grow drought tolerant crops to mention a few. However, though these measures have been put in place the district is still at risk of disasters.

The district is also vulnerable to biological disasters and is main focus of this research. According to Ministry of Health and Child Welfare statistics the district is always affected by the top 10 diseases. Among them are injuries due to existence of timber industries, malaria, acute respiratory infections, diarrhoeal diseases and eye infections. These diseases outbreaks are impacting negatively to the community. Due to the background of the district the eastern part of the district experience outbreaks of diarrhoeal diseases. Poor sanitation is the contributing factor in the whole district. The western part is mostly affected by malaria since the area is dry and rainy whilst other diseases affect the whole district.

To lessen the impact of the disasters CRDC, government ministries and departments implemented the national strategies and they strategies include:

a) Case Management

This entails treatment in clinics, at homes through Village Health Workers (VHW). It also involves capacitating all health workers to effectively combat the diseases outbreaks.

b) Vector Control

This is to reduce the impact of malaria through Indoor Residual Spraying (IRS), provision of long lasting nets and mosquito repellents. This is also through environmental management.

c) Health Education Promotion

Health education promotion entails capacity building to health all workers and to the community. The strategy goes hand in hand with the Hyogo Framework of Action priority number three.

d) Disease surveillance

It entails Rapid Disease Notification System (RDNS), continuous communication about the diseases from health facilities to health officers and it is done weekly. Disease surveillance is also done through threshold limit value, that is alert threshold (average number of patience affected) and action threshold (when statistics shows that the number of people affected exceed the expected number). The strategy is also in line with the Hyogo Framework of Action priority number two.

e) Epidemic Preparedness and response

This includes preparation of plans before the disaster occurs, during and after the disaster. Epidemic preparedness and response includes planning on resources to be used, hazard analysis (hazard mapping) and role definition of all parties involved. This is in line with The Hyogo Framework of Action priority number five.

f) Co-ordination

This includes reporting of all possible outbreaks of diseases in the district.

1.2 Statement of the problem

Chimanimani district among other districts in Zimbabwe at large is at risk of biological disasters. In recent years a number of disasters occurred and statistics shows that a number of people lost their lives. Chimanimani RDC and Ministry of Health all the stakeholders put up measures to lessen the impact of these disasters to the community. Therefore, the study seeks to assess the effectiveness of the strategies to mitigate the disasters, to investigate the challenges faced in trying to reduce the effect of the disasters. The study also seeks to suggest possible solutions to the challenges faced in reducing biological disasters.

1.3 Research Objectives

- To assert the main causes of biological disasters in Chimanimani district.

- To assess the effectiveness of the mitigation strategies to curb the impact of biological disasters in the district.
- To identify the challenges that being are faced in lessening the impact of biological disasters.
- To suggest the possible solutions to the challenges faced in lessening the impact of biological disasters.
- To recommend to the DRR on the challenges faced in mitigating biological disasters.

1.4 Research Questions

- What are the main causes of biological disasters in the district?
- How effective are the mitigation strategies to curb the effect of biological disasters in the district?
- To what extent is the district vulnerable to biological disasters?
- What are the challenges being faced in trying to lessen the impact of biological disasters in Chimanimani district?
- What are the solutions to the challenges in mitigating biological disasters?
- How the community is responding to the strategies that requires behaviour change?
- Is there effective co-ordination between the local authority, government ministries and NGOs in DRR?

1.5 Significance of the study

The study is of great importance to the student, to Chimanimani district and to Midlands State University.

1.5.1 To the student.

The research will enhance the student knowledge on Local Governance concepts. Thus, the student is better equipped for the future working environment. The research is also going to cement the student knowledge on the concepts of disasters risk management in Zimbabwe.

1.5.2 To Chimanimani District.

The research findings are going to be used by different organisations in Disaster Risk Reduction Management. Gaps in biological disaster mitigation strategies in place are going to be identified. Possible solutions to the gaps are also going to be identified. Thus, the district will be in position to manage disasters better through the research.

1.5.3 To Midlands State University (MSU).

To the institutions like MSU the information can aid value in many departments with modules like Disaster Preparedness and Management.

1.6 Delimitations

The research was conducted in Chimanimani district which is situated in Manicaland Province which is in the eastern highlands region of Zimbabwe. According to Chimanimani Rural District Council Strategic Plan (2012-2016) the district boarders with Mozambique to the east; Chipinge district to the south, Buhera district to the west, and Mutare district to the north. The district covers an area of 3,353 square kilometres and is the smallest out of the seven districts in the province. The district has twenty three wards on which Chimanimani Rural District Council is the local authority which caters for both urban and rural communities.

1.7 Limitations

- The research was only conducted in Chimanimani District, hence the information may not be generalised to the whole country.

- Lack of resources on part of the researcher is also one of the limitations that the researcher faced during the research process.
- Some of the respondents did not want to give the accurate information since they regard some of the information as confidential information for the district that should not be disclosed.
- Chimanimani district consist of 23 wards, thus the researcher did not manage to move around the whole district to collect data due to limited time.

1.8 Definition of terms

Disaster

It can be defined as an incident that badly disturbs the operation of a society causing losses to that society.

Hazard

Is a likely destructive incident or human activity that could cause harm to property, peoples' lives or environment.

Mitigation

Is the action that can be taken to reduce the incidence of disasters.

Risk

Is the likelihood of harmful consequences or economic losses resulting from interaction between natural or human caused hazards and suspectable or capable conditions.

Strategy

A strategy is a plan or a method that can be employed to achieve certain objectives to solve a certain problem.

Vulnerability

The degree to which the community is exposed hazards. These can be determined by physical, social, economic, environmental factors in a certain community.

Disaster mitigation strategies are measures, actions or methods that eliminate or limit the impacts and risks of hazards before a disaster occurs or even after a disaster to lessen the impact of the next disaster.

1.9 Chapter summary

Chimanimani district is affected by biological hazards that include diarrhoeal diseases, malaria, Acute Respiratory Systems, injuries and eye infections. A lot of people have lost their lives due to these diseases and had actually led to biological disasters. Measures have been put in place to lessen the impact of these biological disasters and these are case management, vector control, health education promotion, disease surveillance, co-ordination, epidemic preparedness. These strategies have been put in place in line with the national, regional and global policies.

The following chapter shall look at literature review that will focus on literature from other scholars.

CHAPTER II

LITERATURE REVIEW

2.0 Introduction

This chapter relates the research to the available literature. Many scholars have presented their literature in line with the research topic. The chapter therefore seeks to determine what these scholars have presented in relation to biological disaster mitigation. The literature from different scholars, journals and articles will be reviewed in defining the disaster mitigation strategies. The theories and models of disasters will be shown so as to have a better understanding on disaster management concepts. The chapter will also reveal natural and human causes of biological disasters to assert the main cause, reasons for mitigating hazards to show the importance among other disaster management approaches, problems faced in mitigating biological disasters as well as solutions to the problems presented. The study also seeks to review factors that ensure sustainability and effectiveness of mitigation activities. Biological disasters in developed and developing nations will be presented. The chapter will end with a summary of the chapter.

2.1 Defining Literature Review

Tsvere (2008) defined literature review as, a description, critical analysis and evaluation of what other key authors or researchers have written or researched on in the area or topic or research problem. Literature review can also be defined as the process on consulting different sources that have been published by other scholars; the information should be in line with the research topic. Therefore, this chapter presents what other scholars have published in relation to mitigation of biological disasters.

2.2 Definition of key terms

2.2.1 Disaster

NEPAD (New Partnership for Africa‘s Development) (2004) defines a disaster as, a severe distraction of the operation of the society resulting in widespread human, material or environmental losses which exceed the capability of the community or society to survive using its own resources. The Oxford Dictionary (2001) also defines a disaster as, a sudden accident or a natural catastrophe that causes great damage or loss of life. Therefore, a disaster is a seriously damaging event to a community or a society to the extent that, it will not cope with its own resources, hence requires a third party to intervene.

2.2.2 Defining disaster mitigation strategies

Federal Emergency Management Agency (2011) reveals that, disaster mitigation strategy is the attempt to decrease loss of property as well as life by reducing the effect of disasters. Mitigation concerned with taking action before another disaster occurs, to reduce financial losses through risk analysis and risk reduction. According to this Agency, effective disaster mitigation requires communities to understand risks in their local areas to ensure sustainability. Thus, mitigation measures create safe communities, financial security and self-reliance.

According to the United Nations International Strategy for Disaster Reduction (UN/ISDR) (2004) disaster mitigation is the reduction or limitation of the unfavourable impacts of disasters and other related hazards. The undesirable impacts of disasters at times cannot be completely presented, but their magnitude or severity to a large extent can be reduced by various approaches and actions. Mitigation strategies include enhanced environmental laws, public awareness and these are non-structural measures as well as construction (structural measures). However, there is a slight difference by the Australian Government Disaster

Strategic policy (2010). It states that, disaster mitigation involves approaches taken in advance of or after a disaster directed at lessening or eliminating the impacts on societies and the environment. Thus, the policy emphasise that disaster reduction can be before a disaster or even after the disaster to lessen the impact of the next disaster.

Disaster mitigation has also been defined by Manitoba Health Model (2000) as, actions to eliminate or decrease the threat from hazards to the susceptible community. The actions are driven by the possible hazard rather than the imminent threat. The model also states that, disaster mitigation is mainly concerned with averting a risky interaction between severe events and a susceptible community. Mitigation also can be aimed at decreasing the risk by controlling the likely consequence to the susceptible society. Advocates of the model also reviews that, both the individuals and the community is responsible for disaster mitigation, thus the health section has two important functions , directly decreasing the risk to its services, programs and promoting risk reduction measures within societies.

2.3 Reasons for mitigating disasters

2.3.1 Mitigation creates safe communities

There are many reasons for mitigating disasters in communities. According Matinoba Health Model (2000) well planned disaster mitigation measures can protect people, save lives and decrease health care cost. Thus, it creates safe communities by reducing the impact on communities at large.

2.3.2 Saves money

Disaster reduction approaches can minimize the financial costs on individuals and communities (Federal Emergency Management Agency 2011). It preserves services hence, reducing or even eliminating the actual cost of the real disaster. Mitigation strategies can

remove the disaster threshold permanently so that a certain degree of incident can no longer be present thereby reducing the cost.

2.3.3 Enhance economic growth

Zimbabwe National Contingency Plan (2012) reveals that, preparation for disaster will not only improve wellbeing of citizens but, will improve economic growth through protection. Hence, reducing the impact of disasters is of great importance since it also leads to development in a community.

2.3.4 Speeds Recovery

According to Federal Emergency Management Agency (2010) long term disaster mitigation plans and projects allow individuals and societies to destroy the disaster cycle. Hence, mitigation plays a pivotal role in reducing impact of disasters among other disaster management approaches.

2.4 Theories and Models of Disasters

2.4.1 Disaster Theory by Long (2009)

Long (2009) developed a disaster theory to explain the concepts of emergency management that that is preparedness, mitigation, response and recovery. The theory tries to explain how disasters occur and how the society reacts before, during and after disasters. Long (2009) states that, the theory about disasters has been created as a "silver bullet" this means that, one answer fits all approaches, hence it tend to answer a number of questions.

McEntire (2004) cited by Long (2009) states a theory is, an explanation of best conditions for a society. He then states that, the second explanation should be based on data collection, concepts, principles and statistics from various societies. Thus, this explanation fits well in the study since conclusions on the effectiveness of disaster mitigation strategies shall be

made basing on the findings revealed through data collection through statistics from Chimanimani community.

Webster (2000) cited by Long (2009) defines a theory as, a description on scientific research and reasoning. Long notes that, from a disaster management viewpoint society is not supposed to suffer financially and physically (losing lives) but should be free from them. In this theory, it has been suggested that, there are steps that can take to mitigate disasters from happening. Thus, from this point of view, this study seeks to measure the effectiveness of the biological disaster mitigation strategies that aims to reduce the incidence of disasters in Chimanimani district.

The disaster theory also reveals the importance of the media on disaster management. He states that, media have an impact on how incidence will be remembered; it brings the attention of the community indicating people devastated by a disaster. Hence, media can create history of a disaster that can be later studied. There are two types of sources of information on disaster that is official sources and unofficial sources that can is actors in the incident like business men and labour unions. In response to disasters an "all hazards approach" was developed to curb the impact disasters however, there were weaknesses which were found in the approach.

According to this theory, in the past a number of disasters and emergencies resulted in many people living in packed small environment. This created poor sanitation conditions and environments, shortage of food and water supplies and the state failed to support the community properly as a result of the idea that, governments lacked interest and understanding to prepare for disasters. Long (2009) also states that, the government is not always responsible for the effects of a disaster rather the actual society may fail to identify risks before they occur. He noted that, communities with high economic and political status

believe that they are safe from disasters since they can afford it. However, there are people who are always at risk for instance, elderly, people with mental disabilities and the poor. This is due to the fact that they are not able to take care of themselves.

The theory states that, the definition of a disaster depends on the background of the society to which a disaster happens. To the poor a small house fire that destroys them is a disaster whereas the rich cannot perceive it as a disaster. Thus, the term disaster differs with community. Therefore, according to Long (2009), a disaster is an event can lead to disruption of the normal functioning of a community. From a sociological point of view a disaster is an event, above other social events and it causes disruption and dislocation.

This theory also states that, to understand were disasters comes from, those involved in disaster management must understand human reaction and all things that happen around them and why they react in such a way. Disaster is based on perceptions on what people perceptions on what people perceive to be devastating to them or the society. According to Long conclusions on what is a disaster is based on the traditional theory and the theory based on research. The current modern way of a disaster management reveals that, status quo is not important to a society, thus one's disaster theory is based on studies and lessons from the research and data findings. On the other hand, McEntire (2004) cited by Long (2009) states that, most disasters are characterised by lack of information.

2.4.2 Disaster Management Model: Disaster Management Cycle by Professor Khan (2008)

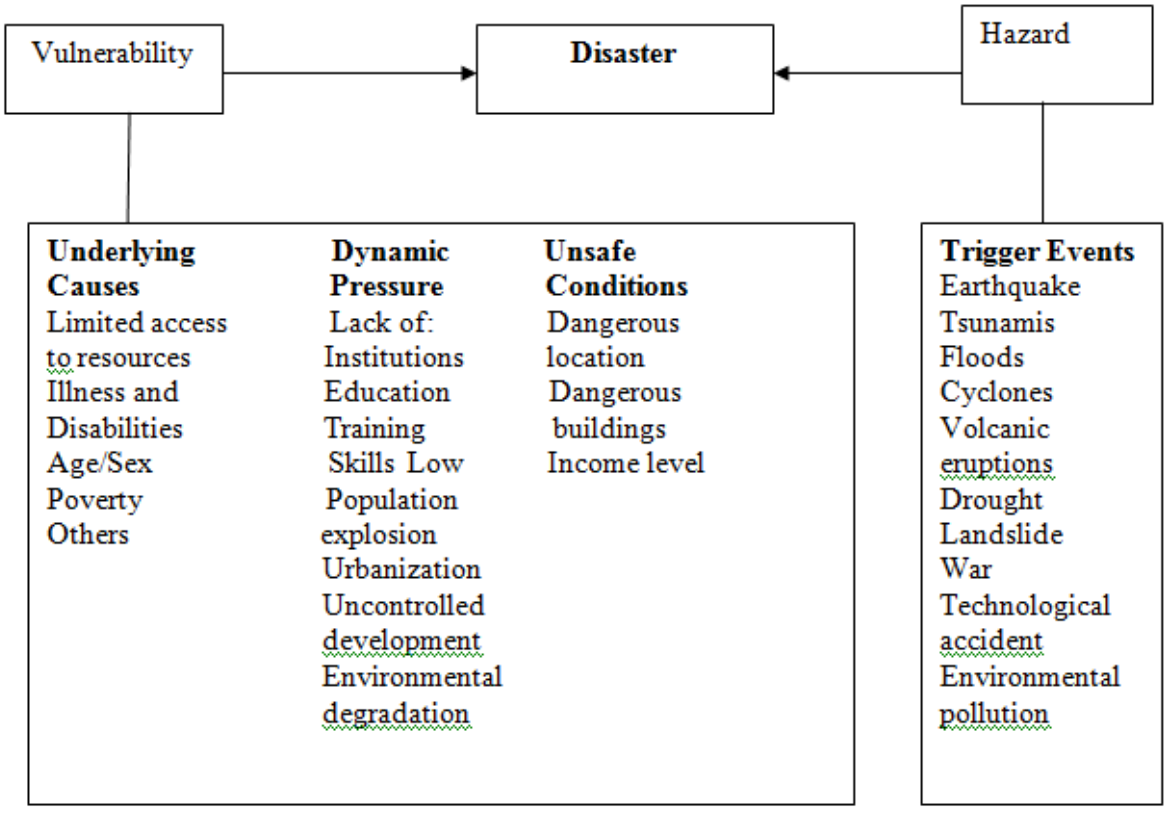
This model explains various concepts used in disaster management. It states that, disasters are old as human history but, the harm caused by these disasters in the past years is the root cause of international concern. Khan (2008) in this model defines a disaster as, a sudden, unfortunate, excessive incident which causes great harm to human beings and plants. The

events can be natural or man induced. He also states that, disasters have resulted in construction of permanent structures so as to reduce the adverse impacts of disasters. However, disasters have resulted in loss of life, property and have affected the environment. Thus, the global community responded to these disasters in a new perspective.

The model also attempts to trace the origins of a disaster. It states that, it owes its origins from a French name "desastre" which emanate from word "des" meaning bad then "aster" meaning star. Thus, it means "bad or evil star." This means that, a disaster is a bad event.

Khan also states that, a disaster result from a hazard, vulnerability and sufficient capacity or methods to reduce potential chances of a risk. Therefore, he states that, a disaster occurs when a hazard affects the vulnerable community and the causes harm causalities and destruction as illustrated by the diagram below:

Fig 2.1: How disasters occur



Source: www.mnmk.no/document/ 2008/2008 – 6 pdf

Fig 2.1 explains how disasters occur; this is where a hazard attacks the vulnerable community. Vulnerability involves underlying risks, dynamic pressure and unsafe conditions whereas hazards include trigger events.

The model explains types of hazards these are geological hazards, environmental hazards, biological hazards, water and climatic, industrial accident well as all accident related disasters.

The model defines a number of concepts in disaster management. It defines vulnerability as, the degree to which a society or geographic area is likely to be destructed by impact of certain hazard. Capacity has also been defined as the resources, strength and methods which enable the communities to cope with a disaster that is to plan, prevent, reduce or recover from a disaster. The model also noted that, rich people tend to recover from a disaster quickly as a result of their wealth as compared to the poor who do not have the resources to cope with disasters. It states that, a risk is the measure of the anticipated losses as a result of hazard event in a particular area in a specific period of time. The community is at risk when exposed to disasters.

2.4.2.1 Disaster management cycle

The model reveals a cycle of disaster management, which includes all activities, actions, methods and measures that can be taken into consideration before a disaster, during and after a disaster. There are three stages of actions that are involved in disaster management as indicated in the diagram below:

Fig.2.2: Disaster management cycle

Source: www.mnmk.no/document/ 2008/2008 – 6 pdf

Fig.2.2 shows a disaster management cycle which involves a number of activities. These are as follows:

- Individual disaster Response – this entails the actions that are taken by individual community members when a disaster strikes. This can include safety, rescue and first aid.
- Response or relief - this includes immediate actions of the rescue team for instance, medical care, shelter, sanitation, water, clothes and food. Thus, there is need the involvement of the third part.

- Rehabilitation and reconstruction – the activity reflects the restoration of important and services and functions, full resumption of services and preventative measures.
- Preparedness and response – preparedness involves contingency planning that is early warning in preparation of next disasters. Mitigation includes risk assessment as well as structural and non-structural measures.

The activities falls under two phases that is the disaster response (post – disaster) / emergency response and recovery phase as well as the disaster mitigation and disaster preparedness phase (pre – disaster / risk reduction. The focus of this research is the pre-disaster phase which is the preparedness and the mitigation phase.

2.5 Natural and human causes of biological disasters

Whilst there are natural and human causes of biological disasters, ISDR (2003) contends that, communities are always affected by natural disasters, but nowadays disasters in most cases are caused or worsened by human actions. The following are human and natural causes of biological disasters.

2.5.1 Urbanisation

Biological hazards add up to about 36% of disasters in Africa (UN/ISDR 2004). Most of the urban areas in African countries are growing and a lot of poor people are homeless to the extent that they live in slums, unsafe and hazardous areas. As a result of these factors they are at risk of many disasters, among them are floods, fires and disease epidemics. Thus, they are the main causes of morbidity and mobility in Africa.

According to the International Strategy for Disaster Reduction (2003), lack of proper drainage system makes many cities vulnerable to flash floods and the population to water related diseases. Rapid urban growth is also exacerbated by large number of migrants from

the rural communities due to poverty, this also increase susceptibility to biological and other natural hazards in many areas of the world.

In addition to this, ISDR (2003) also supports that, developing countries are more susceptible to natural hazards. Poverty, unemployment, economic instabilities and migration especially to urban areas, make communities expose people to risk conditions since they are forced to leave on unsafe locations and shelters where there cost is very low and land is readily available. Emergencies are also worsened by other aspects for example, violation of human rights, lack of protection, inequalities in wealth distribution and usually the less privileged are disadvantaged. Thus, Zimbabwe is one of the least developed countries that face those challenges.

2.5.2 Air pollution

Air pollution is one of the causes of biological hazards. Mulugeta Et'al (2007) noted that, air pollution as a result of polluted dusts and air in highly populated cities are the main causes of biological hazards, many cases of these have been reported in many parts of the world. This raises the risk of acute respiratory infections. The research intends to investigate if this cause is one of the causes of disasters like acute respiratory infections in Chimanimani district.

2.5.3Water pollution and poor sanitation

Water pollution is also a serious problem in Africa. Mulugeta Et'al (2007) contends that, water pollution as a result of high rate of urbanisation has been estimated about 5% per annum. Chikoto and Sadiq (2012) also state that, breakdown of water supplies is as a result of economic meltdown in the country and the government have failed to invest in water supply maintenance. Zimbabwe Global Health Initiative Strategy (2012) also reveals that, inadequate supply of safe water and poor sanitation conditions contributed to the increase of water related diseases. Chadamuka Et al (2012) reiterated that, Zimbabwe is at risk of cholera

outbreaks. This is due to the fact that, water pipes are old and sewerage systems have decayed (supported by Smith 2009).Thus, outbreak of diseases causing biological disasters is as a result of water pollution and breakdown of water supply the whole of Africa particularly in Zimbabwe. The research therefore seeks to assess if this is one of the problem affecting Chimanimani District.

2.5.4 Poor waste management

Mulugeta Et al (2007) reveals that, waste disposal especially in the industrialised world is one of the causes of biological disasters. The dumping of poisonous waste materials causes environmental threat to the people in Africa. In Zimbabwe waste management is very poor and is causing environmental pollution leading to disease outbreaks. Chikobvu and Makarati (2011) noted that, most of the local authorities in Zimbabwe are failing to collect garbage efficiently, resulting in residents dumping waste everywhere thereby causing environmental pollution. Due to environmental pollution the community is at risk of diseases outbreaks such like malaria and diarrhoeal diseases.

2.5.5 Other causes of biological disasters

Globally it has been noted that, biological disasters can emanates from other natural disasters like floods and earthquakes to mention a few. Floods result in outbreaks of diseases such as cholera and malaria (Madamombe (2004) cited in Chikoto and Sadiq (2012). People are exposed to poor environment that can cause outbreaks of diseases. Thus, other types of disasters can cause biological disasters.

2.6 Challenges faced in mitigating biological disasters.

The challenges that are being faced vary from social, political, economic and environmental. Zimbabwe has not been spared from a number of challenges that most developing countries

are facing in the world. The research thus aims to assess if these are the same challenges that are affecting Chimanimani as a district.

2.6.1 Economic meltdown

Literature reveals that, there are of challenges that Zimbabwe as a whole is facing in terms of mitigating biological disasters. Whilst other scholars discovered that, urbanisation, poor sanitation and inadequate water provision are some of the challenges being faced in reducing the impact of biological disasters. Betera (2011) contends that, in the past it used to be common in areas with poor water and sanitation, temporary settlements and overcrowded slums. However, with the present economic hardship leading to water shortages and unfavourable sanitation conditions nearly in every area in Zimbabwe, the country is at risk of diseases epidemics like cholera. Chadambuka et al (2012) cited in Chikoto and Sadiq (2012) states that, high inflation, worsened by political insecurity and economic meltdown remains a problem to the nation. This clearly shows that, the economic meltdown is the challenge that is leading to shortage of water and poor sanitation thereby posing peoples' lives at risk of disasters.

2.6.2 Inadequate Resources

Another challenge that the country is facing is limited financial, material and human resource (Betera 2011).This challenge is also one of the challenges affecting the whole of Africa in disaster mitigation. Effective disaster reduction requires enough resources, the department of Civil Protection responsible for disaster management in Zimbabwe lack adequate resources to plan effectively the strategies that curb the impact of disasters on the community. Hence, this makes it difficult at local level to implement these strategies. Thus, Betera (2011) states that, the country needs capacity building support in infrastructure development equipment and human resource development to strengthen disaster reduction in Zimbabwe.

2.6.3 Dependency syndrome

Dependency syndrome is one of the challenges affecting most African countries including Zimbabwe. Most African countries to rely on donor funding instead of building their research capacity to ensure improved policy and decision making that will enable better management of disasters. Mulugeta et' al (2007) also states that, the reason that the majority of the African countries are disadvantaged makes the region one of the least prepared and least equipped to deal with the effects of hazards and emergencies. Zimbabwe Global Health Initiative Strategy (2012) states that, the Ministry of Health and Child Welfare is relying on donor assistance in strengthening preventive measures in the health sector and at community levels. Hence, poverty that perpetuates dependency syndrome results in weak disaster reduction strategies.

2.6.4 Little community participation and decision making

Little community participation and decision making is another challenge that is affecting Zimbabwe. The National Health Strategy for Zimbabwe (2009-2013) reveals that, whilst there has been active enthusiasm on the part of communities to participate in the health development, there has been little involvement of communities in planning and decision making process, the lack of resources within communities has also lessened their participation and involvement. Therefore, lack of community involvement in health development (that helps to mitigate biological disasters) is the challenge that the department responsible for disaster reduction is facing.

2.6.5 Lack of database

There is no data base on disaster risk reduction in Zimbabwe. Information is being accessed through sharing reports, newsletters and minutes on email facilities (Zimbabwe Report 2004). Hence, it is difficult to effectively plan for biological disaster reduction.

2.6.6 Weak co-ordination on activities among stakeholders

Ministry of Health National Health Strategy (2009- 2013) states that, the capacity of the Ministry of Health and Child Care to coordinate the activities of other stakeholders is very weak (Ministry of Health National Health Strategy 2009- 2013). Effective disaster reduction in the country calls for good networking amongst all the stakeholders involved. Betera (2011) also supported the statement recommended that, there should be need for improved network both at national and local level.

2.6.7 Lack of clear cut policies

On one hand Betera (2011) contends that, the government of Zimbabwe is committed to the management of disasters, this is revealed by availability of legal enabling statutes which create favourable environment for disasters risk reduction programmes. He also states that, the government committed itself in setting up institutional framework and appropriate policies for disaster risk reduction. On the other hand, Gogo (2014) noticed that, lack of clear cut policies on part of government to deal with a number of catastrophes due to poor funding is the major factor affecting strategies to lessen the impact of disasters in Zimbabwe. Hence, he states that, the country need to make improvements on disaster risk management and preparedness.

2.6.8 Lack of capacity to limit the impact of hazards

International Strategy Disaster Reduction (2003) reveals that, while there is no state in the world is completely safe from disasters, lack of capacity to reduce impact of hazards and emergencies is a major challenge for most developing countries. Betera (2011) also contends that, capacity to implement strategies before, during and after an emergency or disaster is insufficient. Allocation of resources remains inadequate in disaster prevention, preparedness, mitigation and recovery. In this way, it can be noted that, the lack of ability to limit the occurrence of hazards in the country is one of the challenges that is being faced.

2.7 Solutions to the challenges faced in biological disaster mitigation

It has been noted that, the government of Zimbabwe has adopted and adapted global and regional policies, strategies and approaches to reduce the impact of biological disasters. The government however, need to strengthen and fully implement the strategies employed globally and regionally. The research seeks to ensure if these can also be applied in Chimanimani district.

2.7.1 Enhance community participation and awareness

Gogo (2014) states that, even if there are inadequate resources to fund management of disasters the government of Zimbabwe through the department of Civil Protection, should shift some of the responsibilities to vulnerable communities by strengthening their capacity to curb the impact of disasters through education and awareness campaign. In addition, the Civil Protection Unit should enhance knowledge and information at the lower level to improve disaster risk reduction and response. This would also ensure strengthening of disaster risk reduction at community level. ISDR (2003) also reveals that, increasing peoples' awareness and participation reduce susceptibility to hazards. Thus, it has been recognised that, community involvement in disaster reduction (mitigation) is of great value since they can bring their ideas and capabilities thereby making mitigation strategies more sustainable and more effective.

In support of this, solutions to the challenges being faced in reducing impact of disasters can be through the use of traditional and local knowledge to lessen the impact of disasters. This can be through promoting community based disaster management planning by local authority. It can also include training activities to raise public knowledge as revealed by the International Strategy for Disaster Reduction (2003). In addition, the Agency states that, developing better understanding of the causes of disasters through sharing experiences and

access to appropriate information and would also reduce dependency on international donor on better management of disasters.

2.7.2 Promoting multi- sector partnership

The Civil Protection Unit can view the benefits of promoting multi-sector partners by working hand in hand with better funded organisations in the civil sector (Gogo2014). Partnership with these organisations will curb the challenge of lack of resources. Better funded organisations such as the civil society organisation will also bring their capacity to promote biological disaster reduction in the country. In support of this, Chikoto and Sadiq (2012) in emergency management states that, the government of Zimbabwe need to capitalise international and private sector to ensure success of disaster management initiatives. Therefore, the government through this strategy would establish an effective a disaster management system with the required human and financial resources.

2.7.3 Acquiring political commitment from public authorities

Obtaining political commitment from public authorities can be one of the strategies that need to be reinforced. International Strategy for Disaster Reduction (2003) reveals that, this would be dealt with through enhanced inter-sectoral co-ordinations at all levels, the implementation of risk management approaches and resources mobilisation include the establishment of new funding methods. Thus, public authorities should also assume responsibility in disaster risk reduction so as to ensure integration among various sectors.

2.7.4 Invest more in research

The nations should invest more into research, studying and examining the factors affecting change or inefficiencies in the management of disaster risk reduction thereby contributing to formulation of required policy framework and improvement of indicators to effectively evaluate the impacts of disasters. Isidore et al (2013) also noted some of the solutions to the

challenges faced in lessening the impact of health disasters. They state that, re-establishing and developing the provision of primary health care should focus on training of health care personnel on appropriate case management. There is need to improve training to enhance knowledge so as to and to build capacity so as to ensure better use of research findings in policy and decision making. This would result in reduction in the spread of various diseases.

2.7.5 Improve and restore water and sewerage systems

The government should try hard to improve and re-establish water and sewerage systems in order to decrease the likelihood of cholera outbreaks and other diarrhoeal related diseases. It should continue to organise community awareness campaigns to educate and train Zimbabweans (Chikoto and Sadiq (2012). Therefore, if the government of Zimbabwe improves its water and sewerage systems the risk to biological hazards will be minimised.

2.7.6 Formulation of clear policies

Gogo (2014) contends that, lack of clear cut policies on part of government to deal with a number of catastrophes due to lack of funding is affecting the country. The government of Zimbabwe should strengthen the strategies suggested by United Nations International Strategy for Disaster Reduction as well as the Hyogo Framework for Action 2005- 2015. ISDR (2003) reveals that, implementation of development policies appropriate frameworks can reduce disaster risk. Hence, adoption of clear policies would ensure success in reducing impact of hazards on Zimbabwean communities.

2.8 Factors that ensure that mitigation strategies are more effective and more sustainable.

Apart from the suggested solutions on the challenges and gaps in biological disaster mitigation strategies there are certain factors that ensure that mitigation strategies are more

effective and more sustainable. Communities and societies can adopt them for success of disaster reduction strategies.

Mitigation strategies are long term strategies to curb the impact of disasters in communities. Twigg et al (2000) revealed that, disaster mitigation is intrinsic to sustainable development. Mileti (1999) in Matinoba Health Model (2000) states that, members should maintain environment quality, people's quality of life to promote local resilience and accountability for disasters, and recognise that sustainable, crucial local economies are important. Adopt a consensus oriented approaches starting at the grass root level. Therefore, community involvement is of great importance when mitigating disasters.

Community participation has been viewed as an important aspect in disaster management essential to reverse the world-wide trend of increase in disaster incidence of loss from all types of disasters and establish a culture of security and ensure sustainable development for all (Victoria 2001). Thus, community based risk assessment, mitigation planning and implementation process build confidence and pride in communities thereby enhancing development responsibility at local level.

Dyness (nd) in Matinoba Health Model (2000) also states that, the local community should be taken as the prime focus of attention in disaster risk reduction since it is the one affected by a disasters and more significantly, responds to deal with the incident. Whether a disaster is major or minor, it is the people in the society who experience the undesirable effects of disasters. They use survival strategies to respond to the situation before the outside help from NGO, other private organisations or government arrive. Community based approaches plays a pivotal role in disaster risk reduction as well enhancing bottom up approaches in development planning and disaster management. This has also corrected the failures of the

top down approaches which failed to address local needs and ignored the importance of local resources and abilities that can even reduce peoples' vulnerabilities.

Betera (2011) concurs with the above arguments on the importance of the community in flood mitigation. He reveals that, the local (affected) communities have a significant role to play in flood mitigation, early warning and response. They are always the first to respond to disasters and they use their coping strategies (indigenous knowledge systems) as initial early warning. Thus, community at large is also important in biological disaster mitigation.

Community participation in risk assessment and risk reduction planning leads to community ownership, commitment and individual concerted efforts in disaster mitigation and resource utilisation. Mulugeta Et al (2007) reveals that many projects to mitigate disasters have failed because they are not based on local priority initiatives and resources. Thus, nations should fully engage the local communities since they are the affected ones and they play a vital role in disaster risk reduction.

2.9 Biological disasters in developing countries

The causes of biological disasters in Zimbabwe are the same causes that most of the developing countries are facing in the whole world. The causes have been attributed to higher standards of living and urbanisation, poverty, unsafe drinking water, lack of access to health services, illiteracy, political conflicts and social discrimination. NEPAD Report (2004) also supported the point stating that, incidences and impact of disasters are increasing in Africa and other developing countries due to several pre-disposing factors such as poverty, population pressures and unplanned urbanisation, weak governance and armed conflicts.

The challenges that developing countries are facing in mitigating biological disasters are varied and many as compared to developed nations. According to Sorensen et al (2006), huge inequalities still exists (developing countries are not able to access public health globally) not

everyone is able to access fruits of public health achievements. As a result some least developed countries have been left behind. Hence, disaster mitigation strategies remain very weak unlike those of developed nations.

NEPAD (2004) shows that, disaster risk assessment methods to reduce disasters is only applicable in developed countries and are not suitable for African countries and other developing countries. NEPAD (2004) reveals that, progress towards disaster risk reduction is slow in Africa and other developing countries. This has been attributed to legacy of their institutional history and insufficient knowledge of transition.

Another challenge that impedes effort of disaster reduction in developing countries is limited resources. Damon (2011) reveals that, due to lack of finance, developing countries divert funds from development programs and projects to emergency aid and recovery. Thus, disaster management remains under funded. Chang Ko Et al (2003) contends that, developing countries suffer from inadequate financial resources, however in countries like Mozambique, South Africa, Namibia, Botswana, Ethiopia, Nigeria and Mauritius appears to be capacitated financially.

According to NEPAD (2004) integrating disaster management is a joint effort that depends on the participation many of actors. In countries like Uganda, Ethiopia, South Africa and Lesotho participatory, decentralised planning and implementation is central to their disaster management approaches and identify the roles of non-state entities. However, development of disaster management initiatives still follows a usual ‘parachute drop’ method whereby outside (local and foreign government) development specialist drop into planning programs and leave for communities to implement them. Citizens are just recipients of disaster management results mainly being relief delivered by government and other donors. As a result, their involvement in formulating those programmes and projects invariably very

restricted. In this way, lack of community participation result in ineffectiveness disaster mitigation strategies.

In addition to this, decentralisation of disaster management suffers same problems as decentralised development administration. This included limited and inadequate resources, capacity devolution of decision making, authority inadequate competences and capacity to realize decentralised responsibilities, weak public private partnerships management, conflicting institutional relationships and authorities and low fiscal decentralisation. Hence, disaster reduction in developing countries remains weak.

2.9.1 Impact of disaster risk reduction field session in Myanmar in Asia by Redcross Society and IFRC (2012).

The research was carried out in Myanmar in Asia and the main objectives of the study was to empower the communities with information on the underlying causes of natural disasters as well to assess the impact of the impact of the mitigation strategies put in place. The main objective of this study is to assess the impact of disaster mitigation strategies in Chimanimani community.

The research findings indicated that, the community was vulnerable to number hazards that can develop in to disaster at local level. The community suffered from diarrhoeal diseases, dengue and haemorrhagic fever. The community was exposed to polluted canals and bare drainage systems. However, the main causes were lack of knowledge on the root causes of the disasters. This study aims to discover if the biological disasters are exacerbated by the community itself or the inefficiencies of the Disaster Risk Reduction Committee as well as to identify the challenges faced in mitigating biological disasters.

The study findings indicated that, the study raised awareness of the community and identified mainly health related problems and their solutions. Proper dumping of garbage was one of the

strategies to mitigate health disasters. Thus, this result in reduced the impact of hazards in the community. The study revealed that, use of collective leadership, corporation and networking with the Community Based Organisation (CBOs) can result in effective disaster reduction in the community. Community participation through developing action plans for disaster awareness was also important, hence this study seeks to assess if there is effective community participation for success of the mitigation strategies that have been put in place.

The study also reveals that, the local authority worked hand in hand with community based organisations that is, Maternal and Child Welfare Association so as to effectively reduce impact of disasters. The findings enhance awareness on disaster risk reduction health, water, sanitation and proper housing infrastructure. Therefore, this study aims at recommending to the DRR Committee of Chimanimani on the challenges faced in mitigating biological hazards in the community.

2.10 Biological disasters in developed countries

ISDR (2003) reveals that, no country is entirely safe from disasters; developed countries are also being affected by biological disasters. While there are number of causes of biological disasters in developing nations, they differ from those of developed countries. Disasters such as hydro metrological and geophysical are the ones that are common in developed nations. The existence of these disasters in developed nations creates environments where pathogens can thrive thereby leading to outbreak of epidemics. However, biological disasters also continue to present significant health and economic concerns especially in United States. Infectious diseases are often devastating, decreasing survival rates and impending economic growth and development in developed nations. One of the challenges is that, mitigation suffers institutional arrangements; there are several regulatory takings in terms of disaster

management. Another challenge is that, there is lack of effective international corporation with developing nations.

Though developed countries face problems in mitigating biological disasters, reveals that developed countries are able to contain epidemics. According to Damon (2011) developed nations suffer higher economic losses but, have mechanism to avoid loss of life, they have immediate emergency and medical care and insurance of property losses. In other words, developed nations have the capacity to contain epidemics before they develop in to disasters. According to Sorensen et al (2006) in developed governments at any level have greater capacities to cope with disasters. Thus, this tends to differ with the situation in developing countries where poverty thrives.

2.10.1 Exposure to biological hazards and the provisions of the controls against biological hazards in Australia work places by Dr Fleurde Crespigny (2010)

The main aim of the study of the study was to provide an explanation of the types of biological hazards that workers are typically exposed to and to describe factors that affect provision of the controls against hazards in Australia. This study aims to assess the effectiveness of the mitigation strategies to reduce the impact of biological disasters and the challenges that are being faced. However, the study was carried out on workplaces and this study shall be carried out in the community.

The study findings reveals that, the causes of biological hazards were contact with laboratory cell cultures, plant material, organic dust, food and rubbish waste and sewerage all these were human causes. Therefore, this study seeks to reveal if biological disaster are exacerbated by human actions or inefficiencies of the DRR Committee. The study reveals that, the control measures that have been put in place were protective clothing, warnings on waste disposal

and training on safe handling of biological materials. The main causes of these biological hazards were that, workers were exposed to industrial materials.

The study recommends on the control measures to reduce impact of biological hazards. The recommendations were that, more disease surveillance was supposed to be carried out. Australian authorities were supposed to consider developing interventions related to the European Union to improve knowledge of the state about biological hazards and to improve risk assessment for biological hazards. Improvements were supposed to be made training in the safe handling of biological hazard. It is the objective of this study to recommend to the Chimanimani district to improve handling of biological disasters.

2.11 Chapter summary

The chapter reviewed literature from different authors, journals and organisations. Definitions on disaster mitigation strategies revealed that, these are efforts to lessen or reduce the impact of disasters before or even a disaster occurs to reduce the impact of the next disaster. The study reviewed reasons for using mitigation as an approach to curb the impact of disasters, natural and human causes of disasters in general, challenges faced in mitigating disasters. Literature also reviewed some of the solutions that can be employed to reduce the challenges that are faced. Factors that ensure that strategies in mitigating biological disasters are more effective have been shown and cases relating to biological disasters in both developed and developing countries have been revealed.

The next chapter shall focus research on methodology revealing different tools, models, designs and techniques that were employed during the research process.

CHAPTER III

RESEARCH METHODOLOGY

3.0 Introduction

The chapter focuses on research methodology and seeks to reveal different methods, techniques and procedures involved in data collection. The chapter shall explain research methodology and research design revealing its importance to the study. It seeks to show different data collection instruments that were used in the research. The chapter will also reveal the sampling techniques, data collection procedure, data presentation as well as primary and secondary sources of data which were used during the research process. The chapter shall end with a summary of the whole chapter.

3.1 Research Methodology

Penneerselvan (2005) defined research methodology as a system of models, procedures and techniques used to find the results of a research a study. Holden (2004) defined methodology as a way for solving an issue, with specific components such as stages, tasks, methods, techniques and tools. Bryman (2012) also defined research method as, a method collecting data collection which involves specific tools, such as questionnaires, interview schedules or observations. Therefore, research methodology is a method, technique, procedure of collecting data using certain tools or instruments to obtain results on the study problem.

3.2 Research Design

According to Du Plooy (2001) a research design is a plan on how to conduct the research indicating who is involved, what the research will include and the area of the research will take place. Somekh and Lewin (2011) concurs with Du Plooy (2001) stating that, a research

design is the whole plan in research and it include four important ideas, the strategy, the conceptual framework, and the question of who will be studied, what will be studied and the instruments to be used for data collection data and evaluating empirical material. Bryman (2012) also defines research design as, the criteria that are employed when evaluating social research. He reveals that, it provides a structure for the gathering and analysis of data, a choice of research design reveal decisions regarding the research procedure. Thus, research design can be defined as a plan or a framework which indicates the instruments to be used in the research, who will be involved, what strategies will be employed and the place where the research will be carried out.

There are many research designs that can be used when carrying out a research. These include experimental design, cross sectional design, longitudinal design, comparative design and case study design. The research focused on the case study design to obtain results on the area under study. Somekh and Lewin (2011) define a case study design as, a design aimed at a single case (or perhaps a small of cases), the case will be studied in detail using any method seems suitable. A case study understands case in depth and in its normal setting, recognising its difficulty and its background. It also aims understand the totality of unit case. Therefore, the design was more suitable for the research since it was studied in detail where the researcher had real evidence of personal experiences.

The researcher also combined multiple methods to collect data thus; the use of methodological triangulation strengthens data collected. Bryman (2012) mentioned that, triangulation refers to the traditional view that quantitative and qualitative research can be combined to triangulate the research conclusions in order to ensure that they can be jointly corroborated. Hence, the use of triangulation in research ensures validity of data collected. Both qualitative and quantitative research techniques were employed in the research. Quantitative research can be defined as a research method that stresses on quantification in

data gathering and evaluation whereas qualitative research can be defined as a research technique that emphasizes on words instead of data quantification in gathering and analysis of data.

3.3 Target population

Sekaran (2000) reveals that, population refers to a group of people, events or things of interest that researcher desires to investigate. Therefore target population can be defined as the group of people the researcher aimed at during the research period. Chimanimani district consist of 23 wards with total population of 133 810 (64 333 males and 69 478 females). The researcher selected a segment of 158 participants from the whole population and the segment represented the whole population. Conclusions were drawn on the findings from the selected sample.

The research was carried out on various ministries and organisations that are part of the District Risk Reduction Committee that is, government ministries such as Ministry of Health and Child Care, Ministry of Women Affairs, Ministry of Youth and Employment Creation, Ministry of Education, and Ministry of Social Services, Chimanimani Rural District Council, Department of Livestock and Environmental Management Agency. It was also carried out on individual members in Chimanimani district. The population is presented in the table:

Table 3.1: Sample Population Frame to be used in the research

Stratum	**Population**	**Sample Size**	**Percentage**	**Sampling technique**
CRDC management	7	5	71%	Judgemental sampling
Ministry of Local Government	4	4	100%	Judgemental sampling
Ministry Welfare Social	2	2	100%	Judgemental sampling
Ministry of education	3	3	100%	Judgemental sampling
Ministry of Health and Child Care	6	4	66%	Judgemental sampling
EMA	2	2	100%	Judgemental sampling
Ministry of Youth and Employment Creation	4	2	50%	Judgemental sampling
Department of Livestock	2	2	100%	Judgemental sampling
Ministry of Women Affairs	4	4	100%	Judgemental sampling
Nurses	10	5	50%	Simple random sampling
NGOs	10	5	50%	Simple random sampling
Community members	133 810	120	0.09 %	Snowball sampling
Total	**133 864**	**158**		

3.4 Sampling

Sampling can be defined as the method of selecting units from a certain population of interest to represent the whole population. Chimanimani district is a district that consists of 23 wards, due to limited time the researcher selected a sample that represented the whole district.

Bryman (2012) define a sample as a segment of population that is selected for study. That is it is a subset of the population under study. The researcher used simple random sampling, judgmental sampling and snowball sampling technique during data collection.

Advantages of sampling in general

- Sampling involves the study of a small population hence it saves time.
- Sampling reduces the possibility of bias in selecting units thus, it increase the chances of selecting the right sample of population under study.
- It ensures that the resources are not wasted since the sample is small, thus sampling saves resources since only a few will be studied to represent the whole population.
- It is easy to obtain results from the sample than from the whole population.

Disadvantages of sampling in general

- A sample may not be fully represents the total population therefore the researcher selected sampling techniques that ensure that the whole population.
- The relevance of data depends on the size of the sample used. However, the researcher used sampling techniques that enabled collection of accurate and valid data.

3.4.1 Simple random sampling

This is a technique where each unit of the population under study has an equal opportunity of being selected in the sample. Somekh and Lewin (2011) pointed out that, it falls under probability sampling where each unit has the equal opportunity to be selected through " pulling names from a hat" or assigning a unique number , using random generators (tables of random numbers or a computer program that generates random numbers with a specified range). Simple random sampling was used in distributing questionnaires to the nurses and the top officials from Non- Governmental Organizations. The researcher collected list of nurses

and top official from Non- Governmental Organizations from the Social Services Department at Chimanimani Rural District Council. All names were be put in two boxes (one for nurses and one for NGOs), five names for nurses and five names for top official from Non-Governmental Organizations were picked from the box for the research.

Advantages of simple random sampling

- Each unit has the equal chance of being selected.
- It is unbiased due to the fact the members has an equal and independent chance of being selected.

Disadvantages of simple random sampling

- The disadvantage is that, it cannot be possible to select a sample without complete list of the population members hence the researcher collected a list of the nurses and Non-Governmental officials from Chimanimani Rural District Council to overcome the problem.

3.4.2 Judgmental sampling

The type of sampling can also be called purposive sampling and it falls under non probability sampling. According to Bryman (2012), in judgemental sampling the researcher does not select participants on random basis, the main idea is to select units in a strategic way so that the selected are relevant to the questions in the research. Thus, the sampling technique does not allow researcher to generalize to a population. The research was conducted to some of the officials in different organizations and ministries including officials from the Ministry of Health and Child Care since they were the members responsible for disaster risk reduction and they had information on the research topic.

Advantages of judgmental sampling

- The sampling technique saves time since the researcher knows the where to get the required information.
- The researcher selects a sample in way that the sampled population is a representative of the population and is relevant to the research questions.

Disadvantage of judgmental sampling

- It is difficult to determine the probability of the inclusion of any specific unit in the sample. Therefore, the researcher approached respondents who had the required information.

3.4.3 Snowball sampling

Snowball is another sampling technique that was used in the research. Cough and Nutbrown (2012:74) define snowball sampling as "a socio- metric technique for study of small groups, all the persons in the group or organization identify their friends and associations, until the informal relationships converge into some type of a definite social pattern." Kumar (2011) reveals that, snowball sampling is technique of selecting a sample units using networks, this is done till there is the required number. Thus, in different wards the researcher consulted traditional leaders and councillors to gather people in the community for the research.

Advantage of snowball sampling

- It is easy with snowball sampling.
- It is sometimes be the only way to reach population or where the sampling frame is available.
- It helps the researcher to identify the rightful subjects thereby maintaining standards of accuracy of the data to be collected.

Disadvantage of snowball sampling

- It is very unlikely that the sample will be representative of the total population. However, the researcher had sample of population with the required information, since she consulted traditional leaders and councillors before focus group discussions.

3.5 Research Instruments

These are tools or methods of collecting data. A number of tools such as interviews, questionnaires, observations were used in the research.

3.5.1 Interviews

This is where the researcher had face to face conversations with the respondents. The research tool is suitable in both quantitative and qualitative research. Punch (2003) noted that, an interview is a very good way of obtaining people's views, meanings, definitions of conditions and creation of reality. Interviews is individual face to face verbal interaction, it can be face to face, group interviewing and telephone surveys. In other words, interviews ensure a face to face encounter with the research participants thus making it possible to use structured or unstructured questions. The researcher interviewed six members, the Chief Executive Officer and Social Services Officer from Chimanimani Rural District Council, District Administrator and the Assistant District Administrator, the District Medical Officer and the Environmental Health Technician from the Ministry of health and Child Care.

Advantages of interviews

- Through this technique the researcher can further probe more questions to the respondents.
- There is higher response rate which is free from bias.
- Greater data accuracy can be obtained.

- Interviews are very useful when responses for data of practical nature are essential.
- Through facial expressions and gestures the researcher can extract meanings.

Disadvantages of interviews

- Interviews are expensive. To overcome this, the researcher used face to face interviews rather than telephone interviews which are expensive.
- Personal interviews are time consuming where a large sample is involved to overcome this the researcher used judgmental sampling that is, interviews were conducted to people who had the relevant and required information.
- Interviews require a lot of training and experience hence, the researcher gathered relevant techniques so as to obtain valid and reliable data.

3.5.2 Questionnaires

According to Harper (2001) a questionnaire is an important tool for recording and observing and can either be structured or unstructured with the idea of recording data of the area under study. Bryman (2012) also noted that, in a questionnaire respondents answers by completing questionnaires themselves. It can be postal or mail questionnaire that is it can be sent through post usually asked to return by post. The questionnaires were administered to three officials at Chimanimani Rural District Council, two to the members from the Ministry of Local Government, two members from the Ministry of Social Welfare, three members from the Ministry of Education, two members from the Ministry of Health and Child Care, two members from the department of the Environmental Management Agency, two members from the Ministry of Youth and Employment Creation, four members from the Ministry of Women Affairs, two members from the department of Livestock, five nurses and five officials from Non- Governmental Organisations. In totality thirty two questionnaires were distributed to the members of the DRRC.

Advantages of questionnaires

According to Bryman (2012) there are lot of advantages of using a questionnaire in research. These include:

- They are cheaper to administer that it is cheaper to use a questionnaire than an interview especially if one has a sample that is geographically widely dispersed postal will be cheaper.
- They are quicker to administer that is, it can be distributed in large numbers at the one time.
- Characteristics of interviewers such as social background, gender and ethnicity may lead to bias. Thus, no interviewer is present when self-completion questionnaire are being completed.
- No interview variability thus, there is no way the interviewees will be asked questions in different order and different way.
- They are more suitable for respondents because they complete a questionnaire the way and speed they want.

Disadvantages of questionnaires

Bryman (2012) noted the following disadvantages:

- No presence of interviewers to help participants if they are having problems in completing the questions. To overcome this, the researcher used simple language that enabled respondents to easily understand the requirements of the question on their own.
- There is no opportunity to probe respondents to elaborate an answer. Therefore the researcher used many closed questions that do not require further elaboration.

- With questionnaires it is difficult to ask other kinds of questions because respondents frequently do not want to write many a lot of things. Thus, the researcher used many closed questions and few open ended questions.
- Not suitable to some kind of respondents who are illiterate to complete questionnaires. To overcome this, the researcher used other research tools such as interviews and focus group discussions.
- There is low response rate if posted. However, the researcher administered the questionnaires herself.

3.5.3 Focus group discussions

Focus group discussion is a data collection instrument where a group of members are guided by a group facilitator or moderator who brings in the topic for discussion and then helps the group participants to contribute. The ideal number of participants should be eight to twelve members. Cough and Nutbrown (2012) noted that, a wide bank of data emerges through group interaction. Hence, the method was suitable in gathering information in Chimanimani community. The researcher used snowball sampling technique in this research tool. To form groups the researcher consulted of traditional leaders and councillors in various villages. The researcher intended to from groups on which the total number of community members add up to one hundred and twenty participants.

Advantages of focus group discussions

- Ray and Mondal (2004) states that, focus group discussions, allows members to agree and disagree. Thus, it provides an insight into how the group knows about the issue at hand, variety of ideas and opinions.
- The facilitator can request for clarification and detail in the discussion.
- The tool gathers a lot of data in a short time.

- It relies on focus group discussion guide, for the facilitators' use, to keep the discussion directed; hence it avoids confusion in asking the questions.

Disadvantages of focus group discussions

- Groups may be hard to co-ordinate however; the researcher used small groups so that they were easy to co-ordinate.
- Group dynamics may influence individual responses.
- Group is not randomly selected, so generations cannot be made about the entire community. Thus, the researcher conducted many focus group discussions so that the whole community was represented.

3.6 Sources of data

The researcher used primary sources as well as secondary sources of data during the research process.

3.6.1 Primary data

This is the information that originates particularly for the research hand. The data gathered is reliable since it is the first hand information from the research. Questionnaires, interviews and focus group discussions were used as primary sources in the data collection process. Muranda (2004) defines primary data as data structures of variables that have been specifically collected for the present research problem.

3.6.2 Secondary data

Ching (2001) noted that secondary data are sources of data that already have been collected for other purposes. Thus they can be used to support primary data. The researcher gathered information from statics from the Ministry of Health and Child Care, records from

Chimanimani Rural District Council and the Ministry of Local Government to support data gathered through interviews, questionnaires and focus group discussions.

3.7 Pre-testing

A pre-test is a pilot study carried out before the actual research process. The questionnaires were given to the supervisor and a few students to help the researcher to identify errors and wrong wording. A pre-test was also done to correct poorly designed questions. This helped the researcher to eliminate errors and omissions and to determine the relevance of information gathered.

3. 8 Data collection procedure

Before the research process the researcher requested for permission from top management of various organisation as well as the leaders of the district. This was done relation with research ethics where researcher was supposed seek permission from leaders before carrying out the research. Furthermore, this also safeguarded confidentiality of respondents who were consulted during the research process. The researcher introduced herself to the participants as student from Midlands State University carrying out a research on "Disaster mitigation strategies in rural communities. The case of Chimanimani district." The researcher made it clear that the research was for academic purposes only.

3. 9 Data presentation and analysis

The researcher used a computerized method of analysing statistical data. The data was then presented in the form of tables, graphs and pie charts. Data was analysed according to the findings of the research. Data presentation clearly revealed that all objectives set in the first place were achieved.

3.10 Reliability and Validity of data

The validity and reliability is a way of measuring research instruments. The researcher was concerned with reliability and validity of the data collection instruments which were used in the research. According to Punch (2007) reliability is a central concept in measurement and it basically means consistency. Wellington and Szczerbinski (2007: 45) defined reliability as "a judgement of the extent to which a test, a method or a tool gives consistent results across a range of settings and if used by a range of researchers." Thus, it consists of repeatability and consistency so as give the same results in a different context or with different researchers. Punch (2007) noted that, validity is the second concept in measurement. He states that, it measures the extent to which an instrument measures what it intend to measure in the first place. Wellington and Szczerbinski (2007: 43) define validity as "the degree to which a method, a test or a research tool actually measures what it is supposed to measure….. it tends to be related to the notion of truth."

A pre-test was conducted to test if the questionnaires could be answered. The researcher used simple language to ensure that respondents understand the instruments easily. Unclear questions were also avoided to ensure validity of data.

3.11 Chapter summary

The chapter focused on the plan that the researcher followed during the research process. Various tools, techniques and models were used in the research. The researcher selected a sample where simple random sampling, judgmental sampling and snowball sampling were used. The research was carried out in different ministries and organizations of the District Risk Reduction Committee as well as on individuals in the community. Tools such as interviews, questionnaires and observation were used in the research. Both primary and

secondary sources were used as sources of data. Data gathered was computerized and presented in form of tables, graphs and pie charts.

The next chapter shall dwell on data presentation and analysis so show information on gathered data.

CHAPTER IV

DATA PRESENTATION AND ANALYSIS

4.0 Introduction

Chapter four will present, interpret and analyse data gathered from the field. Thus, it seeks to reveal data gathered from the members of the District Risk Reduction Committee through interviews and questionnaires as well as data gathered from the community through focus group discussions. This will enable the research to draw conclusions from the field and the data will help the researcher to fulfil the research objectives stated in chapter one. Data will be presented through pie charts, tables and graphs. The chapter will end with a chapter summary revealing the main ideas in the chapter.

4.1 Analysis of Data Response Rates

This entails analysis of response rate to all data collection instruments which include interviews, questionnaires and focus group discussions.

4.1.1 Response rates to interviews

The researcher intended to interview six members, the Chief Executive Officer and the Social Service Officer from Chimanimani Rural District Officer, the District Administrator and the Assistant District Administrator from the Ministry of Local Government, the District Medical Officer and the Environmental Health Technician from the Ministry of Health and Child Care. However, only five interviews were carried out. The researcher did not manage to interview the District Administrator since he went to attend a workshop. The response rate is illustrated in the table below:

Table 4.1: Response Rate: Interviews

Strata	**Total No of interviewees**	**Respondents interviewed**	**Respondents not interviewed**	**Response rate**
Chimanimani RDC	2	2	0	100%
Ministry of Local Government	2	1	1	50%
Ministry of Health and Child Care	2	2	0	100%
Total	**6**	**5**	**1**	**83%**

Source: *Research Data*, *2014*

Analysis

Table 3 summarizes the response rate to interviews carried out. The response rate of interviews from Chimanimani RDC was 100%, from Ministry of Local Government was 50% and from the Ministry of Health and Child Care was 100%. The total response rate of all interviews was 83%. The European Social Survey (2003) reveals that, valid response rate should be at least 60%. Thus, the response rate to interviews was deemed adequate for making conclusions and recommendations for the study.

4.1.2 Response Rates to Questionnaires

A total number of thirty two questionnaires were distributed to Chimanimani Rural District Council management, Ministry of Local Government, Ministry of Social Welfare, Ministry of Education, Ministry of Health and Child Care, Ministry of Youth and Employment Creation, Ministry of Women Affairs, Environmental Management Agency, Department of Livestock,

Non-Governmental Organizations and Nurses. The table below shows the response rate of questionnaires from all departments:

Table 4.2: Response rates to Questionnaires

Respondents	**Number of questionnaires administered**	**Number of questionnaires received**	**Number of questionnaires not received**	**Response rate**
CRDC management	3	3	0	100 %
Ministry of Local Government	2	2	0	100%
Ministry Welfare Social	2	2	0	100%
Ministry of Education	3	2	1	67%
Ministry of Health and Child Care	2	2	0	100%
Environmental Management Agency	2	2	0	100%
Ministry of Youth and Employment Creation	2	1	1	50%
Ministry of Women Affairs	4	2	2	50%
Nurses	5	4	1	80%
NGOs	5	3	2	60%
Department of Livestock	2	2	0	100%
Total	**32**	**25**	**7**	**78%**

Source: *Research Data, 2014*

Analysis

The table above shows that, there was 100% response rate from Chimanimani RDC, Ministry of Local Government, Ministry of Social Welfare, Ministry of Health and Child Care, Environmental Management Agency and from Department of Livestock. The response rate from nurses was 80% whilst Ministry of Education has 67%. NGOs has 60% response rate and Ministry of Women Affairs had the lowest response rate of 50%. Out of 32 (thirty two) questionnaires distributed, 25 (twenty five) were answered and 7 (seven) were not answered. The average response rate of all questionnaires was 78%. This reveals that reliable and valid data was obtained from questionnaires since the total response rate is high. The researcher failed to get 100% response rate since some of the questionnaires were not returned and some were not answered.

4.1.3 Response rates to focus group discussions

Focus group discussions were aimed at a total number of 120 (one hundred and twenty) participants in Chimanimani District. The table below summarizes the response rate:

Table 4.3: Response rates to focus group discussions

Respondents	**Total No of all participants**	**No of respondents who participated**	**Respondents who didnot participate**	**Response rate**
Chimanimani community members	120	90	30	75%

Source: *Research Data, 2014*

Analysis

The table summarizes response rates to focus group discussions. These were carried out in areas like Mandarume, Nyanyadzi, Chikukwa, Ngorima, Ruwedza, Mutambara, Biriiri and Ngangu high density area. The numbers of participants in the mentioned areas were 12, 12, 12, 11,11,11,11 and 10 respectively. Out of one hundred and twenty respondents targeted, only ninety participated and the average response rate was 75%. The researcher did not manage to consult all the group due to financial constrains to move round whole district.

4.1.4 Overall response rate

In all research instruments that include questionnaires, interviews and focus group discussions, the research was aimed at 158 participants. The response rate of interviews was 83%, of questionnaires was 78% and focus group discussions was 75%. The total population who participated is 120 giving a total response rate of 76% (102 divided by 158 multiplied by 100). The problems encountered were that, in interviews one of the officials was not present, in questionnaires some were not returned and in focus group discussions the researcher did not managed to meet the targeted number due to limited time and resources to move around all the areas in the district. The European Social Survey (2003) states that, valid response rate should be at least 60% thus, the total response rate was deemed necessary to draw conclusion from the research since the percentage is above 60%.

4.2 Demographic Data presentation

Demographic characteristics that were looked at during the research were gender, age and educational levels

4.2.1 Distribution of respondents by gender

Table 4.4: Gender of the respondents

Gender	Focus Group Discussions	Questionnaires	Interviews	Gender Percentage
Males	30	17	4	43%
Females	60	8	1	58%

Source: Research data 2014

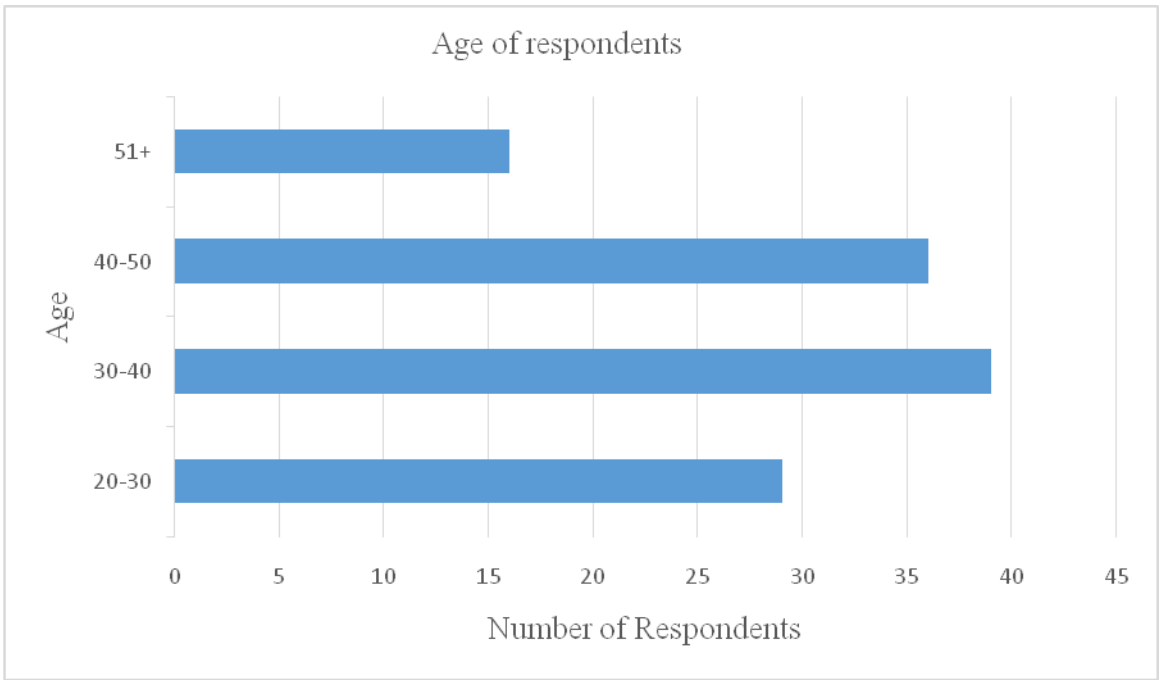
Analysis

Table 4 reveals gender of the respondents from all data collection instruments. The table shows that, 30 males who responded were from focus group discussions, 17 males from questionnaires and 4 males from interviews giving a total response rate of 43%. It also reveals that, 60 females respondents were from focus group discussions whereas 8 were from questionnaires and 1 female from interviews. Female response rate was 58%. From the table there was high female response rate of 58% than male response rate of 43%. However, the figures from questionnaires and interviews show that there was low response rate of females. This reveals that, females are not yet fully empowered to occupy management positions since the research was targeted on top officials of the District Disaster Risk Reduction Committee. High figures of female response rate from focus group discussions reveals that, females are more interested in participating in community issues than males.

4.2.2Age profile of respondents

The bar graph below shows age profile of the respondents.

Fig. 4.1: Age profile of respondents



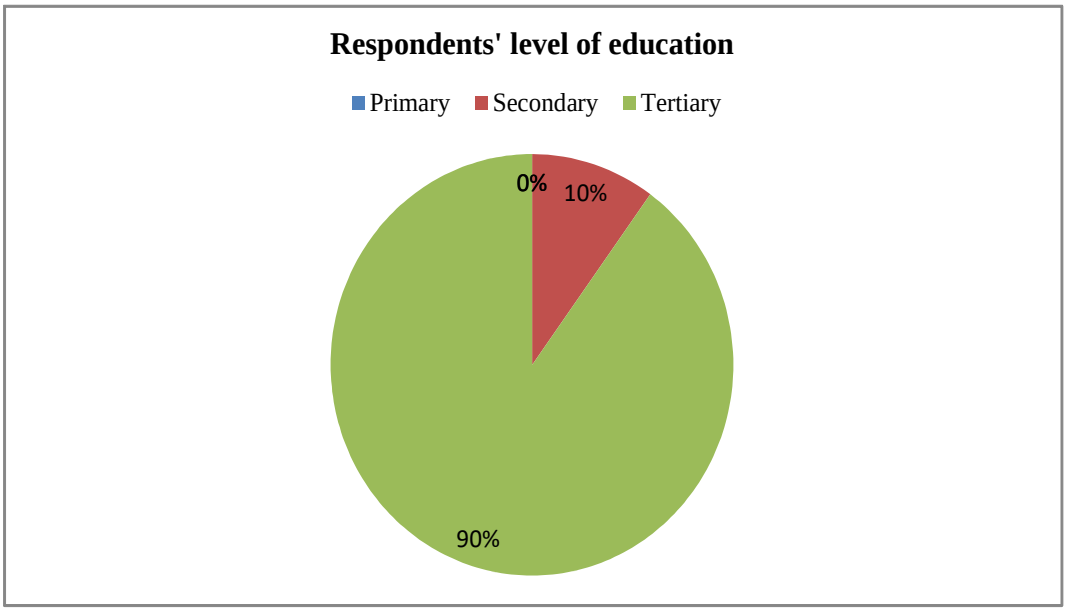
Source: field data 2014

Analysis

The highest response rates of participants were from the ages which range from 30 to 40 years and were represented by 39 participants. This was followed by the ages between 40 to 50 years which were represented by 36 people. The ages from 20 to 30 years were represented by 29 participants and the last age group were those participants aged 51years and above. There were 16 participants who represented the age group. However, the participants below the age of 20 were not consulted since there were not part of the management in various organisations which constitute the District Risk Reduction Committee in Chimanimani. This does not represent that the ages above 20 years are the ones that are mostly affected by biological disasters in the district but, it represents that there were the ones who had information on the effectiveness of the biological disaster mitigation strategies in Chimanimani district.

4.2.3 Level of Education of the members of the Disaster Risk Reduction Committee

Fig 4.2: Respondents' level of education



Source: field data 2014

Analysis

Fig 4.2 represents the level of education for the members of the DRR Committee. The level of education for the community members were not looked at during the research. The pie chart shows that none of the top officials from the DRR Committee has a primary qualification and this is represented by 0%. Only 3 officials holds secondary level qualifications, these were only top officials whose age are 51 years and above. They were only employed when secondary level qualifications were regarded as the highest qualifications before. The pie chart also reveals that most of the members are highly qualified, 27 of the respondents have reached tertiary level and this constitutes 90%. Thus, the existence of highly skilled personnel in the district enables formulation and implementation of effective measures in curbing the impact of biological disasters.

4.3 Diseases in Chimanimani District

For the researcher to obtain data on the causes, biological disaster reduction measures and challenges faced in lessening biological hazards, there were statistics which were collected from the Ministry of Health and Child Care. This reveal the cases on the top diseases affecting Chimanimani district as presented in table 5.

Table 4.5: Chimanimani district top ten diseases conditions by age groups for the second quarter 2014.

Disease	**Below 5yrs**	**Above 5yrs**	**All ages**
Malaria	3281	12275	15556
Acute Respiratory Infections (ARI)	4159	6796	10838
Skin disease	1037	1593	2630
Diarrhea	1595	1211	2806
Injuries	193	1495	1688
Ear Nose and Throat (ENT)	243	1021	1264
Eye disease/ infections	280	833	1113
Dental conditions	8	600	608
Dysentery	54	196	250
Bilharzia	9	225	234

Source: Ministry of Health and Child Welfare statistics for the second quarter 2014

Analysis

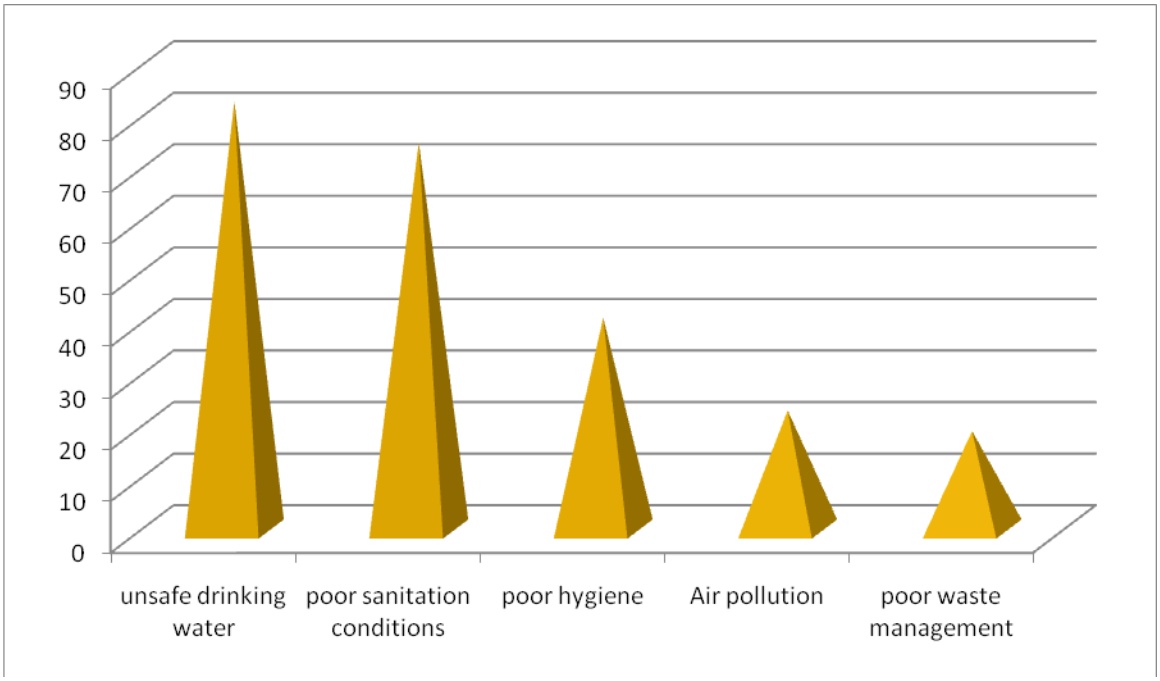
The table above reveals the top ten diseases affecting the people in Chimanimani district. The Environmental Health Technician in an interview mentioned that, these are the top ten

diseases affecting the community, however the statics could change due to seasons for example, many people are affected by diarrheal diseases during rainy season. Thus, cases of illness will raise or fall depending on the season.

4.4 Causes of biological disasters in Chimanimani district.

Whilst other scholars noted that the main causes of biological disasters in general are urbanization resulting in population growth, air pollution, water pollution, poor sanitation and poor waste management to mention a few. There were many causes of biological disasters which were raised by respondents through different research techniques which were used. The causes are indicated in fig. 4.3.

Fig 4.3: Causes of biological disasters



Analysis

Fig 4.3 shows the causes of biological disasters in Chimanimani district. Through the answers which were provided in questionnaires, interviews carried out and focus group discussions the results indicated that, the main cause of biological disasters is access to unsafe drinking

water. The cause constitutes about 83% of all the responses from participants. Respondents stated that, most of community members have no access to clean water. This is also supported by Zimbabwe Global Health Initiative Strategy (2012) which reveals that, inadequate supply of water is another factor which contributed to the increase of water related diseases. Through interviews members stated that, all the stakeholders are making efforts to make sure that the problem has been addressed however, still most of the areas have access to unclean water especially in the resettled areas. Through focus group discussions members also commented that, their sources of water are uncovered, these are known as *"Zvitubu"* springs, also members in Chimanimani urban states that, the water they receive is not treated it just come from the mountains to the taps thus, this exposes the community to water borne diseases such as dysentery, cholera typhoid and other diseases.

The graph also shows that, another cause is poor sanitation and is represented by 75% response rate. Participants stated that, sanitation conditions are poor in the whole of Chimanimani, therefore the community is at risk of biological disasters. In fact, through and this year (2014) is at 27% in the whole district, hence it is difficult for them to effectively curb the occurrence of biological disasters in the district. Community members also commented that, the main problem is that, they have no resources especially financial resources to build toilets. Zimbabwe Gobal Health Initiative Strategy (2012) supported the point stating that, poor sanitations conditions in Zimbabwe contributed to water borne diseases. This therefore indicates that, poor sanitation conditions in Chimanimani are also another cause of biological disasters in the district.

Apart from this, poor hygiene is also another cause. This constitutes about 41% response rate from all participants. This entails poor hygiene especially amongst community members. Another cause is air pollution which was about 23% response rate. Air pollution as a cause is also supported by Mulugeta Et al (2007). It was also stated that, air pollution emanates from

timber industries that are in Chimanimani. This affects most of the workers in the industries as well as the local people living nearer to those industries. Thus, this increases cases of acute respiratory infections.

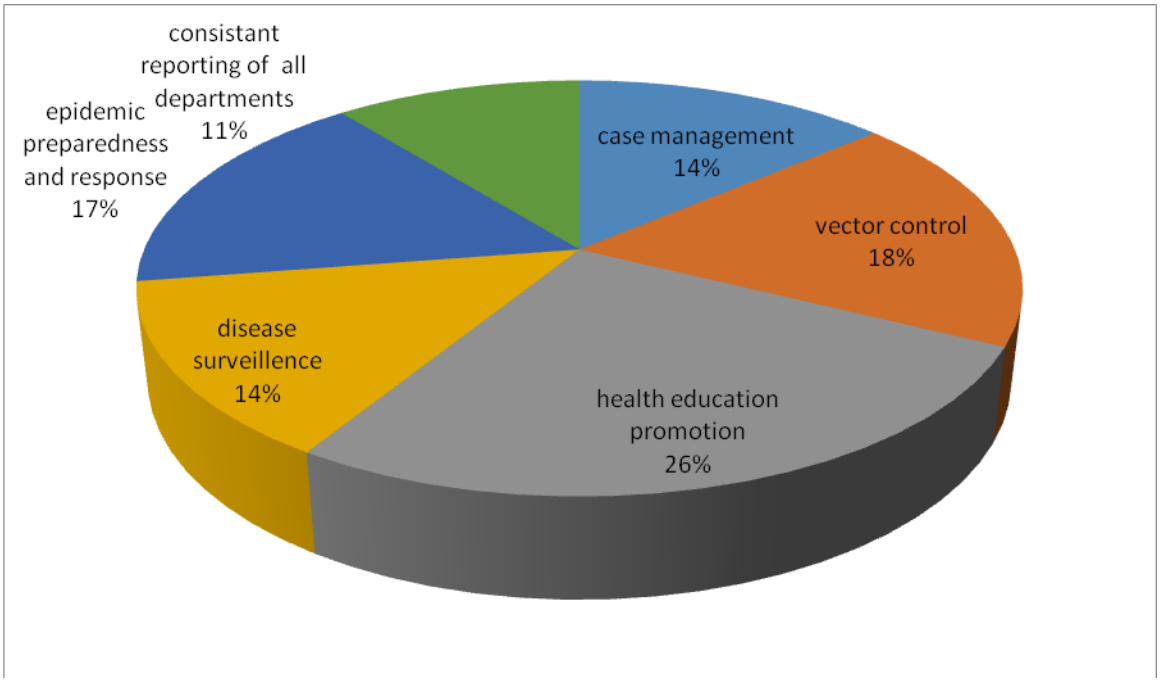
Fig.4.3 indicates that, another cause of biological disasters is poor waste management by council and was represented by 19%.The respondents were basing on the argument that, there is poor waste management especially in Chimanimani urban. This is also supported by Chikobvu and Makarati (2011) who states that, most local authorities have failed to collect waste efficiently….., thereby causing environmental pollution. However, this does not affect people living in rural areas. During Work Related Learning the researcher also discovered that, there was irregular garbage collection by the Rural District Council, it used to spend about two weeks without collecting refuse. Community members also commented that the situation is still prevailing. Thus, this exposes the residents at risk of biological hazards especially in the high density of Ngangu.

Apart from the causes provided by the researcher, there were also different causes which were raised by the participants. Through an interview with the Social Services Officer, the researcher discovered that, biological hazards are also worsened by the fact that, health services are inadequate, there is shortage of drugs and people in some areas are still travelling long distances to access health facilities. Hence, it is difficult to manage cases. Some of the causes were attributed to behavior change resistance by community members. Respondents state that, some community member do not accept some the aspects introduced to them by the DRRC due to their religious, cultural and traditional beliefs. Therefore, this actually lead to outbreak of diseases on which could have been mitigated.

4.5 Biological disaster mitigation measures in Chimanimani district

There are various mitigation measures which were employed by the DRRC in Chimanimani. There is a multi-sectoral approach where different stakeholders have a role to play to ensure effectiveness of the mitigation measures that are in place. The measures are case management, vector control, health education and promotion, disease surveillance, epidemic preparedness and response as well as consistent reporting of all members of the DRRC. The mitigation strategies in place are illustrated below:

Fig. 4.4: Biological disaster mitigation measures



Source: Research data 2014

Analysis

The illustrations in fig 4.4 show the results from the members of the DRRC. It has been revealed that, the most effective mitigation strategy is health education and promotion which was represented by 26% response rate. This entails education of all health workers as well as education of the community members to ensure that they have the knowhow on how to

handle cases before, during and after disasters. The efforts will be to ensure that the incidents of biological disasters will be minimized. 18% of the respondents revealed vector control as another mitigation strategy, followed by 17% who mentioned epidemic preparedness and response as another measure which plays an important part in reducing the incidences of biological disasters.

14% participants pointed out that, both case management and disease surveillance are also other strategies that have been employed and 11% of the respondents indicated that consistent reporting of all departments also plays a part in reducing impact of biological disasters.

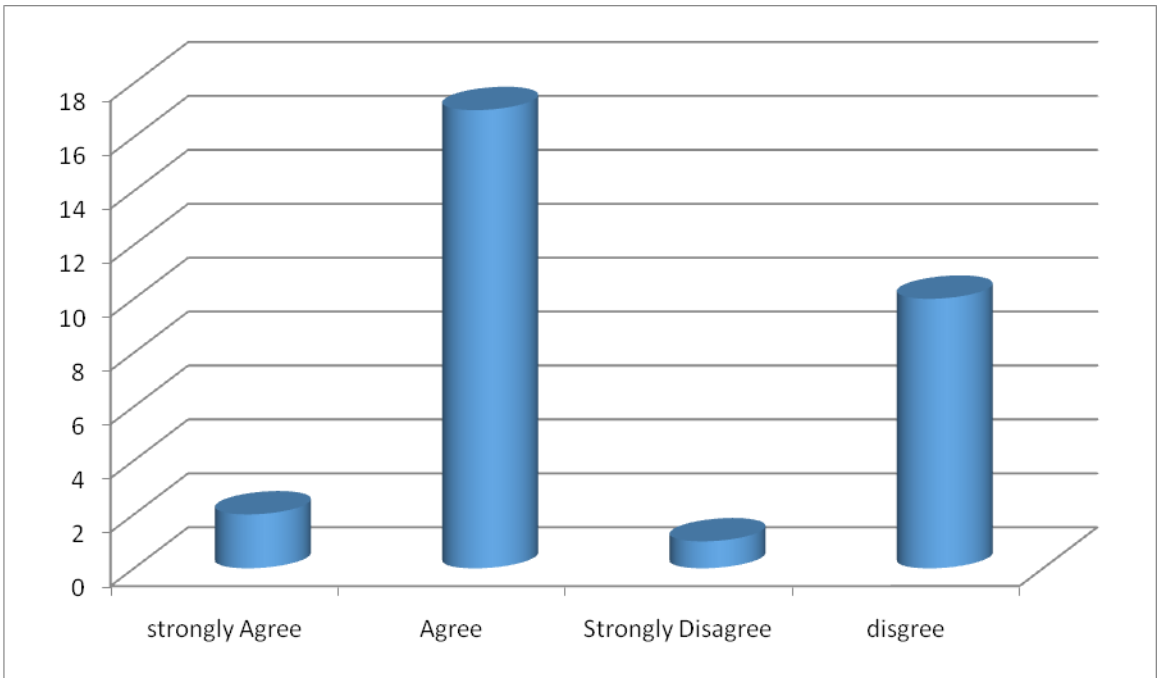
Apart from those mitigation strategies provided, there are also other measures provided through interviews and focus group discussions. In fact, during interviews members stated that, there are plans that are in place to reduce the incidence of biological disasters on communities. The plans include plans on how to use these resources thus, this allows effective resource mobilization.

Community members also indicated that, they also use their traditional methods to reduce occurrence of biological disasters for example they mentioned that, they burn cow dung to scare away mosquitoes. They also mentioned that, they accept and implement other strategies brought by the various organizations through awareness campaigns. They cite cases of the Water Sanitation and Hygiene (WASH) programs brought by ZIMAHEAD in 2013. Most of the community members participated and even those who were successful in the trainings were given certificates (focus group discussion at Mutambara 2014). They also cited cases of United Methodist Committee On Relief (UMCOR) a which is actively taking part in reducing the incidents of biological hazards for example, they are distributing mosquito nets together with the Ministry of Health and Child Care. The distribution of mosquito repellents is also still in progress. This reveals that, community participation in the strategies introduced is lessening incidences biological disasters in the district.

4.6 Effectiveness of biological disaster mitigation strategies

The research aims to assess the effectiveness of biological disaster mitigation strategies in Chimanimani district, in this view the respondents came out with their views on the situation at hand. The table below shows the response rate of participants regarding the effectiveness of the biological disaster mitigation strategies employed by the Disaster Risk Reduction Committee in Chimanimani district.

Fig. 4.5: Effectiveness of the biological disaster mitigation strategies.



Source: Research data 2014

Analysis

Fig 4.5 reveals that most of the participants in Chimanimani district agreed that, the mitigation strategies that have been put in place are effectively reducing biological hazards. From the questionnaires distributed and interviews carried out to the members of the DRRC 17 out of 30 respondents agreed that mitigation members are effective and they constitute 57%. Only 2 participants strongly agreed that they are really effective and they are

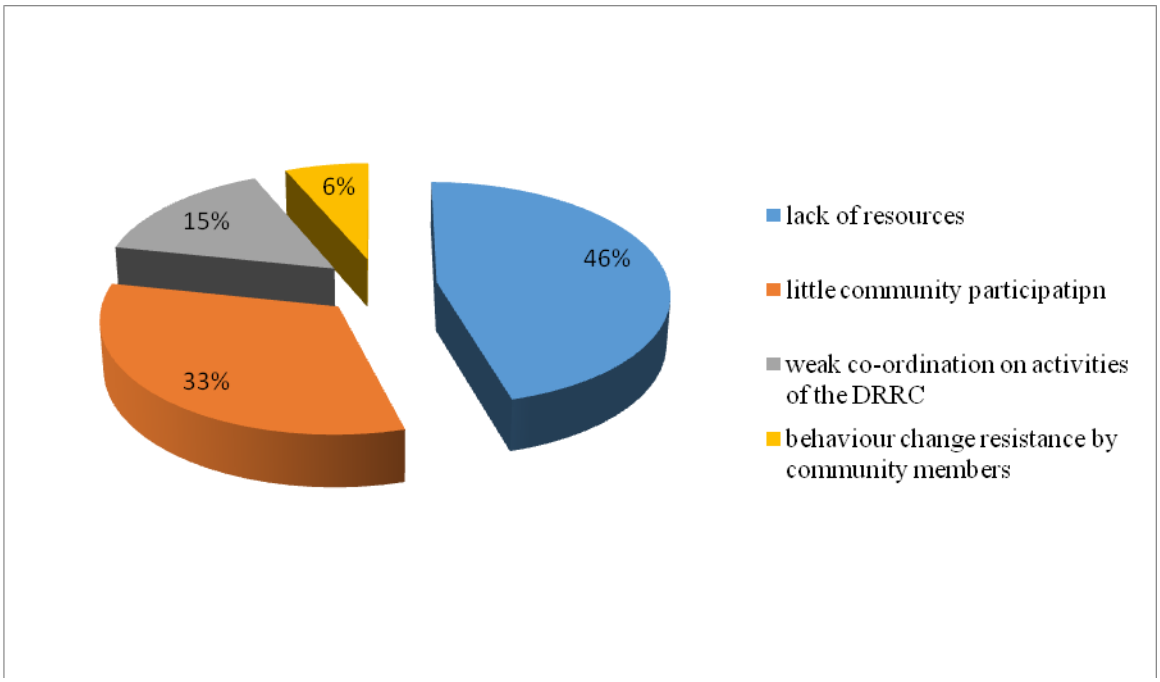
represented by 7%. However, 10 participants disagree that, the measures in place are not effective and they constitute 33 %. One participant strongly disagrees and is represented by 3%. The members who disagree were basing their argument on the fact that, there are challenges which are hindering reduction of biological hazards hence, arguing that the reduction measures in place are not very effective.

Apart from responses from the interviews and questionnaires, through focus group discussions similar questions were asked to the community members. However, the difference was that, the researcher asked about the effectiveness of the community reduction strategies. Community members stated that, the measures that they employed proved to play an important role in the reduction biological disasters since the cases of illness are being reduced however some indicated that, they lack resources to effectively implement disaster risk reduction measures.

4.7 Challenges that are faced in reducing biological disasters in Chimanimani.

From the responses provided by participants in Chimanimani district, the researcher noted that, there are challenges that are impeding the effectiveness of the mitigation measures in lessening the impact of biological disasters. These challenges are presented in fig. 4.6:

Fig. 4.6 Challenges faced in reducing the incidence of biological disasters



Source: Research data 2014

Analysis

Fig. 4.6 shows the challenges that impede the effectiveness of the biological disaster mitigation measures in Chimanimani community. A total number of 105 represented by 46% the respondents point out that, the major challenge that the district is facing is lack of adequate resources to curb the disasters affecting the community. Resources include financial, human and material. Betera (2011) also noted that, Zimbabwe is facing limited financial, material and human resources and this is impedes effectiveness of disaster management approaches in many areas. Through interviews respondents stated that, due to lack of resources the district is facing a number of challenges in vector control programs and other disease control programmes. Only 10 wards out of 23 are being sprayed, this is due to lack of material resources such as chemicals, protective clothing, and financial resources to recruit manpower. In fact, they pointed out that, there are only 2 teams of 30 people who are

spaying in the whole district. Thus, this reduces the effectiveness of vector control programs since the whole of Chimanimani is at risk of the disease.

In addition, due to lack of resources the district is also failing to train all health workers in clinics as well as in the villages. There are 165 village workers in the district. However, there are more than 165 villages in the whole district thus; there is no home treatment in some of the villages. Hence, this reduces the effectiveness of case management as a strategy to lessen the incidents of biological disasters.

Participants also mentioned that, little community participation is also another challenge impacting the effectiveness of the mitigation measures. 75 participants which constitute 33% of the respondents revealed that, there is little community co-operation in lessening the occurrence of biological disasters. This is supported by National Health Strategy for Zimbabwe (2009-2013) which states that there is little involvement of communities in planning and decision making process in disaster risk reduction. Others pointed out that, the community participate however the argument of little community participation was centered on the idea that, they lack resources to be fully engaged in disaster risk reduction measures.

Weak co-ordination on the activities of the Disaster Risk Reduction Committee has been supported by 35 participants and they form 15% of participants. Members stated, the DRRC only meet when disaster occurs hence, it is difficult for monitoring and evaluation on progress on the biological disaster risk reduction. It is also supported by Ministry of Health National Health National Strategy (2009-2013) which stated that, the capacity of the Ministry of Health and Child Care to co-ordinate activities with other stakeholders is very weak. This is also what is transpiring in Chimanimani.

Another challenge that was identified was behavior change resistance by some members of the community. This was supported by 15 respondents and they form 7% of the participants.

Some community members are still holding the belief that diseases can be healed in their churches not in hospitals. Thus, cases of illness increases since infections are not cured from the onset. Thus, it is difficult to effectively reduce biological disasters due to behavior change resistance by some community members.

4.8 Chapter Summary

Chapter four presented and analyzed data collected through questionnaires, interviews and focus group discussions. The information has been presented through tables, pie charts and graphs. The chapter fulfilled the research objectives and research questions that were set in chapter one. The overall response rate of interviews was 83%, of questionnaires was 78%, focus group discussion was 75% and the overall response rate was 76% and the response rate enabled the researcher to draw conclusions for the research. The causes of biological disasters which were stated by the respondents were access to unsafe drinking water, poor sanitation conditions, poor hygiene, air pollution and poor waste management. The reduction measures which were mentioned by the participants were health promotion and education, vector control, epidemic preparedness and response, case management, disease surveillance, consistent reporting of all government departments, planning and community involvement.

Most members agreed that, biological disaster mitigation measures are effective in reducing biological disasters. However, there are challenges that are hindering the effectiveness of these reduction measures. These were identified as lack of resources, little community participation, weak co-ordination on activities of the DRRC and behavior change resistance by some of the community members. Therefore, the following chapter will focus on summary, conclusions and recommendations what should be done to further the effectiveness of the biological disaster risk reduction measures.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter is the concluding chapter of the whole study. It aims to provide a summary of the previous chapters. It seeks to give a conclusion to the research findings of the study. The chapter will also provide recommendations on the challenges faced by Chimanimani community in lessening the incidence of biological disasters so as to ensure effectiveness of the mitigation measures that are in place.

5.1 Summary

In an attempt to reduce the incidences of biological disasters in Chimanimani district, there are measures that have been put in place. These measures at grass root level are in line with the international, regional and national priorities. However, there are challenges that are being faced in the implementation of biological disaster reduction measures. Thus, it was the aim of the study to provide probable solutions to the challenges so as to ensure effectiveness of the biological disaster mitigation strategies as well as to eliminate biological disasters at local level.

Chapter one was the introductory chapter to the study highlighting that, the concept of disaster risk management is a global, regional, national and local issue. Globally there is the Hyogo Framework of Action (2005-2015) aiming at building resilience to nations and communities, this has also been applied to the health sector to deal with health problems. This Framework of Action has been adopted regionally, nationally and locally. The chapter also revealed that, among other districts in Zimbabwe, Chimanimani is at large risk of biological disasters and a lot of people lost their lives hence the need for effective mitigation

measures. To ensure that the research has direction the chapter came up with research objectives and questions. The research objectives were to assert the main causes of biological disasters in the district, to assess the effectiveness of the mitigation strategies to curb the impact of biological disasters in the district, to identify the challenges that are being faced to reduce the impact of biological disasters in the district, and to suggest possible solutions to the challenges and give recommendations to ensure effectiveness of the reduction strategies. The research questions were linked to the research objectives to ensure they are addressed. The chapter gave the importance of the study to the student, to Midlands State University as well as to the district. The delimitations revealed that, the study was conducted in Chimanimani district which is located in Manicaland province which borders with Mozambique to the east, Chipinge to the south, Buhera to the south and Mutare to the north. The limitations of the study were that, there researcher lacked finance to effectively carryout the research as well as the fact that the research was only carried out in Chimanimani district, thus the findings could not be generalized. The research also defined the key terms which are disaster, hazard, mitigation, risk, strategy and vulnerability. The chapter then ends with a summary to reveal main ideas in the chapter.

Chapter two brought to light the views of different scholars so as be well knowledgeable on the concepts of disaster management. Definition from various scholars shows that disaster mitigation strategies are the efforts to reduce, limit or eliminate the magnitude of disasters before they happen of after they happen to limit the impact of the next disaster. Literature also revealed why mitigation is important among other disaster management approaches. The causes of biological disasters in general were urbanization, air pollution, water pollution, poor sanitation and poor sanitation conditions. Scholars reviewed the challenges that are being faced in reducing the incidence of disasters; these were economic meltdown, inadequate resources, dependency syndrome, little community participation and decision

making, lack of data base, weak co-ordination on activities among stakeholders, lack of clear cut policies, and lack of capacity to reduce the effect of hazards. Some of the challenges which are faced nationally are also the same challenges that are being faced in Chimanimani district. The solutions which were proposed by other scholars were to enhance community participation and awareness, promote multi- sector partnership, obtaining political commitment from public authorities, investing more into research, improve and restore water and sewerage systems as well as formulation of clear cut policies. These solutions will help regions, nations and local communities to enhance the effectiveness of disaster reduction measures.

In order to obtain information on the situation in Chimanimani district the researcher planned the way to carry out a research in chapter three. The researcher came out with a sample of one hundred and fifty eight participants where different sampling techniques such as judgmental sampling, simple random and snowball sampling techniques were used. To collect data the researcher used research tools which include questionnaires, interviews and focus group discussions. The research was carried out on different organizations of the members of the Disaster Risk Reduction Committee and the community members. Both primary and secondary data sources were used as sources of data. A pre-test was conducted to test if data collection instruments were suitable for collection of data as well as to ensure that reliable and valid data was collected. The researcher also seeks permission from the leaders as the procedure followed during the research process.

Chapter four presented, interpreted and analysed data gathered from the field through questionnaires, interviews and focus group discussions. The overall response rate was 76% and this indicated that, the researcher was able to obtain valid and reliable data. This enabled the researcher to draw conclusions from the field. Data was presented through pie charts, tables and graphs.

5.2 Conclusions

- From the research it can be noted that, Chimanimani district is at risk of biological hazards due to a number of factors and among them include, access to unsafe drinking water, poor sanitation, air pollution, poor hygiene and poor waste management. The district as whole tried to limit the impact of these disasters to the community through some mitigation measures. Mitigation among other disaster management approaches proved to play a pivotal in reduction of hazards that can lead to disasters. Mitigations measures can be part of disaster preparedness plans and they limit occurrence of disasters as well as eliminating disasters.
- Inadequate resources can hinder implementation the mitigation strategies in place to reduce the occurrence of biological disasters. The resources include financial resources to purchase equipment as well as to train staff for effective implementation of the reduction efforts. Resources also include human resources especially health staff both in hospitals and at village level to enable home treatment thereby reducing distances to be travelled by villagers to access health facilities.
- If community members do not fully participate, disaster mitigation efforts may not be successful. Community members may not participate due to lack of resources. The community also do not participate due to the fact that, they are not even consulted during the planning phase where they can bring their ideas in the measures. Community based approaches are important to ensure effectiveness of the biological disaster mitigation strategies.
- For disaster risk reduction measures to be effective there is need for total behaviour change by community members. If the community do not change their behaviour it entirely affects success of the biological disaster risk reduction efforts. People do not participate due to their religious and cultural beliefs that do not allow them to accept

some of the mitigation effort such as visiting health centres when they are affected by diseases. Thus, increases number of people being affected by biological hazards.

- Less Civil Protection Unit meetings can also affect the implementation of biological disaster mitigation efforts. This result in weak co-ordination on the activities of the members of the DRRC. Hence, it is difficult for the biological disaster mitigation measures to be successful since there will be no effective partnership among various government ministries and departments.
- Effective resource mobilisation is a central feature in disaster management. If resources are not mobilised effectively in the whole district some areas will be left at risk of biological hazards and will continue to be affected.

5.3 Recommendations

Due to the challenges that Chimanimani district is facing in reducing the incidences of biological disaster the researcher came up with recommendations that the district could implement to ensure the effectiveness of biological hazards mitigation efforts. The recommendations include:

5.3.1 Enhance community participation and involvement

Community participation is an important aspect that the district must take into consideration in all biological hazard mitigation efforts. When disasters occur the community members are the ones that will be affected, hence there should be capacitated. There should be community involvement starting from mitigation planning. Also to note that the community is capable for establishment of their own traditional disaster mitigation strategies that could add on to the mitigation strategies employed before. Therefore, to ensure effectiveness of the biological disaster mitigation strategies community based risk reduction strategies should be incorporated in the district.

5.3.2 Revival District Risk Reduction structures

District Risk Reduction structures should be revived from village level, ward level up to the district level. During the research it was discovered that, structures for disaster are there but they are not active. These structures should be resuscitated so that they would be at work. District Risk Reduction Committee should also meet continuously not only when disasters occur. This will enable monitoring and evaluation of all disaster risk reduction efforts in the district. Thus, this will also allow monitoring on progress, identification of gaps as well providing paths for improvements. Hence, there is no doubt that, risk reduction measures would be more effective.

5.3.3 Resource mobilisation

There should be equity and equality in terms of resource distribution. The district should ensure effective mobilisation of the available resources to limit the occurrence of biological disasters. For example, the researcher discovered that, using vector control as a strategy to reduce malaria, only ten wards are being sprayed out of twenty three, thus there should be equitable sharing of the available resources in all wards to ensure that risk reduction efforts are applied in all wards. Therefore this should be applied to all disease control programmes.

5.3.4 Strengthen co-ordination among various government ministries.

There is need for strong collaboration among various government ministries and departments where Chimanimani Rural District Council would be the co-ordinator. Thus, disaster mitigation responsibilities should be shared amongst all government ministries and departments where all organisations effectively participate.

5.3.5 Enhance training and ensure effective education to all health workers

The district should ensure that all health workers are capacitated to assist in case management. Effective training and education should also be done especially to Village

Health Workers (VHW). More VHW should be trained in all villages, thus this will enable home treatment in the whole district.

5.3.6 Partnership with the private sector

To curb the challenge of lack of resources Chimanimani district can partner with other private organisations so that they would assist in resources provision. The local authority can also provide a conducive environment for the private organisation especially non-government organisations, community based organisations and other private sectors. Thus, they would also assist in reducing biological disasters in any way.

5.3.7 National budget apportionments to local institutions

Disaster Risk Reduction is highly incapacitated financially; hence central government should also ensure that, it provides resources to the local institutions. The national budget also must cater for local health institutions. This will also reduce the challenge of inadequate resources.

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APPENDIX I

QUESTIONNAIRES FOR MEMBERS OF THE DISTRICT RISK REDUCTION COMMITTEE

My name is Linaster Nyengeterai, studying towards Bsc (Honors) Degree in Local Governance Studies at Midlands State University. I am carrying out a research on "**Biological disasters mitigation strategies in rural communities. The case of Chimanimani District."** You have been identified as one of the relevant participants and your input in completing this questionnaire will be sincerely appreciated. Your contribution will help in the completion of the study. The information you provide will be used for academic purposes only. Participation in this research is voluntary and your **confidentiality** is guaranteed. Do not include any names or personal information.

NB: Tick where applicable and please answer the questionnaire on your own.

Demographic Information

1. Sex:

   Male ☐ Female ☐

2. Age group:

a. 20-30 years ☐ b.30-40 years. ☐ c.40 – 50 years ☐ d.51+ years. ☐

3. Level of education:

a. Primary level ☐ b. Secondary level ☐ c. Tertiary level ☐

4. What are biological disasters?

   a. Disease and pest epidemics ☐

   b. Disease outbreaks that cause death among humans, animals and plants. ☐

c. Others

specify……

5. What do you understand by disasters mitigation?

a. Lessening or limitation of impacts of hazards and related disasters. ☐

b. Means taken in advance or after a disaster aimed at decreasing or eliminating its impacts on communities. ☐

c. Other

specify……..

6. Are biological disasters impacting negatively on the community?

☐ Yes ☐ No

7. If yes explain how

a. They lead to loss of life ☐

b. They lead to malfunctioning of the community due to cost. ☐

c. Other

specify……

8. What do you think are the reasons for mitigating disasters? (you can tick more than one)

a. To save money. ☐

b. To create safe communities. ☐

c. To enhance economic growth. ☐

d. For fast recovery ☐

e. Other specify……

9. What are the main causes of biological disasters in the district? (you can tick more than one)

a. Air pollution ☐

b. Poor hygiene.
c. Poor waste management. ☐
d. Unsafe drinking water and poor sanitation. ☐
e. Other specify……

10. As members of the District Risk Reduction Committee what are the measures that are in place to lessen the impact of biological hazards. (you can tick more than one)
    a. Case management ☐
    b. Vector control ☐
    c. Health education promotion ☐
    d. Disease surveillance ☐
    e. Epidemic preparedness and response ☐
    f. Consistent reporting of all departments ☐
    g. Other specify……

11. The mitigation measures in place are very effective in reducing the impact of biological disasters.
    a. Disagree ☐
    b. Strongly disagree ☐
    c. Agree ☐
    d. Strongly agree ☐

12. Is there effective community participation in lessening biological disasters?
    a. Yes ☐
    b. No ☐

13. If no, why (you can tick more than one)
    a. The community is ignorant ☐
    b. They are not given the opportunity to participate ☐
    c. It is due to their culture and religious values ☐
    d. Other specify……

14. How is the community responding to those mitigation strategies that requires behaviour change?
    a. They are not accepting them ☐
    b. Some are accepting but others are not changing their behaviour ☐
    Other specify……

15. Is there effective coordination between the members of the District Risk Reduction Committee towards lessening the impact of biological disasters in the district?
    a. Yes ☐
    b. No ☐

16. If no why? (you can tick more than one)
    a. Weak coordination measures ☐
    b. Lack of resources ☐
    c. It is because of ignorance ☐
    d. Other specify……

17. What are the challenges that are being faced in mitigating biological disasters? (You can tick more than one).
    a. Lack of resources. ☐
    b. Little community participation in decision making. ☐
    c. Weak coordination on activities of the Disaster Risk Reduction Committee. ☐
    d. Behaviour change resistance by community members ☐
    e. Other specify……

18. In your view what are the solutions to the challenges that are being faced in mitigating biological disasters?
    ……
    ……
    ……
    ……
    ……
    ……....

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APPENDIX II

QUESTIONS FOR COMMUNITY FOCUS GROUP DISCUSSIONS

My name is Linaster Nyengeterai, studying towards Bsc (Honors) Degree in Local Governance Studies at Midlands State University. I am carrying out a research on "**Biological disasters mitigation strategies in rural communities. The case of Chimanimani District."** You have been identified as one of the relevant participants and your input in this discussion will be sincerely appreciated. Your contribution will help in the completion of the study. The information you provide will only be used for academic purposes. Participation in this research is voluntary and your **confidentiality** is guaranteed.

1. What are biological disasters?
2. What do you understand by disaster mitigation?
3. What are the main causes of biological disasters in the district?
4. As the community are you actively taking part in lessening the occurrence biological disasters in the district?
5. As the members of the community what are the measures you have put in place to lessen the incidents of biological hazards?
6. To what extent are those mitigation measures able to reduce biological disasters in the district?
7. What are the challenges that are being faced in mitigating biological disasters?
8. What in your view are the solutions to the challenges that are being faced in mitigating biological disasters?

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APPENDIX III

INTERVIEW QUESTIONS FOR THE CHIEF EXECUTIVE OFFICER AND THE HEAD OF DEPARTMENT FOR THE SOCIAL SERVICES DEPARTMENT AT CHIMANIMANI RURAL DISTRICT COUNCIL, THE DISTRICT ADMINISTRATOR AND THE ASSISTANT DISTRICT ADMINISTRATOR FROM MINISTRY OF LOCAL GOVERNMENT

My name is Linaster Nyengeterai, studying towards Bsc (Honors) Degree in Local Governance Studies at Midlands State University. I am carrying out a research on "**Biological disasters mitigation strategies in rural communities. The case of Chimanimani District."** You have been identified as one of the relevant participants and your input in this interview will be sincerely appreciated. Your contribution will help in the completion of the study. The information you provide will only be used for academic purposes. Participation in this research is voluntary and your **confidentiality** is guaranteed.

1. What are biological disasters?
2. What do you understand by disaster mitigation?
3. To what extent is the district vulnerable to biological disasters?
4. Which are the biological disasters that mostly occur in this district?
5. What are the main causes of biological disasters in the district?
6. What are the mitigation measures that are in place to lessen the biological disasters?
7. Is there effective community participation in lessening the occurrence of biological disasters?
8. How is the community responding to those mitigation strategies that requires behavior change?

9. What are the challenges that you are facing in trying to reduce biological hazards in the district?

10. What do you think should be done to overcome the challenges faced in reducing the occurrence of biological disasters?

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APPENDIX IV

INTERVIEW QUESTIONS FOR DISTRICT MEDICAL OFFICER AND THE ENVIRONMENTAL HEALTH TECHNICIAN FROM THE MINISTRY OF HEALTH AND CHILD CARE.

My name is Linaster Nyengeterai, studying towards Bsc (Honors) Degree in Local Governance Studies at Midlands State University. I am carrying out a research on "**Biological disaster mitigation strategies in rural communities. The case of Chimanimani District."** You have been identified as one of the relevant participants and your input in this interview will be sincerely appreciated. Your contribution will help in the completion of the study. The information you provide will be used for academic purposes only. Participation in this research is voluntary and your **confidentiality** is guaranteed.

1. What are biological disasters?
2. What do you understand by disasters mitigation?
3. To what extent is the district vulnerable to biological disasters?
4. Which are the biological disasters mostly occur in this district?
5. As Ministry of Health and Child Care what is your role in mitigation of biological disasters in the district?
6. What are the main causes of biological disasters in Chimanimani district?
7. What are the mitigation measures that are in place to lessen the biological disasters?
8. According to your statistics how often did these disasters occur?
9. Is there effective community participation in lessening the occurrence of biological disasters?
10. How is the community responding to those mitigation strategies that requires behavior change?

11. What are the challenges that you are facing in trying to reduce biological hazards in the district?
12. What do you think should be done to overcome the challenges faced in reducing the occurrence of biological disasters?