AN IMPACT OF FLOODS ON THE SOCIO-ECONOMIC LIVELIHOODS OF PEOPLE: A CASE STUDY OF SIKAUNZWE COMMUNITY IN KAZUNGULA DISTRICT OF ZAMBIA

MINI DISSERTATION SUBMITTED IN PARTIAL FULLFILMENT OF THE REQUIREMENTS FOR THE MASTERS DEGREE IN DISASTER RISK MANAGEMENT

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Abstract

This study examined the impact of floods on the socio-economic status of livelihoods for the people of Sikaunzwe Community in Kazungula District of Zambia.

The study employed both quantitative and qualitative approaches. The study had discussions with key Stakeholders at district and Community levels as well as randomly sampled households. Quantitative Household Questionnaires and Qualitative Key Informant Interviews were used to collect the data.

The study established that floods impacted on people's socio-economic livelihoods and critical aspects such as agriculture, health, education, housing, water and sanitation and property and assets.

The following are the key recommendations:-

- Government and key Stakeholders should engage communities in order for them to move permanently to higher grounds as they have expressed willingness to relocate. The relocating should go with the provision of all the necessary social amenities such as schools, hospitals, infrastructure, water and agriculture support for a period of three (3) years to enable the households settle. Consideration should also be made to introduce alternative livelihood strategies in the new area of settlement.

- There should be a deliberate policy to compel communities especially in rural areas to build houses using durable materials and away from the flood prone areas.

- Communities should be encouraged to increase area cultivated on the upland in order to enhance food security and household level.

- The relevant authorities should delineate both the non-flood areas and flood areas. The non-flood areas can serve as a temporary shelter for the settlements during floods.

- Construction of dams should be considered to trap the excess water. This could be used for irrigation.

- Construction of canals into the main Zambezi river should be considered.

- Government and key Stakeholders should engage the communities and local authorities in making them aware of the flood risk in view of climate variability.
- Community initiated mitigation measures should be promoted so as to build community resilience and in the long term, community based floods early warning system should be developed. Multi-sectoral approach to flood mitigation as opposed to single sector should be promoted as there are inter-linkages in terms of flood impact on various aspect of society.

Declaration

I declare that this mini dissertation hereby submitted for the **MASTERS DEGREE** in **Disaster Risk Management at the Faculty of Natural and Agriculture Sciences ,University of the Free State** is my own independent work and that I have not previously submitted this work for a qualification at another university .

STUDENT'S NAME:……..

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CHAPTER ONE

BACKGROUND TO THE STUDY

1.1. Introduction

The study explores the impact of floods on the socio-economic livelihoods of people in Sikaunzwe community in Kazungula District.

The aim of this study is to provide a thorough understanding of the impact of floods on the socio-economic livelihoods and underlying causes of the community's vulnerability. The contribution of the research should compel other stakeholders to undertake further research in issues that may arise in this study and need further inquiry.

The frequency of natural disasters has been increasing over the years, resulting in loss of life, damage to property and destruction of the environment. The number of people at risk has been growing each year and the majority are in developing countries with high poverty levels making them more vulnerable to disasters (Living with Risk 2006:6).

Grunfest (1995) argues that due to high poverty levels, people have become more vulnerable because they live in hazardous areas including flood plains and steep hills. They have fewer resources which makes them more susceptible to disasters .They are less likely to receive timely warnings. Furthermore, even if warnings were issued, they have fewer options for reducing losses in a timely manner. The poverty level affects the resilience and process of recovery from disasters. Disaster mitigation, preparedness and prevention needs to address socio-economic issues not only geological and meteorological aspects.

According to Carter (1991:1), floods have the following characteristics:

- Long, short and no warning, depending on the type of floods (for example, flooding within parts of a major river may develop over a number of days or even weeks, whereas flash floods give no warning);
- Speed or onset may be gradual or sudden; and
- There may be seasonal patterns of flooding.

Major effects arise mainly from inundation and erosion and may include the isolation of communities or areas and involve the need for large scale evacuation.

The Third World Water Forum: Poverty and Floods held in March,2003 indicated that in recent years ,floods had become more frequent and of increasing severity resulting into loss of life, injury, homelessness, damage to infrastructure and environment as well as impacting on other critical sectors such as education and agriculture .

Zambia has not been spared by floods which have had adverse impacts. According to assessments undertaken by the Zambia Vulnerability Assessment Committee, heavy rains experienced in recent years have resulted into recurrent flash floods and water logging in valley and / or low lying areas respectively causing varying impacts on a number of sectors namely infrastructure , agriculture ,education ,health ,water and sanitation and habitation (Zambia In – Depth Assessment of Floods Report,2007).

1.2. Statement of the problem

The problem which this study addressed is the impact of floods on the socio-economic livelihoods of people in Sikaunzwe community in Kazungula District of Zambia. The study area is in a low-lying, severely flood prone area (wetlands). Most of the communities targeted in the area are located along the Ngwezi River which flows into the Zambezi River. The population along the river has grown over the years. More than 8,000 people live in this area. Almost three quarters of the land is used for crop production, mainly maize and vegetable gardening. Other crops grown include sorghum, millet, groundnuts, beans and sweet potatoes. Some livestock farming is also present and fishing is practiced. Owing to its geographical location, that is, along the river banks, the communities have a limited capacity to control the hydrological events ensuing from the river catchment (Zambia In –Depth Assessment of Floods Report, 2007).

The area has suffered floods for three (3) consecutive rainfall seasons namely; 2005/06, 2006/07 and 2007/08.The 2007/08 season has been described by the community as the worst in terms of the amount of rainfall received and level of impact. The floods caused displacement of people from their usual dwelling places resulting into varying impacts on infrastructure, crops, health,

education, environment as well as damage to property (Zambia In-Depth Assessment of Floods Report, 2008).

This case study therefore endeavored to answer the following questions:

- What is the impact of floods on the socio –economic livelihoods of people in Sikaunzwe community?
- Who are the most vulnerable groups to floods and what are their coping strategies?
- What are the sustainable developmental and policy options to deal with the problem of floods?

Overall, the study findings will contribute to efforts in enhancing Disaster Risk Management and Mitigation in flood prone areas.

1.3. Conceptual Framework

The Conceptual Framework identified to guide this study is Disaster Risk Reduction. Disaster Risk Reduction is the systematic development and application of policies, strategies and practices to minimize vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards within the broad context of sustainable development. As indicated in the introduction, natural disasters and floods in particular have become frequent and are likely to occur in future due to climate variability. It may therefore, not be feasible to remove the flood risk .What is important therefore is to fully understand the flood risk and the associated effects within the framework of Disaster Risk Reduction .This can be done by developing the flood hazard and risk profiles which can be used to design appropriate measures to manage and mitigate the floods and build people's adaptation capacity and resilience(Report on the Regional Stakeholders' Consultative Workshop on Disaster Risk Management,2004).

Studies undertaken in the recent past in the country have shown that the frequency and intensity of disasters have tremendously increased over the last few years, rendering the already impoverished populations more vulnerable (Concept Note on the Comprehensive Vulnerability Assessment and Analysis Survey for Zambia, 2006).

Despite the increase in the frequency and magnitude, no comprehensive impact assessment study on the socio-economic livelihoods of people has been undertaken. Hence the response to the impact of hazards such as floods has been reactive. There is, therefore, need to establish a proactive as opposed to reactive risk and vulnerability framework for Disaster Reduction and Mitigation in the country. This is also in line with the Hyogo Declaration (ISDR, 2005).

1.4. Overall Objective of the Study

The overall objective of the study was to assess the impact of floods on the socio-economic status of livelihoods of people in Sikaunzwe community in Kazungula District of Zambia.

1.4.1. Specific Objectives

The specific objectives of the study were as follows:

i. To identify the impact which floods have had on the socio-economic livelihoods of the people in Sikaunzwe community;
ii. To establish and analyze the underlying causes of vulnerability of the people in Sikaunzwe community;
iii. To establish vulnerable groups that are most affected by floods including gender considerations;
iv. To identify coping mechanisms employed by the community during floods and strengthen positive coping strategies; and
v. To establish cultural impact on traditional patterns of life and work, family structures and authority, religious and tribal factors, archeological factors and social networks.

1.5. Significance of the Study

The study is important because it assesses and estimates the effects of the floods on the community's socio-economic livelihoods. The study also endeavours to establish the underlying causes of vulnerability of people in Sikaunzwe community. More importantly, it is envisaged that the outputs of the study will be key inputs in the designing of sustainable mitigation measures to minimize the impact of floods and the associated risks.

1.6. Scope of the Study

The study was undertaken in Sikaunzwe Community in Kazungula District of Zambia. Zambia is a landlocked country in Southern Africa with an area of 752,614 square kilometers. The county has nine [9] provinces. The projected 2008 population of the country was approximately 12.5 million people. According to the United Nation (2007) Zambia Human Development Report, Zambia was ranked as one of the world's poorest countries (ranked 165 out of the 177 countries surveyed). The 2002/03 Living conditions monitoring survey (LCMS) indicated that most households in Zambia earned low incomes. About 92 percent of rural households and 68 percent of urban households earned 150 USD or less per month. The survey also indicated that the incidence of poverty was higher in rural areas at 74 percent than in urban areas at 52 percent. The extremely and moderately poor households constituted 46 percent and 21 percent of the population, respectively. UNDP (2005) estimates life expectancy at birth to be at 37.5 years.

Zambia suffered erratic rainfall patterns particularly drought which caused widespread crop failures in the 1998/9, 2002/3 and 2003/4 agricultural seasons. Floods are also a cause of crop failure, although less frequently than drought. In the recent past agricultural seasons (2005/06, 2006/07 and 2007/08), floods have also become an important cause of crop failure and impacted on critical sectors of the economy (Concept Note on the Comprehensive Vulnerability Assessment and Analysis, 2006).

Kazungula, the study area is located in Southern Province in the southern part of Zambia, covering an area of 85,283 square kilometers, which is about 11.8 percent of Zambia's land. Southern Province is one of the nine provinces. Kazungula district has a total population of 85,612 people. Sikaunzwe community, which is the focus of the study, has a population of 8,137 people (9% of the district population).

Sikaunzwe community was selected for the study because the floods have become a recurrent phenomenon there for three (3) consecutive rainfall seasons, that is, 2005/2006, 2006/2007 and 2007/2008 (Zambia In-Depth Assessment of Floods Report, 2008). The problem studied therefore was of societal concern because floods have negatively impacted on the community.

The government has had to divert resources from critical developmental programmes in order to mitigate the negative effects of the floods ***(See appendix 3 showing the study area).***

Despite the increase in frequency and magnitude of floods, no impact assessment study on the socio-economic livelihoods of the people has been undertaken to establish the underlying causes of their vulnerability. In the absence of comprehensive data and information, the measures to cope with floods have remained ad-hoc. All the assessments undertaken have been carried out as a short -term response to the impact of floods.

The study, therefore, will attempt to come up with recommendations and mitigation measures that will assist in dealing with the impacts of floods in the long term and sustainable manner, given the problem outlined in 1.1 above.

1.7. Outline of the Study

The study has five (5) chapters as outlined below:

1.7.1 Chapter 1: Background to the Study

This chapter gives the background and introduction to the research study.

It gives an insight on how the research was done, the conceptual framework, overall and specific objectives. The chapter further provides the significance and scope of the study.

1.7.2. Chapter 2: Review of Literature

This chapter allows for the review of past research work adding more knowledge to the research study. It further points out weaknesses and critically analyses published body of knowledge by way of justification and comparison to prior research studies. It thus comprises review of empirical data.

1.7.3. Chapter 3: Research Design and Methodology

This chapter provides an introduction, the study design, sample selection and size, study methodology (instruments used), and how the data analysis was done. It further presents the credibility, transferability and dependability of the study.

1.7.4. Chapter 4: Presentation and Discussion of the Results

This chapter provides an introduction to the discussion of the results, and rainfall performance for 2006/07 and 2007/08 rainfall seasons. Furthermore, the chapter presents a discussion on the results, coping strategies, development options to deal with the floods, vulnerable groups to floods, interpretation, limitations and implications of the study. Lastly, the chapter recommends further research if necessary.

1.7.5. Chapter 5: Conclusion and Recommendations

This chapter provides an introduction to the conclusion and recommendations of the research study.

CHAPTER TWO

REVIEW OF LITERATURE

The various rolling Vulnerability Assessments conducted in Zambia indicate that the last two (2) decades have seen an increase in the frequency and occurrence of climate-induced hazards such as floods and drought in the country. It is worthnoting that studies undertaken in the past have not looked at the impact on the socio-economic livelihoods in depth and the response therefore has remained *adhoc*, focusing on short-term measures (Concept Note on the Vulnerability Assessment and Analysis Survey for Zambia, 2006).

According to Nott (2006:51), the causes of floods can be broadly divided into physical, such as climatological forces, and human influences such as vegetation clearing and urban development. The most common causes of floods are climate related, most notably rainfall. Prolonged rainfall events are the most common cause of flooding worldwide. These events are usually associated with several days, weeks or months of continuous rainfall. Human impacts on river catchments influence flood behavior. Land use changes in particular have a direct impact on the magnitude and behavior of floods. Deforestation results in increased run-off and often a decrease in channel capacity due to increased sedimentation rates.

Nott (2006:54) correctly points out that a flood event is not considered to be a natural hazard unless there is a threat to human life and/or property. The most vulnerable landscapes for floods are low-lying parts of flood plans, low-lying coasts and deltas, small basins subject to flash floods. Rivers offer human populations transport links, a water source, recreational amenities, fertile plains and are an attractive place for settlements. Floods then become a major natural hazard because of the high human population densities that inhabit these lands.

He indicated that the direct impacts of a flood are closely related to the depth of inundation of floods water. The extent of a flood has a direct relationship for the recovery times of crops, pastures and the social and economical dislocation impact to populations.

Floods are the most costly and wide reaching of all natural hazards. They are responsible for up to 50,000 deaths and adversely affect some 75 million people on average worldwide every year. Disease outbreak is common especially in less developed countries. Malaria and Typhoid

outbreaks after floods in tropical countries are also common. It has been estimated that in India and Bangladesh 300 million people live in areas that are affected by floods (Nott 2006:57).

Nott (2006:60) further stated that physical damage to property is one of the major causes for tangible loss in floods. This includes the cost of damage to goods and possessions, loss of income or services in the floods aftermath and clean-up costs. Some impacts of floods are intangible and are hard to place a monetary figure on. Intangible losses also include increased levels of physical, emotional and psychological health problems suffered by flood-affected people.

Know Risk (2005:74) observed that studies undertaken show that the economic impact of natural disasters shows a marked upward trend over the last several decades. The hazards tend to hit communities in developing countries especially the least developed countries, increasing their vulnerability and setting back their economic and social growth, sometimes by decades. The floods have led to loss of human life, destruction of social and economic infrastructure and degradation of already fragile ecosystems. The study indicates that social impacts include changes in people's way of life, their culture, community, political systems, environment, health and wellbeing, their personal and property rights and their fears and aspirations.

The study undertaken in Scotland suggests that social impacts are linked to the level of well being of individuals, communities and society. It includes aspects related to the level of literacy and education, the existence of peace and security, access to basic human rights, systems of good governance, social equity, positive traditional values, knowledge structure, customs and ideological beliefs and overall collective organizational systems. Some groups are more vulnerable than others mainly those less privileged in society (Living with Risk 2002: 47).

Different population segments can be exposed to greater relative risks because of their socio-economic conditions of vulnerability. Because of this, disaster reduction has become increasingly associated with practices that define efforts to achieve sustainable development. The links between disaster and the economic system, another pillar for sustainable development are essential for disaster reduction. Risk Management planning should, therefore, involve an

estimation of the impacts of disasters on the economy, based on the best available hazard maps and macroeconomic data. (Living With Risk 2002: 13) However, hazard maps for Zambia are non-existent making response to floods *adhoc.*

A study by the International Flood Initiative (2003) suggest that floods are the most taxing of water related natural disasters to humans, material assets as well as to cultural and ecological resources affecting people and their livelihoods and claiming thousands of lives annually worldwide.

According to the Australian experience, the emotional behavior of many flood victims was shocking. The emotional cost of flooding was long lived. Follow-up studies found that about one-quarter still had not recovered from the emotional trauma of the event. Factors that contributed to the non-recovery included the severity of the flooding, the degree of the resulting financial hardship, age and socio-economic status. Elderly people on low incomes whose houses were deeply flooded were the most ill- affected (Flood Management in Australia, 1998:81).

Thus, a severe flood can impose a range of emotional costs on flood victims, many of them quite severe. Moreover the emotional strain may linger for years after the event. Flood aware communities can be expected to suffer less social and financial disruption than communities with a low level of flood awareness (Flood Management in Australia, 1998:82).

Lindsell and Prater (2003) argue that social impacts can cause significant problems for the long term functioning of specific types of households and businesses in an affected community. A better understanding of disasters' socio-economic impacts, therefore, can provide a basis for prediction and the development of contingency plans to prevent adverse consequences from occurring.

Ariyabandu and Wickramasinghe (2005:22) observed that some groups are more vulnerable to floods than others are. Vulnerability is not just poverty, but the poor tend to be the most vulnerable due to their lack of choices. The influences of both poverty and development process on people's vulnerability to disaster are now well established. Class, ethnicity, gender, disability and age are some of the factors affecting people's vulnerability.

They further noted that because vulnerability plays such an important part in why natural hazards become human disasters, it is worth spending time to examine the characteristics of vulnerability. Conditions of vulnerability are a combination of factors that include poor living conditions, lack of power, exposure to risk and the lack of capacity to cope with shocks and adverse situations.

As noted earlier, poverty does not equal vulnerability but being poor makes people more vulnerable to disasters because poor people lack the resources (physical, social and knowledge based) to prepare for and respond to such threats and shocks as natural hazards. Poor people often get locked in a cycle of vulnerability. Because they are poor, they become vulnerable. Because they are vulnerable, they are at great risk in the face of a natural hazard, leading to disaster. Close analysis of disaster impact shows that the vulnerability of men and women to disaster, their capacities, and the options available to them differ in character and scale to their gender(Ariyabandu and Wickramasinghe 2005:25).

Ariyabandu and Wickramasighe (2005:26) suggest that although women are often more vulnerable to disasters than men (owing to conventional gender responsibilities and relations) they are not just helpless victims as often represented. Women have valuable knowledge and experience in coping with disasters. Yet these strengths and capabilities of women are often ignored in policy decisions and in mitigation, thereby, allowing these valuable resources to go to waste and sometimes creating dependency situations. Thus ignorance of gender differences has led to insensitive and ineffective relief operations that largely bypass women's needs and their potential to assist in mitigation and relief work.

The impact of disasters is usually measured in quantifiable ways, such as adding up the number of the dead and injured, and estimating the physical damage to housing, land, livestock, agriculture, stores and infrastructure. But attention is not necessarily paid to how disasters impact on different categories of people, men, women, children, aged people, etc. Disasters affect men and women differently because of the different roles they occupy and the different responsibilities given to them in life and because of the differences in their capacities, needs and vulnerabilities. Family size may change at household level due to disasters. For example in

Chitwan district, Nepal during the floods, the extended family system collapsed, leaving the women and elderly without support (Ariyabandu and Wickramasighe 2005).

The floods that occurred in Sarlahi district in Nepal left a lot of houses damaged washed away and uninhabitable. The type of construction influenced the extent of flood damaged (thatched homes) (Kimbrough, *et al* .2007:57).

Sinclair and Pegram (2003:1) stated that floods cannot be prevented but their devastating effects can be minimized if advance warning of the event is available. With large increase in population and increasing urbanization (mainly driven by poverty) there are more people living in informal settlements, which are often on flood plains as this is the only undeveloped land available near cities. The people living in these settlements are those who are most at risk, not only due to their geographical location in the flood plain but also because they do not have the financial resources to recover from the damage caused by flooding. Early warning information can, therefore, allow the disaster managers to take steps which may significantly reduce loss of life and damage to property.

According to Smith and Ward (1998:5), there is more evidence that the flood problem is getting worse in terms of the damage caused by flooding. Despite massive expenditure on flood defense, flood damage losses continue to rise in many countries. Although most floods are more or less natural phenomena (albeit intensified by human action such as land use change), the flood hazard is largely of human origin. Most floods results from moderate to large events, occurring within the expected range of stream flow. Floods constitute a "hazard" only where human encroachment into flood prone areas has occurred.

African Wildlife: *Who is to blame for floods?* (2000:24) also point out that the cumulative impact of human activities without regard for nature has turned the recent floods from a natural phenomenon into a man-made disaster of epic proportions.

When severe floods occur in areas occupied by humans, they can create natural disasters which involve the loss of human life and property plus serious disruption to the on-going activities of

large urban and rural communities. Flood losses are therefore essentially human interpretations of the negative economic and social consequences of natural events. The impact of the flood hazard will, in part be determined by the magnitude of the events and the duration of the event. But the true significance of the flood disaster will depend primarily on the vulnerability for the local community. The relationship between physical exposure and human vulnerability is highly dynamic and can change through time (Smith and Ward 1998).

Smith and Ward (1998) argued that direct losses to floods occur immediately after the event as a result of the physical contract of the flood waters with humans and with damageable property. However, indirect losses which are less easily connected to the flood disaster and often operate on-long time scales, may be equally, or even more important. Depending on whether or not losses are capable of assessment in monetary values, they are termed tangible and intangible. Some of the most important direct consequences of flooding such as loss of human life or the consequent ill health of the survivors are intangible. Indirect and intangible consequences of flooding are probably greatest in Least Developed Countries (LDCs), especially where frequent and devastating floods create special impacts for the survivors.

They further argued that despite the negative effects of floods, flood plains act as important corridors for road and rail communications. Floodwaters themselves can bring advantages, particularly with respect to common property resources. Maintenance of high biological diversity in the flood plain ecology is another benefit of floods. Regular annual floods provide abundant water resources to replenish lakes and ponds which, in turn, support irrigation or fish farming. Many rivers carry minerals and nutrients which support the more intensive agricultural production on flood plains.

Primarily losses can be high in rural areas where most of the damage is sustained by crops, livestock and the agriculture infrastructure, such as irrigation system, levees, walls and fences. In other words primary losses relate mainly to the disruption of economic and social activities, especially in urban areas, immediately after a flood (Smith and Ward 1998).

Flood risk posses a significant threat to many communities and, whereas measures can be taken to reduce the likelihood and important of flooding, the risk can never be eliminated altogether (Crossman, *et al*. 2006:41). They point out that in the UK; flood risk represents a significant threat to many communities. Around 1.8 million households and 140,000 commercial properties in England and Wales are located in floodplain areas, affecting at least 4-5 million people. They further point out that a range of flood risk management activities are undertaken by operating authorities. These include emergency planning, awareness raising, provision of flood warning and creation of flood storage areas as well as the construction and maintenance of both conventional and innovative flood defenses. Crossman, *et al* (2006) suggests that in the face of such increases in risk, the provision of reliable information and public awareness is essential. There is a clear need for a continental and deepening partnership between the public and private sectors in managing flood risk and the potential to extend to it to other areas.

According to Lind, *et al*. (2008:143), the loss in case of flooding has many dimensions. In addition to economic loss and loss of life and injury, there may be irreversible loss of land, of historical for cultural valuables and loss of nature or ecological valuables

Kundzewicz, *et al.* (2002:263) argues that floods are natural phenomenon for which the risks of occurrence are likely to continue to grow; increasing levels of exposure and insufficient capacity are among the factors responsible for the rising vulnerability. Water related events such as floods have been a major concern since the dawn of human civilization. They continue to hit every generation of human beings, bringing suffering and death as well as immense and still growing, material losses.

They observed that although the 21st century is predicted to be an age of water scarcity, the flood losses worldwide continue to rise to tens of billions of US dollars in material damage and thousands of fatalities per year. For thousands of years, people have settled in flood plains attracted by the fertile soils, the flat terrain appropriate for settlements, and they have access to safe water. They further observed that floods are natural phenomenon that has always existed and people have tried to use them for their advantage to the extent possible. However, increased population density, urbanization and agricultural expansion in flood prone areas have steadily

increased society's vulnerability to the negative effects of floods. As a consequence, floods have become more and more disastrous to human settlements.

Economic development of flood prone areas is a factor that increases flood risk. Population pressure and shortages of land cause encroachment into flood plains. Mushrooming informal settlements often form enlargement zones around mega cities in developed countries (Kundzewicz, *et al*.2002:273).

Bankoff (2003:224) states that in Philippines, flooding is not a recent hazard but one that has occurred through out the recorded history. On the one hand, it is related to a wider global ecological crisis to do with climate change and rising sea levels but on the other hand, it is also the effect of more-localized human activities. A whole range of socio-economic factors such as land use practices, living standards and policy responses are increasingly influencing the frequency of natural hazards such as floods and the corresponding occurrence of disasters. In particular, the reason why flooding has come to pose such a pervasive risk to the residents of Metropolitan Manila has its basis in a complex risk of inter-relating factors that emphasize how the nature of vulnerability is constructed through the lack of mutuality between environment and human activity over time. Statistical trends suggest that floods have become more numerous and more devastating in recent years. Certainly the frequency of events and the number of people affected have increased steadily as human related activities such as deforestation, overgrazing and urbanization aggravate environmental conditions, making communities more vulnerable (Bankoff 2003:226).

Holmes wrote in Sunday Post (26 October, 2008:11) that the number of those displaced by natural disasters is rising, as the adverse effects of climate change continue to mount. Nine of every ten recorded disasters are now climate related. As many as 50 million people around the world are estimated to be displaced each year by floods, hurricane, tsunamis, earthquakes and landslide. However sudden the initial displacement, the impact can last for generations, together with a long-term need for clean water, shelter, health care, and other basic services, as victims of hurricane Mitch in Central America in 1998 know from bitter experience, nor are rich countries

immune. Two years after Hurricane Katrina, thousands of people remained in temporary shelters.

Hanson, *et al*. (2007:405) states that reducing poverty is one of the great challenges facing the world. Over half of the world's poor live in rural areas. Poverty worsens when natural hazards destroy vital rural infrastructure. Asia is struck by 70% of all floods in the world and the average annual cost of floods over the past decade is approximately 15 Billion USD. Economic losses and impacts have remained high and constitute a large developmental burden. They suggest that there is a need for new types of strategies in order to cope with the financial burden from hazardous events. One of the largest deltas in Vietnam is seriously threatened by floods. Lives and property are threatened by annual flood events which impose a substantial burden on the community. The area has experienced increased flooding due to its dense ad increasing population and its location in a low land.

Borrows and De Bruin (2006:1) indicated that among natural catastrophes, flooding has claimed more lives than any other single natural hazard. In the decade 1986 to 1995, flooding accounted for 31% of the global economic loss from natural catastrophes and 55% of the casualties. The damaging effects of flooding are likely to become more frequent, more prevalent and more serious in the future.

Douben (2006:1) states that since ancient times people have settled in flood prone areas due to favorable geographic conditions which facilitate economic growth, such as accessibility (transportation) and food production (fertile land). This fact forces societies all over the world to protect vulnerable assets against flooding. Nevertheless, flooding is still the most damaging of all natural disasters and more than half of all victims are flood related. Flood mitigation policies and measures should therefore be implemented in order to enable societies to increase their resilience to flood hazards.

Mirza, *et al.* (2003:7) states that flood disaster has different impact on individuals, households and communities. People cope in different ways. Those who have the capacity after being hit by a disaster emerge faster while those without such capacity sink deeper into the spiral of impoverishment. Coping strategies include actions such as migration from floods affected areas, flood forecasting, flood insurance of animals and crops, food stockpiling, providing emergency health services and building flood shelters. They have, however, not been woven systematically into the approach to achieve security from flooding.

If the approaches build on coping strategies and seek to identify new ones, they could address the social impacts of flood problems affectively at a lower social, economic and environmental cost than approaches that attempt to manage or control the resource base itself (Mirza, *et al*. 2003:7).

Zahiran, *et al*. (2008:537) observed that floods are the most lethal kind of hydro-meteorological disasters in the United Sates. According to data from the Spatial Hazard Events and Losses Database for the United States (SHELDUS), floods claimed the lives of 2,353 people from 1970-2000. Over this period, fewer people were killed by hurricanes, tropical storms and tornados combined. In support of this observation, the Federal Emergency Management Agency (FEMA) estimates that flood events are responsible for the death of more than 10,000 people in the US since 1900. The study undertaken in Texas established that socially vulnerable populations suffer disproportionately in terms of property damage, injury, and death as a result of physical impacts of disaster. For reasons of economic disadvantage, low human capital, limited access to social and political resources, residential choices, and evacuation dynamics are the social factors that contribute to observed differences in disaster vulnerability and economic class.

Brouwer, *et al*. (2007:313) states that Bangladesh is a highly flood prone country. Eighty (80) percent of the country consists of floodplains and several other minor rivers. These floodplains sustain a predominantly poor rural population. Once every ten (10) years roughly one-third of the country gets severely affected by floods while in catastrophic years such as 1988, 1998 and

2004, more than 60% of the country was inundated. Floods caused social disruptions and resulted in scarcity of drinking water as surface water got contaminated.

Cases of diarrhea, cholera and other diseases increased remarkably during and after floods. The increased volume of rainfall caused by climate change during the past decades has intensified the flood problem. The hardest hits by flood disasters are the poor people who also have very little capacity to cope with the loss of property and income (Brouwer, et al.2007:314).

A study carried out in 2005 in Southeast Bangladesh confirms the positive relationship between environmental risk, poverty and vulnerability. Poorer segments of society live closer to the river and therefore face a higher risk of flooding and are thus more vulnerable. Environmental risk exposure also goes hand in hand with income inequality and access to natural resources (Brouwer, *et a*l.2007:324). Families living nearer to the river seem to have fewer opportunities to engage in multiple economic activities which make them more vulnerable to natural disasters and may keep them trapped in a poverty cycle (Brouwer, *et al*.2007:325).

Dixit (2003:156) stated that in Southern Nepal, flooding leads to large scale disruption of social and economic lives. The rivers bring large sediments whose deposition on agricultural lands harms productivity. The poor mostly live in these floodplains (vulnerable zones) because they have no opportunity to live in less hazardous areas. In Nepal, every year floods cause death, cultivated fields and irrigation, bridges and after rural infrastructure. He argues that policy makers, donors and relief and development agencies treat flood disaster as isolated events that break the continuity of the normal way of life. Most interventions to mitigate disasters are *adhoc* responses made under the assumption that an emergency support in the form of relief will help overcome the situation of hardship. Such support aims at restoring the situation to what it was before the disaster. Even when a flood disaster affects the same community every year, government, donors and Non-governmental organizations respond by providing the same relief and rehabilitation measures each time. This approach does not consider the situation of a society during normal times between the occurrences of two hazard events. Disasters are considered as a coincidence when a hazard interferes with society. According to Dixit (2003:166), research shows that disasters are the outcome not only of natural hazards but also of socio-economic structures and political process that make individuals and families vulnerable.

Dixit (2003:167) further points out that vulnerability is the condition of a person or group in terms of their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard. Even in normal times people live in vulnerable conditions. Vulnerable conditions and families find it hardest to reconstruct their livelihood following a disaster. Families do not live in conditions that are vulnerable to disasters out of ignorance about the hazards or their erroneous perceptions of risk. Instead, most have little freedom to choose how and where they live. Vulnerability therefore is not static but a dynamic process that depends upon the social, economic and political contexts that change overtime, which will consequently affect the probability of loss. On the other hand, he suggests that strengthening social resilience capacity would reduce vulnerability. These social, political and economic conditions and their interrelationships during normal "times" determine why certain sections of the societies are more vulnerable to disasters than others.

Smith (1996:225) noted that natural, human and technological disasters directly or indirectly, affect a significant portion of the population. Despite their tragic consequences, disasters provide a unique opportunity to study the role that coping can play in stressful events and circumstances. During the summer of 1993, upper Mississippi Valley in the United States was flooded. The flood afforded an opportunity to study some important questions about the role that coping can play in disasters. First does coping make a difference in terms of outcomes? With the effect of disasters being so devastating and overwhelming, do human coping efforts have an impact on how people ultimately fare in their aftermath? Second, if coping does make a difference, what are the effects of different coping strategies? Third, how is coping related to some of the other factors that may influence disaster outcome? What variables are important to control for when examining the role of coping in disasters? Fourth, how does the influence of coping vary across different kinds of outcomes? For example, does coping affect psychological and physical health in the same way? Each of those questions has evolved out of previous research undertaken.

Despite the overwhelming nature of disasters, there is growing evidence to suggest that coping may significantly affect the outcome for those involved (Smith 2008:226).

Rashid (2000:240) described the 1998 floods that hit Bangladesh as the worst in the last country. Almost two-thirds of the country was submerged under water and millions were affected. A total of 33 million people were marooned of whom 18 million needed emergency food and health services in 52 districts. The floods continued for more that 65 days. They destroyed basic infrastructure like roads and bridges as well as houses, crops, animals and cattle. The most damaging aspect of the flood was the destruction of people's means of livelihood. The response to the floods included distribution of food, medicine and clothing for the poor.

In the severely affected areas, boats became the principal means of communication and many slum dwellers coped by living in shelters and relief camps while others made arrangements in their own homes to deal with the rising flood waters. They refused to move, as they did not want to leave their household belongings behind. The 1998 floods clearly illustrated the people's despair and utter helplessness, with no homes, all the property destroyed and no money to buy food. Their lives were completely crushed by the onslaught of the floods. (Rashid 2000:244).

According to Rashid (2000:245), women and children are the most vulnerable during the disasters. During the 1998 floods, the women shared stories about the difficulties they faced in gaining access to basic sanitation as most of the latrines were submerged by the floodwaters. They resorted to a number of desperate measures to cope with the predicament. Some of the women admitted walking long distances with female relatives or planned trips together by boat to other less flooded areas to use the latrines.

During these particular floods almost all of the wells were covered by the flood waters. A number of women managed to cope by purchasing water from individuals who owned deep wells. Children were mainly affected with diarrhea as many of them swam in the dirty flood waters to fetch relief items, and some of them played in the dirty water out of boredom, even drinking and bathing in it. Some of affected people developed skin and fungal infection on their

legs and feet due to dirty flood waters. Further, widespread incidences of diarrhea, fewer, coughs, cold, other skin infections and even cases of jaundice were reported. (Rashid 2000:247).

According to Mustafa (2002:94), despite Pakistan's massive investment in its water sector, it still remains vulnerable to the flood hazard. Pakistan suffered major floods in 1950, 1956, 1973, 1976, 1988 and 1992, each affecting more than 10 thousand lives. The 1992 floods cost the country more than 3 percent of its total GDP.

According to the study undertaken in four villages in Central Pakistan, the people attributed their vulnerability to floods to poverty, God's will, socio-economic powerlessness and Government (Mustafa 2002:100).

Ninno, *et al*. (2003:1221) stated that the 1998 floods in Bangladesh caused severe damage to the rice crop and threatened the food security of tens of millions of households. Government food transfers to the affected people helped limit the impact of the flood on household access to food.

The flood led to major crop losses, losses of other assets and lower employment opportunities and thus affected household income as well as market prices (Ninno, *et al* .2003:1224).

Carey (2005:122), argue that human populations worldwide are vulnerable to natural disasters. Certain conditions such as geographical location or people's income level can affect the degree to which natural disasters impact people's homes and livelihoods.

Gao, *et al.* (2007:27) states that although water shortages often grab the headlines, floods continue to be the most serious natural disaster in China. This is despite enormous efforts to construct structural engineering projects for flood control.

The catastrophic 1998 floods in the Yangtze and Songhuo river basins, for example, directly affected nearly one out of five Chinese. The severity of floods was clearly influenced by erosion in the watershed and the heedless reclamation of lakes. Although fewer lives were lost than in the past floods, the populations living along China's major rivers and lakes remained inordinately vulnerable to flooding events.

They indicate that historical records indicate that China has suffered from a recorded flood disaster on an average of about once every 2 years. The nationwide flood disaster in 1931, for example, led to the deaths of almost 400,000 people in eight provinces.

According to Mohapatra and Singh (2003:131), among all natural disasters, floods are the most frequent to be faced in India. On an average, floods have affected about 33 million persons between 1953 and 2000. This figure may have risen due to population growth.

From the global level outlined above, it is clear that floods have had adverse impact on people's lives and livelihoods.

The African continent has not been spared by the floods. According to UNEP (2006), the continent, home to approximately one (1) billion people is more vulnerable than any other continent to climate change. Almost two (2) billion people were affected by disasters in the last decade of the 20th centaury. Eighty-six percent (86%) of these were floods and droughts.

Heavy rains destroyed homes and crops, leaving whole communities vulnerable. Rising flood waters across Africa are intensifying health risks for millions of people. Major floods in early 2008 plunged Southern Africa into a growing humanitarian crisis killing dozens and displacing thousands.

Du Plessis (1988:11) stated that in South Africa, the farming sector had been particularly hit by the successive floods of 1983, 1984 and 1985. Various farming products had to be imported to supply the domestic market. Further, grazing capacity had been reduced that some stock had to be thinned until only the studs remained. The outcome had been that in certain areas, farmers obtained no income and inexorably built up debt. The shrinking income of farmers had meant that they had invested less in farming implements, reduced their sowing and purchased less fertilizer. This in turn had led to the over production of certain farming requisites and chemicals which had necessitated rationalization in those industries.

In 1986/87, floods hit again and had an adverse direct impact on both the farmer and the consumer and had also seriously damaged the infrastructure of riverside towns. Farmers suffered losses in stock and irrigation land while farming implements, plantations and sheds alongside rivers had been damaged as well as houses, bridges roads railways lines, telephone connections and dams. In many places the supply of drinking water had been affected and apart from the special measures that had to be taken in this regard, it was also necessary to introduce preventive health measures (Du Plessis 1988).

Nxumalo (1984:2)also stated that the South Africa did not only suffer from the effects of the world economic recession but also economic stagnation due to the effects of natural hazards such as floods since government had to divert funds to deal with the impact of floods.

Snoussi, *et al*. (2008:206) said that it has been recognized that climate change and sea level rise will impact seriously upon the natural environment and human society in the coastal zones. In Morocco, for example, the coastal zone forms one of the main socio-economic areas of the country with more than 60% of the population inhabiting the coastal cities as well as incorporating 90% of the industry, making them more susceptible to flooding.

Parker (2000:188) observed that in many African countries, floods create great natural threats to life, health and population. The exposure and vulnerability of human settlements and activities to floods is partly explained by the important role which flood plains play in African Societies and economics, and partly by the condition of societies and the resilience they are able to present in the face of disaster. In addition, there is an important feedback effect between environment degradation caused by African societies and increased vulnerability to flood hazards and tropical storms. Floodplains are important locations for settlements almost everywhere in the world and Africa is no exception. He clearly points out that while regional settlements may have avoided the flood prone areas, subsequent settlement growth has led to floodplain development. For example, in Egypt the rive Nile floodplain is the most densely populated region of the country and by comparison the remainder of Egypt is virtually uninhabited. In Mozambique at least twenty urban centers are at risk of flooding including major settlements along the Zambezi and six coastal locations.

Over the centuries, local communities have learned to utilize Africa's floodplains for their benefit, not least because of the proximity of water but also because of the annual fertilization of land by flood sediments, and these areas have become of central importance to many local economics and societies (Parker 2000).

Parker (2000) further argues that the damaging effects of flood on African societies are complex. Extreme events affect both the formal and informal economics, making it difficult to assess impacts which include direct and indirect ones. The most tangible form of damage caused by floods is structural damage to homes, shops and public buildings and their contents and loss of crops and livestock. Depending on how well they are constructed and the severity of the event, buildings may be partially or totally destroyed by flooding.

The number of reported homeless persons following floods is particularly high because of the vulnerability of dwelling to rain and flood. Floods frequently cause major infrastructure damage including damage of roads, railway lines, airports, electricity supply systems, water supply and sewage disposal systems. Bridges over rivers are particularly exposed to damage and disruption of transportation systems follows. The economic effects of flooding are often much greater than the flood itself (Parker 2000).

According to Parker (2000), because floods frequently destroy crops and livestock, food shortages are not uncommon in the aftermath. For example in the Sudanese floods of 1988, a food shortage arose immediately. Floods may affect food availability in a number of ways. Food stocks may be damaged if storage areas are flooded. Serious flooding usually disrupts transportation of food and insufficient food supplies are likely in food deficit areas, particularly in towns, which are cut off from supply sources and have inadequate food stocks.

The flood that hit Sudan in 1988 is a good example of an extreme flood event. The sudden and unexpected flow of water of the White and Blue Nile due to unprecedented torrential rain caused serious property damage and human sorrow. In Khartoum province alone food production fell by at least 60% and damage included irrigation canals, sewage system, electricity, roads and water

system. Severe losses were reported in agriculture, the main economic activity of the population (Disaster Risk Management Study Guide for DIM 605: Module 2).

According to OCHA (2008), the cumulative number of people affected by rains and floods in 2007 in Southern Africa was more than 194,103 persons. This included 60,995 in Malawi (mostly damage to property and crops), 94,760 people in Mozambique (all were evacuated into resettlement camps); more than 16,680 in Zambia (1,890 persons in temporary accommodation, the rest in host families); and 15,168 in Zimbabwe. An estimated additional 4,000 people had been affected in Lesotho and another 2,500 persons in Swaziland.

In 2008, thousands of people were affected after flash floods submerged hundreds of hectares of farmland in the north-eastern region after floods displaced hundreds of families in the region. The farmland which supported some 1,200 farmland had their livelihoods and food security disrupted (IRIN 2008).

Theron (2007) indicated that at least 20 countries in Africa were affected by floods. These countries included Algeria, Berlin, Burkina Faso, Cote d'Ivoire, Ethiopia, Gambia, Ghana, Guinea, Kenya, Liberia, Mali, Mauritania, Nigeria, Rwanda, Senegal, Sierra Leon, Sudan, Togo and Uganda. Reports estimated that approximately 300 people in 20 countries had died in floods during a period of two (2) months, noting that the inaccessibility of the affected areas had made it difficult to accurately access the death toll.

Floods had several socio-economic and political implications which caused a wide range of complex issues. Some of the immediate consequences included the displacement of people, the destruction of infrastructure such as houses and roads, damage to forms and crops and loss of cattle and livestock. The destruction of roads and other infrastructure delayed on-going development initiatives and political processes (Theron 2007).

He observed the immense damage to farms, crops and livestock caused long-term food insecurity. The Ivory Coast flooding occurred very close to harvest time making the loss even

greater, since farmers did not have much food stored from the previous harvesting season. Floods also caused loss of soil fertility which lessened future harvests. In the long-term, affected areas had to deal with the spread of infections and water borne diseases, cholera, dysentery and diarrhea which increased the need for safe drinking water and the provision of water purification tablets.

He further observed that the displacement of people and damage to infrastructure disrupts African societies in their development effects and impact on the achievement of almost every Millennium Development Goal, for example, damage to schools in Uganda left at least 100,000 children out of school.

A study conducted on poverty, Vulnerability and the Impact of flooding in the Limpopo Province in South Africa argue that while disasters may affect everyone and play an important role in increasing vulnerability, poor people are made more vulnerable from a web of circumstances that make them prone to the effects of disasters(Khandlhela and May 2006:276). In this study, they established that the varying impact of floods on households and the community and large showed that vulnerability to the effects of a flood disaster is indeed an outcome of the interaction between socio, economic and political process.

Adamson (1983:24) states that extreme events such as floods over Southern Africa have resulted in loss of life, massive damage to property, crops and livestock and disrupted communications. The risk of such events at any point in the sub-continent may be small but their occurrence within the total sub-continental space has been historically quite frequent.

The Laingsburg flood disaster of January, 1981 has been described as South Africa's greatest Natural Catastrophe. The flood waters washed away a considerable part of the town with loss of 100 lives. In addition to loss of lives extensive damage was largely on bridges and irrigation schemes. The heavy rains of January, 1974 had a disastrous effect on the agricultural economy of the central regions of South Africa.

From the literature reviewed, it's clear that the increasing population of our planet is leading to the increasing exposure of people and property to hazards of flooding. This assertion is in line with the findings of the research which has confirmed that the population of people living along the river banks in the study area has increased over the years and has made them susceptible to the flooding. With the increased population on our planet, it may be expected that the effects of climate change will further aggravate this. At present, there are not sufficient and effective measures globally to limit the growing chance and consequence of flooding. The evidence is that flood risk is increasing and continuing vigilance is needed to ensure that existing systems are maintained and improvements introduced. It is imperative that human society adopts a risk management approach if there is to be harmonious coexistence with floods. In practical terms, the chance of flooding can never be eliminated entirely. However, the consequences of flooding can be mitigated by appropriate behaviors and actions. Successful flood risk management is dependant upon the active support of all on whom the effects of flooding may impact, those directly at risk, the civil authorities and the wider community and its leaders.

The literature suggests that socially vulnerable or disadvantaged households have lower levels of disaster preparedness. Flood risk is expected to increase substantially in coming years as a result of both climate change and continued socio-economic development.

Further, it's clear that most flood studies acknowledge that floods have had negative impact on people. However, the studies have tended to address the subject matter depending on the objective of the study. This literature review suggests that the documentation of longer-term flood impacts on communities vary markedly.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1. Introduction

This chapter outlines the research design and methodology. It presents the study design, sample selection and size. The chapter also presents the study methodology and data analysis. It further presents the credibility, transferability and dependability of the study. Finally it presents a conclusion on the research design and methodology.

3.1. Study Design

As stated by Strydom, Fouche and Delport (2005:132), a research design is a plan or blue print of how you intend conducting the research. A research design focuses on the end product, formulates a research problem as a point of departure and focuses on the logic of research.

Huysamen (1993:10) offers a closely related definition of design as the plan or blue print according to which data is collected to investigate the research hypothesis or question in the most economical manner. Other scholars refer to research design as all decisions made in planning the study, including sampling, sources and procedures for collecting data, measurement issues and data analysis plans.

Further Strydom, Fouche and Delpot (2005:269) argue that the research design used differ depending on the purpose and the study, the nature of the research questions and the skills and the resources available to the researcher. However each of the possible designs has its own perspective and procedures, the research process will also reflect the procedures of the chosen design. The qualitative research design is that it does not usually provide the research with a step by step plan or a fixed recipe to follow. In quantitative research the design determines the researcher's choice and action, while a qualitative research the researcher's choices and actions will determine the design or strategy. Put more simply qualitative research will during the research process create the research strategy best suited to the research or even design their whole research around the strategy selected.

In selecting the appropriate research design for this study, therefore, the above approaches were taken into consideration. The study employed both quantitative and qualitative approaches. The study was conducted in Sikaunzwe community in Kazungula district in Southern Province. The community was selected because it has experienced floods for three (3) consecutive rainfall seasons. The study had discussions with key stakeholders at district and community levels as well as randomly sampled households at community level.

3.2. Sample Selection and Size

According to Strydom, Fouche and Delport (2005:193), sampling means taking any portion of a population or universe as representative of that population. It is generally stated that the larger the population, the smaller the percentage of that population the sample needs to be and vice versa. If the population itself is relatively small, the sample should comprise a reasonably larger percentage of the population. Large samples enable researchers to draw more representativeness and accurate conclusions and to make more accurate predictions than in smaller samples.

Further, Strydom, Fouche and Delport (2005:194) state that the major reason for sampling is feasibility. A complete coverage of the total population is seldom possible and all the members of a population of interest cannot possibly be reached. Even if it were theoretically possible to identify, contact and study the entire relevant population, time and cost considerations usually make this a prohibitive undertaking. The use of samples may therefore result in more accurate information than might have been obtained if one had studied the entire population. This is so because, with a sample, time, money and effort can be concentrated to produce better quality research, better instruments and more in-depth information.

The target population, therefore, for the study that is, households, institutions and community leaders and practitioners was purposively selected at household, district and community levels respectively. According to Strydom, Fouche and Delport (2005:202), purposive sampling is entirely based on the judgment of the researcher, in that a sample is composed of elements that contain the most characteristics, representative or typical attributes of the population.

Due to time and financial resource limitations, three (3) hundred households out of 1,356 households were randomly sampled and interviewed at community level. A total of five (5) and one (1) Key Informant Interviews were conducted at community and district levels respectively.

3.3. Study Methodology

The study used both quantitative and qualitative approaches. According to the Strydom, Fouche and Delport (2005:159), Qualitative data collection methods often employ measuring instruments. Measurements refers to the process of describing abstract concepts in terms of specific indicators by the assignment of numbers or other symbol to the indicators while in qualitative research, the researcher's choices and actions will determine the design or strategy. As stated above, the study employed both quantitative and qualitative approaches for the purpose of triangulation. The concept of triangulation is based on the assumption that any bias inherent in a particular data source, investigator and method would be neutralised when used in conjunction with other data sources, investigator and methods. The following data collection methods were used:

3.3.1. Quantitative Household Questionnaire

According to Babbie and Mouton (2001: 233), the basic objective of a Questionnaire is to obtain facts and opinions about a phenomenon from people who are informed on a particular issue. Questionnaires are probably the most used generally used instrument of all. In this particular study, primary data was obtained by directly talking to the interviewees at household level so as get very reliable and accurate information.

Data was therefore collected through personal interviews from three (3) hundred households randomly sampled from Sikaunzwe community. The households were interviewed from their individual homes.

The household questionnaire covered the following topics: -

- Household demographics
- Livelihood Patterns
- Flood Impact on:

- Agriculture
- Health
- Infrastructure
- Education
- Water and Sanitation
- Housing and Property

- Vulnerable Groups due to floods
- Underlying causes of vulnerability
- Coping Strategies

3.3.2. Qualitative Key Informant Interviews

The interviews were held with key informants using a checklist at both district and community levels. The composition of key informants comprised of all critical players that have a role to play in the management of floods. Some notable organizations and individuals at district level included the following:

i. The Kazungula District Disaster Management Committee (Health, Education, Water Affairs, Community Development and Social Services, agriculture, etc);
ii. Non-Governmental Organisations (NGOs);
iii. Churches;
iv. Community Leaders and Practitioners;
v. Local Authorities;

At community level, the interviewees were representatives of the community. It was envisaged that the representatives would give typical perceptions and perspectives on the subject matter. The interviews were conducted at a venue organized within the community.

The key informant and focus group discussions at district and community levels covered the following topics:

- Main Livelihood patterns

- Main Sources of income
- Main sources of food
- Rainfall performance and its effects
- Impact of floods on:
    - Agriculture
    - Health
    - Infrastructure
    - Education
    - Water and Sanitation
    - Housing and Property
- Underlying causes of vulnerability to floods
- Coping Strategies
- Development options to deal with the problem of floods.

3.4. Data Analysis

According to Strydom, Fouche and Delport (2005:218), data analysis means finding answers by way of interpreting the data and results. To interpret is to explain and find meaning. It is difficult or impossible to explain raw data, one must first describe and analyse the data and then interpret the results of the analysis. Analysis means the categorization, ordering, manipulating and summarizing data to obtain answers to research questions. The purpose of analysis is to reduce data to an intelligible and interpretable form so that the relations of research problems can be studied tested and conclusions drawn.

Interpretation takes the results for analysis, makes inferences pertinent to the research relations studied and draws conclusions about these relations.

For this study, Data Entry Screens were developed in SPSS for Data Entry Version 3.This applied to the quantitative data collected. The qualitative data was coded and entered into MS Excel before being transported to SPSS.SPSS Windows Version 11.5 was used for the analysis.

3.5. Credibility, Transferability and Dependability

3.5.1. Credibility

Strydom, Fouche and Delport (2005:346) states that credibility is the alternative to internal validity in which the goal is to demonstrate that the inquiry was conducted in such a manner as to ensure that the subject was accurately identified and described. The aim is to assess the intentionality of respondents, to correct for obvious errors and to provide additional information. It also creates an opportunity to summarize what the first step of data analysis should be and to assess the overall adequacy of the data in addition to individual data points.

In this study, the author was confident that the primary data collected is a fair reflection of the problem being studied. The reason being that the method of data collection used gave the author an opportunity to ask probing questions and sought clarifications where it was necessary. Furthermore, by conducting personal interviews, the researcher was confident that the interviewees meant what they said and hence their responses were a true reflection of the impact of floods on the socio-economic livelihoods, the subject of the study.

3.5.2. Transferability

According to Strydom, Fouche and Delport (2005:346), transferability is alternative to generalization. This refers to the extent to which the findings can be applied in other contexts or with other respondents. It is the obligation of the researcher to ensure that findings can be generalized from a sample to its target population. From the personal interviews with the sample interviews, it was established that there was some uniformity and consistency in their responses. This in a way gave the researcher the confidence in the community's responses on the impact of the floods on their socio-economic livelihoods.

3.5.3. Dependability

Strydom, Fouche and Delport(2005:346) suggests that dependability is alternative to reliability in which the researcher attempts to account for changing conditions in the phenomenon chosen for

the study as well as changes the design created by increasingly refined understanding of the setting. The study must provide its audience that if it were to be repeated with the same or similar respondents (subjects) in the same (or similar) context, its findings would be similar. Since there can be no validity without reliability and thus no credibility without dependability, a demonstration of the former is sufficient to establish the existence of the latter. In terms of this study, the information obtained at community level was triangulated with that obtained from the household level and there was consistence in the data generated.

3.6. Conclusion

In conclusion, both quantitative and qualitative approaches were employed for the study. Structured and open-ended questionnaires were used to collect primary data. However, the analysis took into account both primary and secondary data especially for meteorological data. The next chapter presents the discussion of results.

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF RESULTS

4.1. Introduction

This chapter provides a discussion on the results of the research based on the primary and secondary data collected. It highlights the performance of the 2006/07 and 2007/08 rainfall seasons. Furthermore, it provides a discussion on the household demographics, livelihood patterns, impact of floods on various aspects, coping strategies, underlying causes of vulnerability, interpretation, limitations and implications of the study. Lastly, the chapter recommends further research.

4.2. Rainfall Performance for 2006/07 and 2007/08 Rainfall Seasons

The rainfall performance during the 2006/07 and 2007/08 rainfall seasons was characterized by varying rainfall intensities which resulted into flooding that subsequently caused damages to different sectors of the economy. The 2006/07 season had an early start in the northern half of the country while the southern half had a late start. As the season progressed, the southern parts of the country eventually had increased rainfall activity that resulted in isolated flooding of the main wetlands areas. Southern Province in particular experienced below normal rainfall at the start of the season which gradually became normal to above mid in the season. On the contrary, 2007/08 rainfall season experienced an early start mainly in the southern half of the country. This was characterized by heavy falls that resulted into severe flooding and water logging on low lying areas. This confirms the information obtained from the sampled communities.

4.3. Discussion of results

4.3.1. Household Demographics

The demographic distributions are such that out of the three hundred (300) households sampled in the survey, 71% were male headed and the remainder female headed. Furthermore, 66% of the heads of households were married while 17% were widowed. In terms of the ages of the heads of

households, the survey findings show that most of them were aged between 30 – 34 years and 60+ years as shown in ***figure 1below.***

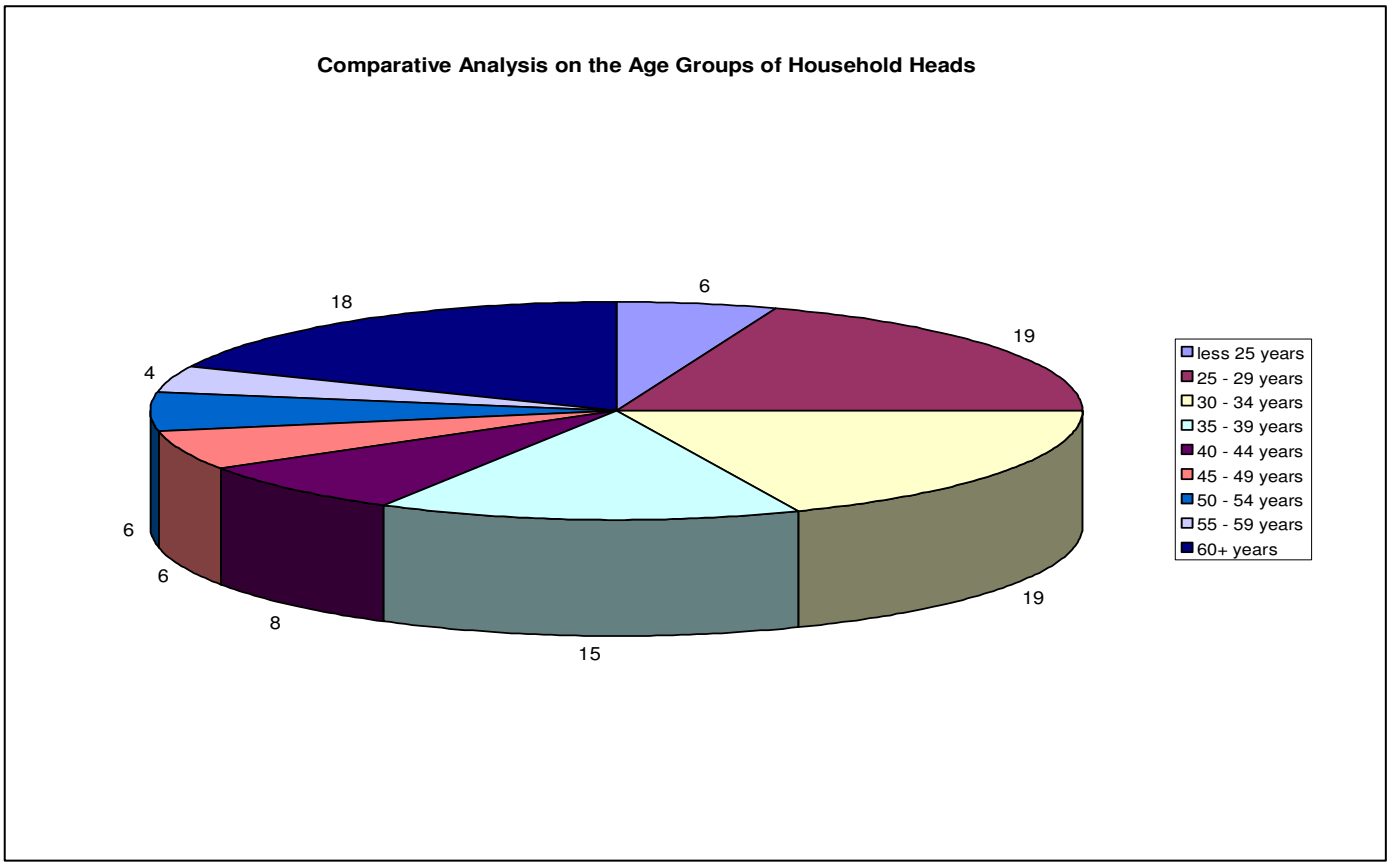


Figure 1: Comparative Analysis on the Age Groups of Household Heads

Furthermore, 54% of the heads of households whose ages are 60+ years are widowed (***see figure 2 below***). The research also revealed that household size of the sampled households was between 3 to 6 persons (63%).

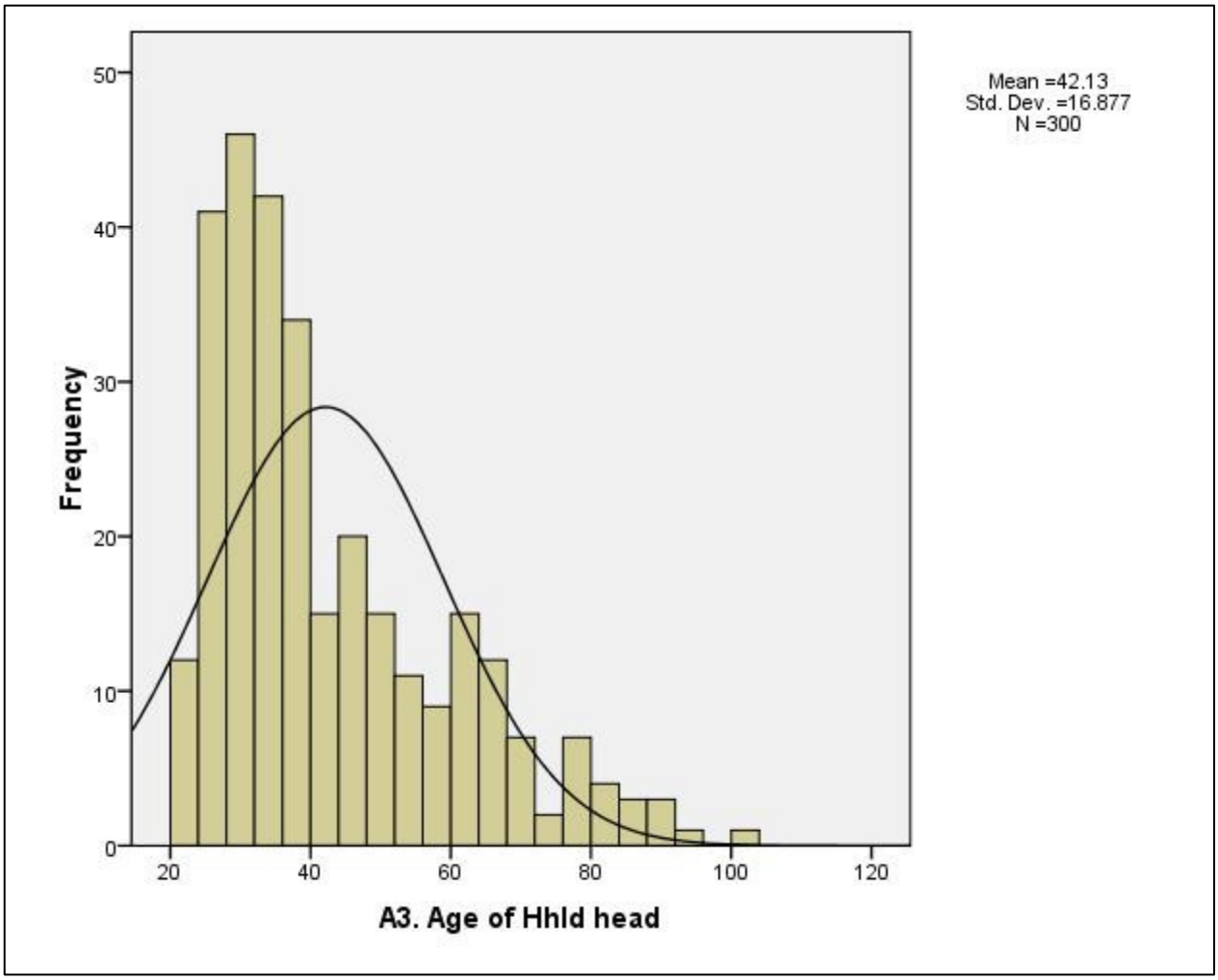


Figure 2: Chart showing the distribution of ages for the household heads

Within the sampled households whose family size was between 3-4 people, 57% were found in male headed households. Furthermore, within the households whose family size was between 5-6 people, 83% were found in male headed households. The statistical distribution as shown in the above chart is as result of the sampling being non statistical (random sampling) and the age of the sampled household heads not predetermined.

4.3.2. Livelihood Patterns

The research revealed that the first most important livelihood sources for the assessed communities in Sikaunzwe Ward were crop production (90%) followed by trading (4.7%) and fishing (3.7%) ***(See figure 3 below)***.Discussions at district and community levels established that the main source of income for most households was crop production followed by trading and charcoal burning. The main sources of food were found to be own production, followed by casual labour and fishing. The implication is such that since crop production is the main source of livelihood and food, increased exposure to floods will exacerbate their vulnerabilities by compromising their household food security.

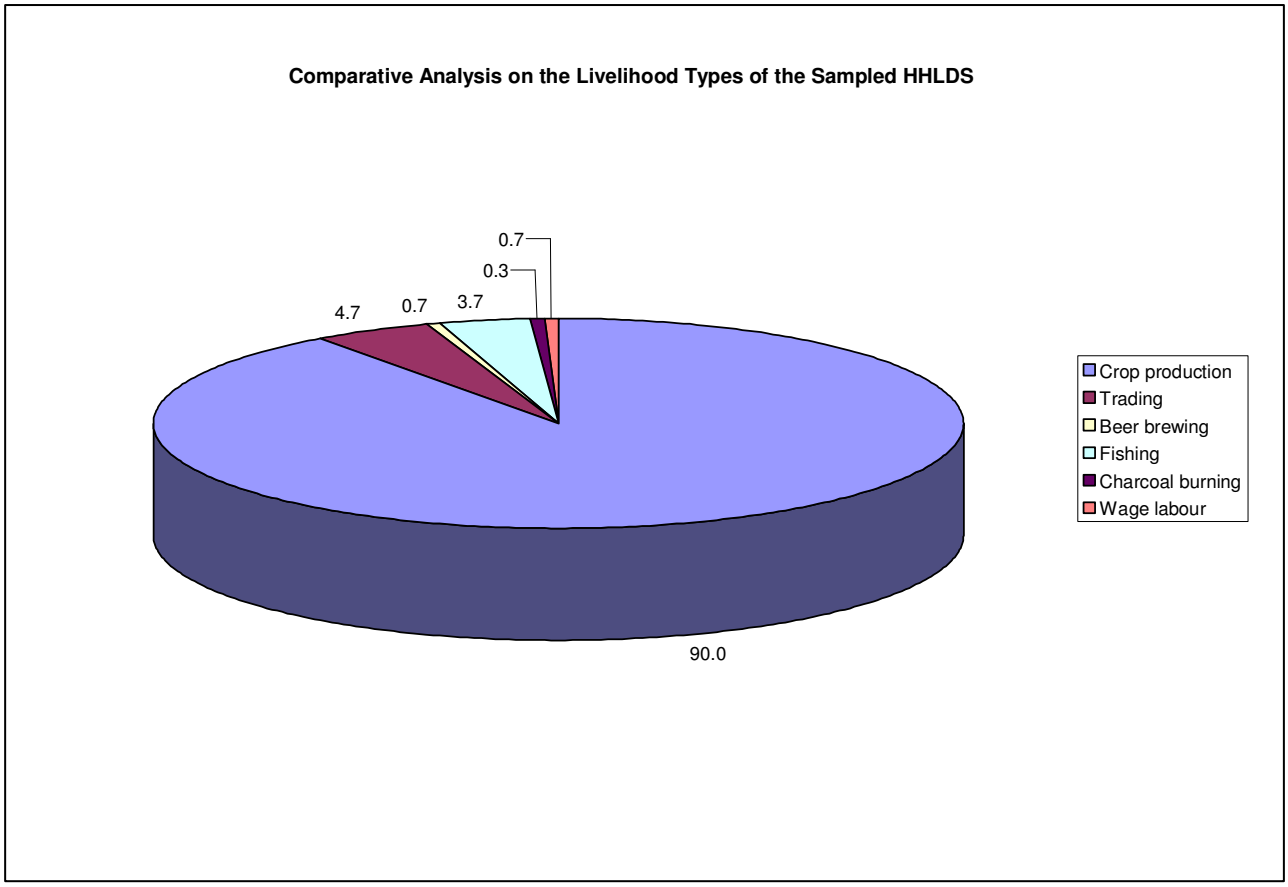


Figure 3: Comparative Analysis on the Livelihood Types of the Sampled Households

There is clear evidence that the communities in Sikaunzwe ward had very limited livelihood options as most of them indicated to have little or no significant secondary livelihood sources.

The implications are such that the communities will have reduced resilience to floods due to lack of a wide range of livelihood options. Of all the assessed households only 13%, 12% and 12.3% indicated that charcoal burning, horticultural production and trading respectively were the second sources of livelihoods.

It was observed the marital status of household head played an important role in determining the livelihood strategy. Those who were married had a diversity of livelihoods (crop production, trading, beer brewing, fishing and charcoal burning) as opposed to the single, divorced, separated and widowed household heads (***see figure 4 below***). Furthermore, only a small percentage of the sampled households do not depend on crop production as a livelihood source (trading at 4.7% and fishing at 3.7%.

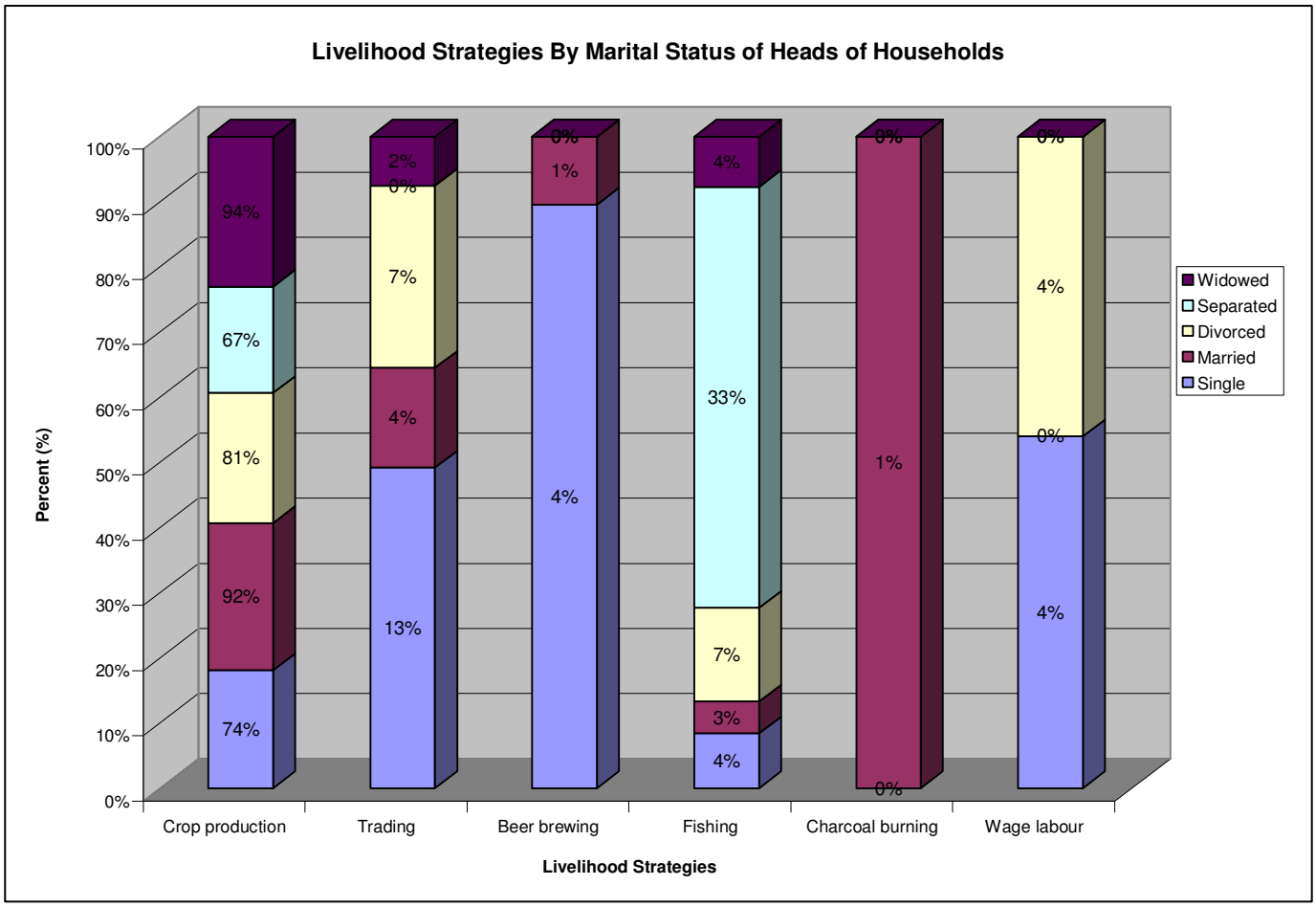


Figure 4: Livelihood Strategies by Marital Status of Heads of Households

The study established that households with family size ranging from 3 to 6 persons had diversity in terms of livelihood options (***refer to figure 5 below***). In an event that they are affected by floods, they will be able to employ alternative livelihood options to mitigate the effects there of.

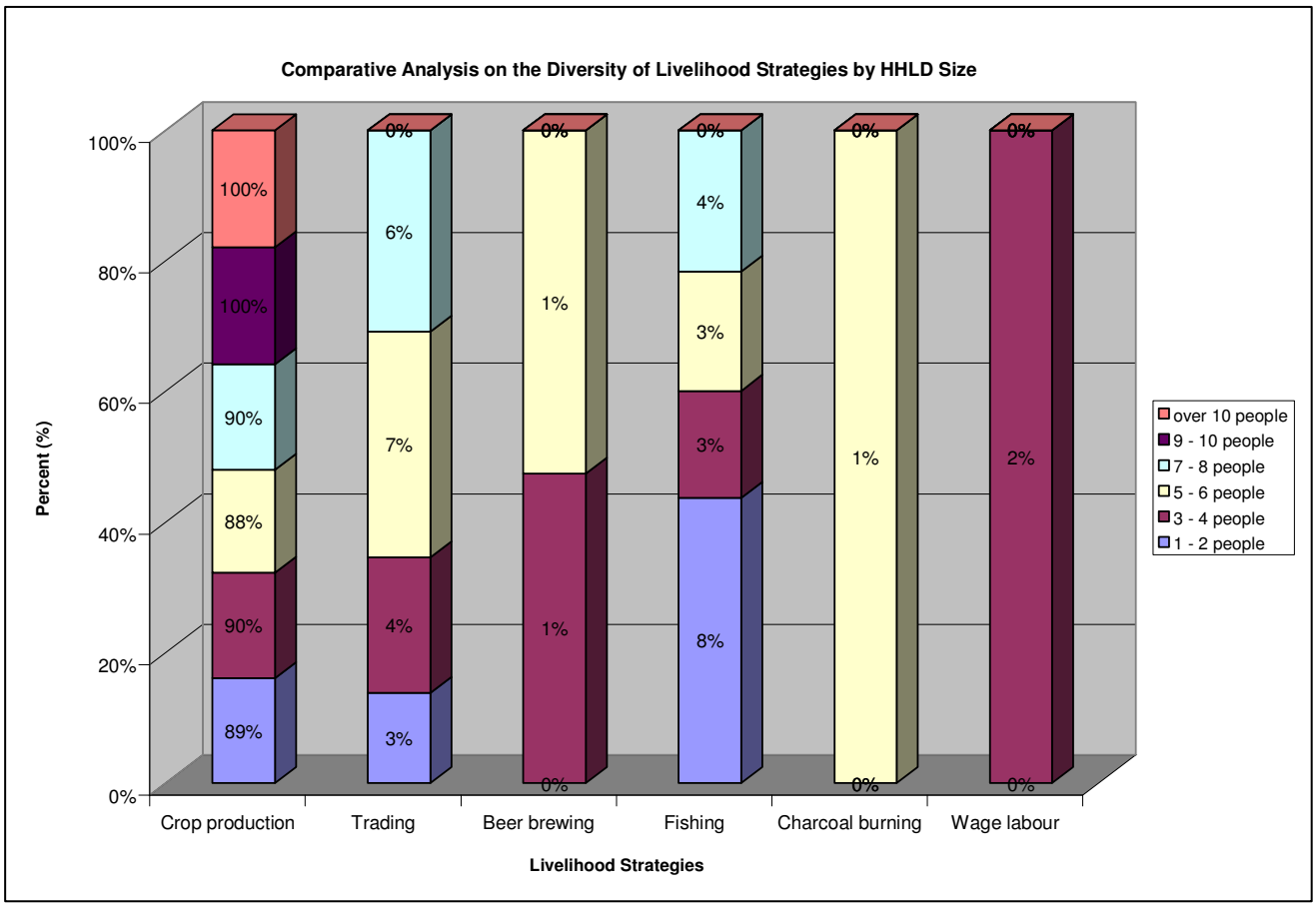


Figure 5: Comparative Analysis on the Diversity of Livelihood Strategies by HHLD Size

4.3.3 Impact of floods

4.3.3.1. Agriculture

Most of the sampled households (94%) indicated that their crop fields were damaged by floods. It was also evident that of the crops which were damaged by floods, most of it (92%) was the main staple crop (maize). This was followed by Sorghum at 29%.Although no data on area planted was collected, it was evident that there was impact on agriculture which is the main source of livelihood and income as discussed under the livelihood patterns section.

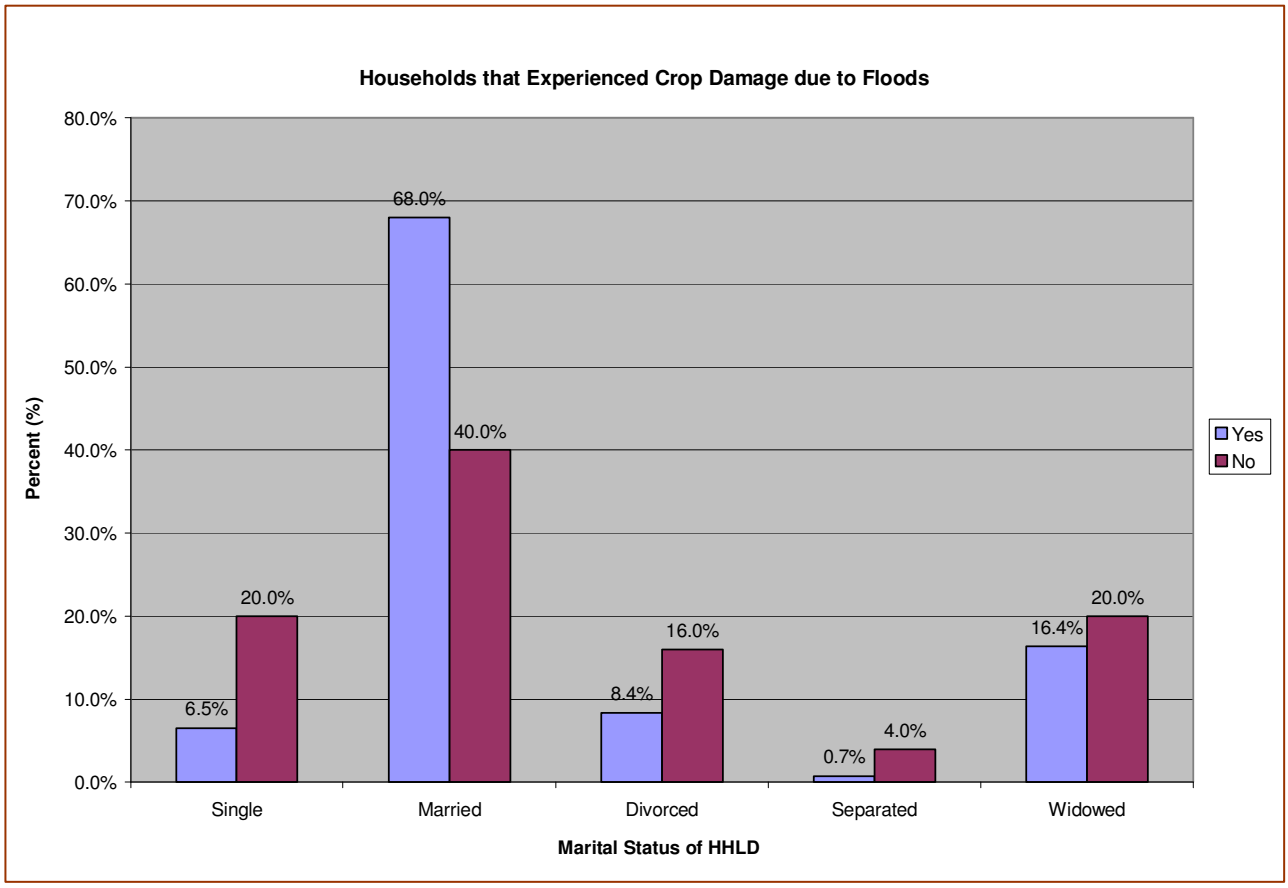


Figure 6: Households that Experienced Crop Damage Due to Floods

Further more, the marital status of households who experienced much of the crop damage due to floods were found to be married (68%) and widowed (16%) ***(See figure 6 above).*** The Implications are such that there will be reduced staple crop production which will result into

reduced food availability. This finding has provided better understanding of the vulnerability of the households due to the over dependency on crop production as their main livelihood source. Furthermore, of the 16% of the household heads whose marital status is widowed and experienced reduced production due to flood damage did not have alternative livelihood options other than crop production to mitigate the food insecurity as can be seen in figure 4 above.

Out of the 300 sampled households, 30% indicated having experienced food stock losses due to floods. The research also revealed that within the households whose crops and food stocks were damaged by the floods, 93% resided in the flood prone areas of the Sikaunzwe community.

4.3.3.2. Health

The research revealed that most of the sampled households (96%) indicated that health facilities were available in their communities. Furthermore, very few households (2%) had indicated that health facilities had been damaged by flooding in their communities. The study further revealed that 32% of the sampled households experienced disruption in access to health services due to damaged roads and bridges as a result of floods.

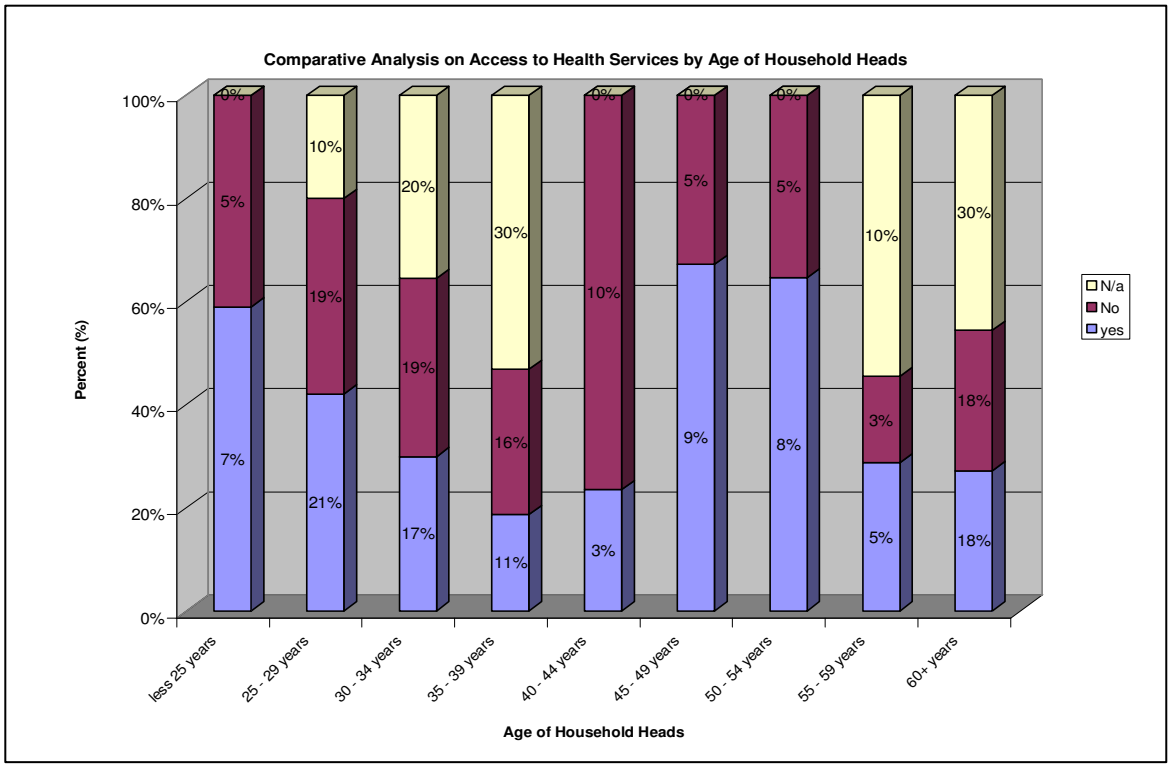


Figure 7: Comparative Analysis on Access to Health Facilities by Age of

The study found that household heads aged between 25 to 29, 30 to 34 and 60+ experienced disruption in accessing health services as a result of damaged roads and bridges (***refer to figure 7 above).*** Disruption in accessing health services implied an increase in disease incidence due to lack access to appropriate medication.

The research also revealed that out of the 300 sampled households, 77% indicated having at least one member of their household getting sick during the floods. The most significant diseases experienced among the sampled households were, malaria/fever (65%), diarrhea (21%) and cough/ARI (15%). Furthermore, 8% of the sampled households indicated that they experienced other disease outbreak such as scabies, sores and rash during the floods.

The survey further established that 74% of households whose main source of drinking water was the river had household members falling ill followed by 14% of households who indicated borehole as their main source of water. This means that households will continue to be vulnerable to increased disease outbreak as long as the river continues to be their main source of drinking water. This is as a result of increased contamination that occurs during flooding. Despite borehole being the safest water source for drinking, past vulnerability assessments undertaken within the district have shown that handling of the water by households due to distance to the source has led to increased disease burden such as diarrhea[1].

In terms of specific diseases experienced by households due to varying water sources for drinking during the floods, 78% of households whose main source of water was the river experienced diarrhea. Furthermore, 14% of households whose main source was borehole experienced diarrhea. In addition, 74% of households whose main source of drinking water was river suffered from malaria/fever while 14% of households whose main source of drinking water was bore suffered from the same disease. The study further established that 66% of households whose main source of drinking water was river suffered from cough while 20% of households whose main source of drinking water was bore hole experienced the same disease.

[1] 2008 In-depth Vulnerability and Needs Assessment Report

4.3.3.3. Education

All the sampled households indicated availability of education facilities in their communities. Furthermore, 17% of the sampled households indicated that school infrastructure was damaged due to floods in one way or another. The study showed that 38% of the sampled households indicated that school going children experienced disruption due to floods. The disruption was attributed to various reasons such as road being impassable (32%) and school being submerged (9%).

4.3.3.4. Water and sanitation

The sampled communities showed a lot of diversity on the type of drinking water sources they had. It was evident that rivers, boreholes and dambos[2] were the most common water sources that communities used for drinking ***(see figure 8 below).***

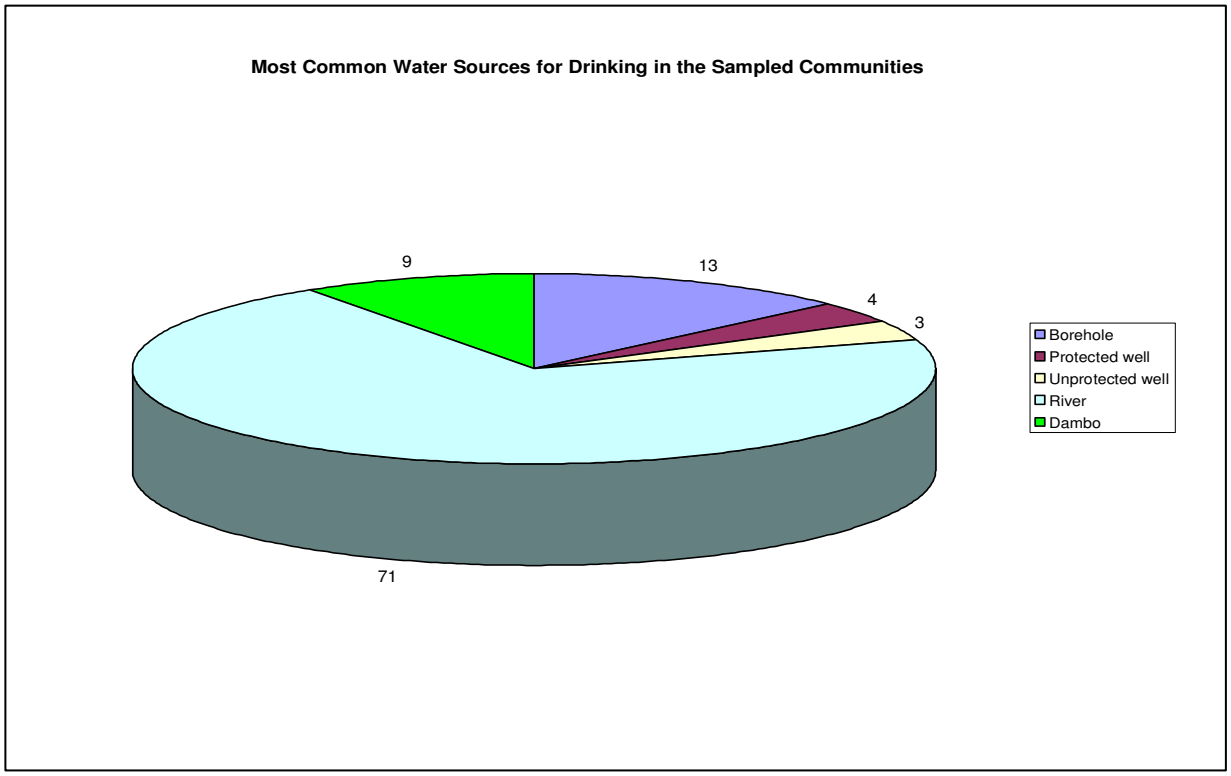


Figure 8: Most common water sources for drinking for sampled Households

[2] '**Dambo**' is a word used for a class of complex shallow wetlands in central, southern and eastern Africa, particularly in Zambia and Zimbabwe.

The survey established that 71% of the households indicated that their main source of drinking water was the river followed by borehole and dambo at 13% and 9% respectively. Furthermore among the sampled households, 73% indicated that their common water sources for drinking were affected by floods.

In terms of sanitary facilities, 84% of the sampled households had no sanitary facilities (i.e. using bush and rivers as alternatives).It is worth noting that bush and river in the context of sanitation are usually regarded as no sanitary facility even though they are used as alternatives for excreta disposal. The correlation between water drinking sources and health has been discussed under the health section. Furthermore, 16% of the households indicated having traditional pit latrines as their main sanitary facilities (***see figure 9 below***). Within the households that indicated having

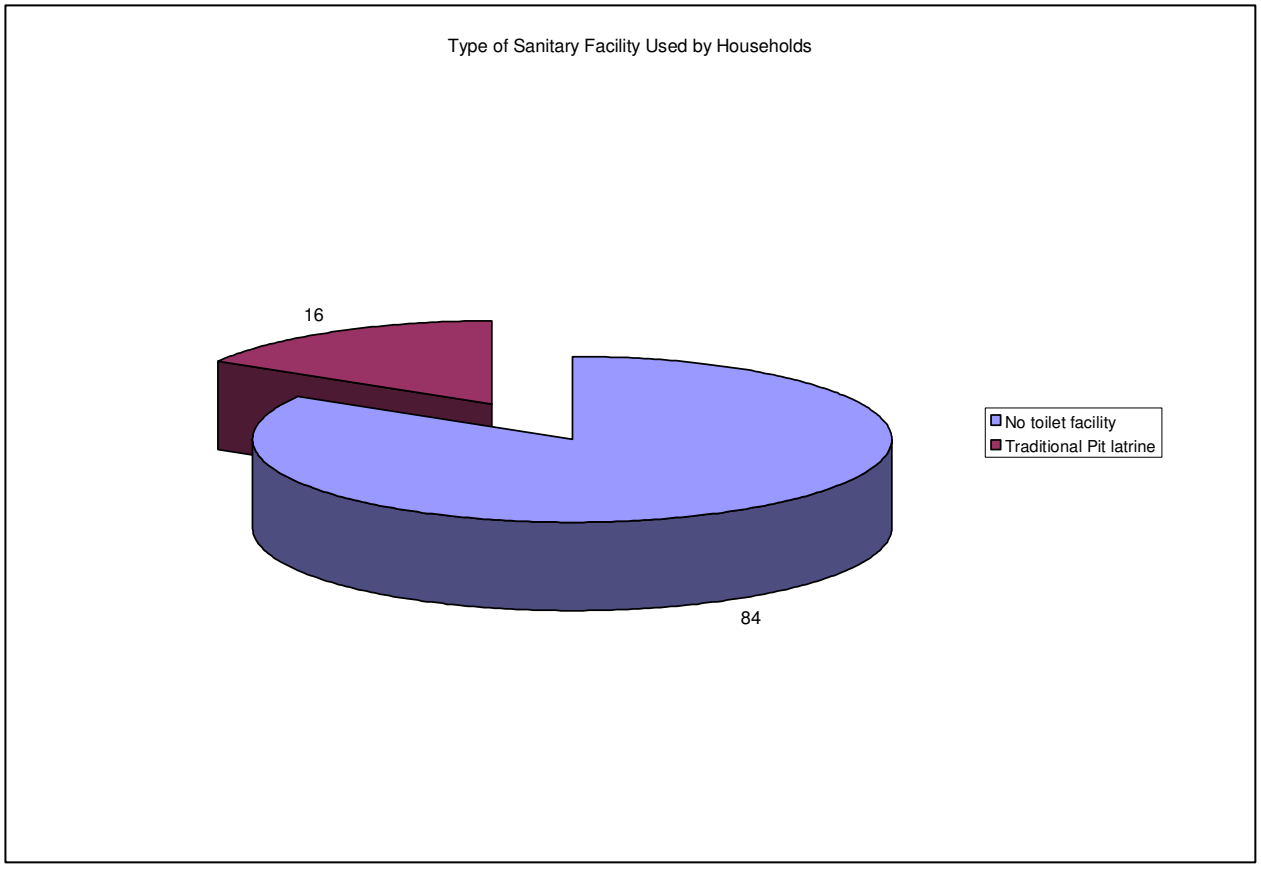


Figure 9: Type of sanitary facilities used by sampled households

sanitary facilities, 12% had indicated that their facilities were damaged by floods. Furthermore the survey established that 14% of households whose sanitary facilities were affected by the floods experienced coughing.

4.3.3.5. Housing

Among the three hundred (300) sampled households, 36% indicated that their houses collapsed due to excessive impacts of floods while the rest had their houses intact. Furthermore, within the number of households who indicated having had their houses affected by floods, 75% were male headed households with the remainder being female headed households ***(refer to figure 10 below).*** Of the households whose houses collapsed due to floods, 66% were married and 16% widowed. The implication is that since the married and widowed heads of households are the majority and the family sizes are large, they may not be able to be integrated within unaffected households due to size of the houses.

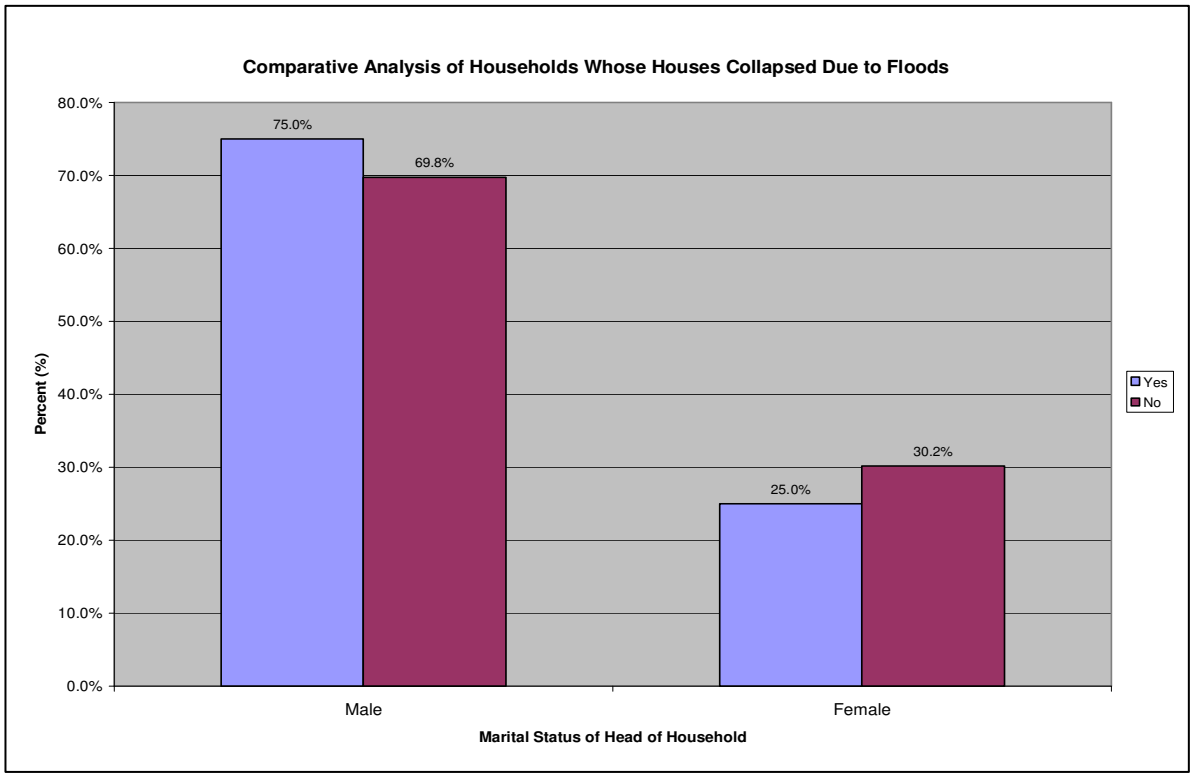


Figure 10: Comparative Analysis of households whose houses collapsed during floods

About 32% of the households whose houses were impacted by floods were forced to relocate to other alternative areas while the remainder continued to stay within their home states. The community discussions revealed that some displaced households sent their children to stay with other relatives. This in a way disrupted their pattern of life and social networks. For those who have moved temporary to higher grounds, they have returned to their usual residence. Discussion with these households indicated a positive will to move permanently to safer havens should alternative fertile land be secured by relevant authorities. It is worth mentioning that some households have shifted to a new area altogether.

4.3.3.6. Property and Assets

The research revealed that a substantial number of productive and non productive assets were damaged by floods. Of the productive assets which were lost, 4% were fishing nets and 3% were hoes while the majority of non -productive assets were beds (10%), chairs (9%) and radios (7%). Some households (24%) indicated that they lost other property such as clothes and blankets. Most of the losses to these assets were attributed to households' proximity to flood prone areas. Discussions with the communities revealed that some households indirectly lost their assets in that after their houses collapsed, some of the income sources got disturbed. This forced them to off load some assets to raise money to meet other household basic requirements.

4.3.3.7. Coping Strategies

The survey established that sampled households employed a range of coping strategies due to the floods. The most important coping strategies were cultivating on small portions on higher grounds (75%), shifting to higher grounds (68%) and making furrows and canals (63%). ***(See figure 11 below).***

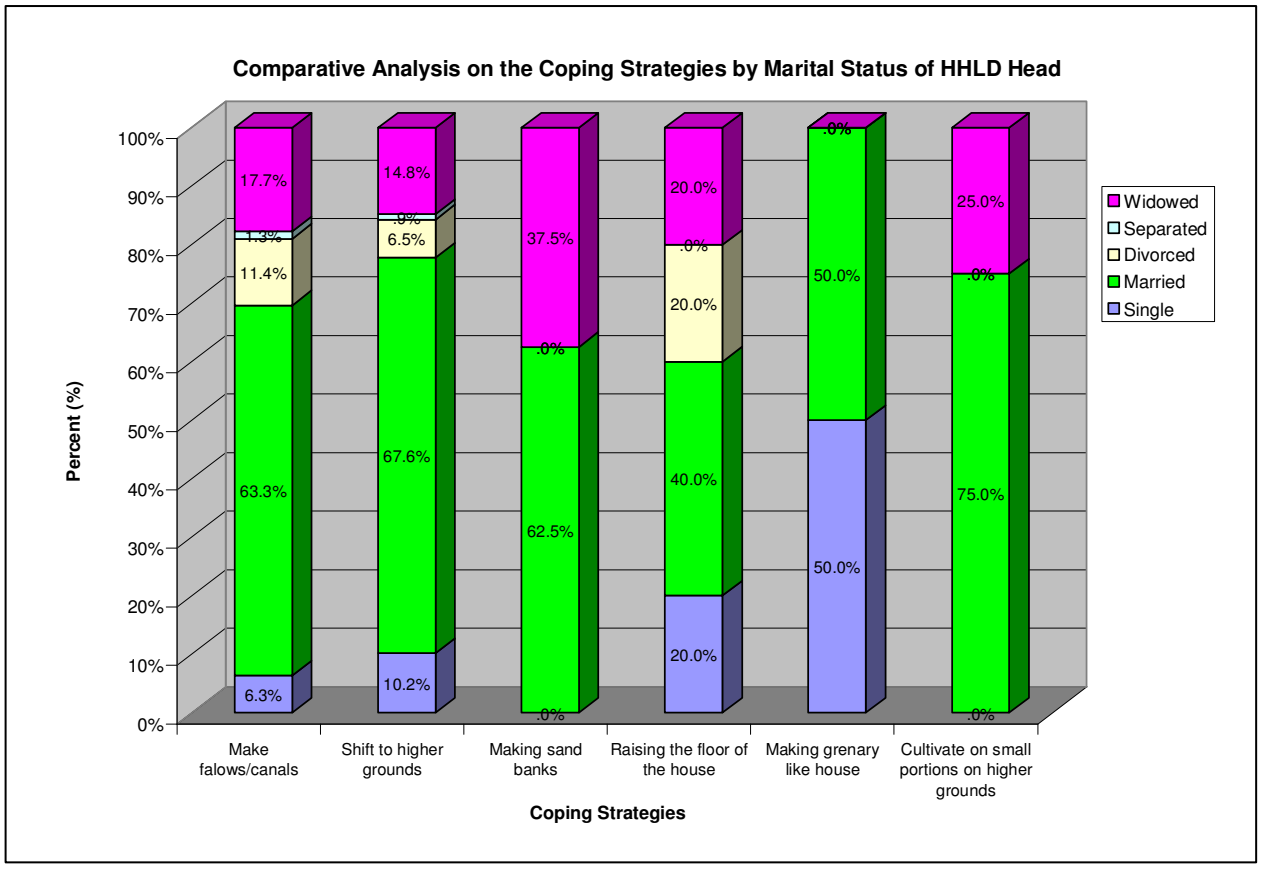


Figure 11: Comparative Analysis on the range of coping strategies by marital status of HHLD Head

The research showed that households had diverse coping options with the exception of those households whose head were separated. Of the sampled households, 21% indicate that the coping strategies were not very effective.

The survey established that households whose coping strategies were shifting to higher grounds and making sand banks had trading, beer brewing and fishing as their main livelihood as evidenced ***figure 12 below***. The implication is such that these households would employ other livelihood options to cushion the impact of the floods.

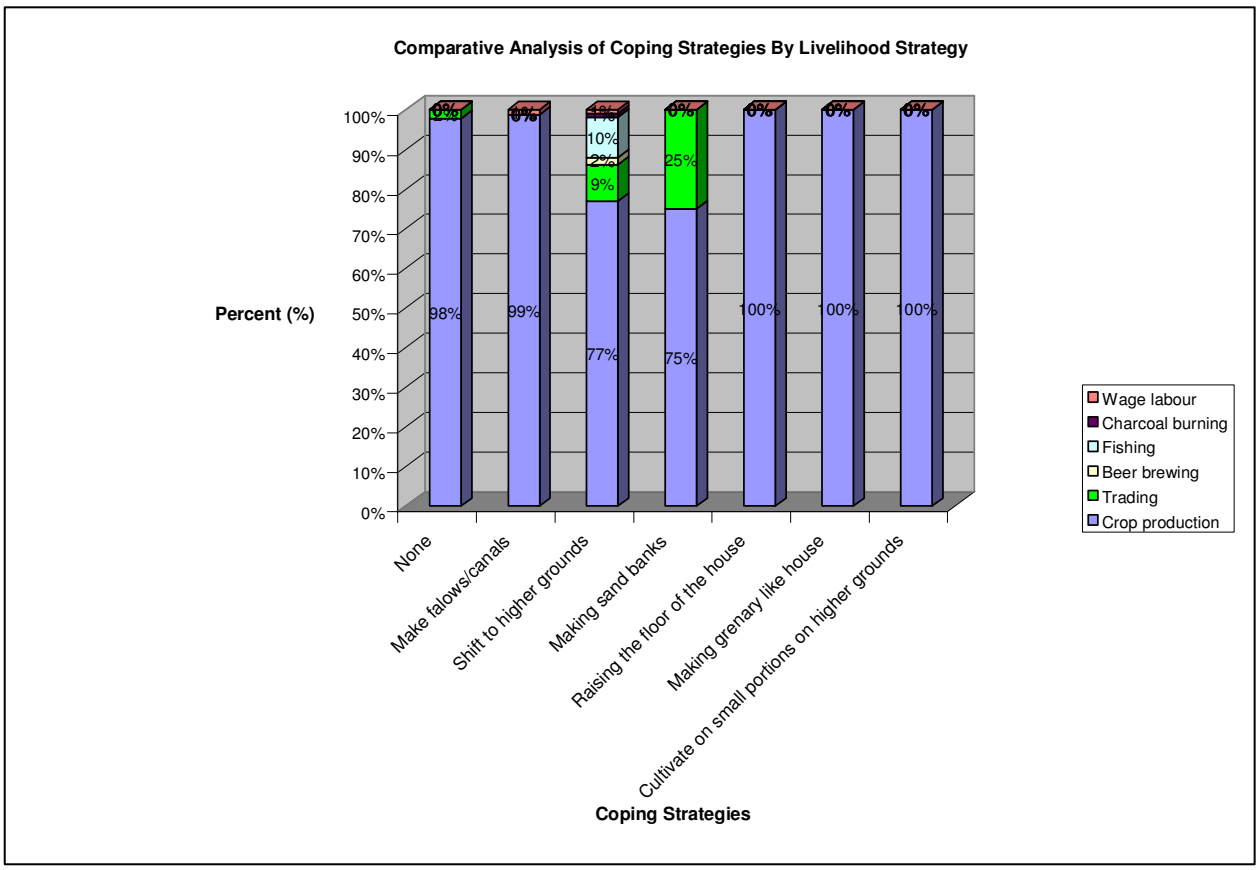
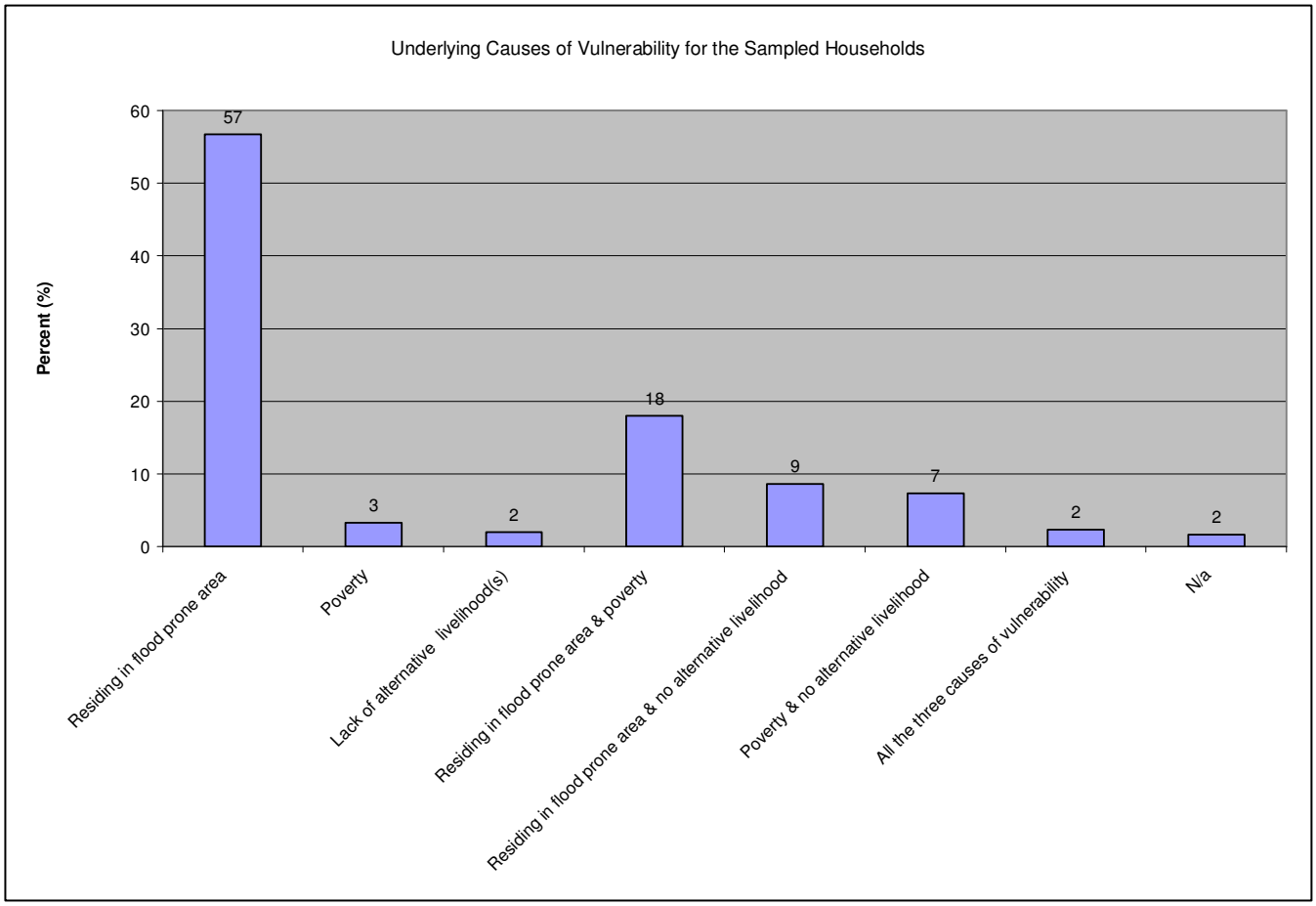


Figure 12: Comparative Analysis of Coping Strategies by Livelihood Strategy

4.3.3.8. Underlying Causes of Vulnerability

There were varying underlying causes of vulnerability to floods for most people in Sikaunzwe ward. Proximity to the flood prone area (57%), residing in flood prone area and poverty (18%) were identified as being the main underlying causes of vulnerability by the Sikaunzwe community. The research revealed that the main underlying causes of vulnerability for the sampled households were residing in flood prone areas and poverty as can be seen in ***figure 13 below*.**

Figure 13: Underlying Causes of Vulnerability for the Sampled Households



It is very clear that most male headed households indicated proximity to flood prone areas (76%) and lack of alternative livelihood sources (83%) as the main underlying causes of vulnerability (see figure 14 below). Furthermore, the research revealed that most of the female headed

households indicated poverty and no alternative livelihood sources (41%) and the combination of all the three underlying causes (43%) as their main underlying causes of vulnerability (***refer to figure 14 below which analyses the underlying causes of vulnerability in relation to the sex of the sampled household).***

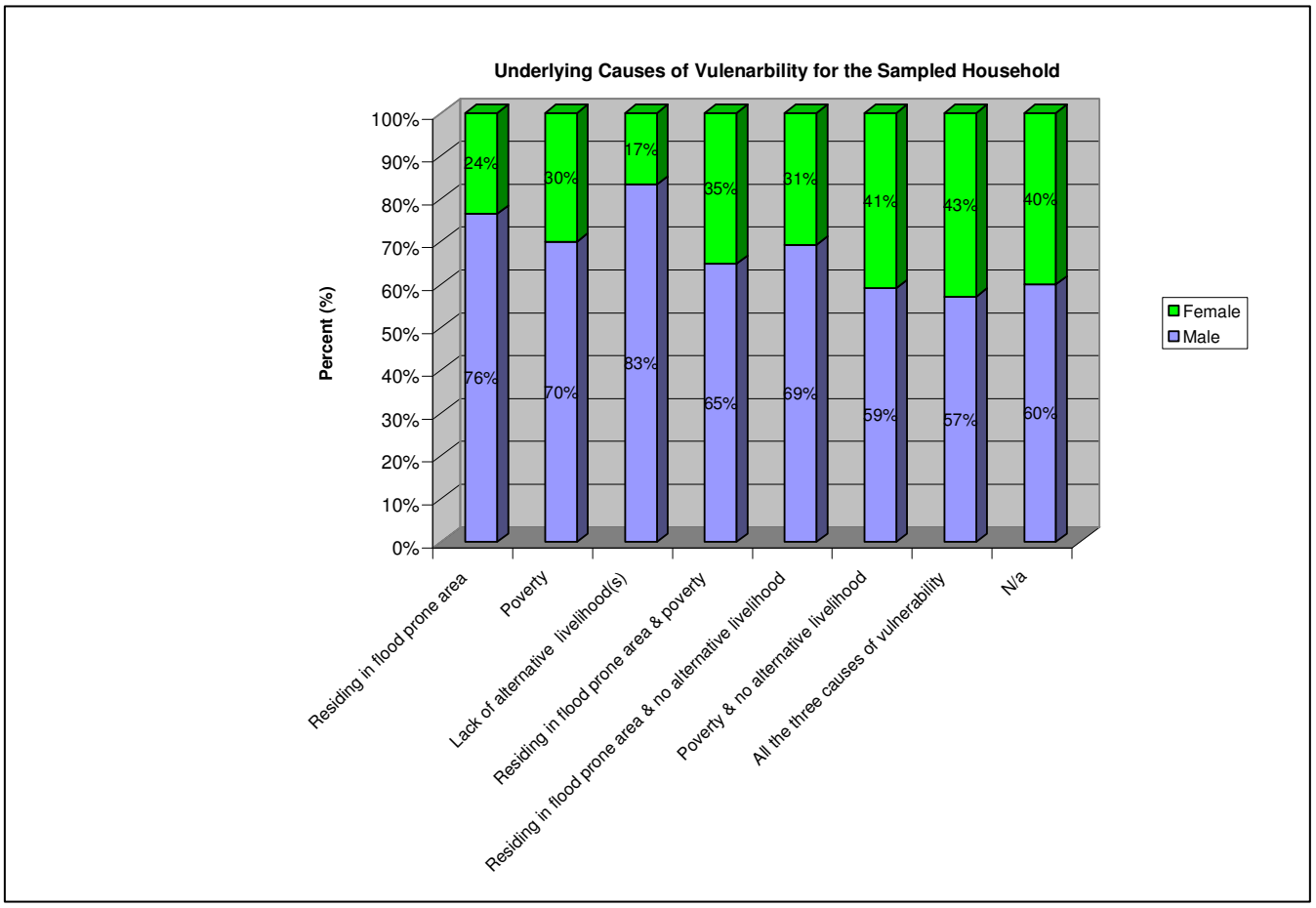


Figure 14: Underlying Causes of Vulnerability in relation to sex of the Sampled Household

Furthermore, it was also clear that all age groups for the head of households indicated proximity to flood prone areas as the main underlying cause of vulnerability. Furthermore, the research revealed that heads of households aged between 45-49 years (17%), 55-59 years (17%) and less than 25 years (18%) indicated poverty and no alternative livelihood as the underlying causes of the vulnerability. The research further revealed that age groups less than 25 years (24%), 55 – 59 years (25%) and 60+ years (27%) indicated residing in flood prone area and poverty as the underlying causes of vulnerability (***refer figure 15 below***). There is need to enhance household's

resilience to flood impacts through poverty reduction strategies and promote diverse livelihood options which will ultimately reduce the levels of vulnerability.

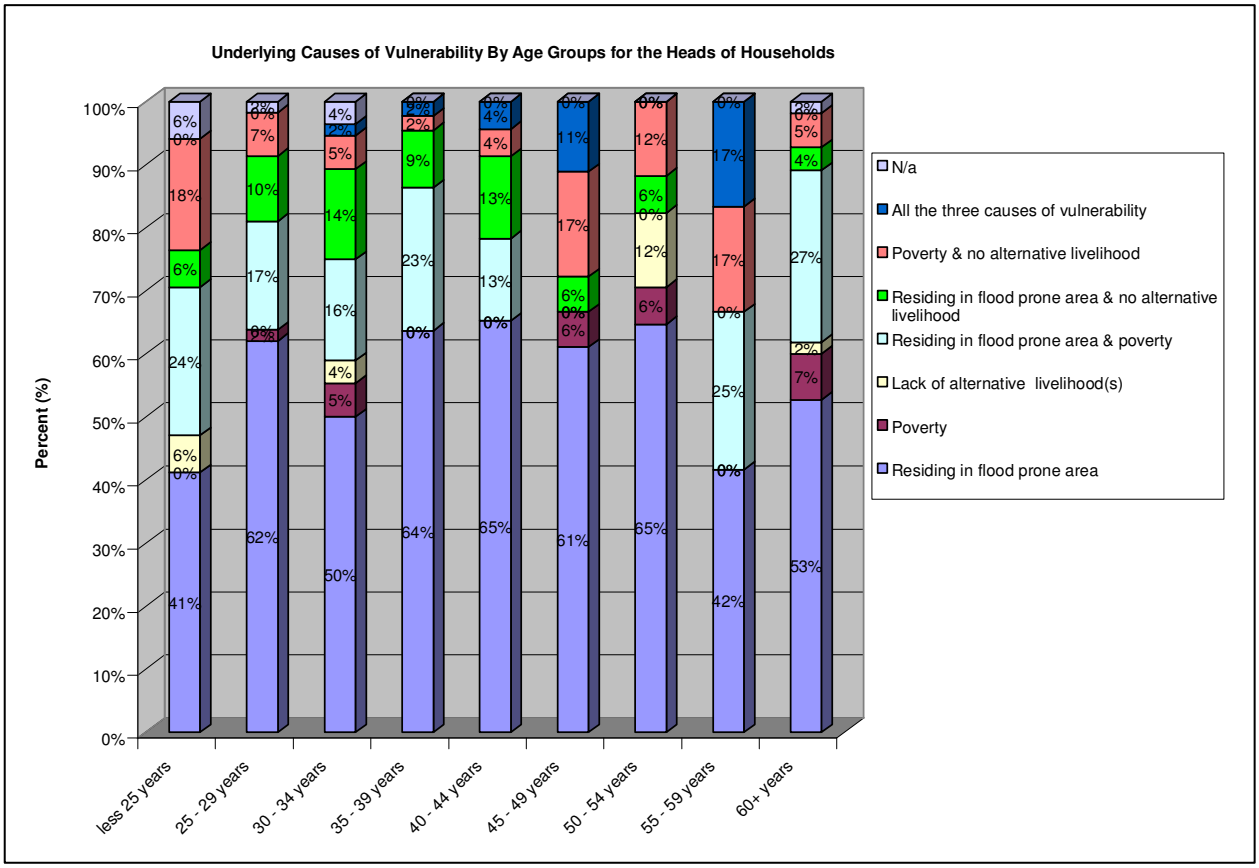


Figure 15: Underlying Causes of Vulnerability by Age Groups for the Household Heads

4.4. Interpretation of the results

From the results of the analysis it is clear that the floods, particularly from the 2007/08 rainfall season impacted on the livelihoods and critical aspects namely Agriculture, Health, Education, Water and Sanitation, Housing and Property and Assets of people in Sikaunzwe Community in Kazungula district.

The main livelihood of the sampled households was crop production followed by trading and fishing.

The survey established that over 90% of households had their crops damaged, mainly maize (92%) which is the staple crop and this ultimately resulted into food insecurity at household

level. As discussed under the livelihood section, crop production was the main livelihood and income source. This in a way reduced people's income since income sources are embedded in livelihoods. Further, for those households who had some food stocks at the time of the floods, these were damaged and consequently compromised food security at household level.

Although health facilities were not affected by the floods, access to the health services was hampered due to damaged and/or washed away roads, bridges and culverts. This ultimately contributed to increased disease burden (mainly diarrhea, malaria and coughing) at household level. The disease incidences were also attributed to access to unsafe water sources and flooded sanitation facilities.

Regarding water and sanitation, the river was the main source of water followed by borehole for most of the sampled households. This means that households will continue to be vulnerable to increased disease outbreak as long as the river continues to be their main source of drinking water. This is as a result of increased contamination that occurs during flooding. Despite borehole being the safest water source for drinking, past vulnerability assessments undertaken within the district have shown that handling of the water by households due to distance to the source has led to increased disease burden such as diarrhea[3].

The education sector was equally not spared. Learning was disrupted due to submerged schools and damaged infrastructure.

Housing units, most of which were made of pole and mud were damaged in one way or the other forcing households to relocate to other alternative areas.

The results from the study established that households lost a number of both productive and non-productive assets (both directly and indirectly) making them more vulnerable.

The results further show that the main coping strategies employed by households were shifting to higher grounds and making furrows and canals during floods. It is clear from the findings that these coping strategies are not very effective. The coping strategies employed by households

[3] 2008 In-depth Vulnerability and Needs Assessment Report

depend on a number of factors, some of which include the type of livelihood strategy and marital status.

The results also show varying underlying causes of people's vulnerability which poses a challenge as far as reducing levels of vulnerability is concerned. These include poverty as the main one, residing in flood prone areas and lack of alternative livelihoods.

Overall the objective of the study as outlined in chapter one (1) have to a large extent been realized. Government and key co-parenting partners should implement the recommendations proposed in this study.

4.5. Limitations of the results

The study had some limitations as provided below;

- The sample design did not take into consideration gender balance as more male headed households (72%) were sampled as compared to female headed households (28%).
- Accessibility was a challenge as the data collection was done during the rainy season.

4.6. Implications of the results

The broad objective of the study was to assess the impact of the floods on the socio-economic status of livelihoods of people in Sikaunzwe Community in Kazungula district of Zambia. Although no purely economic date was collected it is evident from the annual vulnerability assessments[4] done in the country referred to in the literature review that income sources are embedded in livelihoods. Any impact therefore on livelihood would result into reduced income and reduced purchasing power for households.

[4] 2008 In-depth Vulnerability and Needs Assessment

The factors that determine the underlining cause of vulnerability have been established and coping strategies and development identified.

The findings from the study have implications for the development of the people in Sikaunzwe Community and the nation as a whole. Hazards such as floods entail that efforts should be directed at formulating sustainable mitigation measures. Appropriate mitigation measures discussed under the recommendations section should be put in place in order to enhance community resilience in view of climate variability. Thus the need to continuously assess the flood risk can not be overemphasized.

The identification for mitigation measures should not only involve the vulnerable communities but all stakeholders including the Private Sector and Civil Society.

There should be adequate finding towards risk mapping, monitoring and implementation of preparedness and mitigation measures.

Investment in flood management, taking into account climate variability should be a priority. Further community awareness on the flood risk itself should be promoted.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1. Introduction

This chapter presents the conclusion and recommendations that arose from the study. The research reviewed a wide range of secondary literature and collected primary data on which the conclusion and recommendations are based. The study was conducted within the Disaster Risk Reduction conceptual framework which emphasizes a proactive approach to disaster management. It is imperative that communities adopt a risk reduction approach to effects of floods. The research endeavored to answer the following questions:

- What is the impact of floods on the socio –economic livelihoods of people in Sikaunzwe community?
- Who are the most vulnerable groups to floods and what are their coping strategies?
- What are the sustainable developmental and policy options to deal with the problem of floods?

The conclusion and recommendations are outlined below:-

5.2. Conclusion

As discussed under various sectors and across sectors, it is clear from the study that floods had adverse impact on the socio-economic status of livelihoods for people in Sikaunzwe Community. To a large extent, the study has established that livelihood patterns play an important role in settlement patterns. It is also evident that there are varying underlying causes of people's vulnerability and this poses a challenge for reducing or minimizing vulnerability Proximity to the flood prone area (57%), residing in flood prone area and poverty (18%) were identified as being the main underlying causes of vulnerability by the Sikaunzwe community. The study has further demonstrated that effects of floods in one sector can affect other sectors of society. For instance as discussed under the health section, the outbreak of disease incidences (malaria, diarrhea and coughing) was attributed to the impact of floods on water sources and sanitation

facilities. The issue of water contamination of the river at the pick of floods and the handling of water from the borehole increases the health risk. Furthermore, although no health facility was damaged due to floods, accessibility to health services was a problem due to infrastructure (roads and bridges) damage as discussed under the health section. In addition school attendance was disrupted due to impassable roads as discussed under the education section.

From the study, it was clear that households cope differently when affected by floods. The current coping strategies being employed by most households are not very effective. Discussions at community and district levels established that the coping strategies were not sustainable because they had been using them and yet the situation did not seem to improve. The local communities coping capacities should not be underestimated but rather built upon. The focus must be on improving livelihood conditions of the people.

The communities should be encouraged to build houses using durable materials and away from the flood prone area as a way of coping with the floods. Further the Ministry of Agriculture and Cooperatives should through the Extension Services encourage the communities to increase the area cultivated on the upland to enhance the food security at household level. Input support programme for the vulnerable but viable farmers should be considered.

Clearly, there is need to develop better and appropriate measures (as discussed under the implications and recommendations sections) to prepare and mitigate the effects of the floods there-of. Above all, the aim must be to involve all the players to enhance communities' resilience to floods.

5.3. Recommendations

It is therefore appropriate in this chapter to highlight some policy consideration which, if implemented could play an important role in flood risk management. The following policy considerations are recommended:-

- Government and key stakeholders should engage communities in order for them to move permanently to higher grounds as they have expressed a willingness to relocate. The relocating should go with the provision of all the necessary socio amenities such as

schools, hospitals, infrastructure, water and agriculture support for a period of three (3) years to enable the households to settle. Consideration should also be made to introduce alternative livelihood strategies in the new area of settlement.

- There should be a deliberate policy to compel communities especially in rural areas to build house using durable materials and away from the flood prone areas.
- The Ministry of Agriculture and Cooperatives should through Extension Services encourage Communities to increase area cultivated on the upland in order to enhance food security and household level.
- The relevant authorities should delineate both the non-flood areas and flood areas. The non-flood areas can serve as a temporary shelter for the settlements during floods.
- Construction of dams should be considered to trap the excess water. This could be used for irrigation.
- Construction of canals into the main Zambezi river should be considered.
- Government and key Stakeholders should engage the communities and local authorities in making them aware of the flood risk in view of the climate variability.
- Community initiated mitigation measures should be promoted so as to build community resilience.
- In the long term, community based floods early warning system should be developed.
- Multi-sectoral approach to flood mitigation as opposed to single sector should be promoted as there are inter-linkages in terms of flood impact on various aspects of society.

5.3.1. Consideration for further research

- There is clearly a need for more research into the human adjustment to the flood hazard, particularly in terms of the perception and behavioral responses to floods. The aspect of early warning and how the information is utilized (what action is taken by the community when the warning is issued) should be investigated.

- There is need for further investigation (environmental impact assessment) on the proposal to construct canals in the flood affected area especially that floods are a natural phenomenon.

6.0. References

1. A Global Report on Reducing Disaster Risk: A Challenge for Development (2004), United Nations Development Programme, Bureau for Crisis Prevention and Recovery, New York, USA.
2. Adam, T.P. 1983. Technical Report on Southern African Storm Rainfall, Republic of South Africa. Department of Environment Affairs, Branch of Scientific Services.
3. African Wildlife: Who is to blame for Floods? 2000. Journal, 54 (3): 24-25.
4. Ariyanbandu, M.M. and Wackramasinghe, W.M. 2005. Gender Dimension in Disaster Management: A guide for South Asia: Sri Lanka.
5. Babbie, E. and Mouton, J. 2001.The Practice of Social Research. In Research Methodology: Practical Research Planning ND Design, 7th Edition, Study Guide for DIM 601.Bloemfontien: University of the Free State.
6. Babbie, E. and Mouton, J. 2001.The Practice of Social Research. Cape Town: Oxford University Press.
7. Bankoff, G. 2003. Constructing Vulnerability: The Historical, Natural and Social Generation of Flooding in Metropolitan Manila. Journal, 27 (3): 224-238.
8. Borrows, P. and De Bruin, D. 2006. The Management of Riverine Flood Risk. Journal, 55:5151-5157.
9. Brouwer, R., Akter, S.,Brander, L. and Haque, E. 2007. Socio-economic Vulnerability and Adaptation to Environmental Risk: A case study of Climate Change and Flooding in Bangladesh. Journal, 27 (2):313.
10. Carey, M.2005.Living and Dying with Glaciers: People's Historical Vulnerability to Avalanches and Outburst Floods in Peru. Journal, 47:122.
11. Carter, W. Nick. 1991. Disaster Management – Disaster Managers' Handbook. Manila, Philippines: Publication of the Asian Development Bank.
12. Crossman, M., Richardson, D. and Milne, J.2006. Proceedings of the In Civil Engineers. A partnership approach to Managing Flood Risk. Civil Engineering. Journal,159 (2):41-45.
13. Dixit, A. 2003. Floods and Vulnerability: Need to Rethink Flood Management. Journal, 28:155-179.

14. Douben, J.K. 2006. Characteristics of River floods and Flooding: A Global Overview, 1985-2003. Journal, 59:59-521.
15. Du Plessis, B. 1988. Drought, Floods a Major Setback. The Citizen. 17 March: 11
16. Emergency Management – Preparing for floods. (online) http://harnett-org/fire/flood_preparedness.asp.Retrieved :7June 2007.
17. Exploring the social impacts of floods risk and flooding in Scotland (April, 2007).(online) http://www. Scotland.gov.uk/publications/2007.Retrieved:28 February 2008.
18. Floodplain Management in Australia.1998.In Disaster risk Management Study Guide for DIM 605: Module 2.Bloemfontein: University of the Free State.
19. Gao, J., Nickum, E.J .and Pan, Y.2007.An Assessment of Flood Hazard Vulnerability in the Dongting Lake Region of China.Journal, 12:27-34.
20. Greg, B. 2003. Disasters: Constructing Vulnerability: The Historical, Natural and Social Generation of Flooding in Metropolitan Manila. Journal 27 (3): 224-238).
21. Grunfet, E. 1995. Hydro meteorological, impacts and Management of Extreme floods. (Paper presented at a workshop on long term social and economic impacts of extreme floods at the University of Colorado in November, 1995). Colorado springs, USA.
22. Handbook for estimating the socio-economic and environmental effects of Disasters. 2003. United Economic Commission for Latin America and the Caribbean (ECLAC) and International Bank for Reconstruction and Development.
23. Hansson, k., Danielson, M. and Ekenberg, L. 2008. A Framework for Evaluation of Flood Management Strategies. Journal, 86 (3):465-480.
24. Holmes, J. 2008. At Home But Homeless. Zambia Sunday Post. 26 October: 11
25. Huysamen, G.K.1993.Methodology for the Social and Behavioural Sciences. Halfway House, Pretoria: South Africa.
26. IRIN. 2008. Kenya: Thousands affected as Floods Submerge Farms. Humanitarian News Analysis, 5 November.
27. Khandlhela, M. and May, J. 2006. A study on Poverty, Vulnerability and the Impact of Flooding in the Limpopo Province, School of Development Studies, University of Kwazulu Natal, South Africa.

28. Kimbrough,E.P.,West,K.P.,Katz,J.,Leclerq,S.C.,Khartry,S.K. and Shreshtha,S.R.2007.Risk of Flood Related Mortality in Nepal.Journal,31(1):57-70.
29. Know Risk (2005), United Nations, Geneva, Switzerland.
30. Kundzewicz, Z.W., Budhakooncharoen, S., Bronstert, A., Hoff, H., Lettenmaier, D., Menzel, L. and Schulze, R. 2002. Natural Resources forum: Coping with Variability and change: Floods and Droughts. Journal, 26 (4): 263-274.
31. Lind, N.,Mahesh, P. and Nathwani, J. 2008. Structural Safety: Assessment and Affording the Control of Flood Risk. Journal 31 (2): 143-147.
32. Lindsell, K. M. and Prater, S. C. Abstract on "Assessing Community Impacts of National Disasters": 176-178 (electronic), National Hazard Review vol. 4, No. 4, November, 1, 2003.
33. Living with Risk (2002): A global Review of Disaster Reduction Initiatives, Geneva Switzerland.
34. Mirza, Q.M.M., Dixit, A. and Nishat, A. 2003. Natural Hazards. Journal 28:7.
35. Mohapatra, K.P. and Singh, D.R. 2003. Flood Management in India. Journal, 28:131-143.
36. Mustafa, D. 2002. Linking Access and Vulnerability: Perceptions of Irrigation and Flood Management in Pakistan. Journal, 34 (1):94-105.
37. Ninno, D.C., Dorosh, A.P. and Smith, C.L. 2003. Public Policy, Markets and Household Coping Strategies in Bangladesh: Avoiding a Food Security Crisis Following the 1998 floods. Journal, 31 (7):1221.
38. Nxumalo, S. 1984.Economy takes Battering on Swaziland. Rand Daily Mail.27 February: 2.
39. Nott, J. 2006. Extreme Events: A Physical Reconstruction and Risk Assessment. Cambridge University Press. New York.
40. OCHA. 2008. Situation Report 5-Southern Africa Floods. 31 January.
41. Parker, J.D. 2000. Floods. Tangler and Francis, National Academy Press, Asian Disaster Preparedness Centre, Thailand
42. Rashid, F.S. 2000. The Urban Poor in Dhaka City: Their Struggles and coping strategies during the floods of 1998. Journal, 24 (3): 240-253.
43. Report on The Regional Stakeholders Consultative Workshop on Disaster Risk Management held in December, 2004 in South Africa.

44. Sinclair, S. and Pegram, G. 2003. A Flood Nowcasting System for the eThekwini Metro, Volume 1: Urgent Nowcasting using Radar-An Integrated Pilot Study. Water Research Commission (WCR). Silowa Printers South Africa.
45. Smith, I.D. and Handmer, W.J. (eds). 1990 Losses and Lessons from The Sydney floods of August, 1986 (Volume 1): Prepared for Public Works Department of Water Resources, New South Wales. Environmental Management Pty Ltd, Sydney. Centre for Resource and Environmental Studies, Australian National University, Canberra.
46. Smith, K .and Ward, R. 1998. Floods: Physical processes and Human Impacts. John Wiley and son. England.
47. Smith, W.B. 1996. Coping as a Predictor of outcomes following the 1993 Midwest Flood. Journal, 11(2): 225-239.
48. Snoussi, M., Ouchani, T. and Niazi, S. 2008. Vulnerability Assessment of the Impact of sea-level rise and flooding on the Moroccan coast: The case of the Mediterranean East Zone. Journal, 77 (2):206-213.
49. Stephenson, S. R. 1991. Disaster Assessment (1st Edition), Disaster Management Training Program, UNDP
50. Strydom, H., Fouche C. B. and Delport C.S.L (Third edition). 2005. Research at Grassroots for Social Sciences and Human Service Professions.
51. Theron, M. 2007. Climate Change and Increasing Floods in Africa: Implication for Africa's Development.
52. UNDP. 2005. Human Development Report.
53. UNEP (2006): Gathering Storm: The Humanitarian Impact of Climate Change.
54. 3rd World Water Forum: Poverty and Floods (March, 2003). (online) http://www.adb.org/water/theme/floods.asp. Retrieved: 28February, 2008.
55. Zambia 2000 census of population and housing (Population Projection Report).
56. 2007 Zambia In-Depth Assessment of floods Report.
57. 2008 Zambia In-Depth Assessment of Floods Report
58. 2006 Concept Note on the Comprehensive Vulnerability and Needs Assessment for Zambia

59. Zahran, S., Brody, D.C., Peacook, G.W., Vedlitz, A. and Grover, H. 2008. Social Vulnerability and the Natural Built Environment: A model of Flood Casualties in Texas. Journal, 32 (4): 537-560.

7.0 APPENDRCES

Appendix 1: District and Community Questionnaire

AN IMPACT OF FLOODS ON THE SOCIO-ECONOMIC LIVELIHOOD OF PEOPLE: A CASE STUDY OF SIKAUNZWE COMMUNITY IN KAZUNGULA DISTRICT OF ZAMBIA.

Province Name :

District /Community Name :

Date of Interview :

1. Name of interviewee/s (To be administered only to key district officials and community members).

NAME	ORGANISATION	POSITION

2. <u>Livelihoods</u>

2.1. What are the three main sources of livelihood for most households in the district/ Sikaunzwe community?

_____
_____
_____
___

2.2. What are the three secondary sources of livelihood for most households in the district/ Sikaunzwe community?

_____

_____

_____

2.3. What are the three main sources of income?

_____

_____

_____

2.4. What are the three main sources of food?

_____

_____

_____

2.5. How would you describe the impact of the floods on people's livelihoods?

_____

_____

_____

3. Impact of Floods

3.1. How was the flood experienced different from other years (in terms of timing, level, etc) Is there any data available (Rainfall figures for example to back-up the observations of the district/ community members) *Note: Try to be as qualitative as possible – approximate. E.g. 20% more than rain in ten years.*

_____

_____

_____

_____

3.2. What was the effect of the flood on the following;

Areas	Level of Effect 1 = No Effect 2 = Moderate 3 = Severe	Comments/ Reasons
Crop (Production)		
Crop (Stocks)		
Livestock		
Health		
Water (Access)		

Sanitation(Access)		
Infrastructure		
Housing		
Property		

NOTE: Probe for both negative and positive effects

3.3. Geographical Spread of Flood Affected Areas.

3.3.1. Indicate areas affected by flood, giving an estimate of the people affected (use proportional pilling approach to estimate the % number of people affected).

Ward Name	Community Name	Total Population	Estimated Number of Flood affected population.

3.4. Were health facilities in the flooded area(s) affected? If yes, explain to what extent they were affected.

_____
_____
_____
_____
_____
_____

3.5. Was there any disruption in the access to health facilities? If yes, provide details of the disruption.

_____
_____
_____
_____

_____
_____

3.6. Was there an increase in disease outbreak/ incidents due to the floods?) Explain giving details of major health problems and age groups affected).

_____
_____
_____
_____
_____
_____

3.7. What are the common water sources in the community?

_____
_____
_____
_____
_____
_____

3.8. What percentage of the community water sources were affected by the floods?

_____
_____
_____
_____
_____
_____

3.9. Did the affected households experience any water accessibility problems?

_____
_____
_____
_____
_____
_____

3.10. What are the three main types of sanitary facilities used mostly in the district/Sikaunzwe Community?

_____
_____
_____
_____

3.11. What percentages of the commonly used sanitary facilities were affected by the floods? (Give estimates using proportional pilling approach)

_____
_____
_____
_____
_____
_____
_____

3.12. What type of infrastructure (road, bridges/ culverts) are available in the District/ Sikaunzwe community?

_____
_____
_____
_____
_____
_____
_____

3.13. What was the impact on the infrastructure?

_____
_____
_____
_____
_____
_____
_____

3.14. Was there any educational infrastructure affected by the floods in the district/Sikaunzwe community? If yes, provide details;

_____
_____
_____
_____
_____
_____

3.15. Was there any disruption in learning due to floods?

_____
_____
_____
_____
_____

_____
_____

3.16. Did the communities experience crop and livestock loss due to floods? Explain by giving details of losses and estimate population affected.

_____
_____
_____
_____
_____
_____
_____

3.17. What was the impact of the floods on people's houses?(Explain in detail)_____
_____
_____
_____
_____
_____
_____

4. Underlying Causes of Vulnerability to floods

4.1. What in your view are the underlying causes of vulnerability on the district/ community? Elaborate.

_____
_____
_____
_____
_____
_____
_____

4.2. Who are the most vulnerable groups?

_____
_____
_____
_____
_____

5. Coping Strategies

5.1. What is the normal pattern of flooding in the district/community? Explain

5.2. What are the three main coping strategies if any, that people of the district/ community employ during floods?

Positive Coping Strategies	**Negative Coping Strategies**

5.3. What are the development options that might address the flood patterns in both short and long term in the district/community?

Long term	**Short Term**
5.3.1	5.3.4
5.3.2	5.3.5
5.3.3	5.3.6

Appendix 2: Household Questionnaire

AN IMPACT OF FLOODS ON THE SOCIO-ECONOMIC LIVELIHOOD OF PEOPLE: A CASE STUDY OF SIKAUNZWE COMMUNITY IN KAZUNGULA DISTRICT OF ZAMBIA.

Province Name :

District Name :

Constituency Name :

Ward Name :

Community Name :

Questionnaire ID :

Date of Interview :

1. Household Demographics

1. Sex of Household Head	1 = Male 2 = Female	⌴
2. Sex of Main Respondent	1 = Male 2 = Female	⌴
3. Age of Head of Household	1 = Below 15yrs 2 = 16 – 19 yrs 3 = 20 – 39 yrs 4 = 40 – 59 yrs 5 = Above 60 yrs	⌴
4. Marital Status of household head	1 = Single 2 = Married 3 = Divorced 4 = Separated 5 = Widowed	⌴
5. Household Size – How many people eat and stay in the household permanently?	5a: Male: ⌴ ⌴	5b: Female: ⌴ ⌴

2. Livelihood Patterns

2.1. What is the major livelihood strategy of household? (rank 4 of them)

	RANK
1. Crop Production	
2. Trading	
3. Livestock production	
4. Beer brewing	
5. Fishing	
6. Charcoal Burning	
7. Horticultural production	
8. Manufacturing	
9. Wage labour	
10. Other; specify	

2.2. Indicate secondary livelihood strategies of the household (more than one answer possible)

Livelihood Strategy	Yes	No
Crop production		
Trading		
Livestock production		
Beer brewing		
Fishing		
Charcoal burning		
Horticultural production		
Manufacturing		

3. Flood Impact

3.1. Housing

3.1.1. Did your house collapse due to floods? 1 = Yes 2 = No – go to 3.3 ⊔ I

3.1.2. Did the collapsing of the house force you to relocate to a new area?
1 = Yes 2 = No ⊔

3.2. Property/ Asset

3.2.1. Did the house lose any of the following property or asset?

1 = Yes 2 = No ⊔

3.2.1.1.Bed ⊔

3.2.1.2.Fishing Net ⊔

3.2.1.3.Boat/ Canoe ⊔

3.2.1.4.Bicycle ⊔

3.2.1.5.Radio ⊔

3.2.1.6.Plough ⊔

3.2.1.7.Hoe ⊔

3.2.1.8.Ox – Cart ⊔

3.2.1.9.Television ⊔

3.2.1.10. Chairs ⊔

3.2.1.11. Others;

specify:_____

3.3. Agriculture

3.3.1. List three main staple crops that you grow:

3.3.1.1._____

3.3.1.2. _____

3.3.1.3._____

3.3.2. Did the household experience crop damage during the floods?

1 = Yes 2 = No ⊔

3.3.3. Was the main staple crop the one which was damaged? 1 = Yes 2 = No ⊔

3.3.4. Did the household experience any loss of food stocks during the floods? 1 = Yes 2 = No ⊔

3.4. Education

3.4.1. Are there any education facilities in your area?

1 = Yes 2 = No ⊔

3.4.2. Was there any damage to school infrastructure (classroom blocks, teacher's houses, toilets) due to the floods? 1 = Yes 2 = No ⊔

3.4.3. Did any of the school going children in your household experience any disruption in an attendance due to the floods?

1 = Yes 2 = No ⊔

3.4.4. If the answer to 3.4.3 above is yes, why? (Indicate main reason)

3.4.4.1.Road Impassable ⊔

3.4.4.2.Bridge Culvert washed away or Submerged ⊔

3.4.4.3.School submerged/ surrounded by water ⊔

3.5. Health

3.5.1. Are there any health facilities in your area?
1 = Yes 2 = No ⊔
3.5.2. Was there any damage to health facilities due to the floods?
1 = Yes 2 = No ⊔
3.5.3. Was there any disruption in access to health services due to the floods?
1 = Yes 2 = No ⊔
3.5.4. Did any of the household members get sick during the floods?
1 = Yes 2 = No ⊔
3.5.5. Which of the following diseases were experienced by the household members who got sick?
3.5.5.1.Diarrhea ⊔
3.5.5.2.Cough/ ARI ⊔
3.5.5.3.Malaria/ Fever ⊔
3.5.5.4.Measles ⊔
3.5.5.5.Others Specify_____

3.6. Water and Sanitation

3.6.1. What is your common source of drinking water?
3.6.1.1.Borehole ⊔
3.6.1.2.Protected well ⊔
3.6.1.3.Unprotected well ⊔
3.6.1.4.River ⊔
3.6.1.5.Spring ⊔
3.6.1.6.Other (Specify)_____
3.6.2. Was the main source of water affected by the floods? 1 = Yes 2 = No ⊔

3.6.3. What type of sanitary facilities do you have?
3.6.3.1.VIP ⊔
3.6.3.2.Sanplat ⊔
3.6.3.3.Reticulated Sewerage ⊔
3.6.3.4.Traditional Pit latrine ⊔
3.6.3.5.Others
(Specify)_____
3.6.4. Was your sanitary facility affected by the flood water? 1 = Yes 2 = No ⊔

4. Vulnerable Groups Due to Floods

4.1. Who are the most vulnerable households to floods? 1 = Male Headed 2 = Female Headed

4.2. What are the underlying causes of vulnerability?

4.2.1. Residing in a flood prone area. ⊔

4.2.2. Poverty ⊔

4.2.3. Lack of alternative livelihood(s) ⊔

5. Coping Strategies

5.1. What are the main coping strategies that you employ during floods? Rank them in order of importance.

5.1.1. _____

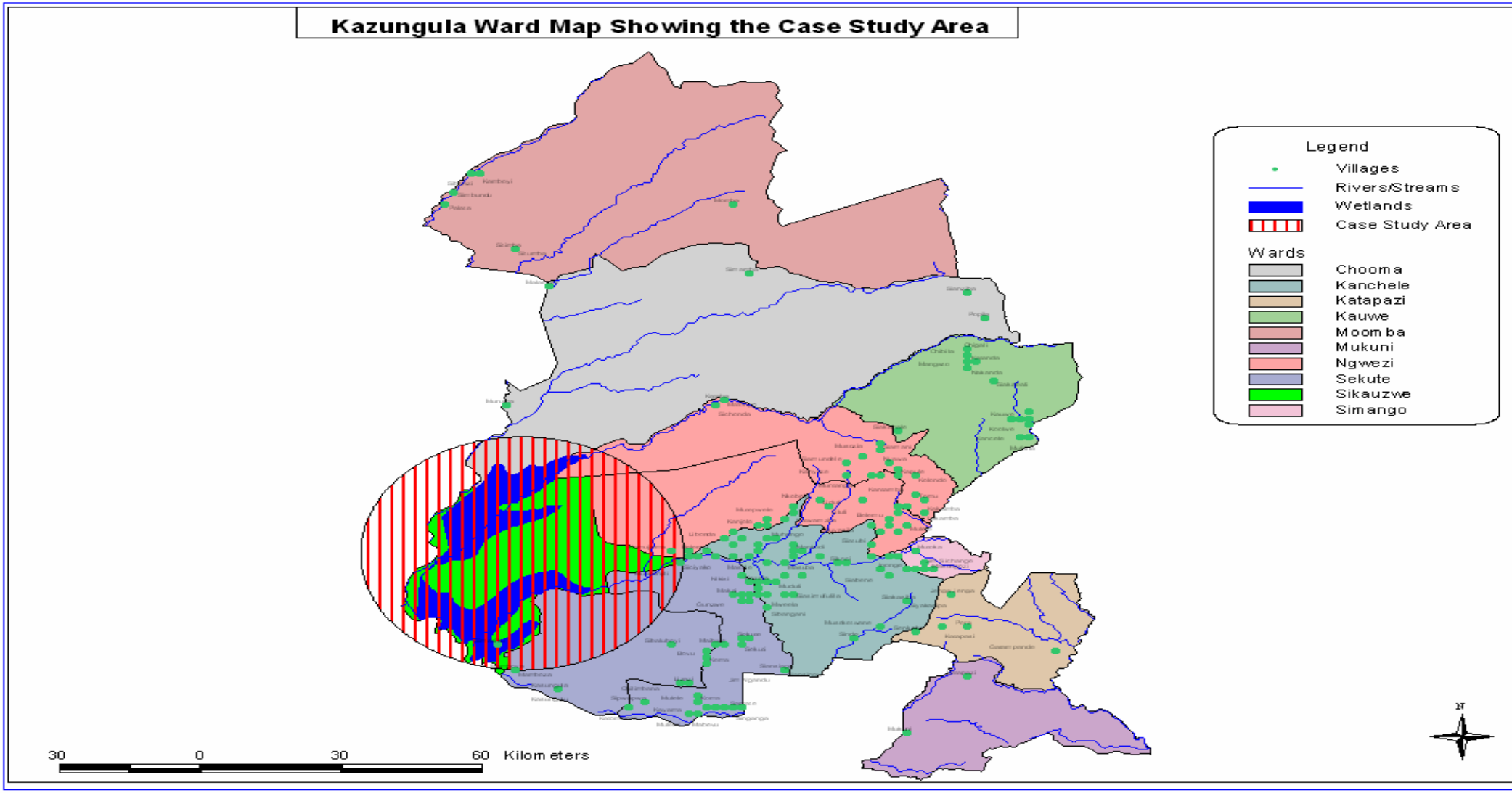
5.1.2. _____

5.1.3. _____

5.1.4. _____

5.1.5. _____

5.2. Are the above coping strategies effective? 1 = Yes 2 = No ⊔



Appendix 3: District Map showing Area covered by the study