USING THE COMMUNITY CAPITALS FRAMEWORK TO FORMULATE A RESILIENT INDEX FOR A COMMUNITY-BASED DISASTER RISK MANAGEMENT PROGRAMME IN MWANACHINGWALA WARD, MAZABUKA DISTRICT OF ZAMBIA

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DECLARATION

I, **Joseph Ivwananji Simukoko**, hereby declare that the work contained in this dissertation submitted for the degree of Masters in Disaster Risk Management at the University of the Free State, is my own original work, that all sources used or quoted, have been indicated and acknowledged by means of complete references, and that this dissertation was not previously submitted by me or any other person at any other university for a degree. I hereby forfeit any copyright of this thesis to the University of the Free State.

Signature:…… Date:……..

DEDICATION

I dedicate this thesis to my late father Dr. Youngson Titus Simukoko and my late sister Lena Namukoko who taught me to believe in myself, believe in hard work and follow my dreams.

ACKNOWLEDGEMENT

I wish to express my sincere gratitude and appreciation to the following individuals and institutions that contributed in many ways to the completion of this thesis:

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- My children Salma and Temwanji Namukoko for accommodating my studies.
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- Not forgetting the entire staff of the Disaster Management Training Centre for Africa at the University of Free State.

ABSTRACT

This study was undertaken to propose a resilience index that could be used to evaluate Community Based Disaster Risk Management (CBDRM) efforts at community level by the community actors. The community capitals framework was used to formulate the resilience index to evaluate a CBDRM programme in Mwanachingwala Ward; Mazabuka District of Zambia. The focus area for this study was selected because it had an active CBDRM programme being implemented. It has been noted in literature that while community-based approaches to disaster risk management have increased in popularity in recent years, it is difficult to show their contribution to the improvement of community resilience (Zwi *et al*., 2013).Without an index to measure community-based disaster risk management efforts, improvements on disaster risk capacity will be difficult to report. There is, therefore, a need for more accurate, systematic and clear information on how community resilience can be measured especially by community actors so as to evaluate whether their efforts translate into community resilience building (Zwi *et al*., 2013).

The study intended to achieve the following objectives; firstly, it explored the definition of community resilience with a focus on community based disaster risk management (CBDRM) and thus provided the relationship between CBDRM and the measurement of community resilience. Lastly the study proposed a Community Resilience Index (CRi) using the community capitals framework. The study followed both a quantitative and qualitative research design approach that involved direct assessment. The indicators used to measure the community capitals were developed in consultation with the Mazabuka District Disaster Management Committee.

The overall community resilience index for Mwanachingwala was found to be approximately 3 out of a maximum of 5. However, because the study followed a cross-section time horizon, these results are a snap shot of what was attaining at the time of the study. As such, the proposed CRi did not capture both the spatial and temporal dimensions of community resilience and lacks the ability to predict the future status of community resilience. The CRi therefore, can only be used to suggest improvements to CBDRM programming and selection of supportive interventions. As such the following indicators were found to require supportive interventions to be implemented in order to improve the respective community capital domains:

- Both the capacity of the community to organise itself and Community Ownership of CBDRM process were found to be low under cultural capital;
- There is low participation of community members in community-based disaster risk management activities under human capital;
- There are poor relationships of trust under social capital;
- There is low political will by disaster management structures to sustain the CBDRM efforts under political capital;
- There is low access to financial services and low stability of household income under financial capital domain.

From the findings of this study, gathered from the data analysed, it can be concluded that the overall goal of this research, which was to develop a conceptual and methodological framework for the analysis, measurement, and mapping of community resilience using the community capitals framework as a resilience index, was partly achieved. The resilience index developed in this study was derived from the community capitals framework and appeared to be theoretically sound. However, the CRi lacked in depth in terms of the indicators used. The weighting was found to be very subjective and as such requires the use of methods that included statistical models and expert judgments. The study concludes that the community capital framework has the potential to be used as a resilience index if these considerations are put in place.

The following are recommendations for future research based on the research limitations.

- While the study provided a simplified framework that can be used by community actors in a CBDRM programme; the framework uses a few indicators of the Community Capital Framework to generalise the level of resilience. Future research should aim at replicating the proposed methodology with a more conclusive list of indicators with a more robust scientific basis for weighting.

- This study did not determine resilience thresholds for different hazard magnitudes. As there are multiple stable states in different community systems, it is important to know the interconnections of the community capitals that allow communities absorb the impact of hazards. Future research should, therefore, present results that specify what hazards and to what magnitude of these hazards in the community under the study is or not resilient to.

- Most of the data pertaining to community resilience in Zambia is in the form of national averages and statistics. Therefore, future research should focus on cascading these statics to the local level through the collection of field survey data to fill the information gap.
- This study employed a cross-section research time horizon which lacks the ability to predict the future status of community disaster resilience. Future research should, therefore, focus on capturing both the spatial and temporal dimensions of community resilience using a longitudinal research time horizon.

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ACRONYMS

ABCD	Asset Based Community Development
ADPC	Asian Disaster Preparedness Centre
AI	Appreciative Inquiry
ANOVA	Analysis of Variance
CBDRM	Community-Based Disaster Risk Management
CCF	Community Capitals Framework
CFAARM	Consortium for Food Security Agriculture and Nutrition
COVACA	Community Owned Vulnerability and Capacity Assessment
CRS	Catholic Relief Services
CSO	Central Statistics Officers
DDMC	District Disaster Management Committee
DMA	Disaster Management Act
DMMU	Disaster Management and Mitigation Unit
DRR	Disaster Risk Reduction
ERDM	Emergency Relief Disaster Management
FGD	Focus Group Discussion
GAR	Global Assessment Report
GRZ	Government of the Republic of Zambia
IPCC	Inter-governmental Panel of Climate Change
MAL	Ministry of Agriculture and Livestock
MDMC	Mazabuka District Municipal Council
NAIP	National Agriculture Investment Plan
NGO	Non-Governmental Organisation
SDMC	Satellite Disaster Management Committee
SLA	Sustainable Livelihood Approach

UN	United Nations
UNDP	United Nations Development Program
UNESCO	United Nations Educational Scientific and Cultural Organisation
UNISDR	United Nations - International Strategy for Disaster Reduction
USAID	United States Agency for International Development
WVZ	World Vision Zambia

DEFINITIONS OF TERMS

Community-Based Disaster Risk Management (CBDRM): Is an approach that aims at reducing local disaster risks through the application of participatory assessment and planning methods. In essence, it aims at reducing vulnerabilities and strengthening people's capacities to manage specific disaster risks, (DMMU, 2014).

Copying Capacity: This is the ability of people, organisations and systems, using available skills and resources, to manage adverse conditions, risk or disasters (UN/ ISDR, 2015).

Disaster: Disaster refers to a natural or human induced occurrence that causes death, destruction or extensive damage to infrastructure, environment or property. The event outstrips the coping capacity of the affected person or community (DMMU, 2014)**.**

Disaster Risk: Disaster Risk denotes the potential disaster losses that a community is likely to incur such as lives, health status, assets and properties. The definition of disaster risk reflects the concept of disasters as the outcome of continuously present conditions of risk in a community (DMMU, 2014).

Disaster Risk Management (DRM): DRM refers to the systematic process of using administrative decisions, organisation, operational skills and capacities of the society and communities to lessen the impact of natural hazards and related environmental and technological disasters (DMMU, 2014).

Disaster Risk Reduction: Disaster Risk Reduction refers to concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, reduced vulnerability of people and their property, wise management of land and the environment and improved preparedness for adverse impacts (DMMU, 2014).

Early Warning Information: Early warning information refers to the collection of indigenous and scientific knowledge which can be analysed and disseminated to a community threatened by a shock/hazard (DMMU, 2014).

Early Warning Systems: The set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities and organisations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss (DMMU, 2014).

Hazard: A potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation (UN/ ISDR, 2015).

Impact: Represents the overall effects of a disaster, including negative and possibly positive ones (UN/ ISDR, 2015).

Manageability: The capacity to respond to needs created by a disaster on the one hand; this measures the organisational capacity of national disaster programmes, the Red Cross/Red Crescent activities and NGOs, but also addresses the capacity within the affected communities to cope with calamities (UN/ ISDR, 2015)..

Mitigation: Mitigation refers to structural and non-structural measures undertaken to lessen the adverse impact of a shock/hazard and related disasters. In this manual, it entails individual/collective measures undertaken by the community to minimise the negative impact of shocks and disasters (DMMU, 2014).

Preparedness: Preparedness refers to measures undertaken by the community before a disaster strikes. This entails having robust plans, structures and equipment in place, skill and well trained community members, early warning systems that take precautions and the capacity to facilitate a rapid response (DMMU, 2014).

Prevention: Prevention refers to activities carried out by the local community to out rightly avoid occurrence of a shock/hazard and related disasters (DMMU, 2014).

Recovery: The restoration and improvement where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors (DMMU, 2014).

Resilience: The capacity of social, economic, and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganising ways that maintain their essential function, identity, and structure, while also maintaining the capacity for adaptation, learning, and transformation (IPCC, 2014).

Response: The provision of emergency services and public assistance during or immediately after a disaster in order to save lives; reduce health impacts; ensure public safety and; meet the basic subsistence needs of the people affected (DMMU, 2014).

Risk: Risk is the likelihood/probability that a hazard will cause/trigger a shock/disaster. It is dependent on the nature of the hazard, the vulnerability and the capacity of the group/community to anticipate, prepare for, cope with and bounce back from the negative effects of a shock/disaster (DMMU, 2014). The equation for Risk is expressed as follows:

$$R = \frac{Hazard * Vulnerability}{Capacity}$$

Risk Assessment: A methodology to determine the nature and extent of risk by analysing potential hazards and evaluating existing conditions of vulnerability that together could potentially harm exposed people, property, services, livelihoods and the environment on which they depend (DMMU, 2014).

Risk management: The systematic approach and practice of managing uncertainty to minimise potential harm and loss (DMMU, 2014).

Vulnerability: The conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards (UN/ ISDR, 2015).

CHAPTER ONE: INTRODUCTION AND BACKGROUND

1.0 INTRODUCTION

People in rural areas of developing countries are particularly vulnerable to disasters as they often live in high-risk areas, have lower coping capacities, and have limited or no risk cover in the form of insurance or other safety nets, (Info Resources, 2009). Additionally, they are heavily dependent on climate-sensitive primary industries – notably agriculture, forestry or fisheries, (Info Resources, 2009). The majority of households in Mwanachingwala ward, Mazabuka District of Zambia derive their livelihood from agricultural production, however, over the years it has declined drastically and this has adversely impacted the local people's livelihood and means of sustenance (MDMC, 2014).This has resulted in food insecurity in the area due to low agricultural productivity. Food availability also varies from one month to the other during the year (MDMC, 2014).

The Zambian National Agriculture Investment Plan (NAIP) proposes a policy framework which mainstreams disaster risk management strategies to complement agricultural production and productivity for food insecurity challenges to be properly addressed (MAL, 2013). This is under the Fourth Investment Programme of the NAIP; Food and Nutrition Security and Disaster Risk Management. The NAIP notes that there still remains a gap in the agriculture sector to provide the products and services required by farmers and practitioners to ensure food security and disaster risk management. The NAIP further notes that there are a number of knowledge support systems that need to be strengthened and developed. One such system is the adoption of Community-Based Disaster Risk Management (CBDRM) by the Disaster Management and Mitigation Unit (DDMU) which is aimed at enhancing community capacities to initiate and sustain local development. This has provided a framework for the implementation of disaster risk reduction programmes aimed at fostering sustainable livelihoods and addressing food insecurity (DMMU, 2014).

While community-based approaches to disaster risk management have increased in popularity in recent years, it is difficult to show their contribution to the improvement of community resilience

(Zwi *et al*., 2013). The primary focus of the CBDRM in the study area is enhancing community resilience in the face of natural disasters and climate change. Despite this being the goal of the CBDRM programme, evaluation reports do not point at any community resilience building indicators. Without an index to measure community-based disaster risk management efforts, improvements on disaster risk capacity will be difficult to report. Furthermore, CBDRM programmes require external processes for effective monitoring and evaluation. This is because of the complexity of measuring resilience indicators. This has resulted in a divorce from the community driven process in monitoring and evaluating CBDRM efforts leaving community unaware if their efforts are translating into increased community resilience or not. This study was undertaken to propose a resilience index that could be used to evaluate CBDRM efforts at community level by the community actors. The community capitals framework was used to formulate the resilience index and the CBDRM programme in Mwanachingwala Ward; Mazabuka District of Zambia was evaluated.

1.1 BACKGROUND OF THE RESEARCH PROBLEM

The people of the Mwanachingwala Ward are extremely susceptible to natural hazards (MDMC, 2014). According to the Mazabuka District Situation Analysis Report of 2014, over the past 30 years, several hazards have occurred; these include droughts, floods, and disease outbreaks in cattle, pest attacks on crops resulting in destruction of property, livelihoods and the loss of life (MDMC, 2014).

Table 1.1: Hazard occurrence in Mwanachingwala ward over the last 30 years

Hazard	**Years**	**Number of occurrence in last 30 years**	**Impact**
Drought	1982-1983 1992-1993 1997-1998 2002-2003 2006-2007 2012-2013	6	. Less food available . Increased malnutrition incidence . Increased divorce cases . Reduced school attendance . Increased stress related death cases . Increased migration of youth . Reduced household income . Increased prostitution and theft
Floods	1984-1985 1988-1989 1995-1996 1998-1999 2007-2008 2011-2012	6	. Increased food insecurity . Crop failure . Reduced access to remote areas . Animals, crop fields and properties were destroyed . Houses collapsed . Children stopped going to school
Incidences of cattle diseases (i.e. tick bourne diseases, foot and mouth disease, lumpy skin disease)	1989 1996 1999 2008 2012	5	. Increased death of cattle . Reduced animal draught power leading reduced planting hectares . Reduction of household income
Pest attacks on crops (i.e. Larger grain borer, army worms, yellow aphids)	2003 2004 2005 2012	4	. Reduced food availability in households . Reduced household income

Source: (MDMC, 2014)

The table shows how susceptible the people in Mwanachingwala Ward are to hazards based on the number of occurrences of natural hazards in the area. These hazards resulted in destruction of property, livelihoods and the loss of life (MDMC, 2014). The same report further describes the Ward, as being predominantly agrarian with more than 85% of the population dependent on subsistence agriculture. The occurrence and impact of hydrological hazards such as drought in Southern Province, which includes Mwanachingwla, has led to severe consequences in the past, (Chijikwa, 2012). This was the case with the drought that occurred in the early 2000s. Lyons *et al.*, (2000) point out how over 1,000,000 people of Southern Province of Zambia, which includes the populations of Mwanachingwala Ward, experienced large food shortages, (Lyons *et al*., 2000).

According to the Zambia National Agriculture Investment Plan (NAIP) the capacity of government agencies to reach down to community level on issues to do with disaster risk management is limited (MAL, 2013). This is despite the Disaster Management Act Number 13 of 2010 placing the primary responsibility for coordinating disaster risk management and emergency response at District level to District Disaster Management Committees (GRZ, 2010). According to the 2014, Mazabuka District Situation Analysis Report, the Mazabuka District Disaster Management Committee has scored some success but is limited in its capacity to operate at ward level due to inadequate resources (MDMC, 2014).

In trying to address the resource constraints, concerted efforts by different entities (the government, NGO's and other stakeholders) were engaged to implement different community-based disaster risk management programmes in Mazabuka District in the Republic of Zambia, (WVZ, 2012). Mwanachingwala Ward was one of the wards that benefited from these programmes that run in Magoye Constituency, in Mazabuka District of Zambia. The initial programme was a United States Agency for International Development (USAID) Office of Food for Peace programme in 2006. This was a five-year programme managed through a consortium to implement a programme for food security activities (USAID, 2010). The name of this initiative was called the Consortium for Food Security, Agriculture and Nutrition, AIDS, Resiliency, and Markets (CFAARM) and it included Catholic Relief Services (CRS), CARE International, World Vision, and Land O' Lakes, with CRS as the lead organisation (USAID, 2010).

CFAARM project introduced the first community-based approach in disaster risk management called Emergency Relief and Disaster Management (ERDM) approach from 2008 to 2010, (WVZ, 2012). In 2010, another approach was implemented in the ward through an initiative called Africa Community Resilience Project, which was a follow-up to a similar project in Ethiopia with the same name (Maxwell *et al*., 2009). The project empowered community members with the skill to conduct their own vulnerability and capacity assessments through what was termed Community owned Vulnerability and Capacity Assessment (CoVACA), (WVZ, 2012). This was a 3-year initiative that ended in 2012. In 2013, World Vision Zambia, using another approach in resilience programming adapted from Mozambique began to implement a holistic process that the community is empowered with knowledge of how to identify, manage and respond to a range of risks associated with their social, economic and environmental context (Jamal, 2011).

According to the World Vision Zambia, Africa Community Resilience Project baseline report of 2011, coordination between governments and other stakeholders at the ward level was found to be weak (WVZ, 2012). This was due to the few opportunities for people in Mwanachingwala Ward to contribute to the on-going dialogue about how to mitigate the impacts of natural disasters and climate change (WVZ, 2012). The same report also notes that women's roles in the household, were only associated with child bearing and caring for the family, and their work as producers and managers was unlikely to be valued. Therefore, women remained distanced from decision-making processes, were vulnerable to exploitation and abuse, and had fewer opportunities for education and employment (WVZ, 2012).

The World Vision Zambia Magoye Area Development Programme Community Based Disaster Risk Management programme sought to address these focal problems and challenges above with a primary focus on enhancing community resilience in the face of natural disasters and climate change. The programme partnered with seven target wards in, Mazabuka District one of which was Mwanachingwala Ward the focus area for this study. In particular, this programme aimed to provide all community members – adults (men & women), youth and children with improved capacities to plan, prepare for and mitigate potential disasters and improve and protect their livelihoods from the impacts of climate change and natural disasters (WVZ, 2012).

As with the other community-based approaches to disaster risk management that were implemented in Mwanachingwala Ward the CBDRM evaluation reports do not point at any community resilience building indicators. This is consistent with what Zwi *et al*., (2013) say about attempts made by some NGO's to evaluate community-based disaster risk management programmes. The same authors attest to going through reports are that are fairly general with no clear definition of community resilience and even when they do provide a theoretical framework, it just provides stakeholder's activities with recommendations for future sustainability but nothing on impact (Zwi *et al*., 2013). There is, therefore, a need for more accurate, systematic and clear information on how community resilience can be measured especially by community actors so as to evaluate whether their efforts translate into community resilience building (Zwi *et al*., 2013).

1.2 DESCRIPTION OF STUDY AREA

This section discusses some aspects of the general physical characteristics of the study area.

1.2.1 Location of study site

The study was conducted in Mwanachingwala Ward, which is situated in the Southern Province of Zambia in Mazabuka District. Mazabuka District lies at an altitude of approximately 975 Meters above sea level (Chijikwa, 2012). Mwanachingwala is located at latitude 16° 2' 0" South and longitude 27° 37' 0" East, (WVZ, 2011). This area was selected because it is the location of an active Community-Based Disaster Risk Management Programme with the goal of building community resilience.

Mwanachingwala lies within the North-western side of the district of Mazabuka in the Southern Province of Zambia. It is part of the vast piece of land characterised geographically by the Kafue flats which are a wide flood plain and a river valley. Scattered throughout the area are a series of traditional villages organised around small farm holdings. Predominantly, the people of Mwanachingwala are Tonga and are governed by a traditional system of headmen and tribal chiefs. According to the 2010 Zambian Census conducted by the Central Statistics Office (CSO),

Mwanachingwala Ward consists of 2,125 households accounting for 11,742 people of whom 5,898 are males and 5,844 are females (CSO, 2012).

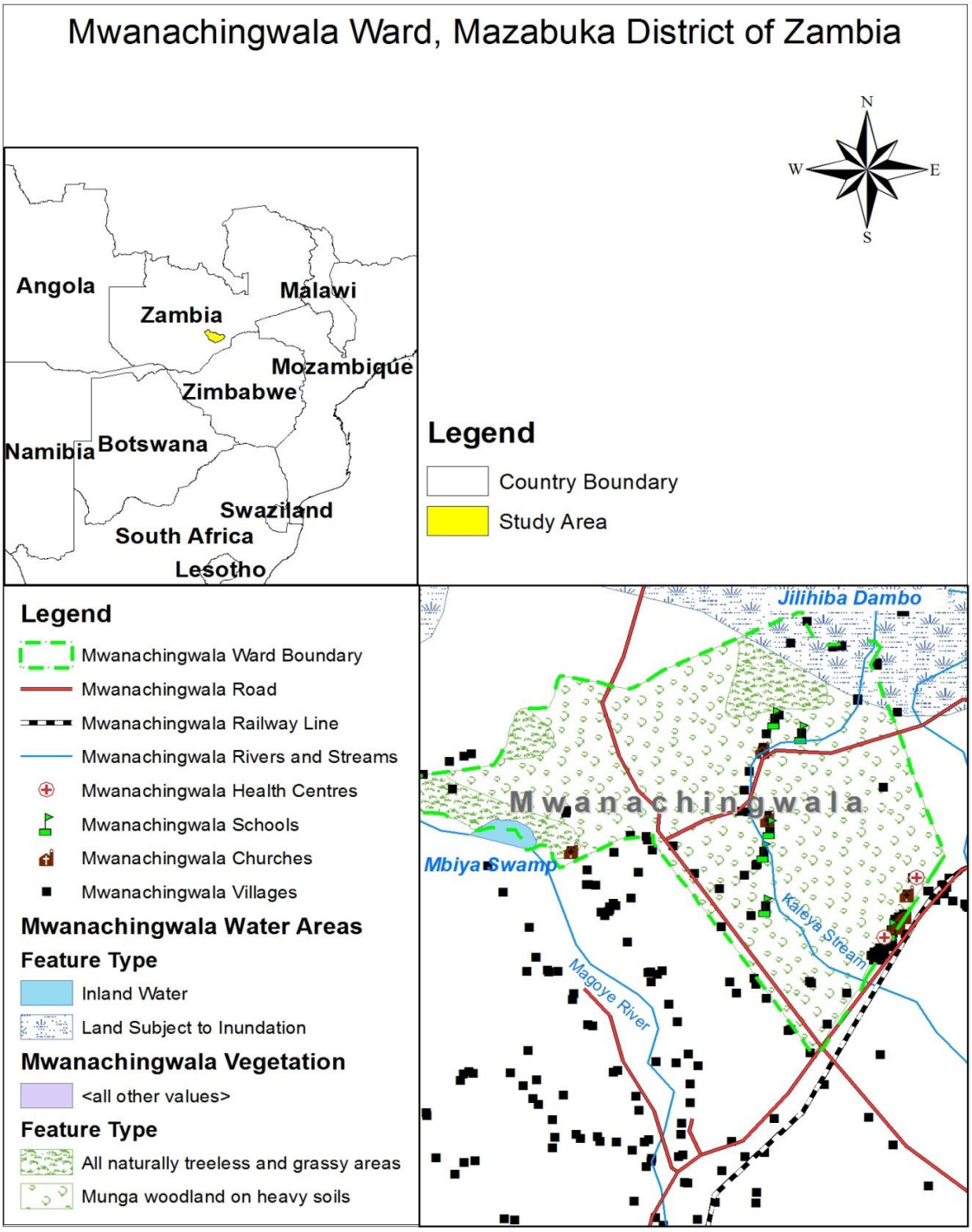


Figure 1.1: Map showing Mwanachingwala ward

Source: Central Statistics Office

1.2.2 Economic Development

From the wealth categorisation exercises and wealth ranking conducted by World Vision Zambia, the majority of the people of the Ward fall under the poor domain (WVZ, 2011). The reports present 3 categories of wealth classification, which includes the rich, the middle class and those who are very poor and vulnerable. Wealth in the Ward was found to be looked at in terms of assets possessed by a household. These assets included the number of livestock one has, the type of house one sleeps in and the number of wives and children a man has whereby a man with more wives and children is being regarded as having more wealth (WVZ, 2011).

Most households survive by engaging in small-scale farming activities including the cultivation of crops and the tending of small herds of livestock (Chijikwa, 2012). In the past, this combination of production allowed families to maintain a level of existence that was not extravagant but was sufficient to meet basic needs (WVZ, 2011). However, much has changed over recent years due to natural disasters and the outbreak of livestock diseases in cattle (i.e. tick-borne diseases, foot and mouth disease and lumpy skin disease) (WVZ, 2012). The recurrent droughts and livestock disease outbreaks have kept the economic status of the community low. Apart from farming, a portion of the community is involved in fishing and others work seasonally for the Zambia Sugar and other commercial farms growing sugar canes (Chijikwa, 2012).

Recent cycles of drought and flooding have led to lower than average harvests over the past several agricultural cycles (Chijikwa, 2012). As the area is historically prone to intermittent rainfall patterns, the production of livestock plays an important role in the economic stability of farm households (Chijikwa, 2012). However, the outbreak of disease wiped out many thousands of animals over the past 10 years. Corridor disease was particularly deadly in its attack on cattle (Chijikwa, 2012). In addition, much of the poultry population was eliminated by an outbreak of Newcastle disease (Chijikwa, 2012). This asset depletion devastated the already fragile household economies (WVZ, 2011).

1.2.3 Climatic and General Weather Conditions

Mwanachingwala Ward constitutes of a predominantly small-scale peasant farmers' community whose main economic activity is rain-fed field crop production, livestock keeping and to a limited extent, vegetable production (MDMC, 2014). Mwanachingwala Ward is located in Zambia's agro-ecological region II (Chijikwa, 2012). This region is characterised by medium rainfall, with mean annual rainfall ranging from 800 – 1000 mm per annum (Nilsson, 2012). Important to note is that over 90% of smallholder crop production in this area is rain-fed, therefore, rainfall is a critical factor for selecting crops, their planting time, the timing and intensity of input and labour use (Chijikwa, 2012).Temperatures are low to medium and the growing season ranges from100 – 140 days. In general, three seasons can be identified throughout the year,hot, rainy and cold season. The rainy season stretches from the end of October to early April (Chijikwa, 2012).

These climatic conditions are adequate to support the mainstay of the people, agriculture. The main food crop grown is maize (Chijikwa, 2012). Most crops are grown for household food security with only a little local trade within the area. Cotton is the major cash crop grown in this area (Chijikwa, 2012). Sunflower was another cash crop grown but it is grown to a limited extent due to lack of a definite market for the commodity (Chijikwa, 2012). Other traditional crops grown in Mwanachingwala are groundnuts, sorghum, sweet potatoes, cow peas, vegetables, and fruits (WVZ, 2011).

The main livestock supported by this climate are cattle, goats, pigs, and chickens (Chijikwa, 2012). Cattle are an important asset to farmers in this area, as it cushions against shocks and shortfalls in consumptions; since they can be sold for smooth food consumption, pay for school fees or buy medicines (Chijikwa, 2012). Cattle are also used as animal draft power. This area is prone to weather extremes where both droughts and floods are regular problems.

1.2.4 Soil Type and Drainage

As an agrarian society, soil is very important as it influences crop yield and depending on the type of soil that is predominant in the area, it can increase the susceptibility of a community to hydrological hazards such as drought. Mwanachingwala has soils that are generally predominant

in Agro-ecological Region II. These soils are moderately leached sandy loams (Chijikwa, 2012). The soils are characterised by high acidity, poor nutrient retention, low water holding capacity, the dominance of coarse textured top soils (abrupt textural change) and severe topsoil capping which results in seedling emergence problems (Chijikwa, 2012). Soil analysis tests revealed that Mwanachingwala soils are 71% sand, 13% silt, and 16% clay. The pH of soil ranged from 4.2 – 5.2 indicating that the soils are acidic in nature. The total nitrogen availability in the soil was approximately 16 mg/kg, phosphorus levels were 7 mg/kg (very low), and potassium levels were 160 mg/kg (very high) (Chijikwa, 2012).

Drainage in the Ward includes MagoyeRiver, Mbiya Swamp, Jilihiba Dambo (a shallow wetland area) and Kaleya stream, (WVZ, 2011). These form important sources of water for livestock and vegetable gardening is done along the banks of the rivers and streams and dambo and swampy areas of the ward (WVZ, 2011).

1.2.5 Social Set-up

Mwanachingwala Ward is predominantly inhabited by the Tonga speaking people. The Ward is considered rural with the people of the Ward settled in villages, which have no distinct pattern, but scattered in what appears like farmsteads, (MDMC, 2014). The villages fall under the traditional system of governance, hence are led by Headmen who report to the Chief, (MDMC, 2014). Tonga is both the predominant tribe and language spoken by the inhabitants of Mwanachingwala (MDMC, 2014).

As per Tonga tradition, most of the rural community lives in extended families. The advantage of the extended family is that it provides security for families, as they are able to help each other in times of crises and they also assist each other during the farming season, (MDMC, 2014). The households are predominantly dominated by men, in decision-making and ownership of assets and have much greater access to land and credit in spite of the active role that women play in the home (MDMC, 2014). The dominance of men in homes perpetuated men's prestige and power within the family and the society.

From the World Vision Zambia MagoyeADP, Social Mapping report of 2011, Mwanachingwla Ward was found to have four schools offering primary education, one rural health centre, and 29

Churches (WVZ, 2011). In 2013, the first High School called Makoye Secondary School was opened in the Ward (MDMC, 2014).

According to the African Community Resilience Project baseline report (2012) that covered Magoye Constituency of which Mwanachingwala Ward is a part,80.2% of the sample population of the respondents were married, 5.0 % single, while 8.7% and 1.4% account for widows and widowers respectively. Those divorced are only 4.7% (WVZ, 2012). Households are arguably the most fundamental units used in the analysis of economic and demographic behaviour and the decisions taken at a household level are crucial for economic development (Renneboog & Spaengers, 2012). For example, decisions relating to family, savings, and investment in human capital are all instrumental in fostering a fruitful environment for development (Renneboog & Spaengers, 2012). Single-headed households tend to have challenges in maintaining households and all that is required to run a household (Renneboog & Spaengers, 2012).

Mwanachingwala Ward has two rural health centres. According to the 2010 census of population and housing, Mwanachingwala comprises of an under-five population of 20% of the total population (CSO, 2012). However, from the 2013/14 Zambia Health Demographic Survey, the deaths in this age group amount to 29% of all deaths per annum, (CSO, 2015). Among the top causes of death, malaria ranks first followed by respiratory infections diarrhoea, malnutrition, and anaemia. Mwanachingwala Ward mirrors the district average of 13% HIV prevalence rate meaning one out of every seven adults is infected by HIV (MDMC, 2014). For a rural area, this is considered very high.

1.2.6 Political Set-up

Mwanachingwala Ward is one of the 9 Wards in Magoye Constituency (MDMC, 2014). An area member of the Zambian Parliament oversees the Magoye Constituency. Mwanachingwala Ward is administered by a Ward Councillor (MDMC, 2014). The Ward consists of villages which fall under the jurisdiction of a village headman or woman who acts as an arbitrator in the village. In other words, he/she is involved in settling disputes, land allocation in conjunction with the Chief, ensuring that the local community participates in decisions concerning development and trying to strengthen unity among the subjects. The village headman of an area falls under the umbrella of the traditional councillor who is appointed by the Chief and acts as a spokesman for his

community. Furthermore, he is a technical advisor to the Chief and supports him in the day to day activities. Above the traditional councilors is the Chief as the head of the chiefdom. He exercises limited legislative, executive and administrative powers. He is the custodian of law and order, the community's customs, and general welfare as well as being a symbol of unity in the chiefdom (MDMC, 2014).

1.3 RESEARCH QUESTIONS

The main research question reads as follows: Can the community capitals framework be used as resilience index to evaluate community-based disaster risk management programmes? The sub-questions are as follows:

- What is community resilience?
- What is the relationship between community resilience and community-based disaster risk management?
- What is the level of community resilience in Mwanachingwala Ward, Mazabuka District of Zambia?

1.4 AIM AND OBJECTIVES OF STUDY

1.4.1 Research Aim

The aim of this study was to develop a conceptual and methodological framework for the analysis, measurement, and mapping of community resilience using the community capitals framework as a resilience index.

1.4.2 Research Objectives

Saunders *et al*., (2009) describe the research purpose as the organisation of research objectives. The research purpose can be seen as the question the research project seeks to answer, (Saunders *et al*., 2009). Research purpose can refer to the use of exploratory, descriptive or explanatory research, (Yin, 2003). Saunders *et al*., (2009), explain that this is dependent on the research questions. They also explain that it is also possible for a research question to be both descriptive and explanatory, therefore; a research project may have more than one purpose. Robson, (2002) further suggests that a research purpose or inquiry may change over time. This study implored a descriptive research as the research purpose. Descriptive research is the portrayal of the profile

of persons, events or situations, (Robson, 2002). The descriptive profile of the community using the community capitals entails that the study was indeed a descriptive research.

The overall objective of this study was to provide an empirical basis for community resilience measurement for community actors in CBDRM Programmes. In view of this overall objective, this study seeks to address the following:

1.4.3 Sub-objectives

- To understand what community resilience is;
- To understand the relationship between community resilience and CBDRM.

1.5 METHODOLOGY

1.5.1 Research Design

The study followed both quantitative and qualitative research design approach that involved direct assessment. This is because the study required a combination of participant observations, interviews, and historical research. Saunders *et al.*, (2009) define quantitative design as being the prominent use of questionnaires for data collection and data analysis procedure yielding numerical data such as statistics. In contrast, Saunders *et al.*, (2009), describe qualitative data collection as being predominantly in the form of interviews and data analysis procedures that generate or use non-numerical data. The study required an understanding of the specific background of the context of Mwanachingwala Ward and involved spending a lot of time with the community. The raw data were collected directly with the help of community members. The indicators used to measure the community capitals were developed in consultation with the Mazabuka District Disaster Management Committee and after pre-testing they were refined for consistency and accuracy.

1.5.2 Population and Sampling

The two-stage cluster sampling/probability proportion to size cluster sampling was used. The first stage cluster sampling method was purposive, based on the selection of 3 zones which make up Mwanachingwala Ward, Mazabuka District of Zambia. The second stage was a random sampling of households within each of the 3 zones, by each enumerator taking a direction and

transect from house to house until their quota is filled. In practice, it is necessary to include almost every household where there is an adult willing to participate in the survey.

A sample of 95 households of the 2,125 households in Mwanachingwala was required based on the following considerations:

- Confidence level 95%
- Confidence interval 10

1.5.3 Data Collection Tools

Household Interviews: Once the evaluation team arrived in a new community and the village headman granted permission to conduct the household survey, the household interviews would commence. Five interviewers were engaged and oriented on how to administer the questionnaire prior to the survey. They were then fanned out across the community and worked individually. Interviewers did not necessarily seek to interview household heads, but any adult member of the household who is available at home at the time became a respondent. If a household head was present, they would be the preferred respondent.

Key Informant Interviews: The key informant interview was conducted with members of the Mazabuka District Disaster Management Committee. The interview focused on establishing the indicator weights for the community resilience index. Indicators were reviewed and corresponding weight determined.

Focus Group Discussions: The focus group discussions (FSD) as a technique involves forming and interviewing groups of people who are specially selected for their particular interest, expertise or position in the community in an attempt to collect information on a particular topic. A focus group interview is a carefully planned discussion designed to collect data on the perceptions of different groups or socioeconomic segments in the community towards a particular topic (Leedy & Ormrod, 2013).A focus group discussion was held with a representation of the three Satellite Disaster Management Committees that are spearheading the CBDRM programme in Mwanachingwala Ward.

Literature Review: This study was accompanied by a comprehensive literature review. The literature review involved consultation of published and unpublished materials relating to the

community-based approaches to disaster risk management and measurement of community resilience. This information was used to extensively sharpen the understanding of the prevailing situation in the Mwanachingwala Ward, Mazabuka District of Zambia. A literature review was also important in providing insights and identifying gaps in the current information for the areas under study (Leedy & Ormrod, 2013). Other literature provided an overview of key concepts behind community-based approaches to disaster risk management and community resilience measurement and formed the basis of the conceptual and theoretical framework for the resilience index.

1.5.4 Data Analysis

Quantitative data from household interviews was analysed using the F-test to determine the Analysis of Variance (ANOVA) this was done using a computer software package called Statistical Package for Social Sciences (SPSS). The F-test was found to be ideal to compare means over several groups. The advantage of using ANOVA over multiple t-tests is that the ANOVA F-test identifies if any of the group means are significantly different from at least one of the other group means with a single test. Qualitative data was analysed manually. Shortly after fieldwork, field notes were typed and expanded then later put into meaningful categories. In addition, relevant excerpts of respondent interviews were also utilised and included in the study findings.

1.8 STRUCTURE OF THE DISSERTATION

The dissertation is organised into six chapters. These include Chapter One, the Introductory Chapter, where the background of the study was discussed, highlighting the statement of the problem, the research objectives, and the research questions. Chapter Two, the Theoretical Framework, focuses on building the theoretical foundation of the study. Chapter Three, the Literature Review, focuses on the review of published and unpublished materials relating to the community-based approaches to disaster risk management and measurement of community resilience. Chapter Four, the methodology, describes in detail the approach used to measure community resilience. Chapter Five, data analysis and presentation of results, focuses on the results of the study and discusses how the community's capitals framework was used to determine the level of community resilience in Mwanachingwala. Chapter Six, conclusion and recommendation, provides the conclusion of how the aim of the study was achieved through a

review of the objectives of the study. In the same chapter, recommendation is provided for the improvement of the CBDRM programme in Mwanachingwala.

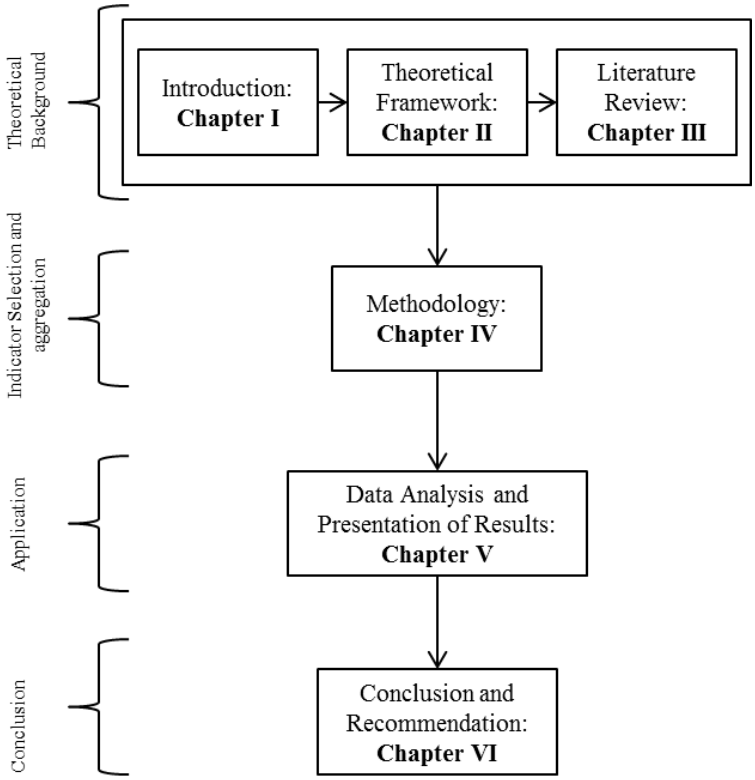


Figure 1.2: Structure of dissertation

CHAPTER TWO: THEORETICAL FRAMEWORK

2.0 INTRODUCTION

The objective of this chapter is to develop a framework in which disaster resilience indicators can be identified. A number of conceptual frameworks or models using the community capitals framework from the literature were critically reviewed in order to identify key elements that can be used to measure disaster resilience in the context of community based disaster risk management. These include the Asset Based Community Development (ABCD) Approach; Appreciative Inquiry (AI): an asset-based, inside-out approach; the Sustainable Livelihoods Approach (SLA): an approach to poverty reduction; the Community Resource Approach.

2.1 THEORETICAL INFLUENCES OF COMMUNITY CAPITALS FRAMEWORK ON RESILIENCE MEASUREMENT

Teo *et al.*, (2013) acknowledge that a number of conceptual frameworks currently exist that can be used in the assessment of community resilience. These frameworks differ based on their emphasis, scope, definition and assessment of community resilience. Kanlou and Wray, (2014) attest to the lack of consensus and clarity on the meaning and implications of the word resilience as do other authors (Khanlou & Wray, 2014). Arbon *et al*., (2013) agree by stating that there are no standard definitions of the different types of resilience (Arbon *et al*., 2013). This is reiterated by Kristen Magis (2010), who in her research to develop a theoretical and empirically based definition of community resilience, notes how authors have tended to differ on the definition and best measurement of community resilience. Teo, *et al*., (2013) further this argument by stating that these differences lie in the use of a mono-disciplinary lens in the emphasis, scope and meaning of community resilience. The same authors suggested that the best way to define and measure resilience is through an integrated framework assessing community resilience in disaster management (Teo *et al.*, 2013).Alevizou, *et al*., (2016) present several potential community resources, frameworks in their study to review community asset mapping and related approaches for cultivating community resilience. These include Asset Based Community Development (ABCD), Appreciative Inquiry (AI), Sustainable Livelihood Approaches (SLA) and Community

Capitals Framework (CCF). The same authors postulate that although these frameworks may be presented as distinct approaches, they tend to overlap in terms of theories and methodologies (Alevizou *et al*., 2016). In this chapter, the theoretical premise of using Community Capitals Framework to measure community resilience will be explicated.

2.1.1 The Asset Based Community Development (ABCD) Approach

Alevizou *et al*., (2016) describes the ABCD approach as being a needs-based approach which allows a community to allocate a range of possible assets available to the community to address these needs thereby creating the premise for desirable change on a social and economic level. Mathie & Cunningham (2003) add that the approach draws on cultural and social capital paradigms emphasising release and restorative practices in the mapping and mobilisation of community assets (Mathies & Cunningham, 2003).

Mathie & Peters, (2014) note that the approach assumes external organisations as partners with communities in their own development. The same authors continue to state that it is a multi-layered approach that requires a new way of working for organisations involved in development (Mathies & Peter, 2014). Alevizou *et al.*, (2016) highlight how this approach has gained a lot of recognition internationally from organisations promoting social-economic inclusion and community resilience through diverse livelihood strategies.

Strengths

Alevizou *et al*., (2016) identifies the following strengths in the model:

- Appreciative inquiry of everyday practices of the community life and social interactions that emerge within them;
- High level of specificity when moving from theory to practice;
- An appreciative, agent-model approach where the community takes the driving seat in developing their own narrative.

In the context of Mwanachingwala Ward, an asset based approach makes it easier in determining what actions or activities can be promoted to ensure that a community continues on a trajectory of building resilience. However, the approach has the following limitations.

Limitations

Alevizou *et al.*, (2016) identify the following limitations in the model;

- It often fails to deal with questions of power relation and power inequalities;
- It fails to clarify the role of external institutions;
- More attention is needed with regard to the wider context of community life;
- Applicability and advocacy must rely on a more critical analysis of local contexts.

As CBDRM draws from the institutional capacity to drive the process, there is need for the roles of external institutions to be clarified and this is one of the limitations of this approach. Furthermore, Mwanachingwala being a rural community where traditional leadership is strong, power relationships need to be well defined as these are pertinent in defining roles in the CBDRM process.

2.1.2 Appreciative Inquiry (AI): an asset-based, inside-out approach

Alevizou *et al.*, (2016), present the Appreciative Inquiry (AI) as another community resource approach in community resilience. The same authors continue to explain how AI approaches focus on collective narratives and local histories to study how learning from the past achievements can be used to foster resilience. Emery, Fey, and Flora (2006) propose the use of a six step process of AI (Define, Discover, Dream, Design, Deliver, Debrief) as opposed to the traditional four step process (Discover, Dream, Design, Deliver). Emery *et al.*, (2006) argue that the theoretical framework behind AI approaches is drawn from the theory of social constructionism. Social constructionism works on the assumption that communities represent cohesive groups that own a group identity and a common history (Emery *et al*., 2006). Alevizou *et al.,* (2016), postulate that awareness of what can work well in communities is critical for the understanding of what the communities can use to then build their resilience. The same authors continue to explain that the wealth of indigenous knowledge and information can be used to successfully mobilise community resources to address the community needs (Alevizou *et al*., 2016).

Strengths

Alevizou *et al.*, (2016) identify the following strengths in the model:

- It brings attention to historical experiences/processes and social and local history;
- It is an appreciative inquiry of storytelling/ collective memory;
- It brings attention to collective experiences and strengthens a sense of belonging in the community.

This approach in Mwanachingwala has the greatest value in understanding the progression of vulnerability over time, thus, creating the premise of the access model in building resilience. Through AI, the question of where did we miss it is answered and communities are then able to correct their past mistakes. However, the approach has some limitations that make its use not ideal for this study.

Limitations

Alevizou *et al.,* (2016) identify the following limitations in the model:

- It is less comprehensive in identifying and discussing physical or natural assets in the community;
- More attention needs to be paid on diversity of local context before applying the model;
- It looks only for the existence of collective histories and common sense and does not ask for absence of them. For instance, a typical question will be, "Is there a set of values that holds together the community?" It does not go further to ask the; 'If not, why?' question.

The one sided approach makes the measure of reinforcing capitals difficult. Furthermore, the natural and physical resources need to be measured as they have a bearing on the ability of an agrarian community like Mwanachingwala to build resilience.

2.1.3 The Sustainable Livelihoods (SLA): an approach to poverty reduction

DFID (1999) presented the Sustainable Livelihoods Approach (SLA) as a proposal to shift from a needs-based to a resource-based attitude. This was with a focus on poverty reduction and natural resource management. Chambers & Conway (1992) define livelihood as a set of the capabilities, assets and activities that are required for one to make a living. A livelihood is only considered sustainable if it able to cope with and recover from stress and shocks in order to maintain or enhance its capabilities and assets while not compromising the opportunities for subsequent generations, (Chambers & Conway, 1992). Guitierrez-Montes *et al.,* (2009) mention

that SLA is oriented towards the analysis of contexts, conditions, and transforming structures and processes that affect the ability of a households to acquire resources (capitals) and livelihood strategies'.

Strengths

Alevizou *et al.*, (2016), identify the following strengths in the model:

- SLA attempts to go beyond conventional methods of poverty reduction by seeking avenues that will enhance people's ability to make a living in an economically and socially sustainable manner;
- Trains people to identify potential strategies and processes;
- It can be combined with interdisciplinary research on resilience, combining qualitative and large scale quantitative methodologies and participatory methods.

The SLA reinforces the paradigm shift from vulnerability to resilience that is the basis of community-based disaster risk management programmes, making it very ideal for this study. However, some limitations were noted.

Limitations

Alevizou *et al*., (2016), identify the following limitations in the model;

- It lacks the capital that reflects politics and freedoms;
- More attention needs to be paid to the diversity of local context before applicability.

The SLA has limited community resources that are measured despite it being very appropriate to a study such as this one.

2.1.4 The Community Resource Approaches

This framework was developed as an expansion of the systems-based approach to poverty, effective natural resource management proposed through the SLA, (Alevizou *et al*., 2016). Guitierrez-Montes *et al.*, (2009) detail how originally the SLA was developed to be applied in rural and analysed only four key aspects or resources: economic, social, environmental, and productive. The same authors narrate how later these resources increased to five: human, social, natural, physical, and financial, and centred on promoting livelihood resilience to stress and

shocks, general improvement of household and community well-being, and sustainable natural resource management (Gutierrez-Montes *et al*., 2009). The advent of the CCF according to Alevizou *et al.*, (2016), was an expansion of the five SLA capitals to seven capitals: human, social, cultural, political, built, financial, and natural. These community capitals according to Flora and Flora (2008) can be divided into two main categories that is: human and material capitals. Alevizou *et al.*, (2016), suggest the premise of this approach is that each community possesses resources in spite of the conditions of poverty or marginalisation which can be used as the foundation of their resilience.

Strengths

Alevizou *et al*., (2016), identify the following strengths in the model;

- It includes political and cultural resources, leading to a better understanding of the importance of local knowledge, traditions and power relations (as well as access to, and the condition of, power structures).
- It can be used in the creation of 'maps' or 'inventories' of assets across the seven categories.

Limitations

Alevizou *et al*., (2016) identify the following limitations in the model;

- It assumes an almost steady flow between the stock of assets, interaction of (community) participants and indeed the capacity to build capital.
- The value of this approach can only be realised if it comes to be understood as inclusive of each of the following several focal areas, and of the complex relationships between them.

Guitierrez-Montes *et al*., (2009), advance that the inclusion of cultural and political capitals in the CCF leads to the improvement of the approach to explicate access to power relations as well as accounting for of indigenous knowledge and traditions. Additionally, they add that CCF allows the mapping of the seven capitals within a community. This provides a mechanism to envisage and comprehend the interrelationships and interdependencies among capitals (Gutierrez-Montes *et al*., 2009). Alevizou *et al.*, (2016) agrees and cites important overlaps between SLA and CCF approaches that make them complimentary in development of a

community resource framework. This makes the community capitals framework ideal for measuring community resilience in support of community-based disaster risk management.

2.2 THE RELATIONSHIP OF THE COMMUNITY CAPITALS FRAMEWORK AND RESILIENCE

The community capitals framework has mostly been used to measure community development. However, the framework can still be adapted to measure resilience (Mayunga, 2007). The same author argues that the community capitals framework reflects the capitals which are necessary for development of a sustainable community economy. These economic opportunities provide the potential for communities to address the impacts of hazards (Mayunga, 2007). Fey, *et al*. (2006) cites that rural communities are able to invest in their different community resources to achieve economic development thus achieve greater resilience.

Developing an index using the community capitals framework offers a plausible avenue for measuring community resilience to support the aspiration of most community-based disaster risk management programmes' efforts. Different indices have been developed and widely applied in several fields, including disaster risk mapping (Sherrieb *et al*., 2010). Simpson (2006) notes how indices have played an important role in poverty and deprivation, social capital, quality of life, human development, vulnerability, and disaster preparedness (Simpson, 2006). The same defines an index as being composed of different indicators to measure a single value through the use of mathematical formulae to indicate rank (Simpson, 2006). Mayunga (2007) explains the importance of indices as they are able to summarise complex technical data in a simpler way that is easier to understand. There are many methods that can be used to construct an index; however, these methods differ in how the sub-components are summed up to create an index (Mayunga, 2007).

2.3 MEASURING RESILIENCE USING A MULTI-HAZARD APPROACH

The Intergovernmental Panel on Climate Change (IPCC) defines resilience comprehensively as:

"The capacity of social, economic, and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganising in ways that maintain their essential function,

identity, and structure, while also maintaining the capacity for adaptation, learning, and transformation", (IPCC, 2014).

Communities like Mwanachingwala are usually impacted by multiple hazards and, hence, face various risks. Measuring resilience should, therefore, consider a multiple hazard approach as well as multiple integrated processes (Kloos *et al*., 2015). To further this point, Mayunga (2007) explains how the reduction of risks from one hazard may increase risks from other hazards. The same author postulates that it is difficult to homogenise or merge different approaches in measuring resilience with a single hazard lens. The term "multiple hazards" refers to several hazards that could occur concurrently or following each other or hazards that affect the same place or the same people in an area (Mayunga, 2007).

2.3.1 Resilience Thresholds

Perturbations such as those arising from hazards can move the community system away from the stability that is maintained by interconnections of the community capitals that allow communities absorb disturbances, (Kloos et al., 2015). As there are multiple stable states in different community systems, a system can move between these stable states either as smooth transitions or as abrupt transitions, (Kloos et al., 2015). Different potential thresholds can exist with the seven community capital domains, i.e., the financial, social, cultural, human, political, natural, and built environmental context and at multiple temporal and spatial scales. When a hazard occurs a community draws from the community capitals to help maintain a stable state up to a certain point. However, when the community system is unable to cope with the hazard the privileged system flips into a different configuration to either absorb or succumb to the impact of the hazard, (Kloos et al., 2015). Resilience therefore relates to the magnitude of a hazard that community can absorb. Different level of resilience can thus be used to describe a systems ability to cope with different levels of disturbances, (Kloos et al., 2015). Resilience in the context of CBDRM can be understood mainly as a function of the capacity of community actors to influence the allocation of the different community capital to achieving resilience. This provides the basis for a qualitative or quantitative process that can be used to gauge or audit a system using different time horizons. In this study the cross section time horizon was used to gauge the state of resilience in Mwanachingwala at the time of the study. The results of this

process can used to show resilience over a continuum. The index in study represents resilience as a number from 1 to 5 where, 1 reflects poor resilience and 5 represents high resilience.

2.3.2 Resilience Indicator Selection

The indicators to be used in this study are largely influenced by those used in the Australian Natural Disaster Resilience Index. The index uses bottom-up approaches that are locally based and locally driven and are qualitative self-assessments of disaster resilience (Parsons *et al*., 2016). These approaches can be used by communities to appraise their community-based disaster risk management efforts. The Australia's National Strategy for Disaster Resilience makes use of a scorecard consisting of indicators of disaster resilience focusing on community capitals (Parsons *et al*., 2016). The index uses indicators to provide the data for a specific community capital domain and together the indicators measure the status of that domain. In this study, indicators will be selected based on the same considerations as the Australian Natural Disaster Resilience Index:

- Significance of the indicator;
- Influence of the indicator with regard to community resilience;
- How management practices can be used to avert the impact of the indicator;
- The ability of the indicator to provide a basis for policy changes and action plans;
- The ability of the indicator to make spatial and temporal comparisons.

2.4 MEASURING COMMUNITY RESILIENCE USING THE COMMUNITY CAPITALS FRAMEWORK

The community capitals framework is based on seven capitals that contribute to the overall community disaster resilience (Fey *et al*., 2006). Each capital is considered as an independent domain that is measured through different indicators (Mayunga, 2007). Despite each indicator being measured in different units, a summation method can be achieved after the indicators are normalised to standardised unit. The normalisation method that will be used follows the work of Mayunga (2007), in a study where he used the capital based approach to measure community disaster resilience. The observations can be adjusted to take a value from 0 to 1. The same author proposed that after the normalisation, the next step is to generate and combine the scores into an

overall index (Mayunga, 2007). He continues by adding that both the capitals domains and indicators will require weighting. Sharpe & Andrews (2012), discuss the importance of weighting of indicators as there are societal differences in valuations of indices (Sharpe & Andrews, 2012). Dwyer *et al*., (2004) reiterates this by adding that assigning weight to indicators is based on subjective perceptions of the importance of some indicators (Dwyer *et al*., 2004).

2.4.1 Natural Capital

Fey *et al*., (2006) present natural capital as an important starting point in the Community Capitals Framework. This is because natural capital informs the basis on which all the other capitals are built. The same authors define natural capital as the landscape, mountains, lakes, green spaces and a biosphere in which the community lives and sustains their livelihood (Fey *et al*., 2006). In the context of disaster resilience, natural resources such as water quality, air quality, soil quality, wetland, and forests are essential for future production and hence community sustainability (Mayunga, 2007). The indicators used in this study include only the access to natural resources as a proxy because the availability of natural resources requires scientific methods of measurement that were beyond the scope of this study. The following equation was used to calculate the index for Mwanachingwala for natural capital.

$$C_H^{env} = \sum_{i=1}^{2} w_i^{env} C_{H_i}^{env}$$

$$V^{env} = f(w_1^{nt} C_{H_1}^{nt}, w_2^{wtr} C_{H_2}^{wtr},),$$

Where: $C_{H_1}^{nt}$ = Access to natural resources index

$C_{H_2}^{wtr}$ = Water source and quality index

And, w_1^{nt} = Weighting factor for access to natural resources index

w_2^{wtr} = Weighting factor for water source and quality index

2.4.2 Cultural Capital

Fey, *et al*. (2006) present cultural capital as the values and symbols of a community reflected in clothing, books, machines, art, language, and customs. The same authors continue by adding that cultural capital informs the lens through which an individual or community envisages the world, the natural environment and is the basis of social construct (Fey *et al*., 2006). In the context of resilience, culture capital is important for harnessing greater social inclusiveness and rootedness, innovation, creativity and entrepreneurship for individuals and communities (UNESCO , 2012). This study will look at how the "culture" of the people in Mwanachingwala Ward affects CBDRM processes. The following equation was used to calculate the index for Mwanachingwala for cultural capital resilience.

$$C_H{}^{cul} = \sum_{i=1}^{2} w_i^{cul} C_{H_i}{}^{cul}$$

$$C_H{}^{cul} = f\left(w_1^{slf} C_{H_1}{}^{slf}, w_2^{own} C_{H_2}{}^{own} w_3^{trad} C_{H_3}{}^{trad}\right),$$

Where: $C_{H_1}{}^{slf}$ = Capacity for community self-organisation index

$C_{H_2}{}^{own}$ = Community Ownership of CBDRM process index

$C_{H_3}{}^{trad}$ = Use of traditional knowledge index

And, w_1^{slf} = Weighting factor for capacity for community self-organisation index

w_2^{own} = weighting factor for community ownership of CBDRM process

w_3^{trad} = weighting factor for Use of traditional knowledge

2.4.3 Human Capital

Fey, *et al*., (2006) define human capital as the proficiency that is either intrinsic or derived from within the working-age population of a community. They add that human capital is what enables the community to use other forms of capital to sustain their economic well-being. Mayunga (2007) stresses the need for building and sustaining human capital in rural communities like Mwanachingwala Ward. Human capital is acquired through education either formally or informally obtained and includes knowledge and skills that are accumulated through training or experience (Mayunga, 2007). Fey, *et al*., (2007) cites that human capital must include the health of the working-age population. Human capital, therefore, is one of the most important determinants of resilience among other forms of capital (Mayunga, 2007). This is because adequate, skilled, and trained workforce is a prerequisite for economic development and capacity building (Mayunga, 2007). In other words, the more human capital is available in the community, the more the capacity for building resilience. This study will look at the factors that influence the quality and availability of human capital in Mwanachingwala Ward. The following equation was used to calculate the index for Mwanachingwala for human capital resilience.

$$C_H^{hum} = \sum_{i=1}^{3} w_i^{hum} C_{H_i}^{hum}$$

$$C_H^{hum} = f(w_1^{age} C_{H_1}^{age} w_2^{div} C_{H_2}^{div} w_3^{part} C_{H_3}^{part})$$

Where: $C_{H_1}^{age}$ = Age of respondents' index

$C_{H_2}^{div}$ = Livelihood diversity index

$C_{H_3}^{part}$ = Participation in CBDRM activities index

And, w_1^{age} = Weighting factor age of respondents index

w_2^{div} = Weighting factor for livelihood diversity

w_3^{part} = Weighting factor for participation in CBDRM activity index

2.4.4 Social Capital

Fey, *et al*., (2006) present social capital as the features of social organisation, which include norms, relationships of trust, formal or informal networks that lead to enhanced coordination and cooperation for the shared advantage of a community. Mayunga (2007) postulates that in the context of community resilience, the capacity of social cooperation allows individuals to draw on social resources in their communities, to increase their capacity to cope with disasters. In this study, the measurement will be for factors that lead to the converting of social capital into organisational forms that encourage collective action. The following equation was used to calculate the index for Mwanachingwala for social capital:

$$C_H^{soc} = \sum_{i=1}^{2} w_i^{soc} C_{H_i}^{soc}$$

$$C_H^{soc} = f(w_1^{info} C_{H_1}^{info}, w_2^{socio} C_{H_2}^{socio}, w_3^{trust} C_{H_3}^{trust}) ,$$

Where:

$C_{H_1}^{info}$ = Access to information about disasters index

$C_{H_2}^{socio}$ = Access to social services index

$C_{H_3}^{trust}$ = Relationships of trust

And, w_1^{info} = Weighting factor for relationships of trust

w_2^{socio} = Weighting factor for access to social services

w_3^{trust} = Weighting factor for length of residency

2.4.5 Political Capital

Fey, *et al*., (2006), present political capital as the policy environment that enables communities to access public resources or impact the rules and regulations that affect its day to day functioning. The same authors postulate that political capital is often mediated through elected leaders and officials. Utami (2016) points out two elements to ensure the governance of the complexities surrounding resilience in a community, namely; institutional arrangements and capacity for adaptation. The higher the levels of political capital indicated the higher the ability for self-organisation and the stronger the institutional arrangements which will result in a shortened length of recovery time from natural disasters, and consequently higher resilience, (Utami, 2016). In this study, political capital will be measured based on the role of local leadership and the government will make in fostering institutional arrangements and the policy environment that impact on building resilience. The following equation was used to calculate the index for Mwanachingwala for environmental capitals.

$$C_H^{pol} = \sum_{i=1}^{2} w_i^{pol} C_{H_i}^{pol}$$

$$C_H^{pol} = f(w_1^{risk} C_{H_1}^{risk}, w_2^{pol} C_{H_2}^{pol}, w_3^{gov} C_{H_3}^{gov}),$$

Where: $C_{H_1}^{risk}$ = community awareness of Government policies on disaster risk management index

$C_{H_2}^{pol}$ = Political will of disaster management structures index

$C_{H_3}^{gov}$ = Governance of CBDRM processes index

And, w_1^{risk} = Weighting factor for community awareness of Government policies on disaster risk management

w_2^{pol} = Weighting factor for political will of disaster management structures

w_3^{gov} = Weighting factor for governance of CBDRM processes

2.4.6 Financial Capital

Mayunga (2007) explains financial capital as economic resources that people use to achieve their livelihoods. Financial capital increases the ability and capacity communities to absorb disaster impacts and speed up the recovery process (Mayunga, 2007). Financial capital is the most direct capital in increasing resilience. Mayunga (2007) presents an example of how a household's access to insurance is related to the level of preparedness a household has. This study focused on savings, income, credit, stability, income, source and alternative off-farm income. The following equation will be used to calculate the index for Mwanachingwala for financial resilience.

$$C_H^{fin} = \sum_{i=1}^{2} w_i^{fin} C_{H_i}^{fin}$$

$$C_H^{fin} = f(w_1^{serv} C_{H_1}^{serv}, , w_2^{stab} C_{H_2}^{stab} w_3^{alt} C_{H_3}^{alt},) ,$$

Where: $C_{H_1}^{serv}$ = Access to financial services index (savings, insurance and credit)

$C_{H_2}^{stab}$ = Stability of household income index

$C_{H_3}^{alt}$ = Alternative off-farm income index

And, w_1^{serv} = Weighting factor for access to financial services index

w_2^{stab} = Weighting factor for stability of household income index

w_3^{alt} = Weighting factor for alternative off farm income index

2.4.7 Built Capital

Fey, *et al*., (2006), explain built capital as the built environment that is comprised of residential housing, public buildings, business/industry, dams and levees, and shelters. It also includes lifelines such as rail, road, bridges, electricity, water, telecommunication, and critical infrastructure such as hospitals, schools, fire and police stations, and nursing homes (Fey *et al*., 2006). In the context of resilience, built environment comprises of critical facilities that ensure that people have access to resources and support during emergencies or facilitate protection from hazards (Mayunga, 2007). The built capital that is being considered in this study is that which can be leveraged to support CBDRM processes and these were public facilities and road network. The following equation was used to calculate the index for Mwanachingwala for infrastructure capitals vulnerability and resilience.

$$C_H^{inf} = \sum_{i=1}^{2} w_i^{blt} C_{H_i}^{blt}$$

$$C_H^{inf} = f(w_1^{pub} V_1^{pub}, w_2^{road} C_{H_2}^{road},),$$

Where: $C_{H_1}^{pub}$ = Access to public facilities during emergencies index

$C_{H_2}^{road}$ = Road access index

And, w_1^{pub} = Weighting factor for Access to public facilities during emergencies index

w_2^{road} = Weighting factor for road access index

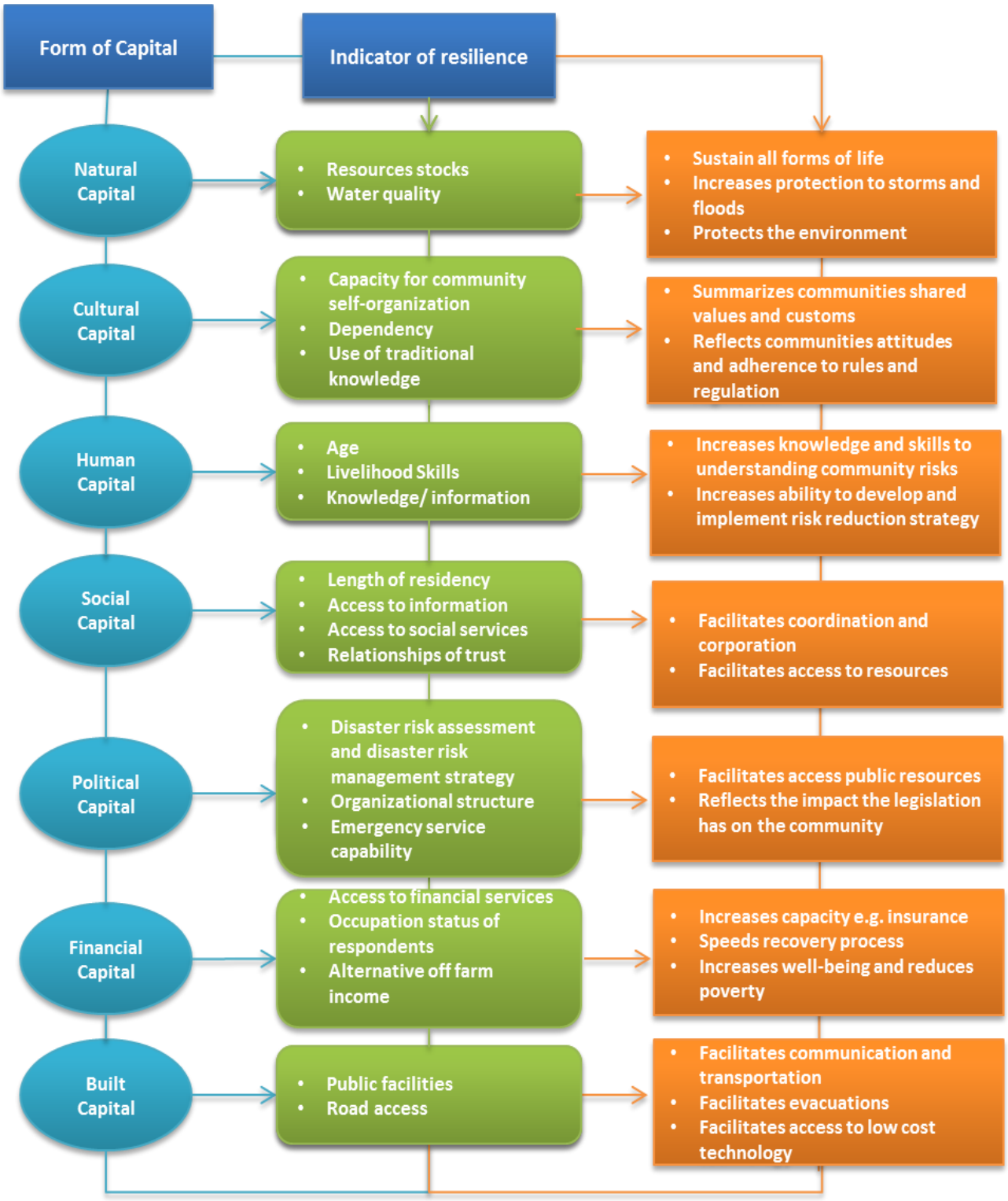


Figure 2.1: The relationship between capital domains and community resilience

Adapted from Australia's National Strategy for Disaster Resilience (Parsons *et al.*, 2016)

2.5 INTERNATIONAL POLICY AND REGULATORY FRAMEWORKS FOR COMMUNITY RESILIENCE

The United Nations (UN) has been promoting the use of community-based approaches in disaster risk management through several UN Resolutions drawing the actions, policies and practices for governments, UN agencies, civil society and non-governmental organisations (UNISDR, 2005). Community-based approaches to disaster risk management came to the fore in the late 80s and early 90s (ADPC, 2003). They quickly became popular because of the recognition of the limitations of a top-down approach in disaster risk management (Thinda, 2009).

2.5.1 Hyogo Framework for Action HFA 2005-2015

With the advent of the Hyogo Framework for Action HFA 2005-2015 a multi-hazard approach that highlighted the community's participation as the key focus emerged (UNISDR, 2005). Twigg (2007), in the Guidance Note for Characteristics of a Disaster Resilient Community showed how community based approaches were becoming a force to reckon with in building community resilience. More and more organisations have been seen to be using these approaches to ensure that communities are driving the process of assessing their own risks and developing their own preparedness and response plans (Twigg, 2007). These communities are also putting together mitigation and recovery strategies as well as preparing contingency plans (Twigg, 2007). The United Nations International Strategy for Disaster Reduction is now leading the push for strengthening local coping capacities through promoting community-based approaches (Wahlstrom, 2015).

2.5.2 The Sendai Framework for Disaster Risk Reduction 2015–2030

This is the successor instrument from the Hyogo Framework for Action which ended in 2015. The Sendai Framework for Disaster Risk Reduction 2015–2030 aims to protect lives, health, livelihoods, ecosystems, cultural heritage, and critical infrastructure from natural and human-caused hazards (Wahlstrom, 2015). The Sendai Framework calls for a historic shift from an emphasis on disaster management to addressing disaster risk management (Wahlstrom, 2015). It

focuses on the underlying drivers of disaster risk, such as poorly planned urban growth in areas subject to flooding, landslides, earthquakes, cyclones, and the effects of climate change (UNISDR 2015). As the Sendai Framework states that it is urgent and critical to anticipate, plan for and reduce disaster risk in order to more effectively protect persons, communities and countries (UNISDR 2015).

2.5.3 Sustainable Development Goals

The need to incorporate disaster risk management in sustainable development can be seen in that there are 25 targets that express disaster risk reduction in 10 of the 17 sustainable development goals (UNISDR, 2015).

2.6 NATIONAL POLICY AND REGULATORY FRAMEWORKS

In keeping with the requirements of both the Hyogo Framework for Action and the successor instrument the Sendai Framework, the Government of the Republic of Zambia has developed various instruments aimed at reducing disaster risks and increasing the resilience of communities (DMMU, 2014). These instruments include the National Disaster Management Policy and Operations Manual of 2005 and the Disaster Management Act No. 13 of 2010. These instruments have provided a framework for the Government of the Republic of Zambia to implement disaster risk reduction programmes aimed at building community resilience.

2.5.1 Zambia National Disaster Management Policy of 2005

The Zambia National Disaster Management Policy of 2005 took cognisance of the gaps that existed in the disaster management strategy of the time (DMMU, 2005). These included *ad hoc* disaster management efforts due to lack of a policy guiding disaster management efforts; there was not legal framework to authorise disaster management actions, and; there was insufficient information on disaster risk management (DMMU, 2005). The Policy was instituted to enhance national capacity to prepare for, respond to, mitigate against and prevent the impacts of disasters. The policy outlines a series of actions to be undertaken to develop an effective disaster management strategy that incorporates proactive strategies as opposed to the reactive strategies

that existed before (DMMU, 2005). It is from this premise that saw the rise of more community based approaches to disaster risk management taking the fore in the disaster management in the country. One such programme was Zambia National Adaptation Programme of Action (NAPA) of 2007 (UNDP, 2010).

2.5.2 Zambia National Adaptation Programme of Action (NAPA) of 2007

The NAPA highlights that Zambia communities are vulnerable to climatic hazards such as droughts, floods, extreme temperatures and prolonged dry spells which affects agriculture production the main livelihood of the majority of Zambians (UNDP, 2010). The programme was instituted to provide guidance to community led climate change adaptation measures such as conservation agriculture (UNDP, 2010). This is in order to reduce the anticipated impact of climate change on Zambia's agriculture sector (UNDP, 2010).

2.5.3 Disaster Management of Zambia Act No. 13 of 2010

According to the Disaster Management of Zambia Act No. 13 of 2010, disaster risk management is the explicit priority of co-operative governance of all stakeholders in strengthening the capabilities of national, provincial and municipal organs of the state to reduce the likelihood and severity of disasters (GRZ, 2010). Community-based disaster risk management requires that local measures or capacities are interwoven with technical programmes run by local authorities and other disaster risk reduction agencies, which increase disaster risk reduction measures (Thinda, 2009). In order to ensure sustainable development, the process must reflect the community context with long-term assumptions in mind coupled with efficiently structured monitoring and evaluation systems that complement community driven systems (Mansuri & Rao, 2004).

2.5.4 Community-Based Disaster Risk Management Programme of 2014

Disaster Risk Reduction (DRR) initiatives encapsulate the growing recognition that relief is not enough in mitigating disasters and that resilient communities in fact are key to reducing the impact and severity of both natural and human induced hazards when they strike (DMMU,

2014). It is with this recognition that the Disaster Management and Mitigation Unit prepared the Community-Based Disaster Risk Management Facilitation Manual aimed at enhancing community resilience and to initiate sustainable local development (DMMU, 2014).

The CBDRM process is the framework for hazard prone communities that help them to analyse their vulnerabilities and capacities in order to design interventions to increase their resilience to hazards. The bedrock of the resilience building process is in creating a strong institutional framework at the district and community levels (Thinda, 2009). The Community-Based Disaster Risk Management implementation process is in two parts; the first part deals with the strengthening or formation of the District Disaster Management Committees (DDMCs) while the second aspect deals with the Community-Based Disaster Risk Management framework itself (DMMU, 2014).

The process leading to the implementation of Community-Based Disaster Risk Management (CBDRM) programmes requires a strong district level structure that would guide the sub–district structures in the quest to improve resilience (DMMU, 2014). To ensure that this is so, CBDRM process detailed in the CBDRM Manual begins with the interrogation of the functionality of the District Disaster Management Committees (DDMCs). A functional DDMC, therefore, becomes the precursor to the establishment of a viable CBDRM framework (DMMU, 2014).

The second aspect of the process delves into the risk reduction/risk management facets. This stage has six sub-processes starting with the formation of the Satellite Disaster Management Committee (SDMC) (DMMU, 2014). During the formation of the SDMC, the process allows the identification of the critical mass at community level that assist in the implementation of CBDRM process (DMMU, 2014). The next aspect of the process is the identification and mapping of hazards at the community level. This then leads to identification and analysis of vulnerabilities and community capacities which becomes the basis for developing a community resource map. Based on the hazards in the community and the resources available to them, an intervention plan is then developed to help build resilience in the community. The last aspect of the process is, therefore, to ensure that the implementation trajectory follows this plan (DMMU, 2014).

2.6 SUMMARY

The ability of a community to cope with the negative effects of hazard varies spatially. Measuring community resilience allows for communities with less resilience to be prioritised and disaster risk management efforts can be directed to those most in need (Mayunga, 2007). This chapter discussed how important it is to find an appropriate unit of analysis for community resilience and how they are many ways to do so. The chapter also focused on how a unit of analysis was arrived at based on the ability of the unit to provide both meaningful and adequate community resilience information that can influence policy and mitigation measures. The community capitals framework proposed in this chapter was found to be most promising in measuring disaster resilience as it covers most of the components of the community-based disaster risk management programme aspirations. Such components include human, social, financial, cultural, political, built and natural environmental factors. The framework provides a good starting point for developing a more robust methodology to assess the impact of community-based disaster risk management in building resilience. The measurement will be done through the use of weighted indicators in each of the capital domains through a methodological process.

CHAPTER THREE: LITERATURE REVIEW

3.0 INTRODUCTION

There has been a growing realisation that disaster management is most effective at the community level where specific local needs, resources, and capacities are met (Twigg, 2007). It is at the local level that the physical, economic, political and social risks faced by the poor can be adequately assessed and managed (Wisner *et al*., 2003). Some initiatives in this direction have come up in recent years, including Community-based Disaster Risk Management (CBDRM). CBDRM aims at reducing local disaster risks through the application of participatory assessment and planning methods (Thinda, 2009). CBDRM involves undertaking precautionary and timely measures to minimise the effects of hazards and vulnerabilities in a community. This approach is, therefore, people-centred in nature and requires the full co-operation and effective participation of the "At Risk" communities in their planning and implementation of this process (Thinda, 2009).

It is important to identify the communities that are at risk of any disasters and to come up with strategies that increase these communities resilience to disasters (Wisner *et al*., 2003). More and more International Humanitarian agencies as noted by Zwi *et al*., (2013), have taken up community resilience building efforts through various CBDRM programmes. These include World Vision International, Catholic Relief Services, CARE International, Concern Worldwide, Oxfam, International Federation of Red Cross and Asia Disaster Preparedness Centre. However, from their work, it has not been easy to deduce the exact impact or bearing on building community resilience their efforts have made (Zwi *et al*., 2013). The purpose of this study is to assess the efficacy of community-based disaster risk management programmes using the community capitals framework as a community resilience index. The information provided in this study is intended to assist disaster risk management agencies with a means by which they can monitor and evaluate CBDRM programmes.

3.1 COMMUNITY-BASED DISASTER RISK MANAGEMENT

Community-based disaster management can be seen as a risk reduction program designed primarily by and for the people in certain disaster-prone areas (Abarquez & Murshed, 2004). Disaster mitigation using government and institutional interventions alone is insufficient because

they pay little attention to addressing the community dynamics or perceptions (ADPC, 2002). At the same time, local communities are often either unaware of these formal disaster management interventions or they find the interventions inappropriate due to the lack of recognition of community's vulnerabilities and capacities, or they lack the external resources or technical support to supplement their own initiatives and capacity(UN/ ISDR, 2004). Just as every individual, family, organisation, business, and public service within a community will be affected by a disaster, each has a role to play in managing disaster (Thinda, 2009). Looking at it practically, the multitude of actions must be taken to implement an effective disaster management programme requires the participation of the entire community (ADPC, 2002).

Another reason for implementing community-based approaches is that communities are knowledgeable about the hazards occurring in their environment and are able to anticipate them in some cases (Twigg, 2007). They may not be scientific but the richness of experience and indigenous knowledge is a resource to be recognised (Yahaya, 2012). These resources need to be tapped and developed. With proper training and information, the communities are able to safeguard and minimise the disaster risks. It is essential that local capacities be strengthened to assess risks and develop mitigation strategies that are based on the communities' human, financial, information and material resources (Yahaya, 2012).

Community-based disaster risk management (CBDRM) is an approach to building the capacity of communities to assess their vulnerability to both human induced and natural hazards and develop strategies and resources necessary to prevent and/or mitigate the impact of identified hazards as well as respond, rehabilitate, and reconstruct following its onset (Twigg, 2001). Strategies have become increasingly important in the face of global climate change, populations expanding into more vulnerable regions, and the heightened recognition of a need for greater linkages between top-down governmental and community level responses (Twigg, 2001). CBDRM empowers communities to be pro-active in disaster management and creates space for them to develop strategies on their own terms rather than waiting for already over stretched governments and NGO's. Central to this is adequate knowledge and understanding of the risks and vulnerabilities that affect communities in the target areas, as well as the capacities and resources available to cope with and respond to them (Cannon, 2004). Essential to the CBDRM process are the District Disaster Management and the Satellite Disaster Management Committees

are the necessary interface or the channel for outsiders such as NGOs or government agencies to assist/support the community at-large(GRZ, 2010). Bollin (2003), agrees and states that community groups are essential in sustaining disaster risk management in the community (Bollin, 2003).The CBDRM process, however, is not done through community organisations alone, but it must be a collaborative mechanism between the local authorities, the local communities and other stakeholders.

3.1.1 Overview of Community-based Disaster Risk Management Process

The Community-Based Disaster Risk Management process should have the community as the central focus of attention in disaster management. This is done through the following process:

Figure 3.1: Summary of CBDRM Process
Source: (Jamal, 2011)

i. **Establishment of Local Disaster Risk Management Committees and Capacity Building**

Local Disaster Risk Management Committees are central to CBDRM. Ideally, these should be embedded in the existing community management structure or at least with the full awareness and blessing of the community management structures to ensure effective and constructive engagement with external stakeholders (Jamal, 2011). In Zambia, a District Disaster Management Committee (DDMC) is formed with regard to the Disaster Management Act No. 13 of 2010. The Act prescribes membership of the DDMCs, states the roles and responsibilities that need to be performed and also gives this structural powers for its operations (DMMU, 2014). DDMCs become the fulcrum for conducting disaster risk management programmes in the district and, therefore, also become the key conduit for taking Community-Based Disaster Risk Management (CBDRM) operations to sub–district structures (DMMU, 2014). As such, before undertaking CBDRM programmes at the sub–district level, it is imperative that the functionality of the DDMC to drive the process is critically evaluated and if lacking is capacitated (DMMU, 2014). The DDMC is then tasked to ensure the formation of the Satellite Disaster Management Committee (SDMC). The process of forming SDMCs allows for the identification of a critical mass community that will assist in the implementation of CBDRM process.

ii. **Hazard Identification and Analysis**

This is done through a participatory process to find out the nature, extent and magnitude of the effects of the various hazards that affect the community-based on past experience. The process attempts to find out the likelihood of experiencing natural or man-made shocks and analyses the impact of each specific shock.

iii. **Vulnerability and Capacity Assessment**

The vulnerability and capacity assessment identifies the characteristics/elements of the community that either hinder or help the community to anticipate, prepare for, resist, cope with and recover from shocks. The characteristics are grouped under the seven community capital domains, namely; natural, human, cultural, social, financial, political and built capitals in order to help focus the process even though there is inevitably some that overlap/interdependence between the capitals. A strong focus on vulnerability sets the scene for the following activities, particularly the development of mitigation plans.

iv. Early Warning and Surveillance

Early warning systems and surveillance are important for the protection of vulnerable people. They designed to alert communities of an impending shock, such as drought or flood and set in motion a series of pre-planned preparedness activities. An Early Warning system needs a good communication plan that ensures the key messages reach the right people in good time.

v. Development of Mitigation Plans

In order to reduce the negative impact, limit the risk and increase resilience or prevent a shock in the first place, it is important to establish effective measures within the community that reduces vulnerability and increases the capacity of the community. This can be done by working through a problem analysis that clearly identifies a desired outcome and identifying practical actions that can be taken. In many situations, writing up the discussions into a project will enable communities to seek external support for their plans.

vi. Community Disaster Preparedness and Response Plans (CDPPs)

The Community Disaster Preparedness Plan is a community prepared and owned document that outlines measures to be taken in the event of a large shock or disaster. It includes plans for disaster response, relief, and rehabilitation or mitigation activities and is based on the earlier shock analysis and vulnerability and capacity assessments, early warning data and mitigation plans. The document is prepared and kept in the local language with external agencies needing to ask for permission to use it. The CDPP is a live document and should be reviewed and updated regularly. Implementation of the specific parts of the plan such as responding to an imminent flood is initiated by the Coordinator in consultation with SDMC members' partner agencies and DDMC. To ensure that all community members understand and are prepared to implement the plan, should the need arise, community simulation exercises are used to practice different activities such as getting early warning information out to community members, moving vulnerable groups to higher ground.

vii. Monitoring and Evaluation

Monitoring and evaluation (M&E) are an important component of CBDRM in that it helps to keep CBDRM relevant and effective in the community, it helps the community

to learn and improve each step of CBDRM and enables an agency facilitating CBDRM in a community to collect data for its own learning and reporting purposes.

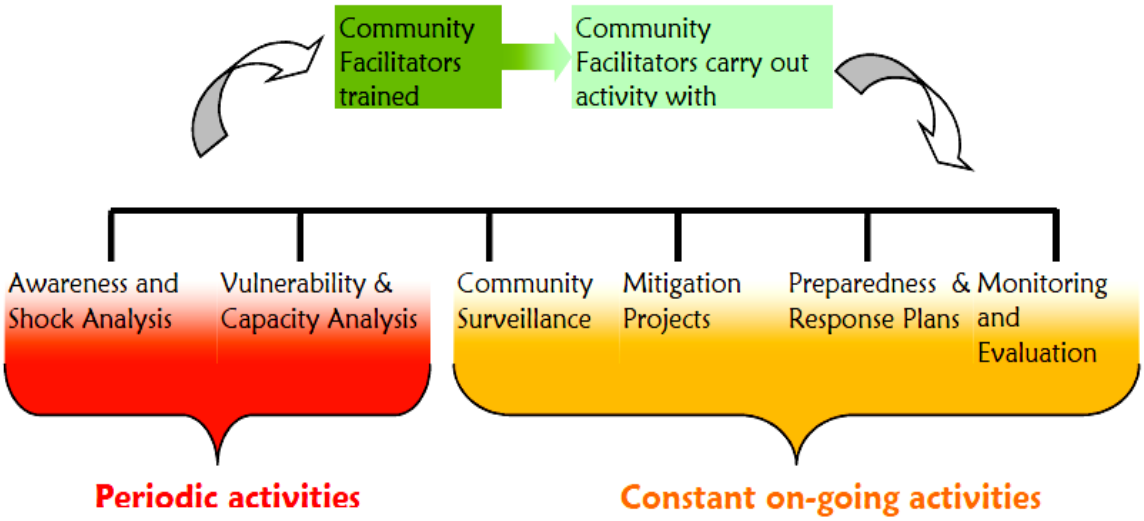


Figure 3.2: CBDRM monitoring framework
Source: (Jamal, 2011)

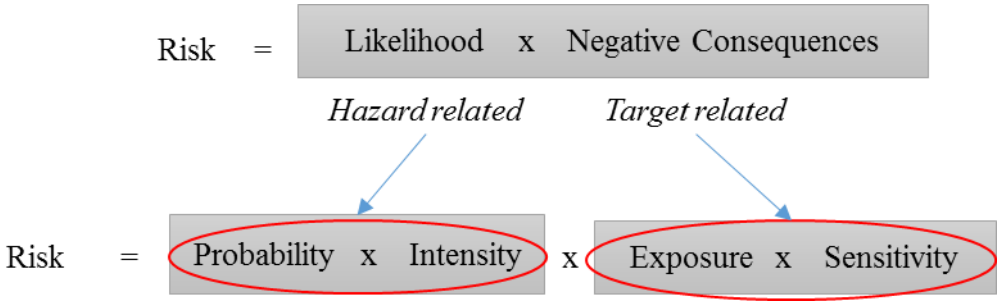
3.2 THE CONCEPT OF RESILIENCE IN DISASTERS RISK MANANGEMENT

Traditionally disaster risk is defined as the likelihood of a hazard occurring and the negative consequences resulting from this occurrence (Wisner *et al*., 2003). UNDP, (2014) affirms this by highlighting the casualties, damaged property, lost livelihoods, disrupted economic activity, and damage to the environment as some of the negative consequences associated with the hazard occurrence. This can be expressed as in the following equation:

$$\text{Risk} = \underbrace{\text{Likelihood}}_{\textit{Hazard related}} \times \underbrace{\text{Negative Consequences}}_{\textit{Target related}}$$

The UNDP (2014) postulates that disaster risk assessment is used to determine the extent and nature of the risk through analysing the probability of a hazard occurring and the corresponding

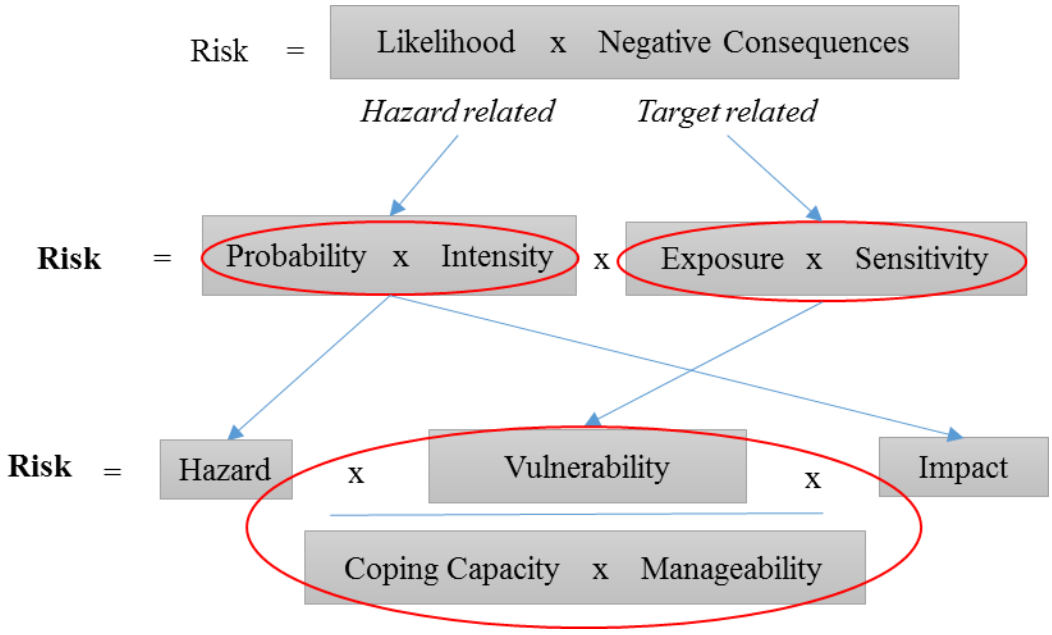
intensity and/or severity. They continue by explaining that risk assessment also involves evaluating the potential harm exposed people, property, services and the sensitivity of their livelihoods and environment on which they depend (UNPD, 2014). Therefore, comprehensive risk assessment involves putting together the following elements:



From this equation, four main elements are brought to the fore namely:

- **Probability:** This is the likelihood or frequency of occurrence of a hazard (Coppola, 2011)(Oppenheime *et al*., 2012).
- **Intensity**: The intensity of hazard describes the magnitude and/or duration of the event in relation to the spatial and temporal distribution of its effects (Coppola, 2011).
- **Exposure:** This relates to the extent to which or the potentiality of a damaging event (hazard) is capable of exerting negative consequences on a particular location (Coppola, 2011).
- **Sensitivity:** This refers to the interplay vulnerability and capacity and their importance in defining the nature and extent of the negative consequences of hazards. This is in consideration of the factors that mitigate negative impacts once hazard event occurs, (Oppenheime *et al*., 2012).

An expansion of the elements presents the following equation:



$$R = H \times \frac{V}{C}$$

Where: R = Disaster Risk

H = Hazard

V = Vulnerability

C = Coping Capacity

Hazard: A potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation (UN/ ISDR, 2015).

Copying Capacity: This is the ability of people, organisations and systems, using available skills and resources, to manage adverse conditions, risk or disasters (UN/ ISDR, 2015).

Vulnerability: The broadly acceptable definition of vulnerability formulated by the International Strategy for Disaster Reduction (UN/ISDR) is:

"The conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards." (UN/ ISDR, 2015).

Birkman (2006) highlights how more than 25 different definitions, concepts and methods to systematise vulnerability as he cited the following authors, Chambers, 1989; Bohle, 2001, Wisner *et al*., 2004; Downing *et al*., 2006; UN/ ISDR, 2004: 16; Pelling, 2003: 5; Luers, 2005: 215; Green, 2004: 323; UN-Habitat, 2003: 151; Schneiderbauer and Ehrlich, 2004; van Dillen, 2004: 9.; Turner *et al*., 2003: 8074; Cardona, 2004b: 37). Hilhorst and Bankoff, (2004) point out how vulnerability points to the degree of the susceptibility of exposed communities through their socio-economic and cultural lens. This, however, created a level of uncertainty of what and how much the term vulnerability covered beyond the socio-economic lens, (Berkes, 2007). Birkmann (2006) cites another author Cardona (2004) who explains how as the concept of vulnerability began to clarify the concepts of disaster risk, it began to represent a paraphernalia of different aspects including a community's physical, economic, social or political susceptibility to the negative effects of a hazard, (Birkmann, 2006). Wisner *et al*., (2004) defined vulnerability as the characteristics of a person or group and their situation that influences their capacity to anticipate, cope with, resist, and recover from the impact of a natural hazard, and that vulnerability changes with time.

Magis (2010) points out how traditional approaches that start by analysing vulnerability and reviewing a set of problems or what is missing (needs) reinforce a victim mentality among participants and at the same time give rise to dependency. In contrast, she opts for the use of resilience instead. The concept of resilience starts with local assets and strategies to build on these assets (Magis, 2010). Birkman (2006) explains that the advent of the Hyogo Framework for Action lead to the increased recognition of the term resilience. Adger (2005), propose the concept of resilience as being inversely proportional to or opposite of vulnerability (Adger *et al*., 2005). Teo *et al.*, (2013), found the focus on resilience in a hazard or disaster context is more empowering as it reinforces positive competencies and adaptive behaviour. Birkmann (2006) agrees and highlights how community resilience has evolved and adds that resilience is a system that is able to adapt and learn. Mitchell & Harris (2012) highlight four major reasons to support the use of resilience in computing disaster risk.

- Firstly, they point out how resilience is a better fit for the context of development programming.
- Secondly, they point out how resilience can be used to track transformation processes from multiple angles, including slow drivers of change and non-linear factors.
- Thirdly, they point out that resilience emphasises institutional, community and individual capacities hinged on learning, innovation and adaptation.
- Finally, resilience is an effective driver of change, especially after a disturbance (Mitchell & Harris, 2012).

Even though the concept of disaster resilience has received support from many respected scholars and international organisations such as the United Nations, one fundamental question remains concerning the concept of disaster resilience: How do you measure disaster resilience?

3.3 MEASURING COMMUNITY RESILIENCE

Norris *et al*., (2008), explained that the concept of resilience was initially applied to the fields of physics and mathematics to describe properties of materials in equilibrium. The same authors explain how the term is used to describe how materials bounce back, absorb changes and still persist over time (Norris *et al*., 2010). Its use in disaster management is focused on how a group of people, a community or society can absorb or cope with the impact of the occurrence of a hazard (UN/ ISDR, 2004). Today many authors are using this concept to describe the complex interrelationships between people and nature to try and understand how they can best recover from a disaster (Teo *et al*., 2013). So while resilience is the subject of interest by different disciplines from distinct historical roots and conceptual perspectives, the potential policy strengths of resilience initiatives necessitate a firm understanding of its definition and concept, (Teo *et al*., 2013)

Luthar and Brown (2007) identify two central themes pertaining to the definition of resilience. The first theme is the general well-being among those at risk. The second is that resilience takes on a multi-disciplinary approach (Luthar & Brown, 2007). The same authors established that despite having multiple definitions, resilience has to do with adaptation/coping in response to

risk/adversity/challenges. Magis (2010) has suggested four views of resilience that influence how to define and consequently measure community resilience.

3.3.1 Dynamic Human System View

Magis (2010) explains how this view stems from the school of thought that a community's adaptation and change in response to threats and opportunities is dynamic. She continues by mentioning that resilience will continue changing with internal conditions, external forces, and a community's ability to respond and develop. Ahmed *et al*, (2004) agree and add that community resilience is not about the control of the conditions that affect them, but it is about a community's ability to respond to change. Therefore, resilience in this view stems from communities' ability to respond to change in order to survive and thrive with uncertainty and surprise. Magis (2010) postulates this discourse to depict communities as dynamic human systems with the ability to remain viable through change, and development. In this view, therefore, community resilience is defined as the ability of a community to acclimatise to their ever changing context. For instance, in the context of an agrarian community like Mwanachingwala Ward, in light of climate change, resilience will be seen as livelihood diversification. From the example, the resilience in Mwanachingwala will be measured based on livelihood diversification. Households with diversified income sources will be more resilient as opposed to those that mainly depend on agriculture.

3.3.2 Ability to Absorb Shock View

The second view Magis (2010) postulates is the one that focuses on a community's capacity to absorb or bounce back from the negative effects of the shock or hazard to return back to their normal functioning. This is seen as Anderies, *et al*., (2004) point out that resilience is how a community draws from the fundamentals that describe its sustenance, renewal and transformation. The same authors argue that these fundamentals will allow communities to absorb the impact of the hazard to retain their original state (Anderies *et al*., 2004). Magis (2010) suggests that despite being pushed to thresholds, a community will have to undergo significant transformations. These transformations are necessary to ensure a community's survival (Smits & Wandel, 2006).The same authors emphasise the aspects related to adaptive capacity required for a community to survive and thrive during adversity. In this view, community resilience is

defined as the adaptive capacity a community has to a particular hazard. In the context of an agrarian community like Mwanachingwala Ward, in the light of climate change, resilience will be seen as the improved agronomic practices that are able to counteract the effects of climate change. These will not only include yield improving, cost saving and labour, reducing practises, but practices that reduce greenhouse gas emissions and practices that increase carbon sequestration like tree planting and agro-forestry. From the example, the resilience in Mwanachingwala Ward will be measured based on adoption of climate smart agricultural practices. Households practicing climate smart agriculture will be more resilient than those that do not.

3.3.3 The Active Agency View

The third view of community resilience is viewed as the responsibility of government and disaster management agencies, while communities are relegated to passive roles regarding their own well-being (Magis, 2010). Resilient communities, therefore, are seen to have systemic structures that are able to develop material, physical, socio-political, socio-cultural, and psychological resources to cope with a particular hazard (Ahmed *et al*., 2004). In this paradigm, despite some community members having local and traditional knowledge as well as experience and understanding their efforts are seen as complementary to those of conventional management (Folkes *et al*., 2003). Abdul-Kadiri Yahaya (2012) advocates for the inclusion of indigenous knowledge in management institutions, however, this still comes off as a complementation. In this view, resilience is seen as the institutional capacity to respond to a hazard. In the context of an agrarian community like Mwanachingwala Ward, in the light of climate change, resilience will be seen as the strengthening of government and disaster management agencies' capacities through legislative, institutional systems' support including review and development of policies and the strengthening of organisational/institutional structures and systems. From the example, the resilience in Mwanachingwala Ward will be measured based on the legislative and policy framework efficiencies to ensure disaster risk reduction.

3.3.4 Community Resources View

In this view, communities are seen to have a variety of internal and external resources from which to draw to respond to change (Magis, 2010). Fey, *et al.*, (2006) present an array of resources that complement economic resources that are important to make community resilient.

These include financial, social, cultural, human, political, natural, and built resources. Flora and Flora (2008), postulate how community members engage these resources collectively and strategically to respond to adversity. This view of community resilience is defined as the ability of a community to survive in the face of change and uncertainty by actively building their resources (Flora & Flora, 2008). In the context of an agrarian community like Mwanachingwala Ward, in the light of climate change, resilience will be seen as the ability of a community to identify, manage and respond to a range of risks associated with their financial, social, cultural, human, political, natural, and built environmental context. Therefore, a household, community that is able to draw on these resources effectively is seen as more resilient as opposed to those that have challenges doing the same.

This definition resonates with the aim of the CBDRM programme in Mwanachingwala Ward. World Vision Zambia the lead organisation implementing the CBDRM programme in Mwanachingwala Ward defines CBDRM as a holistic process in which a community is empowered with the knowledge of how to identify, manage and respond to a range of risks associated with their social, economic and environmental context, (Jamal, 2011). Therefore, for this study, the definition of resilience will be drawn from the community resources view. The community resource view is the most appropriate in a study such as this one as community resources help in the generation of a reinforcing cycle that informs a construct upon which cultural recognition, social networks as well as other solidarity building capitals that foster collaboration and mutual visioning and action are measured (Alevizou *et al*., 2016). Community resource approaches lead to creative engagement and nurture micro-civic acts and cycles of symbolic recognition and self-organisation (Alevizou *et al*., 2016).

3.4 SUMMARY

In this chapter, several studies were reviewed in order to assess and understand the current state of the definition of resilience in the fields of disaster management. The definitions and various concepts reviewed in this chapter provide a better understanding of the concept of resilience, its key components, and how it should be conceptualised and applied in research. An initial working definition of disaster resilience includes the ability of a system to absorb, resist or deflect disaster impact and when impacted on, relatively quickly recovers and learn or adapt to future risks.

Also, the literature review indicates that conceptual and methodological problems still exist with regard to vulnerability assessment methods that need to be addressed. Furthermore, the literature review suggests that the concept of disaster resilience has more potential than the concept of vulnerability in advancing the hazard and disaster research agenda. The noted research gaps informed the research design and data collection procedures discussed in the following chapter.

CHAPTER FOUR: METHODOLOGY

4.0 INTRODUCTION

This study is guided by the main objective of the study which was to provide an empirical basis for community resilience measurement for community actors in CBDRM Programmes. From the previous chapter, the gaps were noted in the literature concerning how community resilience can be measured. These gaps necessitated this research. This chapter explains how the research was conducted. It provides a discussion for the research design, methods of data collection and analysis.

4.1 RESEARCH DESIGN

Saunders *et al*., (2009) suggest that systematic research is the way data is collected to answer a research question. The authors present this question as being in the centre of the research, and guide the choice of data collection techniques and analysis procedures. The research question being: Can the community capitals framework be used as resilience index to evaluate community-based disaster risk management programmes?

4.1.1 Research Philosophy

According to Saunders *et al.*, (2009), research philosophy can be described as the over-arching term that relates to the development of knowledge and the nature of that knowledge. The philosophy one takes on will be influenced by practical considerations (Saunders *et al*., 2009). Johnson and Clark (2006) contend that it is not as important for a research to be philosophically informed as much as it is should reflect upon philosophical choices. A researcher must be able to defend their choices in relation to the alternatives that one could have adopted (Johnson & Clark, 2006). The philosophy that this research implored is subjectivism. According to Saunders, *et al.,* (2009) subjectivism is the understanding of the meanings that individuals attach to social phenomena. The subjectivist view details on how the social phenomena emanate from the perceptions and resulting actions of different social actors (Saunders *et al*., 2009). Remenyi *et al*., (1998) emphasise how when dealing with the subjectivist view, there is need to study all the

details of a situation to understand the reality. The subjectivist view is closely associated with the term social constructionism (Remenyi *et al*., 1998). Saunders, *et al*, (2009), postulate that social constructionism is socially situated and common knowledge in a community is constructed through interaction with others. The development of a resilience index hence becomes a summary of the interpretations emanating from the social construct. Thus, subjectivism was the research philosophy guiding this study.

4.1.2 Research Approach

Research involves the testing of a theory. This can be done either through a deductive or inductive approach or both (Robson, 2002). Deduction testing theory allows for the testing of a theory in a controlled environment. It seeks to explain causal relationships between variables in order to determine why a phenomenon or phenomena is such. A hypothesis is developed which is tested through the collection of quantitative data. The interpretation of the results proves whether the hypothesis holds true or not. Induction on the other hand, involves building theory**.** Induction tries to establish what was going on, so as to understand better the nature of the problem through review and analysis of data. The result of this analysis would be the formulation of a theory. A topic on which there is a wealth of literature from which you can define a theoretical framework and a hypothesis lends itself more readily to deduction. With research into a topic that is new and on which there is little existing literature, it may be more appropriate to work inductively by generating data and analysing and reflecting upon what theoretical themes the data is suggesting.

In this study, a review of literature informed the development of a theoretical framework that in turn informed the development of a resilience index. This index was then used to determine the level of community resilience in Mwanachingwala. This describes the use of both inductive and deductive approaches which informed the research approach of this study. This describes a grounded theory strategy. Saunders *et al*., (2009) describe grounded theory as a 'theory building' through a combination of induction and deduction. According to Goulding (2002), grounded theory supports the prediction and explanation of behaviour. In grounded theory, data collection can begin in the absence of an initial theoretical framework (Goulding, 2002). This study aimed at developing a resilience index based on available literature. The framework in this case is the

resilience index used to measure resilience in Mwanachingwala. The study employed conforms to what Easterby-Smith *et al*., (2008) suggest when they described a cross-sectional study. Therefore, the results describe the level of articulation of community capitals possessed by the people of Mwanachingwala at a given point in time (Easterby-Smith *et al*., 2008).

The study followed a quantitative and qualitative research design approach that involved direct assessment. This is because the study required a combination of participant observations, interviews and historical research. Saunders *et al*., (2009) define quantitative data as being with prominent use of questionnaires for data collection and data analysis procedure yielding numerical data such as statistics. In contrast, Saunders *et al*., (2009), describe qualitative data collection as being predominantly in the form of interviews and data analysis procedures that generates or use non-numerical data.

4.3 DATA COLLECTION TOOLS

4.3.1 Questionnaire

Design of household survey questions: This data collection method involved a list of open and closed ended questions with the aim of securing standardised results and after tabulation, this helped to compare results and make conclusions. Despite the questionnaire being designed in English, all the interviews in all the communities were conducted in the local language – Tonga. The respondents were free and willing to participate in the exercise. To limit translation bias, the selection and wording of the questions included in the household survey was done in collaboration with members of the Mazabuka District Disaster Management Committee in the week prior to the field work. The table shows the indicators for each of the capitals.

Sampling/ population selection: The two-staged cluster sampling/probability proportion to size cluster sampling was found to be the most appropriate for this study. This is because the cluster sampling technique follows statistical populations that are "natural" but relatively heterogeneous groupings. In this study, these were three zones which make up Mwanachingwala Ward in Mazabuka District of Zambia. The first stage cluster sampling method was purposive. This is a non-probability sample that is selected based on the characteristic of the population. In this study, this was the Ward zones for Mwanachingwala which provided the heterogeneity required for the objectivity of the study. Despite being considered subjective sampling, purposive

sampling was noted to have the advantage of being very useful to reach a targeted sample quickly, considering the limited time for the study. The second stage was a random sampling of households within each of the 3 zones, by each enumerator taking a direction and transect from house to house until their quota was filled. A sample of 95 households of the 2,125 households in Mwanachingwala was required based on the following considerations:

Confidence level 95%

Confidence interval 10

4.3.2 Key Informant Interview (KII)

The composition of the interviewees included eight key informants drawn from the District Disaster Management Committee (DDMC) membership. The interviewees were a mixed group that included the following; a District Administration Office staff; a Ministry of General Education staff, a Ministry of Agriculture extension staff, a Ministry of Fisheries and Livestock extension staff, Ministry of Health personnel, a Local Government representative, a Ministry of Community Development and World Vision Zambia field staff.

Table 2.1: Details of key informant interviews (KIIs) conducted

No.	Position	Institution
1	District Commissioner	District Administration Office
2	Education Standards Officer	Ministry of General Education
3	Senior Agriculture Officer	Ministry of Agriculture
4	District Livestock Officer	Ministry of Fisheries and Livestock
5	Environmental Health Technician	Ministry of Health
6	Town Planner	Local Government representatives
7	Community Development Assistant	Ministry of Community Development
8	Food Security Development Facilitator	World Vision Zambia

Weighting of indicators was done using the participatory rural appraisal method of proportional piling the capital domains and indicators were assigned weights. Proportional piling is a

participatory method that can be used to obtain data from respondents in percentages (Adebo, 2000). The same author adds that proportional piling is used to obtain qualitative values of comparable item and in the case of this study, the community capital domain and their respective indicators. This method was used because it is able to compare the different community capital domains using assigned or weighted values by how much one is lower or higher than another. This provides a measure of relative importance of community capital domain or indicator. It shows relative shares or proportions of things to be compared. The ten seeds technique was used where the respondents were asked to proportionally allocate seeds across the capital domains and the corresponding indicators. They were heaped up in front of the facilitator, who asked the respondents to divide them into piles. The piles represented the weighting of the indicators.

4.3.3 Focus Group Discussions (FDG)

The focus group discussion was conducted at Mbiya School on 24th November, 2016. The FGD was made possible with the help of respective community leaders. The discussion was held with 18 respondents made up of a cross-section of the three Satellite Disaster Management Committees and other interested community members and combined interviews were conducted for both women and men. This method of data collection proved valuable in that respondents were free and able to give detailed information to the questions being asked. Through the focus group discussion, indicator weights were arrived at using the participatory tool of proportional piling. The ten seeds technique was used where the respondents were asked to proportionally allocate seeds across the capital domains and the corresponding indicators. They were heaped up in front of the facilitator, who asked the respondents to divide them into piles. The piles represented the weighting of the indicators.

4.4 DATA ANALYSIS

Quantitative data from household questionnaires was analysed using the F-test to determine the Analysis of Variance (ANOVA) this was done using a computer software package called Statistical Package for Social Sciences (SPSS). The F-test was found to be ideal to compare means over several groups. The advantage of using ANOVA over multiple t-tests is that the ANOVA F-test identifies if any of the group means are significantly different from, at least, one

of the other group means with a single test. Qualitative data was analysed manually. Shortly after field work, field notes were typed and expanded then later put into meaningful categories. In addition, relevant excerpts of respondent interviews were also utilised and included in the study findings.

4.5 DATA VALIDITY AND RELIABILITY

The validity and reliability of research very much depend on the measuring instrument. Saunders *et al.,* (1997), states that the validity and reliability of collected data depends on the design of the questions, the structure of the questionnaire, and the diligence of pilot testing. The following strategies were used to enhance the data reliability of the study.

Dealing with Social Desirability Responses; Questionnaire based research tends to have respondents presenting themselves in a certain light that might not be accurate (van de Mortel, 2008). This confounds research results by creating false relationships or obscuring relationships between variables (van de Mortel, 2008). The findings from the questionnaires were cross analysed with multiple variables in order to minimise, and correct for socially desirable responding in order to improve the validity of questionnaire-based research.

Data triangulation: The purpose of triangulation is to increase the credibility and validity of the results (Bogdan & Biklen, 2006).This is achieved by combining multiple observers, theories, methods, and empirical materials, the intrinsic biases that come from single method, single-observer and single-theory studies are avoided (Bogdan & Biklen, 2006). In this study, three data collection methods were employed these included the household interviews, focus group discussions and key informant interviews.

4.6 LIMITATIONS

The study was undertaken with some limitations. These at regular intervals affected the speedy implementation of the survey. Some of the impediments for the survey included:

- The resilience index that was proposed in this study employed few indicators resulting in a generalised measure of resilience.

- A multi-hazard approach was used. However, resilience is hazard specific hence the results did specify what hazards and to what magnitude of hazard the community under this study is/not resilient to.
- The study also noted that there was poor documentation, in terms of secondary data. Updated information was found to be a challenge, especially from government departments and other community-based organisations. Therefore, there was a level of inconsistency in the information provided and/or collected.
- Some villages are a distance apart from each other as Mwanachingwala Ward is situated in the midst of farming blocks and this had an impact on data collection time as enumerators had to cover long distances on foot.
- Some household heads were not found at their homes as they were tending their fields, especially in the morning, this called for enumerators to make appointments or strategically informed visits to various homes.

4.7 ETHICAL CONSIDERATIONS

This study posed fewer ethical dilemmas than experimental or field research designs however, it was still important to ensure that the few that may present themselves are dealt with. Participation in the study was strictly voluntary and those who did not wish to take part were allowed to decline. The survey ensured strict confidentiality which is the major ethical issue in survey research. This was done to prevent any disclosure of sensitive information from the respondents. Access to information was only limited to the research team only. Only numbers were used to identify respondents on their questionnaires. Plagiarism was another ethical issue that was dealt with by correctly citing every source of secondary information used.

4.8 SUMMARY

This chapter highlights on how the research was conducted. It provides a discussion for the research design, methods of data collection and analysis, limitations, and ethical considerations of the study. The research was guided by the research philosophy of subjectivism. This entails that social phenomena emanates from the perceptions and resulting actions of different social actors. Therefore, the resilience index developed in this study was a summary of the interpretations emanating from the social construct based on perception of self-reported

outcomes by the community. The research approach required the testing of a theory; therefore it required the use of both inductive and deductive approaches. A review of literature informed the development of a theoretical framework that in turn informed the development of a resilience index. This index was then used to determine the level of community resilience in Mwanachingwala. This procedure required a grounded theory, strategy. Grounded theory supports the prediction and explanation of behaviour through a combination of induction and deduction. As such, the study followed a quantitative and qualitative research design approach that involved direct assessment requiring a combination of participant observations, interviews and historical research.

Data collection was done threefold to increase data reliability through triangulation. It involved the use of household questionnaires, key informant interviews and a focus group discussion. The sample of the community questionnaire was arrived at using the following considerations; Confidence level of 95% and; Confidence interval of 10. This resulted in a sample size of 95 households out of the 2,125 households in Mwanachingwala Ward. The two-staged cluster sampling/probability proportion to size cluster sampling was found to be the most appropriate for this study. The first stage cluster sampling method was purposive. The second stage was a random sampling of households within each of the 3 zones. Quantitative data from the household questionnaire was analysed using the F-test to determine the Analysis of Variance (ANOVA). Quantitative data was analysed using a computer software package called Statistical Package for Social Sciences (SPSS) whereas, qualitative data was analysed manually. The results of which are discussed in the following chapter.

CHAPTER FIVE: DATA ANALYSIS AND PRESENTATION OF RESULTS

5.0 INTRODUCTION

In this chapter, the results of the study are presented in sub-themes reflecting the capital domains of the community capital framework in line with research questions and the objectives of the study. The study used the community capitals framework to formulate a resilience index to measure the resilience in Mwanachingwala. The capital domains include the following: Natural Capital; Cultural Capital; Human Capital; Social Capital; Political Capital; Financial Capital and; Built Capital.

5.1 SOCIAL DEMOGRAPHIC CHARACTERISTICS

Socio-demographics describe the characteristics of a population. In this study, the following characteristics were considered; gender of respondents and household size. According to the 95 household questionnaires administered the following results were noted:

5.1.1 Gender Respondents

General information about respondents indicated that 52% were female, whereas 48% were male. Additionally, a cross tabulation of household headship with gender suggested similar results. The study found that 61% of the household were headed by females compared to 39 male-headed households. Therefore, there is need for a gender balanced intervention strategy that will mitigate the gender challenges of the population in Mwanachingwala. Gender issues are pertinent in achieving sustainable economic growth, job creation, ensuring food security and reducing poverty.

5.1.2 Household Size

The average household size is 8 people. In terms of sex breakdown, there were on average 4 females and 4 males per household. Furthermore, there were 2 female children aged 0 to 17 and 2 male children aged 0 to 17 per household. Additionally, those aged 18 and above; were 2 females and 2 males per household. We can note from the Table 5.1 that there were slightly more males than females in the household in general and even so among children from 0 to 17 years, but not so among adults aged 18 years and above. The average household size of 8 for

Mwanachingwala is well above the national average of 5.0 and the Southern Province average of 5.5 per household, (CSO, 2012).

Table 5.1: Household Size

Statistics on household size (average absolute counts)						
Household Size	Female	Male	Female children aged 0-17	Male children aged 0-17	Female adults aged 18 and over	Male adults aged 18 and over
8.03	3.98	4.05	2.22	2.42	1.76	1.63

5.2 NATURAL CAPITAL

5.2.1 Access to Natural Resources

In this study, access to natural resources was used as a proxy to measure the availability of natural resources in the community. This is because natural resource availability requires scientific instruments and procedures that were beyond the scope of the study. For instance soil and water testing procedures. Furthermore, available secondary data were of national estimates from out of date sources (more than five years old). The study found that 93.6% of the respondents were able to collect thatching grass, 58.7% collect weaving grass, 30.4% collect building stones, 89.9% collect firewood, 69.6% collect plants for medicine, 64.5% collect poles for building, and 0.3% of the respondents were able to collect other natural resources.

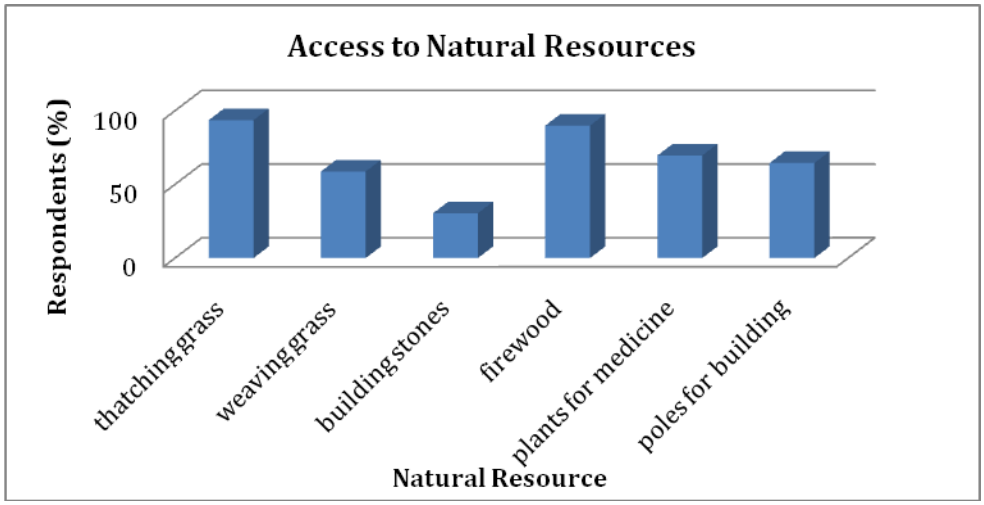


Figure 5.1: Access to natural resources

In the year preceding the study, 47.8% of the respondents did not lose access to the normally collected resources; however, 44.1% lost access to the collected resources. 2.5% lost access due to drought, 12% lost access due to wildfire, 33.5% of the loss of access was due to scarcity of the resources, and 1.4% lost access due to community conflict. 15.9% lost access due to floods, 4.2% lost access due to Government policy, and 1.1% lost access due to other reasons. As one of the primary communal and natural resources accessed, 74% have access to grazing land, and 79% have access to a fresh water sources for livestock. Generally, this is an indication that the area has natural resource stocks that can meet the needs of part of the community. Therefore, from the indicator index weight, the score of five was noted.

Table 5.2: Access to natural resources

COMMUNITY CAPITAL INDICATOR INDEX	INDEX WEIGHT
No access to natural resources with 0-5% of the respondents being supported by the available resources	1
Low access to natural resources with less than 25% of the respondents being supported by the available resources	2
Some access to natural resources with less than 50% of the respondents being supported by the available resources	3
High access to natural resources with over 50% of the respondents being supported by the available resources	4
Very high access to natural resources with over 75% of the respondents being supported by the available resources	5

5.2.2 Water Sources and Quality

Provision of clean and accessible water supply is one of the key action areas in disaster management and should be regarded as top priority as it is highly related to health (Sphere, 2011). Inadequate supply of clean water may lead to the outbreak of water related diseases such as dysentery, cholera, bilharzias and diarrhoea. Unsafe sources of water supply are a well-known cause of water related diseases such as cholera, dysentery, bilharzias and diarrhoea (Sphere, 2011).

Table 5.3: Main drinking water sources

Main source of drinking water	% distribution
Piped into dwelling	5.3
Public outdoor tap or bore hole	61.4
Private well	18.2
River, lake or pond	6.8
Other	8.3
Total	100

Table 5.3 shows the main sources of drinking water by the households obtained from the household questionnaire. The common source of drinking water was public outdoor tap or borehole used by 61.4%, followed by private well 18.2%, then other 8.3%, river, lake or pond 6.8, and piped into dwelling 5.3%. Ganoulis (2009) describes treated piped water as the least at risk water and open water sources from lakes and rivers the highest at risk with boreholes being marginally safe. Access to safe water is obtained from protected wells, protected bores and taps. Conversely, access to unsafe water is obtained from unprotected wells, unprotected boreholes, and rivers/lakes/dams/streams (Ganoulis, 2009). Therefore, from the indicator index weight the score of four was noted.

Table 5.4: Water Sources and Quality

COMMUNITY CAPITAL INDICATOR INDEX	INDEX WEIGHT
No access to clean water with majority (over 50%) having access only to rivers/lakes/dams/streams available	1
Clean water available in normal years but not during dry spells	2
Relatively good availability of clean water supply with majority (over 50%) having access to unprotected wells, unprotected boreholes	3
Good groundwater supply with majority (over 50%) having access to protected boreholes	4
Extremely good water supply with majority (over 50%) having piped into dwelling	5

5.3 CULTURAL CAPITAL

5.3.1 Capacity for community self-organisation

According to Xu (2016), disaster risk reduction strategies are highly dependent on a community's self-organisation ability. Self-organisation is an important way to improve the ability of community disaster risk management as communities are considered the first line of defence against disaster and play a unique and irreplaceable role to reduce casualties (Xu, 2016). From the findings, 2.8% of the respondents agreed that their communities had a high capacity of self-organisation in the case of a disaster, whereas, 97.2% disagreed. Of those that said that their communities did not have a high capacity of self-organisation, 6.1% said they didn't need help to recover, 93.9% however, stated they needed help to recover. Of the help needed to recover, 26.5% required government or disaster management agencies to meet their food needs; 4.2% wanted alternative sources of income and 62.8% suggested they needed help with agricultural inputs. This indicated that there is a relatively low ability of the community to organise itself following the wake of a disaster. Therefore, from the indicator index weight, the score of one was noted.

Table 5.5: Capacity for community self-organisation

COMMUNITY CAPITAL INDICATOR INDEX	INDEX WEIGHT
No capacity for community self-organisation with 0-5% of the respondents reporting that the community could organise itself	1
Low capacity for community self-organisation with less than 25% of the respondents reporting that the community could organise itself	2
Some capacity for community self-organisation with less than 50% of the respondents reporting that the community could organise itself	3
High capacity for community self-organisation with over 50% of the respondents reporting that the community could organise itself	4
Very high capacity for community self-organisation with over 75% of the respondents reporting that the community could organise itself	5

5.3.2 Community Ownership of CBDRM Process

Community-based disaster risk management efforts require ownership by the community for it to be successful. CBDRM is community driven and requires full participation of all community actors. From the findings, only 38% of the respondents believe that it is the individual households and community's responsibility to help reduce risks of disaster in their community. Whereas the rest of the community believe that the responsibility is meant for other actors. Specifically, 37.4% of the respondents believe it is the headman's responsibility, 2.2% believe it to be the chief's and 18.4% believe it is the government or NGO's responsibility to assist, 3.9% do not know whose responsibility it is.

On whose responsibility it is to assist the communities in times of disaster, 17.9% believe it is their personal responsibility to assist people after a disaster, 8.1% believe it is the headman's responsibility, 7% believe it is the chief, 64.2% believe it is the government or NGO, 2.8% do not know. These findings indicate that the majority of the community relies on external agencies assistance for both the management of disaster risks and disaster response. This is an indication of dependency. Dependency in disaster risk management refers to a community's attitudes towards the feeling of being victimised and dependent as opposed to being self-sufficient (UNDP, 1997). This occurs when the victims of a disaster become dependent on aid and its providers, thus increasing their disaster proneness and such a community finds itself, requiring emergency assistance over indefinite time periods or repeatedly to the same groups (UNDP, 1997). Therefore, from the indicator index weight, the score of two was noted.

Table 5.6: Community Dependency

COMMUNITY CAPITAL INDICATOR INDEX	INDEX WEIGHT
No indication of community ownership of CBDRM process between 0-5% of the respondents acknowledging that there is	1
Little indication of community ownership of CBDRM process less than 25% of the respondents acknowledging that there is	2
Some indication of community ownership of CBDRM process less than 50% of the respondents acknowledging that there is	3
Evidence of community ownership of CBDRM process over 50% of the respondents acknowledging that there is	4
Strong evidence of community ownership of CBDRM process over 75% of the respondents acknowledging that there is	5

5.3.3 Use of Traditional Knowledge

Traditional knowledge in disaster risk management refers to is the indigenous understanding, process and practice of people and their communities (IFRC, 2008). They may not be scientific but the richness of experience and indigenous knowledge is a resource to be recognised (Yahaya, 2012). The study focused on whether traditional warning signs were incorporated into the CBDRM process. The findings show that 19.9% of the respondents know the traditional early warning signs of a wind storm, 28.5% know traditional early warning signs of drought, 24.3% know the traditional early warning signs of having pests, 43.9% know the traditional early warning signs of the flood, 43.3% know the traditional early warning signs for diarrhoea, 62.3% know the traditional early warning signs of malaria, and 1.4% do not know any traditional early warning signs of frequently occurring hazards in the area. For most of the hazards noted, more than half of the respondents were unaware of the traditional early warning signs for the different hazards that affect their area. This could be attributed to the age of the respondents as traditional signs are usually known by older people. From the age of the population in Mwanachingwala only 18.2% are above 55 years. This describes a youthful population. CBDRM requires the incorporation of community-based and community driven systems to enhance the community's ability to anticipate hazards. These results show that the majority of the community has knowledge of how to anticipate, manage and respond to a range of risks associated with community context. Therefore, from the indicator index weight the score of three was noted.

Table 5.7: Use of Traditional Knowledge

COMMUNITY CAPITAL INDICATOR INDEX	INDEX WEIGHT
No knowledge of traditional warning signs between 0-5% of the respondents knowing the signs	1
Low knowledge of traditional warning signs less than 25% of the respondents knowing the signs	2
Some knowledge of traditional warning signs less than 50% of the respondents knowing the signs	3
High knowledge of traditional warning signs over 50% of the respondents knowing the signs	4
Very high knowledge of traditional warning signs over 75% of the respondents knowing the signs	5

5.4 HUMAN CAPITAL

5.4.1 Age of Respondents

In terms of their age, results indicated that 53.8 % or above less than half were aged between 16 and 35, whereas slightly above, below half (46.2 %) were aged 36 years and above. It can be noted from Table 3.1 that 81.8 % are in the economically active population. On the other hand, this is a lucid indication that most of the households are headed by a youthful population. A youthful population is energetic and can easily be integrated into simple economic activities such as farming and small scale businesses by teaching them the necessary skills and giving them incentives such as pieces of land and simple agricultural equipment. Therefore, from the indicator index weight, the score of five was noted.

Table 5.8: Respondents by age group

Age group	% Distribution
16-25	11.4
26-35	34.8
36-45	26.5
46-55	9.1
56-65	10.6
66 & above	7.6
Total	100

Table 5.9: Age of Respondents

COMMUNITY CAPITAL INDICATOR INDEX	INDEX WEIGHT
< 25% of respondents between 26 – 55	1
26% - 40% of respondents between 26 – 55	2
> 50% respondents between 26 – 55	3
> 60% of respondents between 26– 55	4
> 80% of respondents are between 26– 55	5

5.4.2 Livelihood Skill Diversity

Community-based disaster risk management efforts seek to protect community livelihoods from the adverse impacts of hazards (FAO, 2013). Livelihood diversity, thus, can be seen through diversity of skills that the community possesses. The larger proportion of skills, diversity indicates higher resilience (FAO, 2013). Of the respondents a proportion of 85% possessed improved farming skills. Improved farming referred to conservation farming skills which involve minimum soil disturbance, crop rotations and incorporation of agroforestry. However, the research did not measure the adoption of the farming practice. However, from the KII, the agriculture department placed it at 29%.

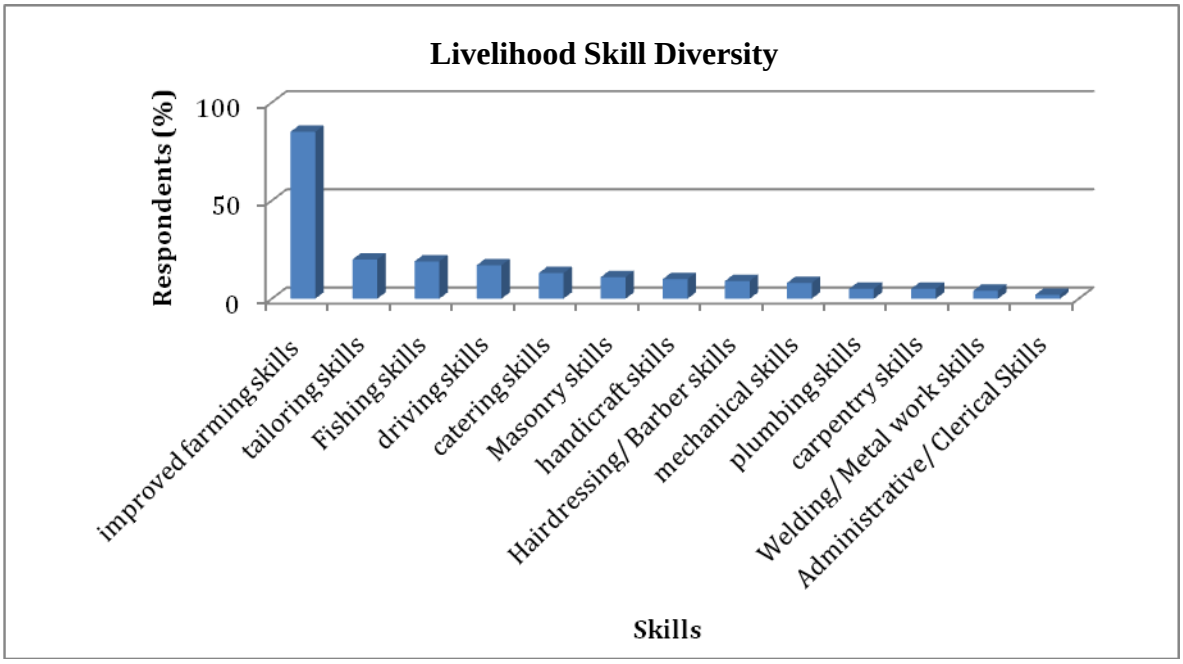


Figure 5.2: Livelihood Skills Diversity

Figure 8, shows that 20% of the respondents had dress making/tailoring skills, 19 % had fishing skills, 17% had driving skills, 13% had skills in catering, 11% had construction/ Masonry skills, 10% had handicraft skills, 9% had Hairdressing/Barber skills, 8% had mechanical skills, 5% had plumbing skills, 5% had carpentry skills, 4% had Welding/Metal work skills, and only 2% had Administrative/Clerical skills. These results show low indication of livelihood diversity as the community mainly relies on agriculture as their livelihood. Therefore, any hazards that affect

agriculture, the community will have limited livelihood options to fall back on. Therefore, from the indicator index weight, the score of three was noted.

Table 5.9: Livelihood Diversity

COMMUNITY CAPITAL INDICATOR INDEX	INDEX WEIGHT
No indication of livelihood diversity between 0-5% of the respondents	1
Low indication of livelihood diversity less than 25% of the respondents	2
Some indication of livelihood diversity less than 50% of the respondents	3
High indication of livelihood diversity over 50% of the respondents	4
Very high indication of livelihood diversity over 75% of the respondents	5

5.4.3 Participation in Community-Based Disaster Risk Management Activities

Through the CBDRM process, the community is empowered with knowledge of how to identify, manage and respond to a range of risks associated with their social, economic and environmental context. Therefore, for any community-based programme to be successful, it requires the participation of all the community actors (Reid, 2000). The findings show that 22.3% of the respondents had participated in CBDRM training in the past year whereas 75.4% had not. The findings also show that 2.2% of the respondents did not know if any of the household members has had participated in any CBDRM training.

Furthermore, when the respondents were asked if they were aware of the satellite disaster management committee in their community, only 23.2% of the respondents were aware. The remaining 76.8% had no knowledge of the committees dealing in disaster risk management in their community. The respondents were asked if they had attended any CBDRM meeting and only 5% responded in the affirmative.

The findings further show that in the past year 1.7% households had participated in a disaster drill about 5 times or more, 3.9% participated in a disaster drill about 3-4 times, 10.9% participated about 1-2 times, and 83.5% have not participated in a disaster drill in the past year. 22.3% have received training in risk assessment in the past year, 75.4% have not been trained in risk assessment and 2.2% do not know if any of the household members had training in risk

assessment. From these finding the level of knowledge in the community is still below average. Therefore, from the indicator index weight, the score of two was noted.

Table 5.11: Participation in Community-Based Disaster Risk Management Activities

COMMUNITY CAPITAL INDICATOR INDEX	INDEX WEIGHT
No participation in CBDRM between 0-5% of the respondents	1
Low participation in CBDRM less than 25% of the respondents	2
Some participation in CBDRM less than 50% of the respondents	3
High participation in CBDRM over 50% of the respondents	4
Very much participation in CBDRM over 75% of the respondents	5

5.5 SOCIAL CAPITAL

5.5.1 Access to Information about Disasters

In the context of awareness-raising, education and communication on disaster risk reduction (DRR) issues, 70.7% and 64.3% of the respondents had radios and cell phones, respectively. The widespread possession of these household items enables DRR communication. On public awareness campaigns that are conducted with the aim of increasing the communities' access to information about how they can take practical measures to protect themselves from the impact of hazards, 48% of the respondents agreed that campaigns were there, 49.2% of the respondents said they are not there and 2.8% do not know. 32.4% said their communities knew what to do in times of disaster, 46.6% said their communities do not know what to do in times of disaster, and 20.9% do not know if their communities know what to do in times of disaster.

On having received early warning information, 72.9% agreed to having had received advance warning in the case of a drought, flood, storm or disease outbreak, 21.2% said no to having received any advance warning and 5.9% do not know if ever they received any advance warning. It was further noted that 17% of the respondents received an advance warning through public meetings, 59.8% received their advance warning through the radio, and 7.3% got their warning from loud hailer/village courier. 2% received advance warnings when they got visits from the district officials, 34.6% heard from their neighbours, and 1.4% received an advance warning from other sources. This generally shows that the majority of the community had access to

information on disaster risk management. Therefore, from the indicator index weight the score of four was noted.

Table 5.12: Access to Information about Disasters

COMMUNITY CAPITAL INDICATOR INDEX	INDEX WEIGHT
No access to information about disasters between 0-5% of the respondents	1
Low access to information about disasters less than 25% of the respondents	2
Some access to information about disasters less than 50% of the respondents	3
High access to information about disasters over 50% of the respondents	4
Very access to information about disasters over 75% of the respondents	5

5.5.2 Access to Social Services (social safety nets)

Social services or social safety nets are the collection of services that are rendered by the state or by other institutions that include welfare, unemployment benefits, universal health care and others (Gentilini & Omamo, 2009). From the findings, 77.7% of the respondents had not received welfare payments in the past year, 0.6% do not know if their household received any while 22.8% received welfare payments in the past year. Of those that received welfare support, 18.2% received from World Vision Zambia, 2.8% received from their local clinic, 0.6% received from the Government and 0.3% received from the Zambia Sugar Company.

The findings further show that 28.5% of the respondents said they have access to emergency shelters, 41.6% have access to medical care, 27.4% have access to beddings, 47.5% have access to food, and 3.9% have access to other facilities. 91.1% have not received any government pension in the past year, whereas 7.3% have received and 1.7% of the respondents were not sure if a government pension was ever collected in their households. Generally, it can be noted from the findings that there is available social safety nets within the community, however, less than 50% of the respondents reported having access. Therefore, from the indicator index weight, the score of three was noted.

Table 5.13: Access to Social Services (social safety nets)

COMMUNITY CAPITAL INDICATOR INDEX	INDEX WEIGHT
No access to social services between 0-5% of the respondents	1
Low access to social services less than 25% of the respondents	2
Some access to social services less than 50% of the respondents	3
High access to social services over 50% of the respondents	4
Very access to social services over 75% of the respondents	5

5.5.3 Relationships of Trust

A key component of successful building of social capital is collaborative and trusting relationships between community members (Wasserman, 2014). Developing these relationships allows for communities to be successful in implementing disaster risk management programmes. The findings show that 7% of the respondents belonged to a savings group, whereas 93% did not belong to any savings group. 71.5% of the respondents do not belong to any committee council (a community group) while 28.5% belong to a committee council. 1.7% households belong to the disaster risk management team, 1.4% households belong to a crime prevention committee, 21.2% of the respondents belonged to farmers' associations or clubs, and 5.9% belong to functional agriculture co-operatives. The results show low levels of participation in community groups an indication of poor relationships of trust existing among the community members that have little impact. Therefore, from the indicator index weight, the score of two was noted.

Table 5.13: Access to Social Services (social safety nets)

COMMUNITY CAPITAL INDICATOR INDEX	INDEX WEIGHT
No trust among members of the community 0-5% of the respondents	1
Some relationships but with little impact less than 25% of the respondents	2
Relationships of trust exist and represent some of the community less than 50% of the respondents	3
Well established and actively assist a good part of the community over 50% of respondents	4
Well established and actively represent the majority of the community over 75% of respondents	5

5.6 POLITICAL CAPITAL

5.6.1 Community Awareness of Government Policies on Disaster Risk Management

The significance of implementing disaster risk assessment, interventions for the most vulnerable households cannot be over-emphasised. It is important to monitor how households change these coping strategies over time. From the findings, 22.9% are aware of the Government's plans and policies addressing disaster risk assessment in their communities, 71.5% are not aware and 5.6% do not know. 14.2% of the respondents have been provided with risk assessment information, whereas, 79.6% have not been provided with risk assessment information and 6.1% do not know. 64.4% said their communities know how safe their important infrastructure is and how they can take practical steps to ensure that all new and existing buildings are strengthened to provide protection from impact of hazards, 28% said their communities do not know, and 7.6% have no idea of such knowledge. From these findings, it is noted that even though risk assessments have been conducted in the past, this information has medium to low impact on the community. Therefore, from the indicator index weight, the score of three was noted.

Table 5.15: Community awareness of Government policies on disaster risk management

COMMUNITY CAPITAL INDICATOR INDEX	INDEX WEIGHT
No awareness of Government policies on disaster risk management evident in the area impacting 0-5% of the respondents	1
Low awareness of Government policies on disaster risk management impacting less than 25% of the respondents	2
Some form of awareness of Government policies on disaster risk management impacting less than 50% of the respondents	3
Well established awareness of Government policies on disaster risk management impacting above 50% of the respondents	4
Well established awareness of Government policies on disaster risk management and actively supporting more than 75% of the respondents	5

5.6.2 Political Will of Disaster Management Structures

Political will refers to the balance of policy implementation in terms of the amount of political benefits and costs that would result from implementation. This can be seen through the level of commitment of by the government in the coordination and implementation of certain policies over time. Regarding disaster risk management, political will refers to a strong understanding

and implementation on the disaster management policy at local level. This study used a proxy measure in the determination of political will through the measurement of activeness of disaster management structures both at community and district level. From the findings, 26.8% of the respondents have knowledge of government body concerned with disaster risk management in the community, whereas, 73.2% do not have any idea of such. The findings further show that 49.7% of the respondents said there was an NGO/s or Community-Based Organisation's (CBO) in their community working on disaster risk management, whereas, 50.3% were not aware of any NGO or CBO in the community working on disaster management. The findings show that from the community's perspective, most of the disaster risk management programmes are not organised by the government. This is also in tandem with the indicator that shows low Community awareness of the Government policies on disaster risk management. Therefore, from the indicator index weight, the score of two was noted.

Table 5.16: Political will of disaster management structures

COMMUNITY CAPITAL INDICATOR INDEX	INDEX WEIGHT
No political will of disaster management structures evident in the area impacting 0-5% of the respondents	1
Low political will of disaster management structures impacting less than 25% of the respondents	2
Some form of a political will of disaster management structures impacting less than 50% of the respondents	3
Well-established political will of disaster management structures impacting above 50% of the respondents	4
Well-established awareness, political will of disaster management structures actively supporting more than 75% of the respondents	5

5.6.3 Governance of CBDRM Processes

The study measured governance through the proxy indicator of awareness on disaster preparedness and response plans by the community. The District Disaster management committee agreed during the KII to having district multi–sectorial disaster preparedness, prevention and mitigation plans for slow and rapid onset disasters. As to whether the community was aware of such plans, only 15.1% of the respondents agreed to their community having a disaster preparedness plan, 70.7% denied and 14.2% did not know.

15.1% said community emergency response plans are tested regularly with rehearsal exercises, 63.4% said they are not and 21.5% do not know. 30.2% affirmed the presence of a vulnerability household register in their community, 57% denied to having one, 12.8% did not know. This indicates that there is medium to low impact of the CBDRM process. Therefore, from the indicator index weight, the score of three was noted.

Table 5.17: Governance of CBDRM processes

COMMUNITY CAPITAL INDICATOR INDEX	INDEX WEIGHT
Lack of governance of CBDRM process in the area impacting 0-5% of the respondents	1
Low of governance of CBDRM process impacting less than 25% of the respondents	2
Some form of governance of CBDRM process impacting less than 50% of the respondents	3
Well established governance of CBDRM process impacting above 50% of the respondents	4
Well established governance of CBDRM process actively supporting more than 75% of the respondents	5

5.7 FINANCIAL CAPITAL

5.7.1 Access to Financial Services

Results showed that 44% have cash savings within the household, whereas 56% do not have any cash savings. In terms of where the savings were being kept for those involved in cash savings, results indicated that 36% keep their money at home whereas 8% keep their money at the bank. The sources of these savings include 23% from crop sales, 11% from business, 6% from other sources, and 2% from income employment income. This is an indication that most of the households were not saving their income, this may be due to low household incomes. On the aspect of households belonging to any informal savings group, results showed that only 7% belonged to a savings group, whereas 93% did not belong to any savings group.

Only 4% of the respondents had loans whereas 96% did not have loans. In terms of the average amount of loans borrowed, results indicated that 40% borrowed ZMW 475; 20% borrowed ZMW 245; 20% borrowed ZMW 350; and 20% borrowed ZMW 1, 100. In addition, to the loans

acquired, 75 % were accessed from micro-finance institution or credit cooperative, whereas 25% were gotten from other sources. Furthermore, all the loans were acquired for the sole purpose of buying farm inputs; and none of the borrowers indicated having had missed the loan repayment. The results indicate that there is very low access to formal financial services. Therefore, from the indicator index weight, the score of two was noted.

Table 5.18: Access to Financial Services

COMMUNITY CAPITAL INDICATOR INDEX	INDEX WEIGHT
No access to financial services in the area supporting 0-5% of the respondents	1
Low access to financial services in the area supporting less than 25% of the respondents	2
Some form of access to financial services in the area supporting less than 50% of the respondents	3
Well-established access to financial services in the area supporting above 50% of the respondents	4
Well-established access to financial services in the area supporting actively supporting more than 75% of the respondents	5

5.7.2 Stability of Household Income

A stable source of income is a form of security for the households; this can bring about savings and purchase of food or assets to help sustain them in times of disaster or great calamity. Without a stable source of income, there tends to be hand to mouth kind of lifestyle where whatever amount comes none is saved but goes to buying food. And in times of disasters there tends to be periods of not having an income bringing about hunger and poverty.

The findings from the household questionnaire show that 92.7% of the respondents were involved in traditional farming, whereas only 0.6% farm at a commercial level. The findings also show that only 3.0% of the respondents were found to be in formal employment and 3.4% were involved in other activities with only 0.3% not involved in any form of work. These findings show that the majority of the sample population are traditional farmers. On households' largest source of income, 70% of the respondents had it from farming, 14% had other sources of income, 6% were getting their income from petty trading, 4% from hiring jobs and 2% from fishing and 2% had no source of income at all.

As to whether the community earnings pay for their household expenditure, the results indicate only 21% of the respondents said all their earning pay for their household expenditure. 26.9% of the respondents said that about half, followed by 21.8 % who said almost none, then by, 16% said less than half, and 14.3% said more than half. The findings suggest that the majority of the households depend on one source of income that is only able to sustain 21.8% of the respondents' households needs. This indicates that there is low stability of household income in the area with less than with 25% of the respondents reporting stability. Therefore, from the indicator index weight, the score of two was noted.

Table 5.19: Stability of household income

COMMUNITY CAPITAL INDICATOR INDEX	INDEX WEIGHT
No stability of household income in the area only 0-5% of the respondents reporting stability	1
Low stability of household income in the area with less than 25% of the respondents reporting stability	2
Some form of stability of household income in the area less than with 50% of the respondents reporting stability	3
Well established form of stability of household income in the area with above 50% of the respondents reporting stability	4
Well established form of stability of household income in the area with more than 75% of the respondents reporting stability	5

5.7.3 Alternative Off-Farm Income

Small-scale farmers need to have other alternative sources of income to ensure diversity. In case there is a hazard occurring that affects one livelihood source, an alternative income can be found. Additionally, households that offer their manpower as farm labour to other households may not have time to work in their own fields adding the poverty spiral.

When asked if they had other sources of income, 45% of the respondents indicated that they only had one source of income, whereas 55% indicated that they had their income from more than one source.

When asked if they had any small scale businesses, 52% of the respondents agreed and 48% of the respondents did not run any small business. Of those that had businesses, 37% only had one business, whereas 15% had two businesses, and 1% had three businesses. Furthermore, in terms of business type, results showed that 31% of the households got most of their cash from petty

trade, 19% got from other income sources, 4% got from handicraft making and selling, 3% got from fishing and 2% got money from transport.

Among those households which had small businesses, 64% of them affirmed having had a business plan, whereas 36% did not have any business plan. In terms of duration for doing business, 76% have been doing business for 0 to 36 months, 12% for 37 to 73 months, 6% for 111 to 147 months, and 3% for 47 to 110 months and 3% for 148 to 180 months. Additionally, 39% expect growth in their business, where as 14% do not expect growth in their business. For those that expect a growth, 34% said it was because of the high demand for a product, 6% attributed to the weak competition for business, 1% had other reasons for growth. However, for those that did not expect growth in their business 2% attributed to the fact that there was low demand for the product, 4% said there is strong competition for their product, where as 7% attributed to other reasons.

On the aspect of average weekly revenue from the above sources, results indicated that 95% of the households were earning ZMW 500 and below, followed by those who owned from ZMW 600 to ZMW 1,000 at 4%, then those who were earning from ZMW 2,100 to ZMW 2,500. This goes to show that the amounts of money made from scale business by most of the households is not sufficient to sustain a household of 8 people. This is an indication that despite a good number of the respondents having an alternative off-business they are unable to meet the needs of the household. Therefore, from the indicator index weight, the score of three was noted.

Table 5.20: Alternative Off-Farm Income

COMMUNITY CAPITAL INDICATOR INDEX	INDEX WEIGHT
No access to alternative off-farm income only 0-5% of the respondents reporting access	1
Low access to alternative off-farm income with less than 25% of the respondents reporting access	2
Some form of access to alternative off-farm income with less than 50% of the respondents reporting access	3
Well-established access to alternative off-farm income with above 50% of the respondents reporting access	4
Well-established access to alternative off-farm income with more than 75% of the respondents reporting access	5

5.8 BUILT CAPITAL

5.8.1 Access to Public Facilities during Emergencies

Public facilities are lifeline systems that serve as concrete facilities that mainly aim at maintaining the convenience of life. In disaster management, the challenges of an emergency evacuation, medical treatment, the functioning of schools, and assurance of safety are at the helm of improvement of public facilities (Taga, 2007). From the focus group discussion, the following public facilities were noted; four schools, one clinic, 29 churches and one police post.

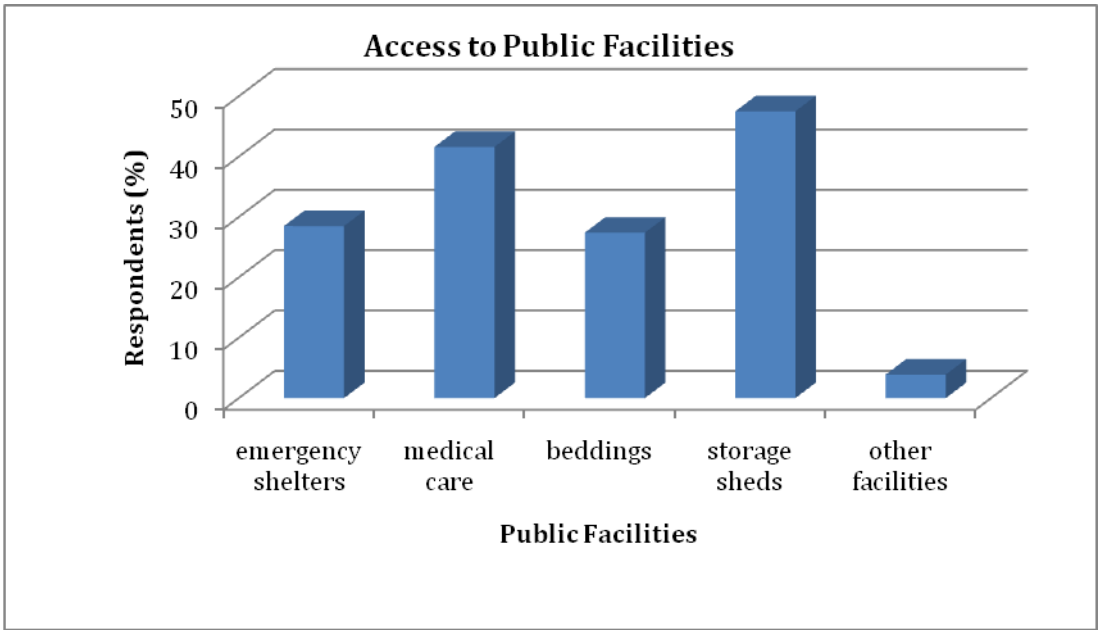


Figure 5.3: Access to public facilities during emergencies

From the household questionnaire, 28.5% of the respondents said that they have access to emergency shelters, 41.6% have access to medical care, 27.4% have access to beddings, 47.5% have access to storage sheds, and 3.9% have access to other facilities. From the findings, less than 50% of respondents had access to the available public facilities during times of emergencies. Therefore, from the indicator index weight, the score of three was noted.

Table 5.21: Access to public facilities during emergencies

COMMUNITY CAPITAL INDICATOR INDEX	INDEX WEIGHT
No access to public facilities only 0-5% of the respondents reporting access	1
Low access to public facilities with less than 25% of the respondents reporting access	2
Some form of access to public facilities with less than 50% of the respondents reporting access	3
Well-establishedaccess to public facilities with above 50% of the respondents reporting access	4
Well-established access to public facilities with more than 75% of the respondents reporting access	5

5.8.2 Road Access

In disaster risk, management access to areas that are affected will reduce lead time for response activities. This lead time can mean life or death for disaster victims. Improved roads increase access to remote villages facilitating market promotion and delivery of social services (World Bank, 2007). Furthermore, the same authors note that improved rural roads (i) reduce production costs; (ii) promote employment opportunities through large-scale agriculture, agro-processing and out-grower schemes; (iii) support non-farm rural small-scale enterprises; (iv) enhance food security among smallholder agriculture; and (v) social interventions in education, health, and sanitation(World Bank, 2007). All these are necessary for enhancing livelihood, which in turn builds community resilience. From the focus group discussion, it was noted that Mwanachingwala is accessible most of the year with feeder roads present but with signs of poor maintenance. It was also noted that drainages were poorly done and some roads get cut off by water. Therefore, from the indicator index weight, the score of three was noted.

Table 5.22: Road Access

COMMUNITY CAPITAL INDICATOR INDEX	INDEX WEIGHT
No feeder roads	1
Some feeder roads but poorly maintained	2
Feeder roads present with signs of poor maintenance	3
Most of the area is accessible throughout the year	4
All farms fully planned with good road network	5

5.9 WEIGHTING OF INDICATORS

The study used a weighting technique derived from the participatory method of proportional piling discussed in the previous chapter. The weighting of indicators was important in the context of this research since composite indicators in most cases should bear a higher weight than individual indicators. Weighting can be very subjective in the absence of adequate data and proper modelling, but according to literature weights based on the experience of the researcher as well as inputs from experts in most cases were better than applying no weights at all (Dwyer *et al.*, 2004). In the context of this research, weights were allocated arbitrarily after consultations and inputs from the district disaster management committee (DDMC) and satellite disaster management committees (SDMC). The weighting was done during the focus group discussions and key informant interviews.

The results of the community capitals weights from the KII and FGD are shown below

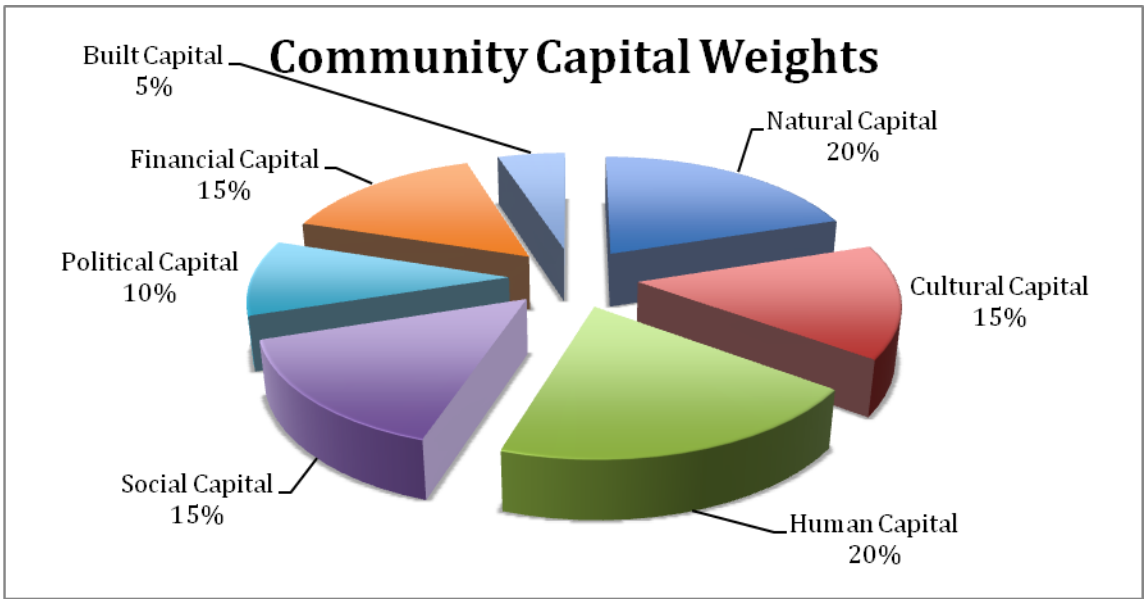


Figure 5.4: Community capital weights

5.10 PROPOSED COMMUNITY RESILIENCE INDEX (CRi)

The premise for a successful CBDRM programme is to see a CBDRM process where:

- Communities are involved in all phases of a project and take ownership over proposed activities, training and support the project and contribute local resources (Jamal, 2011);

- Strengthen existing governance structures rather than create new committees (Jamal, 2011);
- Communities participate in monitoring and evaluation (Jamal, 2011);

It is, therefore, important that tools are developed to ensure that these processes are present and are community led. The basis of this research was to propose a community resilience index that can be used by community actors to evaluate CBDRM programme efforts. The community resilience index (CRi) was calculated as follows:

CRi = Resilience Index

$$CRi = \sum_{i=1}^{\infty} w_i C_{Hi}$$

Where: w = community capital weight

And: C_{H_i} = Community Capital Indicator *i.*

$$CRi = f(w_1^{hum} C_H{}^{hum}, w_1^{soc} C_H{}^{soc}, w_1^{cult} C_H{}^{cult}, w_1^{fin} C_H{}^{fin}, w_1^{blt} C_H{}^{blt}, w_1^{env} C_H{}^{env}, w_1^{pol} C_H{}^{pol})$$

Where: $C_H{}^{hum}$ = Human capital

$C_H{}^{soc}$ = Social capital

$C_H{}^{cult}$ = Cultural capital

$C_H{}^{fin}$ = Financial capital

$C_H{}^{blt}$ = Built capital

$C_H{}^{env}$ = Environmental capital

$C_H{}^{pol}$ = Political capital

The proposed CRi made use of 19 indicators which were measured. Using data from the household questionnaire, these results were triangulated with the results obtained during the key

informant interviews and focus group discussion. The summary of the findings is shown in Table 5.23 below.

Table 5.23 Community Resilience Index (CRi)

Community Capital Domain	Community Capital Weight	Community Capital Indicator	Indicator Weight	Index Weight	Community Capital Measure	CRi
Natural Capital	0.2	Access to natural resources	0.6	5	4.6	3.05
		Water Sources and Quality	0.4	4		
Cultural Capital	0.15	Capacity for community self-organisation	0.3	1	2	
		Community Ownership of CBDRM process	0.4	2		
		Use of traditional knowledge	0.3	3		
Human Capital	0.2	Age of respondents	0.2	5	3	
		Livelihood Diversity	0.4	3		
		Participation in CBDRM activities	0.4	2		
Social Capital	0.15	Access to Information about Disasters	0.3	4	3	
		Access to Social Services (social safety nets)	0.2	4		
		Relationships of trust	0.5	2		
Political Capital	0.1	Community awareness of Government policies on disaster risk management	0.3	3	2.7	
		Political will of disaster management structures	0.3	2		
		Governance of CBDRM processes	0.4	3		
Financial Capital	0.15	Access to Financial Services	0.4	2	2.4	
		Stability of household income	0.2	2		
		Alternative Off-Farm Income	0.4	3		
Built Capital	0.05	Access to Public facilities during emergencies	0.4	3	3	
		Road Access	0.6	3		

5.11 COMPUTATION OF COMMUNITY RESILIENCE INDEX (CRi)

The computation of the CRi was based on the formula discussed above the indicator weight and results from the findings are tabulated in table 5.23. The overall community resilience index for Mwanachingwala was found to be approximately 3 out of a maximum of 5. However, because the study followed a cross-section time horizon, these results are a snapshot of what was attaining at the time of the study. As such, the proposed CRi did not capture both the spatial and temporal dimensions of community resilience and lacks the ability to predict the future status of community resilience. The Cri, therefore, can only be used to suggest improvements to CBDRM programming and selection of supportive interventions. These supportive interventions and recommended areas of future research are discussed in the next chapter; conclusion and recommendations.

5.11 SUMMARY

This chapter shows the data analysis and presentation of results. It includes a discussion to interpret the results. The results of the study are presented in sub-themes reflecting the capital domains of the community capital framework which were as follows: Natural Capital; Cultural Capital; Human Capital; Social Capital; Political Capital; Financial Capital and Built Capital.

The findings show that the majority of the people in the community had sufficient access to natural resources and as such, the natural capital was found to be the highest community capital domain. This was followed by human, social and built capital domain. The findings also showed that political, financial and cultural capital domain were the lowest capital domains in Mwanachingwala Ward.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.0 INTRODUCTION

The premise of this study was to formulate a reliable, valid, and well-tested measure to use in assessing and quantifying community resilience. Communities should be the central focus of all CBDRM processes including monitoring and evaluation. Therefore, tools should be developed for communities to be able to effectively determine if their efforts are translating into increased community resilience or not. This study was conducted to bridge that gap through the use of the community capitals framework to formulate a resilience index that can be used by community actors to evaluate CBDRM programmes. The research sought to answer the research question: Can the community capitals framework be used as resilience index to evaluate community-based disaster risk management programmes?

6.1 CONCLUSION

It was noted from the study that resilience is a relatively new concept in disaster management and is currently still under discussion, and there are no widely agreed indicators for its measure (Birkman, 2007; Berkes, 2007; Mayunga, 2007; Magis, 2010; Arbon, 2013; Teo *et al.*, 2013; Khanlou & Wray, 2014; Alevizou, *et al*., 2016). Community resilience was found to be a concept many international non-governmental organisations have embraced and is widely being used as a guiding objective of their development work (Zwi *et al.*, 2013). In the context of this study bearing in mind the community of Mwanachingwala resilience was defined as the ability of a community to identify, manage and respond to a range of risks associated with their financial, social, cultural, human, political, natural, and built environmental context. Therefore, a household, community that is able to draw on these resources effectively is seen as more resilient as opposed to those that have challenges doing the same.

From this definition of community resilience the use of community capitals framework as a Community Resilience Index (CRi) appeared to be theoretically sound. However, the framework requires a conclusive list of indicators with a scientific basis for the weighting of indicators. The study also found that there is no consensus in literature in the selection of indicators to measure

the different community capital domains. Different authors suggest different indicators to measure community capitals. Some community capital indicators overlap with different authors using one indicator to measure different community capitals, (DFID, 1999; Magis 2010; Arbon *et al*., 2013; Teo *et al.*, 2013. Khanlou & Wray, 2014; Alevizou, *et al*., 2016).

The study noted that the CBDRM programme in Mwanachingwala arose, in part, as an attempt to create a more comprehensive framework to and integrate disaster risk reduction efforts into development work, (WVI, 2011). However, a review of available literature showed a weak link between CBDRM efforts and building community resilience. Furthermore, the study found that CBDRM efforts did not include monitoring and evaluation by community actors in Mwanachingwala. There was little mention of how CBDRM activities translate into increased community resilience. The available monitoring and evaluation tools were not designed to support CBDRM programmes unless they are used by external agencies for evaluation purposes. The proposed community capitals framework was found to be useful to only provide indicative information on what type of supportive interventions would be required to improve programming in the study area. As such the following indicators were found to require supportive interventions to be implemented in order to improve the respective community capital domains:

- Both the capacity of the community to organise itself and Community Ownership of CBDRM process were found to be low under cultural capital;
- There is low participation of community members in community-based disaster risk management activities under human capital;
- There are poor relationships of trust under social capital;
- There is low political will by disaster management structures to sustain the CBDRM efforts under political capital;
- It was noted during the study that there was some awareness and practices of saving and financial management. This was reflected in the presence of a new found ‘savings culture’ and an increased ability of community members, both men and women, to cover the cost of important non-regular expenses such as school fees for children and house improvements. However, the finding shows that there is still low participation from the community members. Thus there is low access to financial services and low stability of household income under financial capital domain.

From the findings of this study, gathered from the data analysed, it can be concluded that the overall goal of this research, which was to develop a conceptual and methodological framework for the analysis, measurement, and mapping of community resilience using the community capitals framework as a resilience index, was partly achieved.The resilience index developed in this study was derived from the community capitals framework and appeared to be theoretically sound. However, the CRi lacked in depth in terms of the indicators used. The weighting was found to be very subjective and as such required the use of methods that included statistical models and expert judgments. The study concludes that the community capital framework has the potential to be used as a resilience index if these considerations are put in place.

6.2 RECOMMENDATIONS

The recommendations of the study address two aspects; those that pertain to supportive interventions to improve programming, and; those pertaining to recommendations for future research.

6.2.1 Addressing Gaps on Built Capital

There is need to improve infrastructure, particularly roads and drainages as it will benefit remote households and encourage more intensive and extensive utilisation of land, and higher income-earning potential. Additionally, improved infrastructure may also increase confidence in the markets. Such confidence could, over time, reduce the tendency of smallholders to allocate scarce resources to the production of staple foods for own consumption. The combination of less remoteness and increased confidence in the market can lead to significant improvements in community resilience.

6.2.2 Addressing the Gaps in Social and Financial Capital

Promotion of community-based savings groups in Mwanachingwala is, therefore, recommended to address the gaps in financial capital noted in the study. Community-based savings groups are a low-cost intervention that can help community members to access credit; provide members with a safe and, convenient place to save and; provide members with a form of micro insurance called social fund (Malika & Rosenburg, 2008). Savings groups have a unique quality of building both

the needed financial and social capital *(Anyango et al.*, 2007).Community savings groups will address the financial capital indicators, low access to financial services and low livelihood diversity. Community members will use the increase in financial services to invest in business or income generating activities. Furthermore, by teaching community members how to work together to improve their economic status trust will be built. Therefore, adoption of community savings groups will improve the social capital indicator of poor relationships of trust among community members. The SGs are available to local people, including those who do not have access to basic financial services, including the extremely poor and living in remote areas, often serving clientele who do not meet the criteria of formal microfinance and banking institutions, (Norell *et al*., 2015).

6.2.3 Addressing the Gaps in Cultural Capital

Implementation of Citizens Voice and Action (CVA) can impact positively on the improvement of the cultural capital. CVA is a simple, well-defined social accountability approach that equips citizens to engage in constructive dialogue with government and civic leaders. It provides such an opportunity to sustainably address the root causes of poverty while making a unique, and very practical, contribution to the field of human rights. It promotes sustainability and reduces dependency by placing a community's destiny in the hands of citizens and governments. Simply put, communities begin to press a demand for improved service delivery from the government and other development actors provide those services. Citizen Voice and Action prepares communities for the transition by facilitating an on-going dialogue with the government about real community needs and priorities. Integration of the CVA approach with CBDRM efforts helps assess the policy environment, strength of institutions and delivery of public services, which are essential to ensure.

- Food is available, accessible, stable, and utilised.
- Families and households absorb shocks and stresses.
- Families and households adapt to a changing environment.
- Families and households transform risks into opportunities.

6.2.4 Recommendations for Future Research

The following are recommendations for future research based on the research limitations.

- While the study provided a simplified framework that can be used by community actors in a CBDRM programme; the framework uses a few indicators of the Community Capital Framework to generalise the level of resilience. Future research should aim at replicating the proposed methodology with a more conclusive list of indicators with a more robust scientific basis for weighting.

- This study did not determine resilience thresholds for different hazard magnitudes. As there are multiple stable states in different community systems, it is important to know the interconnections of the community capitals that allow communities absorb the impact of hazards. Future research should, therefore, present results that specify what hazards and to what magnitude of these hazards in the community under the study is or not resilient to.
- Most of the data pertaining to community resilience in Zambia is in the form of national averages and statistics. Therefore, future research should focus on cascading these statics to the local level through the collection of field survey data to fill the information gap.
- This study employed a cross-section research time horizon which lacks the ability to predict the future status of community disaster resilience. Future research should, therefore, focus on capturing both the spatial and temporal dimensions of community resilience using a longitudinal research time horizon.

6.3 SUMMARY

This chapter provides the conclusions and recommendation in the form of supportive interventions and areas of future research. The chapter provides a discussion as to whether the aim of the study was achieved. From the findings of this study, it can be concluded that the overall goal of this research, which was to enhance community-led monitoring and evaluation of CBDRM programmes through the formulation of community resilience index, was partly achieved.

6.4 GENERAL CONCLUSION

This study was undertaken to propose a resilience index that could be used to evaluate Community Based Disaster Risk Management (CBDRM) efforts at community level by the community actors. The community capitals framework was used to formulate the resilience index to evaluate a CBDRM programme in Mwanachingwala Ward; Mazabuka District of Zambia. The focus area for this study was selected because it had an active CBDRM programme being implemented. It has been noted in literature that while community-based approaches to disaster risk management have increased in popularity in recent years, it is difficult to show their contribution to the improvement of community resilience (Zwi *et al*., 2013).Without an index to measure community-based disaster risk management efforts, improvements on disaster risk capacity will be difficult to report. There is, therefore, a need for more accurate, systematic and clear information on how community resilience can be measured especially by community actors so as to evaluate whether their efforts translate into community resilience building (Zwi *et al*., 2013).

The study intended to achieve the following objectives; firstly, it explored the definition of community resilience with a focus on community based disaster risk management (CBDRM) and thus provided the relationship between CBDRM and the measurement of community resilience. Lastly the study proposed a Community Resilience Index (CRi) using the community capitals framework. The study followed both a quantitative and qualitative research design approach that involved direct assessment. The indicators used to measure the community capitals were developed in consultation with the Mazabuka District Disaster Management Committee.

The overall community resilience index for Mwanachingwala was found to be approximately 3 out of a maximum of 5. However, because the study followed a cross-section time horizon, these results are a snap shot of what was attaining at the time of the study. As such, the proposed CRi did not capture both the spatial and temporal dimensions of community resilience and lacks the ability to predict the future status of community resilience. The CRi therefore, can only be used to suggest improvements to CBDRM programming and selection of supportive interventions. As such the following indicators were found to require supportive interventions to be implemented in order to improve the respective community capital domains:

- Both the capacity of the community to organise itself and Community Ownership of CBDRM process were found to be low under cultural capital;
- There is low participation of community members in community-based disaster risk management activities under human capital;
- There are poor relationships of trust under social capital;
- There is low political will by disaster management structures to sustain the CBDRM efforts under political capital;
- There is low access to financial services and low stability of household income under financial capital domain.

From the findings of this study, gathered from the data analysed, it can be concluded that the overall goal of this research, which was to develop a conceptual and methodological framework for the analysis, measurement, and mapping of community resilience using the community capitals framework as a resilience index, was partly achieved. The resilience index developed in this study was derived from the community capitals framework and appeared to be theoretically sound. However, the CRi lacked in depth in terms of the indicators used. The weighting was found to be very subjective and as such requires the use of methods that included statistical models and expert judgments. The study concludes that the community capital framework has the potential to be used as a resilience index if these considerations are put in place.

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ANNEXES

Annex A: Household questionnaire

001 Questionnaire Identification Number |___|___|___|___|___|

002 District Name _____

003 Village / Community Name _____

Introduction: "My name is_____ I am conducting a research in partial fulfilment of a Masters in Disaster Management at the University of Free State in South Africa. I am interviewing people here in _____[**name of the area/ and village**] in order to get information about their knowledge and practice of the activities related with community based disaster risk management. The data collected will be used to assess the implementation performance of the programme. I feel privileged to spend this time with you. However, in case you are unable to participate in the interview for whatever reason, feel free to excuse yourself and I will not take any offense to that in which case we will terminate the interview. Would you like me to continue with the interview?"

(**Interviewer: If the respondent says NO, thank them and discontinue the interview. If they say YES, proceed with the interview**).

004 Household Code |___|___|___|___|___|

005 Village Name: _____

006 Interviewer Name_____

Date of Interview: __\ ____ \ _____

QUESTIONNAIRE OVERVIEW

Name of Section		Number of Questions
0	Background questionnaire data	6
1	Demographic and background characteristics	14
2	Natural Capital Status	4
3	Cultural Capital Status	4
4	Human Capital Status	3
5	Social Capital Status	4
6	Political Capital Status	3
7	Financial Capital Status	3
8	Built Capital Status	2
Total (actual questions minus background questionnaire data)		**37**

SECTION 1: DEMOGRAPHIC AND BACKGROUND CHARACTERISTICS

No.	Questions and filters	Coding categories	Skip to
Q101	Are you the head of the household?	Yes 1 No 0	
Q102	Record sex of the head of household	Male 1	

	(hhh)	Female	2	
Q103	In what month and year were you born?	Month Don't Know Month No Response Year Don't Know Year No Response	[__|__] 888 999 [__|__] 888 999	
Q104	How old were you at your last birthday? **(*Enumerator: Estimate best answer (and ensure you check correctness of Q103)***)	Age In Completed Years Don't Know No Response	[__|__] 888 999	
Q105	What is your marital status? *(**READ the list and ask them to select which one best fits their situation.)***	Single Never been married Divorced Widowed Married In polygamous marriage Other _____ DON'T KNOW NO RESPONSE	1 2 3 4 5 888 999	

HOUSEHOLD ROSTER

	106. How many people live in your household?	

Now I would like to ask you some questions about each member of your household, beginning with the household head, and then continuing with the oldest adult through the youngest child.

ID Code	107. List the number of persons living in this household. Start the list with the head of this household, then adults then children from oldest to youngest.	108. Gender 1=Male 2=Female 999=No response	109. Relationship to the head ***See code 101***	110. Age *For children under 1 year, write 0.* *If age<3, skip to next household member* *If unknown, ask C.5b*	111 About how old are you? 1=0-3 2=4-12 3=13-17 4=18-30 5=31-40 6=41-50 7=51-60 8=60+	112. Highest level of education completed ***See code 102***	113. Currently enrolled in school? 0=No 1=Yes ***If 1, skip to next household member***	114. Why is the respondent not currently in school? ***See code 103 Probe and code, select all that apply***
	Member Number	Gender	Relationship	Age		Ed	School	No school
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

101–Relationship to head		**102–Level of education**		**103–Not currently in school**	
1=Head 2=Spouse 3=Son/daughter 4=Spouse of son/daughter 5=Grandchild 6=Brother/sister 7=Brother/sister in-law 8=Spouse of brother/sister 9=Parent	10=Spouse's parent 11=Uncle/aunt 12=Cousin 13=Nephew/niece 14=Stepchild 15=Other relative 16=Not related 97=Other, please specify	1=None 2=Grade 1/Sub-standard A 3=Grade 1/Sub-standard B 4=Grade 2/Standard 1 5=Grade 3/Standard 2 6=Grade 4/Standard 3 7=Grade 5/Standard 4 8=Grade 6/Standard 5 9=Grade 7/Standard 6	10=Grade 8/Form 1 11=Grade 9/Form 2 12=Grade 10/Form 3 13=Grade 11/Form 4 14=Grade 12/Form 5 15=Post-secondary 888=Don't know 999=Preferred not to answer	1=Cannot afford school fees 2=Needed for domestic duties 3=Needed for farming 4=Working for other household 6=Education is not necessary/no point 7=Completed their education 8=Too old to attend school 9=School is too far away	10=School closed temporarily 11=School closed permanently 12=The teacher is absent at the school 13=Too sick to attend school 14=Someone else in the household is sick, so cannot attend 15=No transport 97=other, please specify

SECTION 2: NATURAL CAPITAL STATUS

No.	Questions and Filters	Coding Categories				Average
Q201	How would you describe the your access to natural resources that your household has access to? **Explanations:** 1 = No available stocks 2 = Some available stocks with medium to low impact 3 = Average available stocks but not all community members are supported 4 = Well established that can support part of the community 5 = Abundance of stocks that can support majority of community members **888 = Don't Know** **999 = No Response**	Land for settlement and agriculture [__|__]__]	Forest and forest products [__|__]__]	Water Resource [__|__]__]	Wetland resources [__|__]__]	[__|__]__]

Q 202	How would you describe your soil?	**Explanations:** 1 = Extremely low soil quality 2 = Low quality soil. Good for grazing 3 = Medium quality soil. Good for pastures 4 = Good quality soil. Good for crops and irrigation 5 = High quality soil. Good for high potential crops **888 = Don't Know** **999 = No Response**	[__|__]__]
Q 203	How would you describe your ground water?	**Explanations:** 1 = No groundwater 2 = Groundwater available in normal years but not during dry spells 3 = Relatively good groundwater supply 4 = Good groundwater supply with boreholes 5 = Extremely good groundwater supply **888 = Don't Know** **999 = No Response**	[__|__]__]

Q 204	How would you describe your surface water?	**Explanations:** 1 = No surface water available 2 = Limited supply of surface water during rainy season 3 = Surface water only during rainy season 4 = Adequate surface water during all seasons 5 = Abundance surface water during all seasons **888 = Don't Know** **999 = No Response**	[__|__]__]

SECTION 3: CULTURAL CAPITAL STATUS

No.	Questions and filters	Coding categories	
Q301	How would you describe your community's capacity for community self-organization	**Explanations:** 1 = Extremely low self-organization capacity 2 = Low self-organization capacity 3 = Medium self-organization capacity 4 = Good self-organization capacity 5 = High self- organization capacity **888 = Don't Know** **999 = No Response**	[__|__]__]

Q302	How would you describe your community's dependency government and external organizations?	**Explanations:** 1 = Extremely high dependency on government support 2 = High dependency 3 = Some farmers depend on government for support 4 = Little dependency 5 = No dependency on government support **888 = Don't Know** **999 = No Response**	[__|__]__]
Q303	How would you describe your community's volunteerism?	**Explanations:** 1 = Extremely low volunteerism 2 = Low volunteerism 3 = Medium volunteerism 4 = Good volunteerism 5 = High volunteerism **888 = Don't Know** **999 = No Response**	[__|__]__]
Q304	How would you describe your community's use of traditional knowledge to mitigate the impacts of disasters?	**Explanations:** 1 = Traditional knowledge plays absolute no role in decision making 2 = Traditional knowledge have small impact on management decisions 3 = Most management decisions influenced by traditional	[__|__]__]

		knowledge 4 = Most management decisions influenced by traditional knowledge 5 = Traditional knowledge highly influence management decisions **888 = Don't Know** **999 = No Response**	

SECTION 4: HUMAN CAPITAL STATUS

No.	Questions and filters	Coding categories	
Q401	What would you describe as the general health of the members of the household?	**Explanations:** 1 = Vast majority of farmers are under nourished and suffer from a disease 2 = Majority of the members of the household suffer from stress and other health related symptoms 3 = Half of the household suffer from stress and other health related symptoms 4 = Some members of the household suffer from stress and other health related symptoms 5 = Most members of the household are very healthy **888 = Don't Know** **999 = No Response**	[__|__]__]
Q402	What is the general knowledge level of disaster risk management by your household?	**Explanations:** 1 = Extremely low levels of knowledge 2 = Low levels of knowledge 3 = Average levels of knowledge 4 = Adequate level of knowledge 5 = High levels of knowledge **888 = Don't Know** **999 = No Response**	[__|__]__]

Q403	How would you describe the levels of disaster risk management practices by your household?	**Explanations:** 1 = No indication of good management 2 = Some indication good management practices 3 = In general indications of acceptable management practices 4 = Good management practices 5 = Excellent management skills **888 = Don't Know** **999 = No Response**	[__|__]__]

SECTION 5: SOCIAL CAPITAL STATUS

No.	Questions and Filters	Coding Categories	
Q501	How long has your household lived in this place?	**Explanations:** 1=0-10 years 2=11-20 years 3=21- 30 years 4=31 – 40 years 5= > 40 years **888 = Don't Know** **999 = No Response**	[__|__]__]
Q502	How would you describe you household's access to information?	**Explanations:** 1 = No access 2 = Some farmers with access to radio 3 = Access to TV, radio. No internet. 4 = Good access. TV, Radio, internet 5 = Extremely good access. Majority of farmers have internet **888 = Don't Know** **999 = No Response**	[__|__]__]
Q503	How would you describe you household's access to social services?	**Explanations:** 1 = No access 2 = Some access	[__|__]__]

No.	Questions and Filters	Coding Categories	
		3 = Average access 4 = Good access 5 = Extremely good access **888 = Don't Know** **999 = No Response**	
Q504	How would you describe the relationships of trust in this area?	**Explanations:** 1 = No trust among members of the community 2 = Some relationships but with little impact 3 = Relationships of trust exist and represent some farmers successfully 4 = Well established and actively assist majority of farmers 5 = Well established and actively represent all farmers **888 = Don't Know** **999 = No Response**	[__|__]__]

SECTION 6: POLITICAL CAPITAL STATUS

No.	Questions and Filters	Coding Categories	
Q601	How would you describe the disaster risk assessment strategy in the District?	**Explanations:** 1 = No risk assessment strategy evident in the area 2 = Some form of risk assessment strategy but totally inefficient 3 = Some form of risk assessment strategy with medium to low impact 4 = Well established but not all community members are supported 5 = Well established and actively support majority of community members **888 = Don't Know** **999 = No Response**	[__|__]__]
Q602	How would you describe the organizational structure and flexibility of the District and satellite disaster management committees?	**Explanations:** 1 = No disaster risk management structures operational in this area 2 = Some indications of disaster risk management structures but with little impact 3 = Disaster risk management structures sometimes active 4 = Developed disaster risk management structures and actively supporting part of the community 5 = Well developed disaster risk management structures and actively supporting by majority of the community **888 = Don't Know** **999 = No Response**	[__|__]__]
Q603	How would you rate the emergency service capability of the District?	**Explanations:** 1 = No emergency service capability evident in the area	[__|__]__]

		2 = Some form of emergency service capability but totally inefficient 3 = Some form of emergency service capability with medium to low impact 4 = Well established but not all community members are supported 5 = Well established and actively support majority of community members **888 = Don't Know** **999 = No Response**	

SECTION 7: FINANCIAL CAPITAL STATUS

No.	Questions and Filters	Coding Categories				Average
Q701	How would you describe the availability of financial service providers in your community? **Explanations:** 1 = No available financial services 2 = Some available financial services with medium to low impact 3 = Average available financial services but not all community members are supported 4 = Well established financial services that support part of the community 5 = Well established financial services that support majority of community members **888 = Don't Know** **999 = No Response**	Credit [__|__]__]	Savings [__|__]__]	Insurance [__|__]__]	Business development skills [__|__]__]	[__|__]__]
Q702	How would you describe the level of unemployment in your community?	**Explanations:** 1 = > 70% unemployment 2 = More than 50% unemployment 3 = Significant unemployment 4 = Some unemployment 5 = No unemployment **888 = Don't Know** **999 = No Response**				[__|__]__]
Q703	Does your household have access to alternative off farm income?	**Explanations:** 1 = No potential for additional income 2 = Limited potential for income outside agriculture 3 = Additional income potential with limited support to households needs				[__|__]__]

		4 = Additional income available to support part of the households needs 5 = Much potential for additional income available to support all of households needs **888 = Don't Know** **999 = No Response**	

SECTION 8: BUILT CAPITAL STATUS

No.	Questions and Filters	Coding Categories				Average
Q801	How adequate are the public facilities to support you during emergencies? **Explanations:** 1 = No available public facilities 2 = Some available public facilities with medium to low impact 3 = Average available public facilities but not all community members are supported 4 = Well established public facilities that support part of the community 5 = Well established public facilities that support majority of community members **888 = Don't Know** **999 = No Response**	Churches [__|__]__]	Schools [__|__]__]	Clinics [__|__]__]	Storage Sheds [__|__]__]	[__|__]__]
Q802	How would you describe the accessibility of your community by road?	**Explanations:** 1 = No feeder roads 2 = Some feeder roads but poorly maintained 3 = Feeder roads present with signs of poor maintenance 4 = Most of the area is accessible throughout the year				[__|__]__]

		5 = All farms fully planned with good road network **888 = Don't Know** **999 = No Response**	

THE END

Annex B: Key Informant Interview Questionnaire

Questionnaire ID: |__|__|__|__|__|__|

Composition of interviewees:

The composition of the interviewees should include 5 or more key informants drawn from the District Disaster Management Committee (DDMC) membership. The interviewees must be a mixed group that should at least include any of the following; Ministry of Education staff, Ministry of Agriculture Extension staff, Ministry of Fisheries and Livestock extension staff, Ministry of Health personnel, Local Government representatives, NGOs etc. The target group should be members of the District Disaster Management Committee

	District Name:	Date of Interview: |__|__|__|__|__|__| (DD-MM-YY)
	Place of Interview:	
	Enumerator Name:	
	DDMC Members In Meeting(attach attendance list):	
No.	Position	Institution
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

SECTION 1: EVALUATION THE DISTRICT DISASTER MANAGEMENT COMMITTEE

No.	Questions and Filters	Coding Categories		
Q101	Did the DDMC prepare and update district multi – sectorial disaster preparedness, prevention and mitigation plans for slow and rapid onset disasters?	Yes No No Response	1 2 999	[__|__|__]
Q102	Did the DDMC act as a clearing house for early warning information?	Yes No No Response	1 2 999	[__|__|__]
Q103	Did the DDMC mobilize district resources for disaster management?	Yes No No Response	1 2 999	[__|__|__]
Q104	Did the DDMC conduct Disaster Management training programmes for the district?	Yes No No Response	1 2 999	[__|__|__]
Q105	Did the DDMC ensure efficient information flow from the local communities to the Provincial level?	Yes No No Response	1 2 999	[__|__|__]
Q106	Did the DDMC participate in risk analysis and vulnerability assessment?	Yes No No Response	1 2 999	[__|__|__]
Q107	Did the DDMC implement public awareness programmes in the district?	Yes No No Response	1 2 999	[__|__|__]
Q108	Did the DDMC coordinate district disaster management activities?	Yes No No Response	1 2 999	[__|__|__]
Q109	Did the DDMC review and update district disaster plans?	Yes No No Response	1 2 999	[__|__|__]

SECTION 2: WEIGHTING OF COMMUNITY CAPITAL DOMAINS AND INDICATORS

Community Capital Domain	Community Capital Weight	Community Capital Indicator	Indicator Weight	Community Capital Indicator Index	Index Weight	Community Capital Measure
Natural Capital		Natural Resource Stocks		No available stocks	1	
				Some available stocks with medium to low impact	2	
				Average available stocks but not all community members are supported	3	
				Well established that can support part of the community	4	
				Abundance of stocks that can support majority of community members	5	
		Soil type		Extremely low soil quality	1	
				Low quality soil. Good for grazing	2	
				Medium quality soil. Good for pastures	3	
				Good quality soil. Good for crops and irrigation	4	
				High quality soil. Good for high potential crops	5	
		Availability of ground water		No groundwater	1	
				Groundwater available in normal years but not during dry spells	2	
				Relatively good groundwater supply	3	
				Good groundwater supply with boreholes	4	
				Extremely good groundwater supply	5	
		Availability of surface water		No surface water available	1	
				Limited supply of surface water during rainy season	2	
				Surface water only during rainy season	3	
				Adequate surface water during all seasons	4	
				Abundance surface water during all seasons	5	

SECTION 2: CONTINUED WEIGHTING OF COMMUNITY CAPITAL DOMAINS AND INDICATORS

Community Capital Domain	Community Capital Weight	Community Capital Indicator	Indicator Weight	Community Capital Indicator Index	Index Weight	Community Capital Measure
Cultural Capital	[__|__]__]	Capacity for community self-organization	[__|__]__]	Extremely low self-organization capacity	1	[__|__]__]
				Low self-organization capacity	2	
				Medium self-organization capacity	3	
				Good self-organization capacity	4	
				High self- organization capacity	5	
		Dependency on government and external agencies	[__|__]__]	Extremely high dependency on government support	1	
				High dependency	2	
				Some community members depend on government for support	3	
				Little dependency	4	
				No dependency on government support	5	
		Volunteerism	[__|__]__]	Extremely low volunteerism	1	
				Low volunteerism	2	
				Medium volunteerism	3	
				Good volunteerism	4	
				High volunteerism	5	
		Use of traditional Knowledge	[__|__]__]	Traditional knowledge plays absolute no role in decision making	1	
				Traditional knowledge have small impact on management decisions	2	
				Most management decisions influenced by traditional knowledge	3	
				Most management decisions influenced by traditional knowledge	4	
				Traditional knowledge highly influence management decisions	5	

SECTION 2: CONTINUED WEIGHTING OF COMMUNITY CAPITAL DOMAINS AND INDICATORS

Community Capital Domain	Community Capital Weight	Community Capital Indicator	Indicator Weight	Community Capital Indicator Index	Index Weight	Community Capital Measure
Human Capital	[__|__]__]	Highest education level attained	[__|__]__]	> 50% of farmers with tertiary education	1	[__|__]__]
				> 70% of farmers with secondary education	2	
				> 50% of farmers with secondary education	3	
				< 50% of farmers with secondary education	4	
				< 25% of farmers with secondary education	5	
		Health status of household	[__|__]__]	Vast majority of farmers are under nourished and suffer from a disease	1	
				Majority of the members of the household suffer from stress and other health related symptoms	2	
				Half of the household suffer from stress and other health related symptoms	3	
				Some members of the household suffer from stress and other health related symptoms	4	
				Most members of the household are very healthy	5	
		Age of the head of household	[__|__]__]	> 80% of farmers between 20 - 50	1	
				> 60% of farmers between 20 - 50	2	
				> 50% of farmers with secondary education	3	
				26% - 40% of farmers between 20 - 50	4	
				< 25% of farmers between 20 - 50	5	
		Disaster risk management skills	[__|__]__]	No indication of good disaster risk management	1	
				Some indication good disaster risk management practices	2	
				In general indications of acceptable disaster risk management practices	3	
				Good disaster risk management practices	4	
				Excellent disaster risk management skills	5	
		Disaster risk management knowledge and information	[__|__]__]	Extremely low levels of knowledge	1	
				Low levels of knowledge	2	
				Average levels of knowledge	3	
				Adequate level of knowledge	4	
				High levels of knowledge	5	

SECTION 2: CONTINUED WEIGHTING OF COMMUNITY CAPITAL DOMAINS AND INDICATORS

Community Capital Domain	Community Capital Weight	Community Capital Indicator	Indicator Weight	Community Capital Indicator Index	Index Weight	Community Capital Measure
Social Capital	[__|__]__]	Length of residency	[__|__]__]	0-10 years	1	[__|__]__]
				11-20 years	2	
				21- 30 years	3	
				31 – 40 years	4	
				> 40 years	5	
		Access to information	[__|__]__]	No access	1	
				Some farmers with access to radio	2	
				Access to TV, radio. No internet.	3	
				Good access. TV, Radio, internet	4	
				Extremely good access. Majority of farmers have internet	5	
		Access to social services	[__|__]__]	No access to social services	1	
				Some access to social services	2	
				Average access to social services	3	
				Good access to social services	4	
				Extremely good access to social services	5	
		relationships of trust	[__|__]__]	No trust among members of the community	1	
				Some relationships but with little impact	2	
				Relationships of trust exist and represent some farmers successfully	3	
				Well established and actively assist majority of farmers	4	
				Well established and actively represent all farmers	5	

SECTION 2: CONTINUED WEIGHTING OF COMMUNITY CAPITAL DOMAINS AND INDICATORS

Community Capital Domain	Community Capital Weight	Community Capital Indicator	Indicator Weight	Community Capital Indicator Index	Index Weight	Community Capital Measure
Political Capital	[__|__]__]	Disaster risk assessment and management strategy	[__|__]__]	No risk assessment strategy evident in the area	1	[__|__]__]
				Some form of risk assessment strategy but totally inefficient	2	
				Some form of risk assessment strategy with medium to low impact	3	
				Well established but not all community members are supported	4	
				Well established and actively support majority of community members	5	
		Organization structure and flexibility	[__|__]__]	No disaster risk management structures operational in this area	1	
				Some indications of disaster risk management structures but with little impact	2	
				Disaster risk management structures sometimes active	3	
				Developed disaster risk management structures and actively supporting part of the community	4	
				Well-developed disaster risk management structures and actively supporting by majority of the community	5	
		Emergency service capability	[__|__]__]	No emergency service capability evident in the area	1	
				Some form of emergency service capability but totally inefficient	2	
				Some form of emergency service capability with medium to low impact	3	
				Well established but not all community members are supported	4	
				Well established and actively support majority of community members	5	

SECTION 2: CONTINUED WEIGHTING OF COMMUNITY CAPITAL DOMAINS AND INDICATORS

Community Capital Domain	Community Capital Weight	Community Capital Indicator	Indicator Weight	Community Capital Indicator Index	Index Weight	Community Capital Measure
Financial Capital	[__|__]__]	Access to financial services	[__|__]__]	No available financial services	1	[__|__]__]
				Some available financial services with medium to low impact	2	
				Average available financial services but not all community members are supported	3	
				Well established financial services that support part of the community	4	
				Well established financial services that support majority of community members	5	
		Unemployment rate	[__|__]__]	> 70% unemployment	1	
				More than 50% unemployment	2	
				Significant unemployment	3	
				Some unemployment	4	
				No unemployment	5	
		Alternative off farm income	[__|__]__]	No potential for additional income	1	
				2 = Limited potential for income outside agriculture	2	
				3 = Additional income potential with limited support to households needs	3	
				4 = Additional income available to support part of the households needs	4	
				5 = Much potential for additional income available to support all of households needs	5	
Built Capital	[__|__]__]	Public facilities	[__|__]__]	No available public facilities	1	[__|__]__]
				Some available public facilities with medium to low impact	2	
				Average available public facilities but not all community members are supported	3	
				Well established public facilities that support part of the community	4	
				Well established public facilities that support majority of community members	5	
		Road access	[__|__]__]	No feeder roads	1	
				Some feeder roads but poorly maintained	2	
				Feeder roads present with signs of poor maintenance	3	
				Most of the area is accessible throughout the year	4	
				All farms fully planned with good road network	5	

THE END

Annex C: Focus Group Discussion Questionnaire

Questionnaire ID: |__|__|__|__|__|__|

Composition of interviewees:

The composition of the interviewees should include 8 – 12 community members. Note that gender balance should be observed. The interviewees must be a mixed group that should at least include any of the following; village headman, elders, teachers, pastors or priests, Ministry of Agriculture Extension workers, local NGO workers, nurse/health workers, representative of women's groups, etc.

Province Name: _____

District Name: _____

Constituency Name: _____

Ward Name: _____

Place of Interview: _____

Enumerator Name: _____

Date of Interview: _____

Rural = 1 Urban = 2: |__|

Longitude: I__I__I.I__I__I__I__I__I__I° E **Latitude:** I__I__I.I__I__I__I__I__I__I° S

SECTION 1: EVALUATION THE SATELLITE DISASTER MANAGEMENT COMMITTEE

No.	Questions and Filters	Coding Categories		
Q101	Does the SDMC oversee disaster preparedness, disaster relief and post disaster recovery activities of individuals and households under its jurisdiction?	Yes No No Response	1 2 999	[__|__]__]
Q102	Does the SDMC have an updated register of the vulnerable households and individuals in the community?	Yes No No Response	1 2 999	[__|__]__]
Q103	Has the SDMC undertaken sensitization of the local community on the effects of disasters and appropriate responses?	Yes No No Response	1 2 999	[__|__]__]
Q104	Has the SDMC acted as a clearing house for information related to early warning?	Yes No No Response	1 2 999	[__|__]__]
Q105	Does the SDMC participate in risk analysis and vulnerability assessments?	Yes No No Response	1 2 999	[__|__]__]

SECTION 2: WEIGHTING OF COMMUNITY CAPITAL DOMAINS AND INDICATORS

Community Capital Domain	Community Capital Weight	Community Capital Indicator	Indicator Weight	Community Capital Indicator Index	Index Weight	Community Capital Measure
Natural Capital		Natural Resource Stocks		No available stocks	1	
				Some available stocks with medium to low impact	2	
				Average available stocks but not all community members are supported	3	
				Well established that can support part of the community	4	
				Abundance of stocks that can support majority of community members	5	
		Soil type		Extremely low soil quality	1	
				Low quality soil. Good for grazing	2	
				Medium quality soil. Good for pastures	3	
				Good quality soil. Good for crops and irrigation	4	
				High quality soil. Good for high potential crops	5	
		Availability of ground water		No groundwater	1	
				Groundwater available in normal years but not during dry spells	2	
				Relatively good groundwater supply	3	
				Good groundwater supply with boreholes	4	
				Extremely good groundwater supply	5	
		Availability of surface water		No surface water available	1	
				Limited supply of surface water during rainy season	2	
				Surface water only during rainy season	3	
				Adequate surface water during all seasons	4	
				Abundance surface water during all seasons	5	

SECTION 2: CONTINUED WEIGHTING OF COMMUNITY CAPITAL DOMAINS AND INDICATORS

Community Capital Domain	Community Capital Weight	Community Capital Indicator	Indicator Weight	Community Capital Indicator Index	Index Weight	Community Capital Measure
Cultural Capital	[__|__]__]	Capacity for community self-organization	[__|__]__]	Extremely low self-organization capacity	1	[__|__]__]
				Low self-organization capacity	2	
				Medium self-organization capacity	3	
				Good self-organization capacity	4	
				High self- organization capacity	5	
		Dependency on government and external agencies	[__|__]__]	Extremely high dependency on government support	1	
				High dependency	2	
				Some community members depend on government for support	3	
				Little dependency	4	
				No dependency on government support	5	
		Volunteerism	[__|__]__]	Extremely low volunteerism	1	
				Low volunteerism	2	
				Medium volunteerism	3	
				Good volunteerism	4	
				High volunteerism	5	
		Use of traditional Knowledge	[__|__]__]	Traditional knowledge plays absolute no role in decision making	1	
				Traditional knowledge have small impact on management decisions	2	
				Most management decisions influenced by traditional knowledge	3	
				Most management decisions influenced by traditional knowledge	4	
				Traditional knowledge highly influence management decisions	5	

SECTION 2: CONTINUED WEIGHTING OF COMMUNITY CAPITAL DOMAINS AND INDICATORS

Community Capital Domain	Community Capital Weight	Community Capital Indicator	Indicator Weight	Community Capital Indicator Index	Index Weight	Community Capital Measure
Human Capital	[__|__]__]	Highest education level attained	[__|__]__]	> 50% of farmers with tertiary education	1	[__|__]__]
				> 70% of farmers with secondary education	2	
				> 50% of farmers with secondary education	3	
				< 50% of farmers with secondary education	4	
				< 25% of farmers with secondary education	5	
		Health status of household	[__|__]__]	Vast majority of farmers are under nourished and suffer from a disease	1	
				Majority of the members of the household suffer from stress and other health related symptoms	2	
				Half of the household suffer from stress and other health related symptoms	3	
				Some members of the household suffer from stress and other health related symptoms	4	
				Most members of the household are very healthy	5	
		Age of the head of household	[__|__]__]	> 80% of farmers between 20 - 50	1	
				> 60% of farmers between 20 - 50	2	
				> 50% of farmers with secondary education	3	
				26% - 40% of farmers between 20 - 50	4	
				< 25% of farmers between 20 - 50	5	
		Disaster risk management skills	[__|__]__]	No indication of good disaster risk management	1	
				Some indication good disaster risk management practices	2	
				In general indications of acceptable disaster risk management practices	3	
				Good disaster risk management practices	4	
				Excellent disaster risk management skills	5	
		Disaster risk management knowledge and information	[__|__]__]	Extremely low levels of knowledge	1	
				Low levels of knowledge	2	
				Average levels of knowledge	3	
				Adequate level of knowledge	4	
				High levels of knowledge	5	

SECTION 2: CONTINUED WEIGHTING OF COMMUNITY CAPITAL DOMAINS AND INDICATORS

Community Capital Domain	Community Capital Weight	Community Capital Indicator	Indicator Weight	Community Capital Indicator Index	Index Weight	Community Capital Measure
Social Capital	[__|__]__]	Length of residency	[__|__]__]	0-10 years	1	[__|__]__]
				11-20 years	2	
				21- 30 years	3	
				31 – 40 years	4	
				> 40 years	5	
		Access to information	[__|__]__]	No access	1	
				Some farmers with access to radio	2	
				Access to TV, radio. No internet.	3	
				Good access. TV, Radio, internet	4	
				Extremely good access. Majority of farmers have internet	5	
		Access to social services	[__|__]__]	No access to social services	1	
				Some access to social services	2	
				Average access to social services	3	
				Good access to social services	4	
				Extremely good access to social services	5	
		relationships of trust	[__|__]__]	No trust among members of the community	1	
				Some relationships but with little impact	2	
				Relationships of trust exist and represent some farmers successfully	3	
				Well established and actively assist majority of farmers	4	
				Well established and actively represent all farmers	5	

SECTION 2: CONTINUED WEIGHTING OF COMMUNITY CAPITAL DOMAINS AND INDICATORS

Community Capital Domain	Community Capital Weight	Community Capital Indicator	Indicator Weight	Community Capital Indicator Index	Index Weight	Community Capital Measure
Political Capital	[__|__]__]	Disaster risk assessment and management strategy	[__|__]__]	No risk assessment strategy evident in the area	1	[__|__]__]
				Some form of risk assessment strategy but totally inefficient	2	
				Some form of risk assessment strategy with medium to low impact	3	
				Well established but not all community members are supported	4	
				Well established and actively support majority of community members	5	
		Organization structure and flexibility	[__|__]__]	No disaster risk management structures operational in this area	1	
				Some indications of disaster risk management structures but with little impact	2	
				Disaster risk management structures sometimes active	3	
				Developed disaster risk management structures and actively supporting part of the community	4	
				Well-developed disaster risk management structures and actively supporting by majority of the community	5	
		Emergency service capability	[__|__]__]	No emergency service capability evident in the area	1	
				Some form of emergency service capability but totally inefficient	2	
				Some form of emergency service capability with medium to low impact	3	
				Well established but not all community members are supported	4	
				Well established and actively support majority of community members	5	

SECTION 2: CONTINUED WEIGHTING OF COMMUNITY CAPITAL DOMAINS AND INDICATORS

Community Capital Domain	Community Capital Weight	Community Capital Indicator	Indicator Weight	Community Capital Indicator Index	Index Weight	Community Capital Measure
Financial Capital	[__|__]__]	Access to financial services	[__|__]__]	No available financial services	1	[__|__]__]
				Some available financial services with medium to low impact	2	
				Average available financial services but not all community members are supported	3	
				Well established financial services that support part of the community	4	
				Well established financial services that support majority of community members	5	
		Unemployment rate	[__|__]__]	> 70% unemployment	1	
				More than 50% unemployment	2	
				Significant unemployment	3	
				Some unemployment	4	
				No unemployment	5	
		Alternative off farm income	[__|__]__]	No potential for additional income	1	
				2 = Limited potential for income outside agriculture	2	
				3 = Additional income potential with limited support to households needs	3	
				4 = Additional income available to support part of the households needs	4	
				5 = Much potential for additional income available to support all of households needs	5	
Built Capital	[__|__]__]	Public facilities	[__|__]__]	No available public facilities	1	[__|__]__]
				Some available public facilities with medium to low impact	2	
				Average available public facilities but not all community members are supported	3	
				Well established public facilities that support part of the community	4	
				Well established public facilities that support majority of community members	5	
		Road access	[__|__]__]	No feeder roads	1	
				Some feeder roads but poorly maintained	2	
				Feeder roads present with signs of poor maintenance	3	
				Most of the area is accessible throughout the year	4	
				All farms fully planned with good road network	5	

THE END