A PROACTIVE DISASTER RISK REDUCTION FRAMEWORK FOR RECURRING *EFUNDJA* IN THE RURAL CUVELAI-ETOSHA BASIN, NORTHERN NAMIBIA

by

Victoria Loide Shaamhula

Dissertation presented in fulfilment of the requirements for the degree of Doctor in Military Science in the Faculty of Military Science at Stellenbosch University

Supervisor: Cdr (Prof) H.A.P. Smit
Co-supervisor: Dr. J.D.S. Van der Merwe

December 2021

DECLARATION

By submitting this dissertation electronically, I declare that the entirety of the work contained herein is my own work, that I am the sole researcher thereof (save to the extend explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third party rights, and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

Date: December 2021

ABSTRACT

The Cuvelai-Etosha basin is associated with the *Efundja,* the annual flooding of the basin that results from a combination of local rainfall and water flowing from Angola through the Cuvelai drainage system and spreading across the flat plains of Namibia. This frequently occurring hazard affects the large population of the rural Cuvelai-Etosha basin by destroying their livelihoods, prohibiting their movements and influencing all aspects of their lives. During extreme *Efundja* events, the inhabitants of the Cuvelai-Etosha basin are forced to repetitively relocate into temporary shelters every flooding season. Governmental response to the *Efundja* has remained mainly reactive. However, global policies on disaster management have changed drastically since the 1990s, moving away from the previous emphasis on emergency management, towards new applications of disaster risk management. Several international declarations expressed the determination to implement actions to reduce risks at every level. These approaches were adopted by many national governments. Namibia followed suit by aligning with the current Sendai Framework for Disaster Risk Reduction (SFDRR) as well as the former Hyogo Framework for Action, 2005-2015. Consequently, the government developed its national disaster risk management framework which is stipulated in the Disaster Risk Management Act, Act number 10 of 2012. The Disaster Risk Management Act is the current guiding national *Efundja* response blueprint applied whenever responding to any national hazard.

Despite the existence of this national disaster risk management framework, governmental response to the *Efundja* seems to follow a reactive approach as it mainly focuses on providing relief aid and temporary shelters while failing to address the underlying factors. Most importantly, the national response neglects the response mechanisms and mitigation measures of the vulnerable communities living in the basin, completely negating their input in the response mechanism. The aim of this study was to develop a disaster risk reduction proactive response framework for the recurring *Efundja* in the rural Cuvelai-Etosha basin of northern Namibia, by specifically including the lived experiences of the rural communities of the basin.

This study applied a qualitative phenomenological inquiry in order to investigate the appropriate approach of dealing with *Efundja* in northern Namibia. Through the use of semi-structured interview schedules with key informants and focus group discussions with community members, the present study obtained primary data which was analysed through content analysis with the assistance of *Atlas.ti* software.

The results indicate that the communities of northern Namibia have a negative perception about their ability to deal with the *Efundja*. This perception highlights the need for risk awareness programmes and improved information sharing methods to teach and help these communities to recognise their own potential and capacities in dealing with the *Efundja*. These communities collectively engage in response activities such working together to fix local roads and pedestrian bridges, raise funds, demarcate landmarks in the *iishana* to be able to cross them safely, and use their accumulated knowledge to mitigate the impacts. This indicates capacity and resources to mitigate the impact of the *Efundja*. Their ability to organise themselves through their social networks in order to participate in these activities represents solidarity and highlights available social capital.

Moreover, these communities also engage in mitigation measures that signify the underlying issues that need to be addressed. Mitigation measures such as changing *Mahangu* storage facility type, buying of groceries in bulk and travelling in groups, changing house building materials, digging trenches, storing valuable goods higher and creating sand embankments all reveal the root issues associated with stagnant water. The large volumes of stagnant water eventually penetrate into homesteads and crop fields and destroy these assets. In order to effectively and proactively address these issues, the government response approach should include the provision of proper road infrastructure that would allow appropriate water movement and enable the movement of the people themselves.

An important characteristic of the response mechanisms employed by the communities is that they are only able to respond to, and mitigate, the immediate, short-term and mid-term risks of flooding, but not the long-term risks. Some of the mitigation measures used may lead to further vulnerabilities and accidents such as drowning and the danger posed by open water ditches to children and animals. This indicates the need for the national response approach to earnestly include the vulnerable community's views and ideas into the national disaster risk management framework in order for the framework to substantially address the underlying issues faced by the communities. The ongoing provision of relief aid and temporary shelters is only a solution for medium and short-term risks but such efforts do not address any long-term *Efundja* risk issues. The provision of relief aid and temporary shelters does not reduce the loss of human lives or assets as the national disaster risk management framework envisioned to do. Ironically, both the communities and the government focus on short and medium-term responses. While this is normal for affected communities, governmental responses should take a more long-term approach to be successful.

The local headmen have also expressed an inability to effectively respond to *Efundja*. They have stated that besides monitoring the status of residents and consulting with the local constituency

councillors, encouraging the locals to work harder to have enough food, creating awareness and issuing warnings, they do not have a defined way of preparing for or responding to *Efundja*. Their responses show a lack of confidence in their work and highlight the lack of resources and means to prepare and support their communities during the recurring *Efundja*. They expressed how they are the least recognised in terms of remuneration, resource allocation and funds provision in order to assist their communities. They emphasised that all the resources and relief aid assistance they offer is usually taken from their personal income. This indicates a need for programmes to empower headmen, through training and awareness programmes, with authoritative power and empowerment in the overall traditional leadership to be able to effectively guide and offer direction to their respective communities in times of hazards.

On the other hand, the local-level disaster risk management officials regard the occurrences of *Efundja* as normal and have expressed the way their offices are under-equipped. These officials only assist those who come to ask for help, give precautionary measures, conduct rapid assessments, monitor dam levels and organise and prepare relocation camps. Moreover, the results show that these local officials lack institutional capacity and knowledge of disaster management. This is evident in the way they emphasise maintaining emergency budgets, giving information on dam levels with no actions recommended, the organising of relocation camps and keeping of emergency equipment, without referring to planning or mitigation for future flooding. Their responses indicate the emphasis placed on emergency management and a lack of planning to reduce the effects of the *Efundja* on the people. Therefore, it is necessary to build institutional capacity for the local-level disaster risk management officials to empower them to take the leading role in disaster risk reduction at local levels. It is hence important to equip them to be able to initiate, lead and sustain community-based disaster risk management (CBDRM) programmes. They are the people closest to disaster-related problems taking place in communities, making them the best vehicle to establish and execute long-term solutions to risk reduction. This implies that local and traditional authorities are indispensable components in establishing and maintaining disaster resilient communities.

The entity responsible for overall national *Efundja* response is the national-level disaster risk management officials. The national response is based on the national disaster risk management framework which is stipulated in the national policy on disaster risk management and the National Act No.10 of 2012 on disaster risk management. Although this framework stipulates various proactive measures, it is not appropriately implemented throughout the affected area. It displays a top-down response centred on key government decision-makers coordinating other employees in order to provide swift relief aid and temporary shelter to the affected communities. In theory, the framework

describes the recommended disaster risk management and disaster risk reduction responses to disasters; however, what is practised and implemented on the ground seems to be emergency response management. The overall response approach is less focused on the affected communities, their views or their way of responding to *Efundja* and more concerned with evacuating them out of the *Efundja* zone during flooding season. The affected communities play no role at any level and their views or opinions are not considered on any platform nor do they contribute to the national disaster risk management framework.

Therefore, the present study identified an urgent need for the full implementation of the existing disaster risk reduction framework in order to minimise the negative impacts of the *Efundja,* and the inclusion of the views of the local communities in developing a better, more proactive disaster management framework. The proactive disaster risk reduction framework developed from the results of this study recommends the development of community-based risk awareness programmes, the strengthening of early warning systems and dissemination of information thereof, active participation by community members in improving disaster response and mitigation strategies, and empowerment of local headmen and local-level disaster risk management officials. Further recommendations include the need to secure a funding mechanism for the implementation of further risk reduction programmes and capacity building for all disaster risk management units. By implementing these recommendations, the current disaster risk reduction framework can be improved to ensure sustainable, proactive, disaster risk reduction and mitigation in the Cuvelai-Etosha basin.

ACKNOWLEDGMENTS

Firstly, I would like to thank my heavenly father, the Great I AM for wisdom, strength and commitment throughout this journey. This study would have not been possible without his guidance.

Secondly, I would like to express my sincere gratitude to my supervisor Cdr (Prof). H.A.P. Smit for his continuous and constant support throughout this PhD. Your long-stretched patience, motivation, kindness and immense knowledge have helped me tremendously to attain this incredible milestone. Your guidance has helped me throughout the time of research and the writing of this dissertation. Thirdly, I am grateful for Dr J.D.S. Van der Merwe, my co-supervisor, for his valuable input and for being hands-on in restructuring the dissertation. I am grateful for my kind and supportive supervisors who cared so much about my work, and who responded to my questions and queries so promptly. I could not have imagined having better mentors for my PhD. study.

My sincere thanks also go to the Staff Development Fellow programme at the University of Namibia for funding my studies and granting me an opportunity to study fulltime. Without its precious support it would not be possible to conduct this research.

I would like to thank my family: my dearest parents, Mom and Dad and my siblings for supporting me spiritually throughout the writing of this dissertation and my life in general.

I would like to sincerely thank the following: The rural communities of northern Namibia, for willingness to cooperate and participate in long and tiresome focus group discussions. I appreciate your commitment and patience.

Colleagues at the School of Military Science, University of Namibia, especially Avelinu Justinu, Charlene Simataa and John Anghuwo, for allowing me space to finish the study and for their constant support. I have no words to show my appreciation.

Colleagues and friends at the Military Academy, Susan Henrico, Babalwa Mtshawu, Menge Morake and Bushy Simon for constant support, encouragement and stimulating discussions in persuading me to continue in my learning journey.

Friends at the Military Academy – Nqobizizwe Agostina Nkwanyana, Sherall Brown, Dineo Semenya, Tate Eddy Lendelvo, Jesaya Nakanyala, Johanna Mufeti and Christine Amwaalwa.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND EXPLANATIONS

CBDRM	Community-based disaster risk management.
CDRM	Constituency Disaster Risk Management Committee. Constituency level Disaster Risk Management Committee.
DDRM	Directorate of Disaster Risk Management. The Directorate within the Office of the Prime Minister that is responsible for issues relating to natural hazards.
DM	Disaster management. The coordination and management of resources and responsibilities when dealing with emergencies.
DRM	Disaster risk management. The application of disaster risk reduction policies and strategies to prevent new disaster risks and to manage existing risks.
DRR	Disaster risk reduction. An orderly approach of identifying, assessing and reducing the risks associated with disasters.
Efundja	The annual seasonal flooding of the northern parts of Namibia which causes not only damage to infrastructure but also loss of life. The rains that cause these *Efundja* fall in Angola, then flow into Namibia's Cuvelai-Etosha basin by filling-up its shallow floodplains.
FGD	Focus group discussion. A method of data collection by interviewing people in a group.
HFA	Hyogo Framework for Action. The global model for disaster risk reduction efforts between 2005 and 2015.
IDNDR	International Decade for Natural Disaster Reduction.
iishana	(sing. *oshana*)-A series of shallow, wide and interconnected stream channels that are filled with floodwater (*Efundja*) from Angola during the rainy season.
ISDR	International Strategy for Disaster Reduction. The global framework established within the United Nations for the promotion of action to reduce social vulnerability and risks of hazards.
KII	Key informant interview. Interview to obtain data from key people.

LADRMC	Local Authorities Disaster Risk Management Committee. A local authority level Disaster Risk Management Committee.
Lake Oponona	A lake locally known as '*Kooinakulu yomadhiya*'.
Mahangu	A Pearl millet which is the staple cereal crop in Namibia (*Pennisetum galucum*).
NDF	Namibian Defence Force. The Namibian Defence Force.
NDP4	The fourth National Development Plan.
NDRMC	National Disaster Risk Management Committee. A national level Disaster Risk Management Committee.
NDRMS	National Disaster Risk Management System. A national framework that is applied by the government to respond to disasters.
NGOs	Non-governmental organisations.
NUST	Namibia University of Science and Technology. A University and institution of high learning in Namibia.
OPM	Office of the Prime Minister. The National cabinet co-ordinating office which also advises and assists the president in the execution of the functions of government including the issues relating to *Efundja* and all other disasters.
RAK	The Cuvelai River Awareness Kit. A knowledge hub of information relating to the Cuvelai-Etosha river basin.
RDRMC	Regional Disaster Risk Management Committee. A regional level Disaster Risk Management Committee.
SDRMC	Settlement Disaster Risk Management Committee. A settlement level Disaster Risk Management Committee.
SFDRR	Sendai Framework for Disaster Risk Reduction. An international document on disaster risk reduction that was adopted by the United Nations member states in March 2015.

Silos	The storage facility for traditional staple food known as *Mahangu* in northern Namibia.
UNAM	University of Namibia. An institution of tertiary education in Namibia.
UNDRR	United Nations Office for Disaster Risk Reduction.
UNISDR	The United Nations International Strategy for Disaster Reduction.
USAID	United States Agency for International Development.
Vision 2030	A national vision to fundamentally transform the Namibian political and economic landscape by 2030.
WCDR	World Conference on Disaster Reduction. A series of United Nations conferences focusing on disaster and climate risk management in the context of sustainable development.

TERMINOLOGY

Adaptation	The process of adjustment to actual or expected climate change and its effects (IPCC, 2014:118).
Building code	A set of regulations and standards intended to control aspects of the design, construction, materials, alteration and occupancy of structures which are necessary to ensure human safety and welfare, including resistance to collapse and damage (UNISDR, 2009:5).
Capacity	The combination of strengths, attributes and resources available within a community, society or organisation to manage and reduce the risks and strengthen resilience (UNISDR, 2005:6).
Capacity development	The process by which people, organisations and society systematically stimulate and develop their capacities over time to achieve social and economic goals, including through improvement of knowledge, skills, systems, and institutions (UNISDR, 2009:6).
Climate change	'*Climate change refers to a change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer*' (IPCC, 2014:120).
Coping capacity	The ability of people, organisations and systems, using available skills and resources, to manage adverse conditions, risk or disasters (UNISDR, 2015:10).
Disaster	A serious disruption of the functioning of a community or a society due to hazardous events interacting with conditions of vulnerability and exposure, leading to widespread human, material, economic and environmental losses and impacts (UNISDR, 2015:11).
Disaster impact	The overall effects of a disaster, including negative and possibly positive ones (UNISDR, 2015:11).
Disaster management	The organisation, planning and application of measures preparing for, responding to, and initial recovery from disasters (UNISDR, 2009:10).
Disaster risk management	The application of disaster risk reduction policies, processes and actions to prevent new risk, reduce existing disaster risk and manage residual risk contributing to the strengthening of resilience (UNISDR, 2009:13).

Disaster risk reduction	The policy objective aimed at preventing new and reducing existing disaster risk and managing residual risk (UNISDR, 2009:10).
Early warning system	An interrelated set of hazard warning, risk assessment, communication and preparedness activities that enable individuals, communities, businesses and others to take timely action to reduce their risks (UNISDR, 2015:14).
Ecosystem services	The benefits provided by ecosystems that contribute to making human life both possible and worth living (UNISDR, 2015:15).
Emergency management	The organisation and management of resources and responsibilities for addressing all aspects of emergencies and effectively respond to a hazardous event or a disaster (UNISDR, 2009:13).
Environmental degradation	The deterioration of the environment through depletion of resources such as air, water and soil; the destruction of ecosystems and the extinction of wildlife (UNISDR, 2015).
Forecast	Definite statement or statistical estimate of the likely occurrence of a future hazardous event or conditions for a specific area (UNISDR, 2009:16).
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 (Asian Disaster Reduction Center, 2002:24).
Hazardous event	The occurrence of a natural or human-induced phenomenon in a particular place during a particular period of time due to the existence of a hazard (UNISDR, 2015:20).
Land-use planning	The process of identifying, evaluating and deciding on different options for the use of land, including consideration of long-term economic, social and environmental objectives and the implications for different communities and interest groups (UNISDR, 2009:19).
Mitigation	The lessening or limitation of the adverse impacts of a hazardous event (UNISDR, 2009:10).
Natural hazard	Natural process or phenomenon that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage (UNISDR, 2009:20).
Non-structural measures	Any measure not involving physical construction that uses knowledge, practice, or agreement to reduce risks and impacts,

	in particular through policies and laws, public awareness raising, training and education. (UNISDR, 2009:28).
Preparedness	The knowledge and capacities developed by governments, professional response and recovery organisations, communities and individuals to effectively anticipate, respond to, and recover from, the impacts of likely, imminent or current disasters (UNISDR, 2009:21).
Prevention	Activities and measures to avoid existing and new disaster risks (UNISDR, 2015:24).
Public awareness	The extent of common knowledge about disaster risks, the factors that lead to disasters and the actions that can be taken individually and collectively to reduce exposure and vulnerability to hazards (UNISDR, 2009:22).
Recovery	Decisions and actions aimed at restoring or improving livelihoods, health, as well as economic, physical, social, cultural, and environmental assets, systems and activities, of a disaster-affected community or society (UNISDR, 2015:25).
Rehabilitation	The rapid and basic restoration of services and facilities for the functioning of a community or a society affected by a disaster (UNISDR, 2015:26).
Resilience	The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions (UNISDR, 2009:24).
Response	Actions taken 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 (UNISDR, 2015:27).
Risk assessment	An approach 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 (UNISDR, 2009:26).
Risk	The combination of the probability of a hazardous event and its consequences which result from interaction(s) between natural or man-made hazard(s), vulnerability, exposure, and capacity (Asian Disaster Reduction Center, 2002:30).
Structural measures	Any physical construction to reduce or avoid possible impacts of hazards, or application of engineering techniques to achieve hazard resistance and resilience in structures or systems (UNISDR, 2009:28).

Underlying disaster risk drivers	Processes or conditions, including development-related, that influence the level of risk (UNISDR, 2015:30).
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 (UNISDR, 2015:31).

CHAPTER 1:
THE *EFUNDJA* OF THE RURAL CUVELAI-ETOSHA BASIN

The Cuvelai-Etosha basin is one of the most densely populated areas in northern Namibia, accommodating a large percentage of the poorest, most vulnerable people in the country (Hipondoka, 2005; Steytler, 2013; Beyer, *et al.*, 2018). While the basin consists of both urban and rural settlements, the present study concentrated on rural settlements in the basin. People in the rural settlements suffer unique impacts due to *Efundja* as their livelihoods depends on rain-fed crops and livestock farming which can be negatively influenced by frequent *Efundja* (Mendelsohn & Weber, 2011).

The Cuvelai-Etosha basin stretches from the south of Angola, through northern Namibia and drains into the Etosha pan. The basin is a low lying, flat plain made up of interconnected shallow but wide channels, locally known as *iishana* (sing.*oshana*) (Mendelsohn &Weber, 2011; Cuvelai River Awareness Kit (RAK), 2018). During the rainy season, water flows through the basin, impacting every part of the basin such as roads, schools, businesses, clinics and homesteads before draining into Omadhiya lakes and the Etosha pan. This seasonal type of flooding is locally known as *Efundja* (Beyer *et al.*, 2018). The name *Efundja* means "water that rolls in from Angola", and is an indigenous name in the local Oshiwambo language. The *Efundja* has taken place since the recorded history of the area and the governmental response to this focuses on the provision of relief aid and temporary shelters to the affected people. The governmental response mechanism has been focused on providing these services rapidly once the communities are flooded, and is less concerned about finding a long-term solution or helping these communities to become less exposed to *Efundja*.

Literature identified and explained the two most common approaches to tackling disasters: the reactive and the proactive approach (Mojtahedi & Lan-Oo, 2012). It has been established that disaster management often focuses on reactive strategies while disaster risk reduction tends to focus on proactive strategies. Global aid agencies that help countries deal with disasters, such as the United Nations Office for Disaster Risk Reduction (UNDRR), have promoted the application of the disaster risk reduction concept. Disaster risk reduction (DRR) is a framework and a systematic process of applying policies, initiatives and activities that aim at reducing the risk of disasters and ensuring that new developments are not creating new risks (UNISDR, 2020). DRR is a framework for dealing with disasters proactively by investing in measures that address the underlying root causes of disasters as well as focusing on reducing the risk of disasters in the long term (Van Niekerk, 2007). Successful DRR frameworks are found to require effort from government as well as various role players such as private institutions, civil societies, and traditional authorities, as well as the vulnerable communities

themselves. Input from these role players enables disasters to be effectively assessed which leads to the establishment of appropriate policies and initiatives that correctly address the underlying root causes.

Various studies have investigated the impacts of *Efundja* on the affected communities in northern Namibia, but little attention was given to exploring the possibility of long-term risk reduction measures (Tshilunga, 2014; Shifidi, 2015; Niipare *et al*., 2020). These studies mainly investigated the *Efundja* impacts in urban and rural communities within the Cuvelai-Etosha basin, the consequences that flooding has on rural livelihoods and they described the associated economic losses. Moreover, most of these studies concentrated on urban areas and very few focused exclusively on rural settlements, the sector of society whose livelihoods are easily, directly, and uniquely influenced by the *Efundja*. Most of these studies were also of limited scope.

The present study has filled this gap by exploring the views of the heads of households in rural communities, those of the headmen of these communities, local councillors and government employees on how the risk of *Efundja* in northern Namibia can be effectively reduced. Rural communities impacted by the *Efundja* spread over the whole of the Cuvelai-Etosha basin in Northern Namibia were investigated during the research. Information sourced from these groups of participants made it possible to develop a DRR proactive framework to reduce the risk posed by the *Efundja* as seen from the perspective of vulnerable community members, leaders in these communities, and government officials that must deal with disasters in the Cuvelai area.

This first chapter of the dissertation introduces the topic under investigation, the research approach and methodology, and explains the structure of the dissertation. The chapter starts by briefly exploring the origin and importance of the concept of disaster risk reduction, and continues with a brief discussion of the *Efundja* in the rural areas of the Cuvelai-Etosha basin and how it has negatively affected the life of the vulnerable rural inhabitants of these areas. The research questions, aim and study objectives are then presented, and the approach applied in this scientific enquiry is explained. Accordingly, the use of a qualitative methodological approach and research design is justified. The chapter concludes by supplying a timeline and outlining the dissertation structure.

1.1. DISASTER RISK REDUCTION AS A CONCEPT

The world is currently facing increases in the occurrence of natural hazards at an exceptional rate (Guha-Sapir *et al*., 2004). Natural hazards are defined as natural processes or phenomena that may cause loss of life, injury or other health-related impacts (UNISDR, 2009:5). Between 1990 and 2016, natural hazards claimed over 8 million lives throughout the world, with an average cost of 7

trillion US dollars (Yan & Bissell, 2018). Most of the money spent to respond to hazards was for evacuation, providing immediate assistance, temporary shelter with sanitation, food and all necessary materials needed to sustain human dignity (Delica-Willison &Gaillard, 2012). This reactive response approach remained in use up until emergency experts and those who worked at the forefront of disaster relief realised the need for change (Van Niekerk, 2015). They realised that the reactive response approach was not sustainable and could not keep up with the ever-increasing rate of hazard occurrences and that there was a need for change in the response approach (Kreimer & Munasinghe, 1991; UNDRO, 1991; Yodmani, 2001). By questioning what causes the hazards to occur and what can be done to avoid, prevent or lessen the impact of the hazards, the concept of prevention and avoidance of hazards developed (Kelman, 2003; Khan & Rahman, 2007). This process ultimately led to the development of the concept of disaster risk reduction as we currently know it (Khan & Rahman, 2007).

The concept of disaster risk reduction (DRR) promotes the reduction of the underlying risks of hazards before they occur and addresses the question of what makes people vulnerable to hazards. DRR emphasises that reducing the risk of hazards should be a cumulative effort involving governments, local authorities and the affected communities by implementing measures aimed at reducing the risks of hazards. International frameworks were established promoting the concept of DRR and encouraging countries with vulnerable communities to join in the movement (Kelman, 2003).

The literature on DRR evolved to begin to encourage bottom-up strategies of disaster risk reduction practices, instead of the normal top-down strategies used worldwide at that stage. This was done through the creation of national and international networks, promotion of non-governmental organisations (NGOs) and civil society organisations to get involved in grassroots activities and to actively engage vulnerable communities (Delica-Willison & Gaillard, 2012; Izumi & Shaw, 2012). Since then, many countries have shown significant effort in implementing disaster risk reduction in regions such as in South Asia and Africa (Fernandez *et al*., 2012). The concept began to promote programmes aimed at building capacity among local people so that they are able to assess their risks beforehand, in order to enable them to identify, prioritise, plan and implement risk reduction measures at community level (Gaillard *et al*., 2008). Consequently, disaster risk reduction became an approach of reducing risk, driven by leaders, governments, authorities and the vulnerable communities themselves. However, over time it became clear that not everyone understood the concept in the same way and that many countries had difficulties in reaching the vulnerable communities and actively making them part of the DRR initiatives. This resulted in the establishment of global DRR

frameworks with specific goals and targets, as well as implementation guidelines. A good example of this is the current Sendai Framework for Disaster Risk Reduction, 2015-2030.

The Sendai Framework is an international document with a set of specific priorities for action that was adopted by the United Nations member states and a successor for the former Hyogo Framework for Action, 2010-2015. The document consists of sets of actions and priorities aimed to achieve the substantial reduction of disaster risk and loss of lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries over a period of 15 years.

The present study recognises a need to apply the discussed literature on DRR and attempt to develop a DRR proactive approach for the rural northern Namibia. The study examined the literature and acknowledges the suitability of a DRR proactive approach to effectively deal with the impacts of the *Efundja* on the vulnerable rural communities of northern Namibia. The fact that the disaster risk reduction framework use input from the affected people in the development of proactive measures, shows potential for a long-term sustainable risk reduction strategy. The present study aimed to develop such a DRR framework for the rural communities of the Cuvelai-Etosha basin of northern Namibia. This is important, not only because such a framework recognises the voices of the vulnerable communities but also because it considers the ideas and inputs of other role players which permits the hazard to be appropriately examined, leading to the implementation of effective ways of addressing the root causes of the hazard faced by these communities.

The literature covering the studies of *Efundja* from the perspective of the concept of disaster risk reduction (DRR), the development of DRR, the need for proactive approaches as well as the differentiation between disaster management and disaster risk reduction is discussed in more detail in Chapters 2 and 3.

The following Section briefly discusses the *Efundja* in northern Namibia and explains the causative problem investigated by this study.

1.2. FLOODING AND DISASTER RISK REDUCTION IN THE NAMIBIAN CONTEXT

In northern Namibia flooding is a major hazard. The difference between the impact of *Efundja* in urban settlements and in rural areas is that the risk experienced in rural settlements is unique because the livelihoods in rural communities are derived directly from the ecosystem of the Cuvelai-Etosha basin and are almost exclusively rain-fed and climate dependent. This makes the rural residents more vulnerable to the impacts of *Efundja* when compared to their urban counterparts. In

this sub-section, flooding in urban and rural settlements is contrasted and the flooding in Namibia is discussed.

1.2.1. Flooding in urban settlements

Floods are one of the main types of hazards experienced in developing countries (Jonkman, 2005). Floods are known to have a great impact in urban areas, where development changes the natural environments (Rebele, 1994). For example, in 2006 and 2007 in Luanda, the capital city of Angola, cholera outbreaks peaked due to floods and about 83 520 people were affected and almost 3 140 died (Schmuck, 2012). Another example is the floods of Ouagadougou in Burkina Faso in 2009 which displaced about 150 000 people and killed eight people (Tazen, *et al.*, 2019). The city was said to experience three flood events per year throughout the period 1986–2016 due to extreme hydro-meteorological events (Tazen *et al*., 2019).

The increased occurrence of natural hazards in urban areas, coupled with higher urbanisation as a result of rapid and unplanned growth, has led to increased risk in most urban areas (Arku, 2009). Potential consequences of floods in urban areas include economic losses, large groups of people that become affected and serious environmental damage (Galindo & Batta, 2013). While urban settlements are known to serve a nations' economic needs; cities are becoming producers of new risks due to failed infrastructure, environmental degradation and increased informal settlements (Fatti & Patel, 2013). Additionally, urban areas are growing as a result of natural population growth, rural-urban migration and reclassification of rural or peri-urban areas which puts pressure on their service provision and hence inhabitants are forced to venture into unplanned and risky developments (Fatti & Patel, 2013).

Natural hazards and the impact of climate change pose the greatest threats to urban residents (Williams & Jacobs, 2011). Urbanisation has been taking place even though people recognise and understand the increasing risk of natural hazards in urban areas (Douglas *et al*., 2008). This is often observed in cities in the developing world where marginal areas, with poor service provision, are mostly inhabited by the poorest people in cities. This results in huge numbers of poor people being hard hit by the impact of hazards in cities in terms of losing their homes, food becoming scarce and going through emotional aftershocks (Fatti &Patel, 2013). The UNDRR (2019) validates that people exposed to natural hazards in the poorest nations were found to be more than seven times more likely to die than equivalent populations in the richest nations. This mostly occurs in informal settlements surrounding urban areas of most developing countries where rural-urban migrants try to earn a decent

living. This concurs with the view that in developing countries, natural hazards tend to result in a greater number of people affected than in developed countries (El-Masri & Tipple, 2002).

While this is true for urban settlements, the rural settlements' vulnerability is found to be even worse than the vulnerabilities experienced in urban settlements. Vulnerabilities in rural settlements is worse because they have limited resources and capabilities to face hazards (Twigg, 2004; Birkmann, 2006). Their sources of livelihoods, standard of living and way of life simply increase their vulnerability to hazards which explains why they are usually negatively impacted (Hallegatte *et al.*, 2020). In the next sub-section, how the *Efundja* affects the rural settlements of northern Namibia is examined.

1.2.2. Flooding in rural settlements

The impacts of flooding in northern Namibia are severe in both rural and urban areas. However, rural communities suffer more severely and with long-term impacts compared to urban settlements. It has been established that rural communities face unique challenges in dealing with the floods as they are spread out and not heavily populated, making communication more difficult (Kapucu, 2008). Rural communities tend to have limited resources and their rural housing structures increase their vulnerabilities. In most African cultures, housing structures of the rural communities are normally self-built units, poorly planned and made of mud walls, wooden doors and windows (Jigyasu, 2002; Satterthwaite *et al.*, 2007). These types of structures are easily destroyed by disasters when compared to urban structures that are much more permanent and stable. Furthermore, vulnerability studies revealed that vulnerability in rural areas is unique as rural communities depend on small domestic markets and should this be damaged, their livelihood are seriously disrupted (Karim & Noy, 2016; Dube *et al*., 2018). Rural communities are more at risk due to the vulnerability of their livelihoods because of the limited sources of livelihoods, limited access to services and infrastructures (Henderson, 2004; Dube *et al.*, 2018). The main sources of most rural livelihoods are derived from subsistence farming, animal husbandry and informal labour, which are easily threatened by flood impacts (Ozden, 2004; Mudavanhu, 2014).

Moreover, literature has established a link between duration of community exposure to hazards and low coping capacity (Gwimbi, 2009; Nyakundi *et al*., 2010). This means that the longer communities are exposed to hazards, the more their coping capacity decreases. The exposure to hazards and a low coping capacity makes rural communities highly vulnerable and less resistant to the impact of disasters. In terms of communities residing in the floodplains of rivers, studies on the impact of downstream flooding have shown that negative effects include crop losses, soil degradation,

home and property destructions, and ill health, among others (Lazarus, 2011; Jacob, 2011). Since this study intended to investigate how the most vulnerable communities respond and mitigate the risk of *Efundja*, it followed naturally that the study should focus on rural areas, especially given the dearth of research with vulnerable, rural communities in Namibia as object of investigation.

1.2.3. The climate of northern Namibia and its influence on *Efundja* occurrences

Namibia, with its distinctly arid climate, is one of the most vulnerable countries to the effects of climate change in sub-Saharan Africa (Tjitemisa, 2017). The annual rainfall is low and highly variable between years, ranging from 650 mm in the northeast to less than 50 mm along the coastal areas (Kapolo, 2015). In the southern part, the country's climate is strongly influenced by the cold Benguela current that flows north along the west coast while the northern-eastern part is influenced by the Intertropical Convergence Zone (ITCZ) (Angula, 2010).

The altitude of the country ranges from sea level to 2606 m^2 which is the highest point in Namibia located along the Brandberg Mountains (Republic of Namibia, 2002). Much of the interior of the Cuvelai-Etosha basin has a mean altitude of 1000 m (Tracy *et al.*, 2007). The rain falls in the summer months (November to April) in the form of thunderstorms and showers except in the southwest where winter rains account for at least half of the annual total precipitation (Republic of Namibia, 2002).

In the northern part of the country, which comprises the study area, the climate is characterised by low rainfall averages, high annual temperatures, low humidity and frequent wind which enhances evapotranspiration rates (Mendelsohn *et al.*, 2002). The area has an average rainfall of 200-373 millimetres during poor rainfall years, increasing to 500–830 millimetres during exceptionally wet years (Namibia Statistics Agency (NSA), 2013; Mendelsohn *et al.*, 2013). The high evapotranspiration implies that most rainwater is lost and since the overall rainfall is already low, it intensifies the aridity of the area (Mendelsohn *et al.*, 2002). According to Midgley *et al.* (2005), the prevailing climatic conditions, together with high solar radiation, are the reasons why only about 1% of rainfall ends up replenishing the groundwater aquifers that many Namibians depend on. Such a hot and dry climate and erratic rainfall patterns have traditionally exposed the country to recurrent droughts, *Efundja* and wildfires (NRCS, 2017).

Though the study area is characterised by a dry and arid climate, *Efundja* has been one of the normal events in the Cuvelai-Etosha basin since recorded history (Shifidi, 2015). According to some researchers, it seems as if the intensity of the *Efundja* has increased since the year 2008 (Mufeti, 2014; Shifidi, 2014; Niipele *et al.*, 2015). Particularly, 2008, 2009 and 2011 were classified as years of

major and intense flooding (Mufeti, 2014; Shifidi, 2015; Niipele *et al*., 2015). Such a trend has been associated with climate variability due to climate change (Angula, 2010). While the area is known for annual flooding, some years are characterised by severe droughts. The area experienced *Efundja* together with inconsistent years of drought in between throughout history. In the past decade, 2013, 2016 and 2019 were some of the recent drought years recorded in the area (Shikangalah, 2020).

During the flooding period, water flows through the low-lying plains of the basin almost covering the entire surface. The Cuvelai-Etosha basin initially receives perennial flow from the Kunene River before its current diversion towards Botswana and the Okavango Delta (Mendelsohn *et al.*, 2013; Cuvelai River Awareness Kit (RAK), 2018). During that period, the Kunene River feeds directly into the Cuvelai basin but eventually its headwaters cut back leaving the Cuvelai-Etosha basin with a limited perennial flow (Research and Information Services of Namibia (RAISON), 2012; Cuvelai River Awareness Kit (RAK), 2018). Currently, the Cuvelai basin is only fed by the Mui and Cuvelai rivers. These rivers originate in southern Angola in areas that receive an average precipitation of about 900 millimetres each year (Lindenmaier *et al.*, 2014; Newsham, & Thomas, 2009). However, the distance each river carries water downstream and into the network of *iishana* depends on how much rain has fallen (Tracy *et al.*, 2007; Mendelsohn *et al.*, 2013). Therefore, it is mainly this water that flows through all the drainage lines in the basin that converge at *Omadhiya Lakes* and Etosha Pan which is the lowest part of the Cuvelai basin (Tracy *et al.*, 2007; Lindenmaier *et al.*, 2014; RAK, 2018).

As this water flows through the basin, it affects the entire northern area and usually completely cuts off some villages, making them only accessible by air, usually by using helicopters (Ashipala & Simasiku. 2017). During this period, residents remain cut off from accessing basic services such as health outreach points, schools, markets and other amenities. Apart from being cut off, some communities are temporarily displaced to higher grounds. Displaced communities are normally accommodated in relocation camps where they have limited access to proper accommodation, sanitation facilities, clean water, and preventive items, including mosquito nets to prevent potential malaria disease outbreaks (NRCS, 2017). The annual seasonal flooding in northern Namibia often causes not only damage to infrastructure but also loss of life. It has been reported that close to 70 people have died due to drowning in the past decade (Shaanika, 2017; Tjitemisa, 2017). Annually, normally during the first four months of the year, an estimated 27 000 learners from about 100 schools are sent home as their schools are either flooded or cut off by floodwaters (Shaanika, 2017). See Figure 1.1 of Kandjengedi Primary school cut off by floodwaters.

Figure 1.1: One of the schools routinely cut off by the *Efundja*

When schools are affected as such, and as part of the contingency plan by the Ministry of Education, Arts and Culture, learners normally attend classes during the May school holiday. Although this plan seems to work in some regions, in other regions this has proved to be ineffective. When schools reopen after the water has finally subsided, it has been noted that several buildings, especially ablution facilities, are damaged and require renovations before they can be used again (Tjitemisa, 2017). Obviously, this impacts the throughput of learners negatively.

Additionally, a number of roads within the basin have been reported damaged and destroyed due to *Efundja* (Shaanika, 2017). The damage to roads and bridges hinders delivery of essential services such as health outreach and the delivery of food to affected populations. This forces the assisting institutions to resort to the use of helicopters and boats where possible, an exorbitantly expensive exercise (Tjitemisa, 2017). The floodwater destroys and damages infrastructure, including houses and businesses, mostly small to medium enterprises (SMEs) across the entire northern Namibia (Niipare *et al*., 2020). On an annual basis, about 57 240 hectares of maize and mahangu fields are destroyed across the basin and, an estimate of 2 194 farm animals usually die in the same area (Ashipala & Simasiku. 2017).

The assistance of helicopters and boats is usually rendered by the Namibian Defence Force (NDF). The NDF do not only render air transport but also offer manpower that is essential in carrying goods and services to the affected people in inaccessible areas. These practices not only put pressure on the budget of the NDF but also strain its manpower which should be focused on the national security issues of the country. This is not a unique problem to the Namibian Defence Force but to all other agencies and sectors such as line ministries, the Red Cross and the business community that are involved in the emergency response to the recurring *Efundja* in northern Namibia.

The described problem of *Efundja* has persisted throughout history. Though the problem has persisted over time, past studies have mainly investigated its impacts, and none focused on developing a long-term, sustainable risk reduction approach, informed by inputs from the affected rural communities and their leaders. This lacuna highlights the need for a study aimed at developing a proactive DRR framework to deal with the risk of *Efundja* over the long term. No previous study utilised inputs from the affected communities to address the problem and to develop a proactive DDR framework. The desired proactive DRR framework must not only address the underlying causes of the hazard but should, if applied appropriately, solve the essential problems faced by impacted rural communities and allow resources of different involved sectors and agencies such as the NDF to be used for their intended purposes.

1.3. RESEARCH QUESTIONS, AIM AND OBJECTIVES

A number of **research questions** emanate from how the *Efundja* is dealt with in the rural communities of the Cuvelai-Etosha basin of northern Namibia as discussed in the sections above:

- From the overall literature concerning disaster risk reduction, what is the appropriate approach to deal with the recurring *Efundja* in northern Namibia?
- How are the Cuvelai basin and the study area demarcated?
- How do communities cope with *Efundja* and what are their mitigation strategies of reducing the risk?
- What is the role of local leaders towards responding, mitigating the impacts, and reducing the risk of *Efundja*?
- What is the current national response mechanism of dealing with *Efundja* in northern Namibia?
- What is the appropriate DRR proactive framework for the study area aimed at reducing future impacts of flooding in northern Namibia?
- How should the inputs of the rural communities affected by the *Efundja* be incorporated into such a framework?

From these research questions the following research aim flowed logically: The **research aim** of the study is to develop a DRR proactive response framework for the recurring *Efundja* in rural areas within the Cuvelai-Etosha basin of northern Namibia. In order to achieve this aim, the following **research objectives** were pursued:

- To study the available literature on disaster risk reduction and determine the applicable risk reduction for the study area.
- To identify and demarcate the study area.
- To examine how communities cope with Efundja and understand their mitigation strategies of reducing the risk.
- To analyse the role of local traditional leaders when responding to Efundja, mitigating the impacts and reducing the risk of Efundja.
- To evaluate the current national response mechanism of dealing with Efundja in northern Namibia.
- To develop and recommend an appropriate DRR proactive framework for the study area aimed at reducing future impacts of flooding in northern Namibia.

The current form of response to the recurring *Efundja* has been reactive, and mainly involves the provision of relief aid and temporary shelters. This process is organised by central government and coordinated by governmental agencies until it reaches the affected communities. This reactive response mechanism addresses only the immediate and temporary impacts of the hazard and neglects the long-term impacts. This disaster risk strategy also does not take into account the opinions of the affected people, their traditional leaders or their local councillors.

To develop an effective DRR proactive framework for the area, a literature search for a reliable and appropriate proactive approach was required. Given the extent of the area that is affected by the *Efundja*, there was a need to demarcate the study area to conduct interviews and group discussions with the appropriate informants from the affected area. Inputs from the informants of the study area enabled the development of the desired proactive DRR framework which will help the government identify the gaps in its existing response approach as well as emphasise the importance of considering the voices of the affected communities. Moreover, the study provides a benchmark for further studies on hazards that affect the country such as droughts and epidemics. In the final instance, the study also contributes to academic research that aims to improve rural livelihoods and studies on climate change-both nationally and regionally.

1.4. METHODOLOGICAL APPROACH

As this research aimed to investigate the ways in which the rural inhabitants of the Cuvelai basin cope with *Efundja* and their strategies of reducing the risk of *Efundja*, a qualitative phenomenological inquiry was deemed the most suited. Qualitative inquiries are known for offering flexibility, and detailed and rich views of human experiences of the studied phenomenon. Qualitative inquiries allow different views of the studied phenomenon to emerge and permit participants freedom to express their views and actions (Henning *et al*., 2011). Hence, a qualitative phenomenological study was deemed appropriate to investigate flooding in the Cuvelai-Etosha basin, since the study aimed to explore people's experiences of the recurring *Efundja*. Patton (2015) differentiated between hermeneutic phenomenology and transcendental phenomenology. In hermeneutic phenomenology, a researcher explains, articulates and interprets the reflective character of human experience while the transcendental phenomenology seeks to obtain an unbiased description of the raw data of the phenomena by bracketing their personal biasness (Lester, 1999; Elkatawneh, 2016). The hermeneutic type of phenomenology was found most appropriate for the present study. This is because the study needed to interpret and construct meaning out of participant's responses to develop the DDR framework and not simply describe raw data as per the requirement of transcendental phenomenology approach. Further details of the differentiation and justification for the methodological approach used are given in Chapter 4.

This sub-section discusses the methodological approach used in the study. It begins by briefly explaining the use of qualitative inquiry through phenomenology, the use of semi-structured interviews and focus group discussions as methods of data collection and ends by describing the process of sample selection. A more detailed explanation of all these aspects is supplied in Chapter 4.

1.4.1. Qualitative inquiry through a phenomenology approach

Historically, social scientists have applied various methods to gain deeper meanings of why things happen and why people choose where they live in their investigations of spatial relationships. This has been done through qualitative or quantitative research designs. Quantitative research designs are mainly used for descriptive studies or experimental type of studies that are seeking to determine relationships between independent variables and dependent variables within populations (Babbie, 2020). Quantitative research designs pose disadvantages in studying social research problems since data is controlled and measured to address the accumulation of facts, and to determine the causes of behaviour (Mouton *et al.*, 2006; Creswell, 2015). Consequently, the results of quantitative research

designs are known to be statistically significant but often have limited contextual details, while contextual details are what social researchers seek. Hence, social researchers tend to favour qualitative research designs.

Qualitative research designs are classified into confirmatory-related or exploratory-related designs which translate into positivist and interpretive designs respectively (Onwuegbuzie & Leech, 2005). Positivist designs are known for confirming theories and searching generalised patterns based on an objective view of reality, while interpretive designs are subjective interpretations of social phenomena from the perspectives of the study participants involved (Bhattacherjee, 2012). Interpretive research designs start with data and apply inductive approaches of analysis to derive theories or understand the lived experience of participants (Onwuegbuzie & Leech, 2005). Interpretive methods are known for helping researchers fulfil unfulfilled gaps in areas of interest which is why this method is the appropriate for the present study (Bhattacherjee, 2012).

Interpretive methods are exploratory in nature and employ various approaches. Elkatawneh (2016) differentiated between five approaches to conducting exploratory research, namely biography or narrative, ethnography, grounded theory, case study, and the phenomenology approach to qualitative research. Biography studies take written or spoken words of some individuals' personal stories as data for the investigation (Riemann, 2006). The method makes use of collecting stories of life events of people and scientifically analysing them (Bretschneider, 2014). The strength of the method is that it is useful for investigating real life problems and that it gives access to in-depth, thick description of the event or story (Riemann, 2006). The disadvantage is that the method relies on narrated events whereby participants may fake the data or relate 'horrific' experiences which will negatively affect the study's outcomes (Bretschneider, 2014; Elkatawneh, 2016).

Ethnography studies are inspired by anthropology where researchers study the phenomenon by deeply immersing themselves within the context of the phenomenon over a long period of time. The lengthy process of observation and interaction allows the resources to fully narrate the experience in detail (Bhattacherjee, 2012). Ethnographic studies pose the advantages of sensitiveness to the context, generation of rich understanding and minimal respondent bias (Onwuegbuzie & Leech, 2005). However, they are time and resource consuming studies of which the findings are usually specific to a given culture and less generalisable to other cultures (Onwuegbuzie & Leech, 2005).

Grounded theory on the other hand investigates the experience of people and their responses and reactions to develop a theory. The approach is common especially when researchers desire to illustrate a process or how a particular system works (Urquhart, 2012). Grounded theory methods are

only suitable when there are no existing theories regarding the subject of interest or whenever there is a need to create one for a certain group of people (Elkatawneh, 2016).

Case studies usually investigate an event, a single person, problem or process (Hancock & Algozzine, 2017). These are studies mostly done using a bounded system, whereby the boundaries of the case are usually defined in terms of time or space (Tetnowski, 2015). The common limitation of these types of studies is mainly in defining the boundaries of the case.

Lastly, the phenomenology method studies human experience from the perspective of the individuals of interest in the study (Lester, 1999; Matua &Van Der Wal, 2015). It explores how groups of people experience a particular situation and tries to narrate their experience (Miner-Romanoff, 2012). With the present study being interested in understanding how the vulnerable communities respond to and reduce the risk of *Efundja*, this method was deemed the most appropriate. Phenomenology can be used to identify and explore phenomena through the lens of experienced subjects and how they perceive the situation or phenomena that they experience or witness. The method has been widely used in studying disasters ranging from vulnerability and adaptation assessments to investigating underlying factors of disaster risks such as landslides or tsunamis (Younus, 2014; Osuret *et al.*, 2016). The method has been applied to search and unveil personal knowledge by surfacing deep issues and making voices heard which made it relevant to study the *Efundja* of northern Namibia for this research.

1.4.2. Interview method approach of inquiry

The methods of research imply the procedures used to conduct the scientific inquiry (Petty *et al*., 2012). While a number of methods, such as observations, individual interviews, focus groups discussions, surveys and the use of secondary information to study social phenomena exist, this study found it significant to combine key informant interviews and focus groups to be the most appropriate method of inquiry. The study used a combination of individual key informant interviews and group interviews, also called focus group discussions, as well as secondary information gleaned from reports, journals and information pertaining to *Efundja* in northern Namibia to attain multiple viewpoints. The combination of interviews and focus groups was necessary so that key informants were individually interviewed while the large numbers of community members could be interviewed in groups. Individual key informant interviews were used for key people that are deemed to have important information applicable to the study such as headmen, councillors and selected government employees who are involved in the management of and response to *Efundja* in northern Namibia. Key informant interviews were preferred as they are easy to use and allow participants to respond in their

own words. This process leads to deeper understanding of the phenomenon under investigation (Petty *et al*., 2012).

Group interviews were preferred because they permit the collection of data from a group of people much quicker and at less cost than individually interviewing each informant (Stewart *et al.*, 2009). Since the present study was interested in obtaining the views and experiences of a large community in the Cuvelai-Etosha basin in northern Namibia, focus groups were deemed most appropriate for the purpose. Focus groups also allow participants to agree or disagree on certain issues which is believed to provide insight into how a group thinks about the issue of interest (Redmond & Curtis, 2009). Moreover, focus groups were chosen because of how they can permit stimulation of new ideas and permit follow-up questions (Redmond & Curtis, 2009).

During the research, both individual interviews and focus group discussions were used because both methods offer an open-response format which allows researchers an opportunity to obtain large and rich amounts of data in the respondents' own words (Stewart *et al.*, 2009; Stewart, & Shamdasani, 2014). In that manner a researcher can determine deeper levels of meaning, make important connections, and identify subtle distinctions in expression and meaning, something critical to the present study. Moreover, a combination of individual interviews and focus groups has been commonly used for the same purpose among other researchers (Longhurst, 2003; Palinkas, 2006). An additional advantage of using individual interviews and group interviews was that it allowed data triangulation which means that research data was sourced from multiple sources, a tendency that enhances research credibility (Thurmond, 2001). Hence the views and opinions recorded in this study are not one sided but inclusive of all the experiences of the rural communities in the Cuvelai-Etosha basin.

After the methods to conduct the study had been selected, open-ended interview schedules for assessing the experiences of the rural communities at grassroots level were developed. The study made use of open-ended individual interviews and focus group discussions to permit the flexibility of exploring new information that would emerge during the interviews for both key informant interviews and focus group discussions.

1.4.3. Interview schedules for assessing the impact of the *Efundja*

A comprehensive literature survey about the recurring *Efundja* in northern Namibia, statistics, reports and newspapers was conducted to develop the first drafts of the interview schedules. This literature search also included a thorough analysis of the Namibian national disaster risk management policy and act respectively. From this exhaustive literature search, first draft key informant interview

schedules and focus group discussion schedules, based on the study objectives, were developed. The interview schedules were developed for each of the three categories of key informants to obtain data from the three key sets of informants, namely the village headmen[1], local councillors and the government employees. A focus group discussion schedule was developed for the focus groups to obtain data from the community members in the rural areas of the Cuvelai-Etosha basin.

These initial interview schedules and the initial focus group discussion schedules were tested by piloting, using three focus group discussions and conducting three pilot key informant interviews in consultation with the study supervisors. The pilot testing consisted of three key informant interviews with a headman, a councillor and a government employee, as well as three focus group discussions consisting of six to eight participants each. A total of 21 participants took part in the piloting of the focus group discussion schedules and five people participated in the piloting of the key informant schedules. The results of the pilot study were analysed and used to change and improve the interview schedules accordingly.

In addition to the pilot testing, a workshop session with qualitative researchers and geography experts was organised. The workshop permitted the experts and researchers to critique the interview schedules on content, structure, wording, and all other important issues. During this iterative process, the interview and focus group discussion schedules were changed and adjusted accordingly, with the final interview schedules used in the study emerging from the process. The final structure of the interview schedules consists of several sub-topics, namely demographic information, an overview of flooding events, preparatory activities, *Efundja* management and proactive risk reduction approaches.

A detailed description of how the interview and focus group discussion schedules were developed, expanded, and amended is supplied in Chapter 4.

1.4.4. Selection of the study sample

The population of the study consisted of four groups of informants. These participants are the heads of households in the affected rural communities, headmen leading these communities, local councillors and government employees that are involved in *Efundja* response. The heads of households of community members were the main informants of the study as it is their voice and opinions about *Efundja*, their way of mitigating its impacts and how they respond to the hazard the research strived to capture. The village headmen were selected as informants because they are the

[1] Out of 16 headmen interviewed, two were headwomen.

first level of authority at village level. They are the first responding authority and the link between the communities and the government even though they are also part of the communities and experience the impacts equally. Therefore, it was appropriate to understand their role and involvement in the response to the *Efundja*. The local constituency councillors were selected because of their position and the roles they play in society relating to the *Efundja* occurrences. They are involved in the overall government response to the *Efundja* at the grassroots level. The government employees are the custodians of what happens with regards to the *Efundja* in northern Namibia. It was therefore imperative to obtain their perspective on the choice of the form of response, risk reduction measures and the justification thereof.

The choice of constituencies where group discussion and key informant interviews took place were sampled using the purposive-link-tracing sampling technique as per recommendations of the regional councillor. The recommendation was done to target the most affected constituencies. A similar approach was used at the village level in selecting households. Unlike a quantitative study where sample sizes are predetermined, qualitative samples are usually left undetermined and data collection ends when data saturation is reached (Welman *et al.*, 2012). Though being aware of the concept of data saturation, the study aimed at collecting data from a variety of rural communities within the affected area to further enhance the validity and credibility of the information obtained. Therefore, 22 focus group discussions with community members were conducted, 16 key informant interviews with headmen, six key informant interviews with local-level disaster risk management officials (councillors) and six key informant interviews with national-level disaster risk management officials, rendering a total of 22 focus group discussions and 28 key informant interviews altogether. A total number of 225 participants were interviewed or took part in the focus group discussions.

1.5. DATA ANALYSIS

The qualitative research methods adopted in the study ensured that only qualitative data was collected. This implied that there was only a need to employ qualitative data analysis to analyse the data derived from the focus group discussions and key informant interviews. This section briefly summarises the method of qualitative data analysis applied in the study. A detailed description of data analysis is presented in Chapter 4.

The data obtained was analysed through content analysis with the help of a computer-aided software program known as *Atlas.ti*. This process of data analysis is illustrated in Figure 1.2.

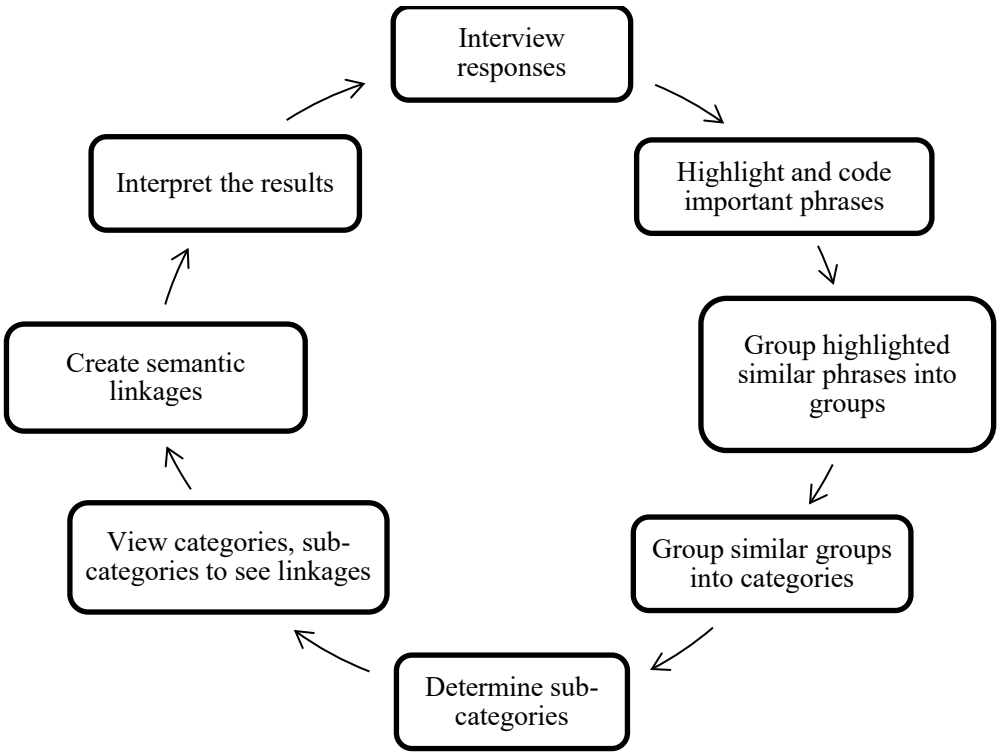

Figure 1.2: The process of content analysis of qualitative data through *Atlas.ti*

Through the thematic content analysis procedure as depicted in Figure 1.2, the responses from the interviews and focus group discussions were collated, reviewed, examined and the important phrases highlighted by assigning codes to them in the software program. Through an inductive approach, these codes were sorted and categorised into groups and units of significance that were further coded into sub-categories through the *Atlas.ti* program (Attride-Stirling, 2001). These sub-categories were reconstructed, re-classified and grouped together to develop themes, visualise linkages and overall obtain a sense of the bigger picture (Henning et al., 2011). This process provided the basis for the discussions set out in Chapters 5 to 8 respectively. A detailed description of the use of Atlas.ti is provided in Section 4.6.2.1.

1.6. RESEARCH DESIGN AND TIMELINE

While a detailed discussion of the research methodology is supplied in Chapter 4, Figure 1.3 graphically portrays the design and execution of the study as well as timelines and implementation of key activities of the study that led to the development of the proactive DRR framework for the rural Cuvelai-Etosha basin.

January 2017	Preliminary **work** • Analysis of existing literature on government response to *Efundja* • Analysis of literature on effective and sustainable ways of dealing with disasters • Development of draft research objectives and research questions	
July 2017	Development of preliminary proposal • **Define objectives and research questions**	
August 2017	**Further literature search** • Determine applicable DRR approach to deal with *Efundja* in northern Namibia • Determine suitable research methodology	
October 2017	**Internal critique of the draft proposal by geographers and researchers** • Improve and adjust proposal as per recommendations	
December 2017	**Presentation of colloquium**	
January 2018	**Detailed literature review** • Disaster risk reduction (DRR) • Disaster risk management (DRM) • Namibian response to *Efundja* **Establishment of research instruments** • Develop draft instruments	
February 2019	**Obtain permission from relevant authorities** • Obtain permission from regional and constituency offices	Preliminary ethics approval from the Stellenbosch Research Ethics Committee (REC)

March 2019	**Pilot testing** • Pilot three focus group discussions and three individual interviews • Use pilot input to refine instruments	
May 2019	**Workshop of experts to improve instruments** • Use inputs to refine instruments **Finalise the focus group discussion schedules and key informant interview schedules**	
August 2019	**Data collection** • Conduct 22 focus group discussions and 28 key informant interviews (KII's)	Obtain final REC approval
January 2020	**Analysis and interpretation of data** • Use *Atlas.ti* for data visualisation • Use of content analysis to extract meaning from the data. Use *Atlas.ti* to aid the process	Attend *Atlas.ti* workshop
August 2020	**Develop proactive DRR framework** • Writing of the dissertation • Revising the DRR framework	
March 2021	**Finalisation of the dissertation** • Writing the conclusion and recommendations	
July 2021	**Dissertation submission**	

Figure 1.3: Key steps and activities in the development of the proactive DRR response framework for the rural Cuvelai-Etosha basin

Some of the steps in the research process took place simultaneously while other activities were carried out chronologically. The study commenced with an analysis and evaluation of the existing literature on response to *Efundja* in northern Namibia. Reports on the forms of response were

examined. These reports indicated a continued reactive form of response that addressed only the immediate impacts but neglected underlying risk factors as well as the voices of vulnerable rural communities. This knowledge was crossed-examined with global literature on disaster risk reduction and disaster risk management which recommended sustainable approaches to countries dealing with disasters. The cross-examination showed an unsustainable and ineffective current government form of response and therefore highlighted the need to consider alternative forms of response. Specifically, it highlighted the need to develop a sustainable DRR proactive response framework that will address the underlying risk of *Efundja* in northern Namibia, informed by the experiences of rural communities who have to deal with the impacts of the *Efundja* annually. This information informed the research questions and study objectives. The process led to further literature review and eventually the development of the preliminary proposal in consultation with the study supervisors.

A further detailed literature review was conducted to determine a suitable research methodology and methods appropriate for the study. The draft proposal was subsequently scrutinised by identified geography experts to assess its relevance and integrity. The proposal was finalised and presented at a research colloquium in December 2017 at the Military Academy in Saldanha. After the study approval had been granted, ethical clearance for the study was applied for. Ethical clearance is a requirement for all studies involving humans as participants. Therefore, ethical approval was applied for, and received from the Stellenbosch University Research Ethics Committee (REC). This application process required permission from relevant authorities of the target audience which was obtained and submitted as part of the Research Ethics Committee application process. These relevant authorities included the various Regional offices as well as the respective constituency offices targeted for data collection.

Upon receiving the preliminary ethical clearance approval, the study was able to carry out pilot testing of three focus group discussions and three key informant interviews consisting of headmen, councillors and a government employee. Insights from the pilot testing were used to improve and adjust the instruments both in terms of content, length, questions re-arrangement and rephrasing respectively. The process of how the instruments were changed and improved through the pilot testing is further discussed in Chapter 4.

Furthermore, to strengthen the instruments, a workshop consisting of geographers and social science researchers was conducted in order to critique the instruments. Once more, their comments, inputs and suggestions were applied to strengthen the research methods before the main data collection.

The final instruments consisted of a consent letter, a demographic information Section, overview of flooding events Section, preparatory activities Section, *Efundja* management Section and proactive risk reduction approaches Section. Since the used instruments were individual key informant interviews and focus group discussions, the data collection process was done by conducting face-to-face interviews and focus group discussions, respectively. A total of 22 focus group discussions and 28 key informant interviews were conducted. The process of data collection is further explained in Chapter 4.

The collected data was analysed using computer aided software known as *Atlas.ti*. Through inductive reasoning, the open-ended qualitative data was analysed using the content analysis method of data analysis as described by Hsieh and Shanon (2005) and Vaismoradi *et al.* (2016) and is further discussed in Chapter 4 (Section 4.6.2.1). The findings from the data analysis were used to develop the proactive DRR framework for the recurring Efundja in northern Namibia, as presented in Chapters 5 to 8.

1.7. DISSERTATION STRUCTURE

This dissertation is structured in a logical sequence from introduction to summary and conclusions in nine chapters. Chapter 1 reviews the *Efundja* in the rural Cuvelai Etosha basin, summarises flooding and DRR in the Namibian context and highlights the need for proactive approaches and the current response approach to the recurring *Efundja* in the Cuvelai-Etosha basin of northern Namibia. It then introduces the research questions, aim, and research objectives and summarises the research approach and methods used in the study. The chapter is concluded by an exposé of the research design and timeline and the dissertation structure.

Chapter 2 introduces the overall origin of the concept of global disaster risk reduction. It starts by revisiting the origin of the concept of disaster risk reduction, compares disaster risk reduction with disaster management and justifies the necessity for proactive approaches. It revisits the history of how disasters were managed, and the emergence and use of disaster relief aid. The chapter further deliberates the disaster management cycle and its limitations. It also discusses the notable events that shapes current global disaster risk reduction by highlighting several international policies and frameworks that were established to address the ever-increasing impacts of disasters. It further examines how disaster risk reduction played out in Africa, and identifies opportunities and challenges still faced by many African countries and Southern Africa as a region. The chapter concludes by presenting the national disaster risk management framework which is the guiding tool in responding to *Efundja* in northern Namibia as recommended by this study.

The third chapter starts by reviewing the nature of the impacts of *Efundja* in the rural communities of northern Namibia. It describes the characteristics of the Cuvelai-Etosha basin, its physical attributes, land use and its associated climate. The chapter closes by discussing the population that participated in the study by describing the nature of urban and rural settlements where they live in the basin.

In Chapter 4 the methodology used to assess community ways of responding and mitigating the risk of *Efundja*, the applied research design, the population of the study area and the rationale for selecting the methods of data collection, are described. The chapter explains the process of sampling, describes the study area and the procedures for data collection. The chapter closes by explaining the applied data analysis methods and the ethical consideration for sourcing information from participants in the study area.

The fifth chapter discusses the results of the study. It begins by highlighting the demographic information of the study participants. It accentuates the different types of impacts of the *Efundja* and examines its implications on the livelihoods within the Cuvelai-Etosha basin. The chapter also describes some of the identified human induced factors that are perceived to exacerbate the risk of *Efundja* in the study area and evaluates how such human induced contributing factors can be mitigated.

The sixth chapter examines the community members' responses to *Efundja* and their preparation measures. It discusses communities' resources and capacities that are necessary to resist and deal with the impacts of the *Efundja*. It also analyses their collective mitigation measures which they apply to deal with the effects of the *Efundja* and presents their perception on whether they are better prepared for future flooding or not. The chapter ends by highlighting the areas of improvement in order to build more resilient communities.

Chapter 7 presents the results and discussion on the responses of the headmen and the local-level disaster risk management officials. In the chapter, an analysis of the involvement and operation of local-level disaster risk management officials, as well as the implications with regards to headmen roles in their respective communities to promote and build resilience, is presented. Furthermore, a discussion on how local-level disaster risk management offices can improve their response mechanism to address the risk of *Efundja* and not only focus on immediate impacts is given in the chapter.

In Chapter 8, an evaluation of how the current government response mechanism works is presented. The chapter analyses the current national disaster risk management framework used to deal

with the effects of *Efundja* and identifies its limitations and shortcomings such as neglecting community views and opinion and an incomplete implementation of the national disaster risk management framework itself. Moreover, a discussion on the need to completely implement the framework in order to effectively address the underlying issues that are responsible for increasing vulnerability to *Efundja* in northern Namibia, is presented. The chapter is concluded by an analysis of some of the viable risk reduction measures and a stipulation of the proposed proactive disaster risk management framework for the rural Cuvelai Etosha basin of northern Namibia.

The ninth chapter is the concluding chapter which is a summary of the findings. A description of how each objective has been attained is given and attention is drawn to the main findings of the study. The chapter concludes by offering recommendations to the improvement of the current framework, stipulating various limitations experienced in the study and highlighting areas of future research.

The rationale for this study, which is to analyse the current government *Efundja* response as well as assess communities' views on how to reduce the risk of *Efundja* in order to develop a proactive DRR framework for northern Namibia, the methods to accomplish this, as well as the structure of the dissertation have been introduced in this chapter. Attention now shifts to the origin of the concept of disaster risk reduction and how it has been applied to deal with disaster impacts.

CHAPTER 2:
ORIGIN OF DISASTER RISK MANAGEMENT

Disasters have occurred since the existence of humans on planet earth. They have always negatively impacted the human race. In order to overcome these negative impacts, humans partake in various mitigation measures to fight disasters. Under these circumstances, this chapter narrates the different ways in which disasters have been managed over time. An overview of how disasters have happened worldwide is given and how different approaches of responding to these threatening events were applied.

The discussion commences by investigating the history of managing disasters, the emergence of disaster management, and the disaster management cycle, as well as notable events that led to the development of the international frameworks guiding current disaster risk reduction (DRR). Disaster risk reduction in Africa and Southern Africa as a region, is also explained. The chapter examines how external relief is perceived to have affected Africa's disaster risk reduction profile and a brief explanation of the role of the United Nations International Strategy for Disaster Reduction (UNISDR) in Africa is also given. The chapter is concluded by looking at the Namibian national disaster risk management framework which is the approach applied whenever responding to *Efundja*.

This chapter is important because not only does it lay the foundation of various approaches applied in dealing with disasters worldwide, but it also describes the ideal and recommended ways of dealing with disasters. It discusses the recommended standard approach of dealing with disasters which is the new concept of disaster risk reduction and not the formerly applied disaster management through emergency management. Therefore, the chapter makes a case for the proactive disaster risk reduction framework which this study proposes as the epitome mechanism to deal with the *Efundja* of northern Namibia.

2.1. THE HISTORY OF MANAGING DISASTERS: FROM DISASTER RELIEF TO DISASTER MANAGEMENT

Humans have always been faced with disasters. Evidence exists that indicates that early humans took measures to lessen the risk of the threatening events they faced (Davies, 1975; Quarantelli, 2000). According to Davies (1975), archaeological evidence indicates that prehistoric ancestors chose to reside in caves as their way of avoiding disasters. The record of Noah's ark in the Bible is some of the earliest written evidence of men trying to prepare and mitigate the risk of floods (Van Niekerk, 2005). The literature indicates that there have always been various applications of

disaster management throughout human existence (Coppola, 2006; Coetzee &Van Niekerk, 2012; Goldschmidt &Kumar, 2016).

Coppola (2006) argued that the practices found in the current concept of DRR can be traced back to the accomplishments of past civilizations. Though the management of disasters in history were limited to single acts addressing a specific disaster, in most cases these accomplishments were quite comprehensive and managed to significantly reduce the impacts of such disasters (Wisner *et al.*, 2004; Coppola, 2015).

Throughout history, floods were one of the most common and devastating types of disaster. According to Coppola (2006), there is evidence of efforts attempting to formally address floods in several unrelated locations worldwide. One commonly cited attempt was the river control project in Egypt around 1817-1722 BC (Quarantelli, 2000). The project diverted the flood water of the Nile River into a lake which caused the recovery of many hectares of arable land which would normally have been covered in floodwater. This practice was clearly an example of a typical flood mitigation measure.

After a series of threatening and disastrous events, it became clear that people struggled to effectively mitigate the effects of flooding. This led to the emergence of humanitarian organisations. Humanitarian organisations evolved mostly because it became apparent that less developed countries struggled to effectively deal with disasters (Comfort *et al.*, 1999). These countries did not have strong economies and the occurrence of disasters worsened their economic situations, making it difficult for them to deal with disasters without outside aid (Comfort *et al*., 1999). Despite the establishment of various humanitarian organisations, disasters continue taking place and disasters at this period were still perceived as once-off natural-occurring catastrophic events (Van Riet, 2016). These once-off catastrophic events would require external assistance for normality to return to these societies (Van Riet, 2016). Such an attitude towards disasters resulted in the provision of relief aid each time a disaster occurred (Lechat, 1990). The 1755 earthquake in Lisbon which killed about 60 000 people and the Caribbean hurricane (Martinique, St. Eustatius, Barbados) in 1780 are typical examples where disaster relief began to become a necessity although these provisions did not help to manage the disasters (Stromberg, 2007). From then on, the practice of disaster relief aid became so common that whenever a disastrous event occurred, the affected communities expected relief and began to believe that they could not help themselves (Stromberg, 2007). The provision of relief aid was not seen as contributing towards long-term mitigation but was simply seen as immediate help to helpless affected people. As soon as a disaster struck, humanitarian groups assisted the affected people by providing

immediate aid such as food, medical aid, and temporary sanitation facilities. The provision of disaster relief became an expected reaction each time a disastrous event occurred.

Although disaster relief was becoming a norm, it was provided strictly on a bilateral basis from one nation to another and not necessarily as coordinated as in modern times (Van Niekerk, 2008). Coordinated relief only came about as a result of the inception of international organisations such as the Red Cross and the former International League (Wisner *et al.*, 2011; Penuel & Statler, 2011; Weiss &Wilkinson, 2013). The idea of relief aid was also used during and after the First and Second World Wars which offered relief aid for war affected people in times of need (Green, 1977; Penuel &Statler, 2011). The provision of relief aid continued after the Second World War and the United Nations Relief and Rehabilitation Administration (UNRRA) was established (Van Niekerk, 2008). The establishment of UNRRA paved the way for the development of international relief aid agencies, such as the United States Agency for International Development (USAID), and the Office of Foreign Disaster Assistance, which is responsible for leading and coordinating the US government's response to disasters overseas (Van Niekerk, 2005).

Despite the good work done by disaster relief organisations, the need to understand why disasters happen, and how their effects can be mitigated was not fulfilled. Disasters such as the Tangshan earthquake of 1976 which killed about 655 000 people in China and the great famine in Ethiopia in the 1970s which killed about 250 000 people, continued to seriously impact large areas of the earth (Guha-Sapir, Hargitt & Hoyois, 2004). At this time, advances in technology allowed the rapid and efficient mobilisation of resources and the establishment of storerooms for emergency relief stocks in many areas that were usually affected by disasters (Comfort, 2001; Mitchell, 2006; Penuel & Statler, 2011). The establishment of warehouses paved the way towards better understanding of disasters. It broadened the understanding of disaster and its associated impacts which led to the realisation that planning to be “ready to respond” is the key factor to reducing the impacts of disasters (Mitchell, 2006). Despite the advances in technology which enabled the development of warehouses, the ever-increasing occurrences of disastrous events indicated that the traditional humanitarian way of providing relief aid was not working. This necessitated a relook at the way of responding to disasters and an evaluation of whether relief aid made any significant long-term difference (Van Niekerk, 2008).

From the events discussed above, the concept of disaster management evolved. Since disastrous events continued to take place, there was a growing realisation that the need existed to respond to recurring catastrophic events rather than continuously providing relief (Coetzee &Van Niekerk, 2012). One of the new concepts was that people must be better prepared for disasters rather

than waiting for disasters to occur, and then responding to it (Mitchell, 2006). This motivated the humanitarian groups involved in disasters to promote public awareness of the need for preparedness in disaster management (Mitchell, 2006; Coetzee &Van Niekerk, 2012; Muttarak & Pothisiri, 2013). This is how the concept of disaster management with aspects of preparedness, prevention, mitigation, reconstruction and rehabilitation evolved to become an alternative to disaster relief. In the next section disaster management is discussed.

2.2. DISASTER MANAGEMENT

Many NGOs and the humanitarian groups started investing in establishing contingency planning and stockpiling emergency relief material (Carter, 2008; Weiss &Wilkinson, 2013; Bullock *et al*., 2017). This were seen as part of 'preparedness', which eventually developed into a more focused facet of emergency relief assistance (Van Niekerk, 2008; Carter, 2008). At the same time, there were also advances in technology which permitted the establishment of early warning systems for specific hazards that could be detected before onset. According to Lavell (1999), it was the advancement in technology that resulted in various early warning systems being established such as the Famine Early Warning System (FEWS), Earthquake Warning System, Indian Ocean Tsunami Warning System (IOTWS) and Agricultural Organisations Global Information and Early Warning System (GIEWS). These early warning systems were intended to warn people before a disaster occurs (Coppola, 2006).

While these systems were promoting and enabling '*disaster preparedness*', it was also realised that disasters can be prevented if people are prepared for disasters (Twigg, 2004; Van Niekerk, 2008). This resulted in the development of the concept of 'disaster prevention', a concept that quickly gained ground (Henderson, 2004; Van Niekerk, 2005). A more thorough interrogation of the concept of 'disaster prevention' led to the realisation that some types of disasters could not really be prevented, and that, in such cases, the emphasis must fall on disaster mitigation (UNDRO, 1991). This realisation led to further research, culminating in the concept of 'disaster mitigation' (UNDRO, 1991). Attention then shifted to 'disaster mitigation' which referred to actions taken to reduce the loss and damage caused by disastrous events (Van Niekerk, 2005). Disaster mitigation became an initiative aimed at minimising the likelihood of disastrous events happening by reducing the vulnerability of those at risk (Holloway, 2003). Disaster mitigation measures for a drought-prone area, for example, can involve a diversification of income generation that goes beyond depending only on agriculture and hence creating other sources of making a living (Holloway, 2003). According to literature, disaster mitigation did not only shift the paradigm towards disaster reduction but also

expanded the general understanding and perspective of disaster preparedness and management (Henderson, 2004; Carter, 2008; Coetzee & Van Niekerk, 2012).

The disaster mitigation paradigm dominated disaster responses until systematic methodologies that could ensure even better mitigation measures and pre-disaster preparedness became available (Van Niekerk, 2005; Coppola, 2006; Coppola, 2015). This resulted in the concept of 'disaster management'. This concept was applied by several international communities involved in humanitarian work (Holloway, 2005; Bullock *et al*., 2017). Coetzee and Van Niekerk, (2012) argued that although disaster management was only recently formalised, its attributes were visible in responses to disastrous events as far back as the 1970s. Defined as the "body of policy and administrative decisions, the operational activities, the actors and technologies that pertain to the various stages of a disaster at all levels", researchers argued that it was being practised long before it was formally realised (Lettieri *et al.*, 2009:117; Coetzee & Van Niekerk, 2012:9).

Disaster management did not completely solve the vulnerability problem of communities. People at the forefront of disaster response questioned whether there was not a better and more efficient way of utilising disaster response money rather than simply spending it on offering relief aid that did not completely solve the problem (Coppola, 2015). These questions eventually led to the development of the disaster management cycle. The disaster management cycle is a continual process in which disaster managers plan for disasters, reduce the impact by planning for a response, mitigate the impacts during the disaster and take steps to aid recovery after the disastrous event (Quarantelli, 2000). The disaster management cycle went through various phases since its inception. According to Coppola (2006) and Coetzee (2010), the cycle was initially developed to be comprised of six phases: reconstruction, mitigation and prediction, preparedness for relief, warning, relief and rehabilitation. However, other scholars redefined the cycle to comprise five phases, while some changed it to consist of four phases, and some even use only two over-arching phases (Coetzee, 2010). Irrespective of the number of phases of the cycle, the focus remains on integrating activities done before, during and after the disastrous event to protect lives and properties (O'Brien *et al*., 2010). In this way, disaster management tried to integrate disaster preparedness with disaster mitigation.

2.2.1. Disaster management cycle

According to Carter (2008), the disaster management cycle as illustrated in Figure 2.1 sustained many at-risk communities worldwide in the past, and through it many nations have disaster risk management departments established.

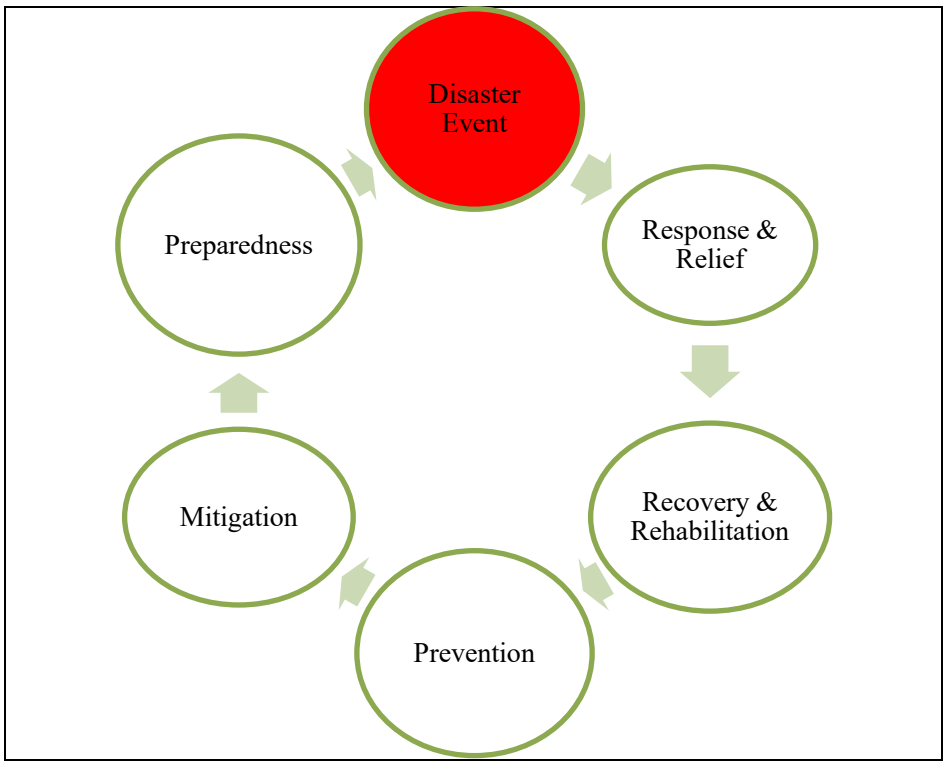

Figure 2.1: The disaster management (DM) cycle

Source: NDP (1992:5)

As illustrated in Figure 2.1, the disaster management cycle consists of activities that take place at various stages of a disaster. The cycle starts with preparedness and each stage is characterised by a set of activities that aims to achieve the overall objective of that phase.

Although the disaster management cycle exists in various forms with numerous phases, for this study, the study adopted the three over-arching phases version of the disaster management cycle. This specific form consists of activities undertaken in the pre-disaster, during the disaster and post-disaster events towards mitigating the impact of a disaster, tackling long-term vulnerabilities and dealing with new threats (Coppola, 2006; Carter, 2008; Coetzee & Van Niekerk, 2012). The stages occur in different periods but not in isolation or in precise order. The phases of the cycle overlap, and the length of each phase depends on the severity of the disaster. The phases of the cycle are designed in such a way that:

- the pre-disaster phase is aimed at minimising the potential losses to humans or the environment caused by the disastrous event;
- during the disaster, the activities are aimed at ensuring that the needs of the affected people are met to alleviate suffering;
- the post-disaster activities are aimed at restoring the affected people's livelihood as close to the way it was before experiencing the hazard.

The activities taking place in the pre-disaster phase are activities completed before the occurrence of disaster and pertain to prevention, mitigation and preparedness (Comfort, 2005; Innocenti & Albrito, 2011). The preparedness activities take place before the disaster which involves actions to prepare responders and the people of the community, while mitigation consists of the actions aimed at minimising the degree of risk, to prevent disasters and to reduce the vulnerability of the community (Khan *et al.*, 2008; Lettieri *et al.*, 2009). Preparedness measures can be in different forms depending on the type of disaster experienced (Muttarak &Pothisiri, 2013). Preparedness measures can range from logistical readiness to deal with disasters to simply having a response mechanism and procedures in place. Other examples can include rehearsals, public education, and early warning systems (Sutton & Tierney, 2006). Mitigation measures on the other hand may include building codes, vulnerability analyses and land use management (Khan *et al.*, 2008; Muttarak &Pothisiri, 2013). All the activities of preparedness and mitigation are taken to fall within the bigger picture of sustainable development. This is because inappropriate developmental activities lead directly to increased vulnerability to disasters.

Responsive activities take place during a disaster and the recovery and rehabilitation activities take place post-disaster, between the end of the disaster and the return to the normal condition (Muttarak & Pothisiri, 2013). The response activities consist of actions aimed at managing and controlling the various effects of disasters, its ripple effects and minimising the loss of lives and property (Sutton & Tierney, 2006). These activities mainly focus on evacuation, medical care, search and rescue, property protection and damage control (Innocenti & Albrito, 2011). Recovery activities consist of actions that return the disrupted area to an often improved normal condition (Lettieri *et al.*, 2009). Response and recovery activities are usually undertaken by humanitarian agencies that are often called in to help deal with immediate response and recovery. Overall, the cycle was developed to comprise all forms of activities, including structural and non-structural measures to avoid or to limit the adverse effects of hazards (Van Niekerk, 2011).

The development of the disaster management cycle signified a progressive shift in the approach of dealing with hazards. Before its inception the preferred overall response towards disasters was an emergency response approach (Sutton &Tierney, 2006; Innocenti & Albrito, 2011). The disaster management cycle was used until the middle of the 1990s when some of the shortcomings of the cycle became evident (Innocenti & Albrito, 2011). Though the cycle was considered effective and achieved considerable levels of reduction in the impacts of disasters, it did not consider the other sectors of activities taking place outside of the cycle (Lettieri *et al.*, 2009). The main limitation was that all its activities and resources were geared towards occurrence of catastrophic events (Arnold,

2012). It was realised that most of the activities were focused on emergency relief and post-disaster rehabilitation. At the time of this realisation, another concern was being raised: the social and economic losses due to disasters being more severe in developing countries than in developed countries (Pandey & Okazaki, 2005). It became apparent that vulnerability to hazards was increased by a combination of factors such as climatic conditions, high population densities and substandard housing conditions (Pandey & Okazaki, 2005). These conditions were found to be most prevalent in developing countries which possibly explains the devastating impacts of disasters experienced in developing countries when compared to the effects of similar disasters in the developed world (Pandey & Okazaki, 2005).

These realisations and questions generated more criticism of the disaster management cycle and eventually led to a deeper understanding of the factors contributing towards the occurrences of disasters. This resulted in the development of the current disaster risk reduction strategies used to combat disasters. Before the current disaster risk reduction approach to disasters is examined, the problems associated with the disaster management cycle are highlighted.

2.2.2. Problems associated with the disaster management cycle

After applying the disaster management cycle for some time, one of the problems that emerged was that the cycle employed a top-down strategy (Delica-Willison & Gaillard, 2012). This top-down strategy allowed governments and civil societies to face disasters by dealing with all disasters in the same way, without a need to experiment with new strategies or to do things differently (O'Brien *et al.*, 2010). Such an approach was criticised with an argument that responding to unknown disasters will require a much broader understanding that goes beyond a conventional disaster management cycle (Grove, 2013). Further, critics claimed that the conventional disaster management cycle tends to lock itself within the single-loop learning within the given parameters, ignoring the richness of local knowledge and local experience necessary to build effective preparedness in responding to these disasters (Grove, 2013). O'Brien et al. (2010) suggested a much more comprehensive and people-centred concept that would use learning methods to develop preparedness.

At this point, the importance of focusing on what makes people vulnerable was realised as well as the significance of the involvement of communities at risk (Gratwa & Bollin, 2002). This realisation was a result of the observation that apart from people suffering the impacts of hazards due to their proximity and exposure to risks, people also suffered because of prevailing socio-economic and political conditions that make them vulnerable to these natural hazards (Delica-Willison & Gaillard, 2012; Shaw, 2012). Based on these facts, the current paradigm in disaster studies was starting to take shape. The paradigm shifted to disaster risk reduction as a better way to deal with the

impacts of natural hazards. This paradigm had been used to deal with natural hazards since its development and achieved considerable success in saving lives as well as preventing damage to property. Although the disaster management cycle received severe criticism, it can be concluded that it taught disaster managers about the necessity to continually develop their disaster risk management structures, as well as to prioritise measures aimed at reducing new risks (Coppola, 2006). Overall, the application of the disaster management cycle is slowly becoming redundant as governments, professionals and researchers are now focusing on DRR and its associated components, such as resilience and community-based disaster risk reduction (Lettieri *et al.*, 2009).

Having dealt with emergency management, disaster management, as well as the disaster management cycle, attention now turns to the concept of disaster risk reduction. The next section discusses what the concept of disaster risk reduction entails, and compares proactive to reactive approaches and states the case for the use of proactive approaches in dealing with disasters.

2.3. DISASTER RISK REDUCTION AS THE LEADING GLOBAL DISASTER REDUCTION FRAMEWORK

The United Nations International Strategy for Disaster Reduction (2012:5) defines disaster risk management as "the systematic development and application of policies, strategies and practices aimed at minimising vulnerabilities and disaster risks, to avoid, limit or mitigate the adverse impact of hazards, within the broad context of sustainable development". On the other hand, DRR is also defined as the concept and practice of reducing disaster risks through systematic efforts to reduce the causal factors of disasters (United Nations International Strategy for Disaster Reduction, 2010). This means that disaster risk reduction is applied through disaster risk management, whereby governments are encouraged to focus on reducing people's exposure to hazards and mitigate the impacts of disasters by applying initiatives and activities that minimise the likelihood of disasters occurring (Holloway, 2013). The framework encourages governments to approach risks in a proactive rather than reactive manner.

The DRR approach requires redefining the roles of governments to become the main actors in reducing risks. This involves the duty to safeguard the safety of citizens by ensuring that DRR is implemented on both small and large scales (Innocenti & Albrito, 2011). Through DRR, governments are tasked with the mandate of being proactive by directing and coordinating disaster-related activities of other organisations as well as creating the necessary policies and legislative frameworks aimed at reducing risks in the general population (Eiser *et al*., 2012). According to the IPCC 2005 report, climate change poses a growing threat of disasters (IPCC, 2005). The report highlights the increasing frequency and intensity of climate-related hazards such as floods, typhoons, heatwaves, and droughts

(Innocenti & Albrito, 2011). Moreover, climate change is predicted to cause undesirable changes in the natural ecosystem and environments leading to the degradation and consequent reduction in the availability of water and food resources for communities. This has been predicted to negatively impact livelihoods, and to reduce the capacity of vulnerable communities to cope with natural hazards, especially in developing countries (Innocenti & Albrito, 2011). The increasing effects of climate change were taken as warning and as the reason for the need to promote the use of proactive approaches to reduce risks in vulnerable communities. It explains why DRR initiatives should pay particular attention to what makes people vulnerable (Eiser *et al*., 2012). This is because only once the underlying factors of vulnerabilities are identified and addressed, can the risks be effectively assessed, and effective programmes implemented. This clearly enhances people's capacity to deal with hazards and to reduce the damage associated with disasters.

Risk reduction activities and initiatives addressing vulnerability strive to either reduce the intensity of outside threats (hazards), or the exposure of people to the risks posed by disasters. Disaster risk reduction strategies include activities such as reducing the vulnerability of people and property, prudent land use management, environmental protection, improving preparedness and providing early warning systems (UNISDR, 2015). The 2009 global assessment report on disaster risk reduction identified vulnerable rural livelihoods as one of the key underlying risk drivers in low-income countries (United Nations, 2013). Hence, there was growing advocacy for more disaster risk reduction efforts to be focused on in the rural areas and remote locations because in such area's fewer skills and less coping capacity exist than in the urban areas. To make matters worse, these areas are often severely affected by disasters (Gwimbi, 2009). Globally, it is encouraged that the DRR efforts in the rural areas should focus on building community resilience rather than just providing a response to disasters.

2.3.1. The need for proactive approaches

Despite the existence of the global disaster risk reduction framework, disaster practitioners, professionals, researchers, and people that work at the forefront of disaster response acknowledge that there are still many countries who deal with disasters in a reactive manner. Mojtahedi and Lan-Oo (2012) stated that countries that still applied disaster management focus on reactive strategies while those who applied disaster risk reduction strategies focused on proactive strategies. It was noted that although disaster risk reduction as a framework was slowly making progress as the preferred way of dealing with disasters in many countries, there is still limited knowledge of its practical application (UNISDR, 2015). Studies describing the differences between reactive and proactive strategies then started to emerge to address this problem.

Reactive approaches were described as responses and recovery activities which are conducted during and after disasters (Moe & Pathranarakel, 2006; Izadkhah & Hosseini, 2008). According to Peek and Mileti (2002), a reactive approach is an approach that focuses on the activities taking place during or immediately following a hazard. Effective reactive approach responses aim to save lives and minimise damage. These forms of responses include activating emergency operation plans and centres, provision of relief aid, evacuation and sheltering of the affected people, searching, rescuing and medical care (UNISDR, 2015). Within the reactive approach, there are also recovery activities that involve rehabilitation (short-term) and reconstruction (long-term) undertakings that aim at restoring vital support systems and returning life to normal (Izadkhah & Hosseini, 2008). Recovery activities can include the rebuilding of residential and non-residential buildings, roads and bridges and infrastructure and coordinating governmental activities (Izadkhah & Hosseini, 2008). Reactive approaches mainly emphasise what should be done whenever a disaster occurs. The approach emphasises how governments can provide the affected people with food, water and sanitation once a disaster occurs.

On the other hand, a proactive approach refers to activities such as mitigation and preparedness that are planned and conducted before a disaster occurs as a way of managing its adverse impacts effectively (Moe & Pathranarakel, 2006). Proactive approaches can consist of structural and non-structural activities aimed at eliminating and reducing the probability and consequences of disasters before they occur (Izadkhah1 & Hosseini, 2008). Proactive activities attempt to protect society from disasters by developing practical managerial measures. These proactive approaches seek to answer questions such as what makes people vulnerable and how their exposure to hazards can be reduced (Peek & Mileti, 2002). Further, proactive approaches aim to reduce deaths, injuries, property damage and economic losses in the long-term by addressing factors that make people vulnerable.

Proactive approaches should place the affected people at the centre of risk reduction initiatives by acknowledging people at the grassroots level through community-based organisations and by allowing them to participate in and lead community-based programmes (Gratwa & Bollin, 2002; Ferdinand *et al*., 2012). The approach promotes community involvement in the initial development of community-based programmes all the way through to their implementation, and revision, something which promotes community ownership and buy-in (Patterson *et al.*, 2010). It advocates for the economic use of scarce resources by investing in the most appropriate measures of risk reduction at grassroots levels (Twigg, 2004).

When evaluating these two forms of approaches, it is clear that proactive measures should be preferred above reactive approaches. However, in countries where disasters are common, the two

approaches will have to co-exist. This is because proactive strategies are still relatively new concepts and governments sometimes still prefer to react to disasters. However, it must be stressed that while governments are reacting to the disasters, their focus should shift from purely reactive strategies to also applying proactive measures so that long-term solutions to problems associated with disasters can be developed. Relating this assessment of proactive and reactive strategies to the present study, it can be stated that the Namibian government has largely responded reactively to the impacts of *Efundja* over the past years. This highlights the need for a shift in focus to a proactive approach as a way of dealing with the recurring *Efundja* in the country.

2.4. NOTABLE EVENTS THAT CONTRIBUTED TO THE DEVELOPMENT OF DISASTER RISK MANAGEMENT AND DISASTER RISK REDUCTION

As described in the sections above, the current concept of disaster risk reduction as used today has evolved as a result of several events that influenced the development of the concept. This evolution did not occur due to one event or action, but is the result of events and activities and work spanning many disciplines and involving many professionals (Van Niekerk, 2005). In this section, notable events that influenced the development of the concept of disaster risk reduction are briefly discussed.

Despite the existence of the disaster risk reduction framework, many nations continued to struggle to address the impacts of disasters they face. Humanitarian agencies realised that the number of disasters was increasing and nations continued to struggle to overcome these impacts. Because of this, several international events, policies and frameworks were held and developed to address the impacts of disasters (Olowu, 2010). Five of these milestone events are discussed in the sub-sections below.

2.4.1. The International Decade for Natural Disaster Reduction (IDNDR)

The first, and most significant, event regarding the advancement of the concept of DRR took place on December 11, 1987. On this day, the United Nations General Assembly declared the years 1990-1999 as the International Decade for Natural Disaster Reduction (IDNDR). This action was taken to "promote internationally coordinated efforts to reduce the loss of lives, livelihoods, and social and economic disruption caused by natural hazards, especially in the developing world" (UNISDR, 2010:17).

The IDNDR aimed to improve the capacity of all UN member states to diminish the adverse effects of natural hazards and to establish guidelines to utilise the existing science and technology in reducing the adverse impacts of natural hazards (UNISDR, 2010). Overall, events planned for the

decade aimed at initiating a shift in the reactive approach towards natural hazards commonly used at that time, to a more planned and preventative type of approach (Lechat, 1990).

During the gathering, according to UNISDR, (2002:5), the General Assembly set forth the goals they wished to achieve during the decade. These were as follows:

- "*Improve each country's capacity to mitigate the effects of natural hazards as well as assist developing countries in assessing potential hazards damage and to help them establish an early warning system and disaster-resistant structures whenever necessary.*
- *Devise appropriate guidelines and strategies for applying existing scientific and technical knowledge, noting the cultural and economic diversity of different countries.*
- *Foster scientific and engineering endeavours aimed at closing critical gaps in knowledge to reduce the loss of life and property.*
- *Develop measures for the assessment, prediction, prevention, and mitigation of natural hazards through programs of technical assistance and technology transfer, demonstration projects and education and training tailored to specific hazards and locations."*

These were the main goals set out to be achieved during the decade. Importantly, these goals also included several targets that had to be achieved to enable the attainment of the goals. Overall, the IDNDR envisioned that all countries carry out national risk assessments and develop national prevention and preparedness plans (UNESCO, 2000). Although many member states struggled with the targets, eventually more than 130 countries managed to set up national disaster committees.

The gathering in December 1987 was followed by another critical event that shaped the disaster risk reduction strategy. This conference took place in Yokohama, Japan, in May 1994. The conference in Yokohama adopted what is referred to as the Yokohama Strategy and plan of action for a safer world.

2.4.2. The Yokohama Strategy

In May 1994, UN member states met at the World Conference on Natural Disaster Reduction in Yokohama to establish global recognition of the need for disaster risk management. The meeting aimed at assessing the progress achieved through the IDNDR over the past decade, and to chart a way forward. The meeting was concluded by accepting the Yokohama Strategy and plan of action for a safer world.

The Yokohama Strategy emphasised that each country has the autonomous responsibility to protect its citizens from natural hazards and that priority must be given to developing countries, especially landlocked countries, as well as small island states in the developing world (UNISDR, 1994). The strategy further stressed "the significance of developing and strengthening national capacities, national legislations for natural disaster prevention, mitigation and preparedness, the mobilisation of non-governmental organization and participation of local communities" (IDNDR, 1994:7). The strategy also identified the need to increase resilience and capacity at local levels by integrating local and traditional knowledge into the bigger framework of DRR and into other developmental activities. The strategy recognised and valued the existing knowledge and experience of managing emergencies in local communities by ensuring that the DRR process is placed in their hands (Van Niekerk, 2008; De la Poterie & Baudoin, 2015). It was through the Yokohama Strategy that the move to promote and strengthen sub-regional, regional and international cooperation regarding the prevention, reduction and mitigation of natural and other disasters originated (Coppola, 2006). The strategy also focused on improving coping mechanisms as another best alternative in coping with and recovering from disaster impacts (Sperling & Szekely, 2005).

The Yokohama Strategy focused on converting the international framework established for the IDNDR into a plan of action. According to the International Strategy for Disaster Reduction (ISDR), the principles of action highlighted that:

- "*risk assessments are necessary for successful implementation of DRR*;
- *DRR needed to be integrated into development planning at all levels of governments*;
- *environmental protection and poverty alleviation are necessary components to DRR and by extension sustainable development".*

The strategy had ten actions which enabled the achievement of its objectives. These actions were the following:

1) "*Risk assessment is a required step for the adoption of adequate and successful disaster reduction policies and measures*.
2) *Disaster prevention and preparedness are of primary importance in reducing the need for disaster relief*.
3) *Disaster prevention and preparedness should be considered integral aspects of development policy and planning at national, regional, bilateral, multilateral, and international levels*.

4) *Development and strengthening of capacities to prevent, reduce, and mitigate disasters are a top priority to be addressed during the 1990s to provide a strong basis for follow – up activities after that period*.

5) *Early warnings of impending disasters and their effective dissemination using telecommunications, including broadcast services, are key factors to successful disaster prevention and preparedness*.

6) *Preventive measures are most effective when they involve participation at all levels from the local community through the national government to the regional and international levels*.

7) *Vulnerability can be reduced by the application of proper design and patterns of development focused on target groups by appropriate education and training of the whole community*.

8) *The international community accepts the need to share the necessary technology to prevent, reduce, and mitigate disasters; this should be made freely available and promptly as an integral part of technical cooperation*.

9) *Environmental protection is a component of sustainable development consistent with poverty alleviation and is imperative in the prevention and mitigation of natural disasters*.

10) *Each country bears the primary responsibility for natural disasters. The international community should demonstrate strong political determination required to mobilize adequate and make efficient of natural disaster reduction – bearing in mind the needs of the developing countries, particularly those least developed"* (ISDR, 1994:8).

Since the groundwork had been done by the IDNDR, the Yokohama Strategy mainly expanded on that and paved the way for its successor, the International Strategy for Disaster Reduction (ISDR) in 2000.

2.4.3. International Strategy for Disaster Reduction (ISDR)

The Yokohama Strategy continued to stress the importance of reducing the risks associated with disasters by protecting against hazards, reducing vulnerability and building resilient communities (UNISDR, 2010). In the year 2000, the International Strategy for Disaster Reduction (ISDR) became the official United Nations Secretariat which served as a catalyst and main focal point within the United Nations system for DRR.

The ISDR preached more or less the same message with the IDNDR but it uniquely professed to cultivate a multi-disciplinary approach to disaster reduction through fostering partnerships with communities at grassroots levels (UNISDR, 2010). The ISDR aimed to increase public awareness in understanding risk and vulnerability, and paid specific attention to ensure political commitment to development and implementation of disaster reduction policies by governments. Unlike the earlier frameworks, the ISDR explored a new angle of the importance of research and improvement in scientific knowledge of disaster reduction (Van Niekerk, 2008).

Similar to the IDNDR, the ISDR needed a strategy to ensure it achieves its goals and objectives. To do this, an inter-agency secretariat (UN/ISDR) was established (Comfort, 2005; UNISDR, 2010). The inter-agency secretariat ensured a close partnership between disaster reduction activities and the activities of humanitarian and socio-economic organisations. The inter-agency secretariat focused on how climate influences disasters, the importance of early warning systems, vulnerability, risk and impact assessment, as well as wildfires (UNISDR, 2010). The second World Conference on Disaster Reduction (WCDR) expanded on the work done at the first World Conference.

2.4.4. World Conference on Disaster Reduction and the Hyogo Framework for Action

In December 2005, the United Nations General Assembly adopted a resolution to convene the second World Conference on Disaster Reduction in Hyogo, Japan to assess the progress made on disaster risk management and reduction by the ISDR and to chart a way forward (UNISDR, 2005). The conference adopted the Hyogo Declaration, commonly known as the Hyogo Framework for Action 2005 – 2015. Resolutions from the conference emphasised the need to shift the focus from merely responding to disasters to disaster prevention and preparedness activities (Olowu, 2010).

The Hyogo Framework for Action (HFA) was adopted in 2005 at the second World Conference on Disaster Reduction (UNISDR, 2005). The framework strived to reduce the risk of natural hazards through efforts to evaluate and manage causal factors, reduce exposure to hazards, lessen vulnerability of people and property, and improve preparedness for adverse events (Djalante *et al.*, 2012).

The framework for reducing disaster risk calls on governments and other stakeholders to prioritise five areas. These five priority areas of the Hyogo Framework of Action (HFA), according to the UNISDR, (2005:3) are the following:

1. "*Ensure that disaster risk reduction is a national and local priority with a strong institutional basis for implementation*.

2. *Identify, assess and monitor risks and enhance early warning systems*.
3. *Use knowledge, innovation and education to build a culture of safety and resilience at all levels*.
4. *Reduce underlying risk factors*.
5. *Strengthen disaster preparedness for effective response at all levels"*.

By 2005, many countries were becoming familiar with the concept of DRR and this framework became the principal tool for dealing with disasters. After the timeframe set for the Hyogo Framework elapsed in 2015, it was replaced by the current Sendai framework for disaster risk reduction which was adopted in 2015.

2.4.5. Sendai Framework for Disaster Risk Reduction

The commitment of the Hyogo Framework for Action to support DRR was renewed when it ended in 2015. The successor framework, commonly known as the Sendai Framework for Disaster Risk Reduction (SFDRR), was launched in Sendai and was developed from lessons learned from the HFA (De la Poterie & Baudoin, 2015). The Framework was the product of stakeholders' negotiations which took place from July 2014 to March 2015 by request of the UN General Assembly (UNISDR, 2015). This time with a fifteen-year duration, the non-binding agreement recognises that although countries have key roles in reducing disaster risk, the responsibility should still be shared with other stakeholders such as the private sectors, local governments as well as any other stakeholders. The Framework comprises a voluntary set of targets and priorities to foster resilience to deal with current and future disasters and to prevent setbacks to development as a result of disasters (De la Poterie & Baudoin, 2015). Moreover, the framework also pays specific attention to climate change and development, increasing globalisation and the importance and improvement of early warning systems (Pica, 2018; Van Niekerk, Coetzee & Nemakonde, 2020).

The Framework has seven global targets and four priority areas which emphasise investing in disaster risk reduction for resilience. It has unique targets, lacking from earlier frameworks, by including specific numerical targets as well as timeframes for each target. According to UNISDR (2015:7), the following are the seven global targets:

i. "*Substantially reduce global disaster mortality by 2030, aiming to lower average per 100,000 global mortality rate in the decade 2020-2030 compared to the period 2005-2015.*

ii. *Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 in the decade 2020 -2030 compared to the period 2005-2015.*

iii. *Reduce direct disaster economic loss concerning the global gross domestic product (GDP) by 2030.*

iv. *Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030.*

v. *Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020.*

vi. *Substantially enhance international cooperation in developing countries through adequate and sustainable support to complement their national actions for implementation of this Framework by 2030.*

vii. *Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to the people by 2030"*.

In addition to the specific targets, the framework defined four priority areas where action was most needed (UNISDR, 2015:8):

1. "*Understanding disaster risk*
2. *Strengthening disaster risk governance to manage disaster risk*
3. *Investing in disaster risk reduction for resilience*
4. *Enhancing disaster preparedness for effective response and to 'build back better'*".

The negotiations stressed the importance of engagement and ownership of action by relevant stakeholders in states and also calls for accountability in disaster risk reduction strategies (UNISDR, 2015). This framework highlights the need of involving women, children, youth, and persons with disabilities, indigenous people and the elderly as all-important actors that can meaningfully contribute to DRR processes (De la Poterie & Baudoin, 2015; Van Niekerk *et al*., 2020). This is precisely what the present study aimed to do, i.e. to involve indigenous people, inclusive of women, in order to develop a better strategy to reducing the risk of *Efundja* in northern Namibia.

The above discussion on events and activities that shaped the current DRR stipulates how the disaster management initiatives, frameworks and policies have slowly evolved in their quest to avert

the impact of disasters worldwide. Current disaster risk reduction frameworks were not developed overnight, but are the result of a slow progress of trial-and-error, change and improvement. The Sendai Framework is the product of these processes. Earlier frameworks experienced various challenges and shortcomings that were used to design better, more robust successor frameworks. All these frameworks were criticised for shortcomings. Even the Sendai Framework has also been criticised for placing too much confidence in scientific and technological solutions and for expecting solutions designed for developed countries to be emulated in developing countries without considering the capacity of these countries (Kelman, 2015; Pearson & Pelling, 2015). It was also critiqued for depending on financial support by member states and not sufficiently emphasising the need for political support of governments in achieving national disaster risk reduction goals. The framework was also criticised because it did not formulate policies and strategies but left this to member states. Lastly, criticism was levelled at the Sendai Framework for failing to initiate risk reduction goals as part of sustainable development (De la Poterie & Baudoin, 2015).

The Hyogo framework, on the other hand, was criticised for being a top-down process, for being donor-driven and for following formal, rigid institutional mechanisms and arrangements (Oxley, 2013). The framework was criticised for having national platforms set up at global level and the entire process being decided at global level, with little investment in local programmes (Olowu, 2010). Moreover, the Hyogo framework was criticised for failing to convert national policies into local grassroot actions and for failing to address the underlying causes of vulnerability and exposure to frequent small-scale disasters in developing countries (Olowu, 2010; Oxley, 2013).

Overall, although the frameworks were well received by many member states, some states struggled with the implementations (Djalante *et al*., 2012). Several authors highlighted that though the frameworks were quite influential in establishing a bigger picture, they lacked guidelines in terms of their implementation (Djalante *et al*., 2012). The struggle for implementation was due to reasons ranging from a lack of resources to technical issues and a lack of skills to facilitate implementation.

Despite the criticism of the frameworks, they have achieved considerable levels of success among several member states. Countries like South Africa, Botswana and Namibia have begun their processes of risk profiling, established operational national disaster policies and to some extent compiled risk reduction national priorities (Amadhila *et al*., 2013; Van Niekerk, 2015; Van Niekerk *et al.*, 2020). Before the inception of these disaster frameworks, many countries did not have any formal structures on disaster management either at the national level or grassroots level. Nor did they prioritise multi-stakeholder relationships to fight disasters as this is currently done. It is therefore

important to acknowledge the essential role the events discussed above had in the development of better global disaster risk reduction frameworks.

The focus now turns to how the concept of disaster risk reduction has evolved in Africa and specifically Southern Africa.

2.5. DISASTER RISK REDUCTION IN AFRICA AND SOUTHERN AFRICA

The development of DRR in Africa was also not a linear process, but mirrored developments in the rest of the world. Africa is one of the continents that has not been prone to massive disasters such as earthquakes and tsunamis that usually attracts huge amounts of media attention (Bhavani *et al.*, 2008; Olowu, 2010). Despite this lack of mega disasters, the continent experiences – and has experienced – its fair share of disasters (Van Niekerk *et al*., 2020). The most common disasters in Africa have mostly been the hydro-meteorological type such as famine, the effects of El Niño, floods, cyclones, veld fires, epidemics and oil spills (Holloway, 2003; Van Niekerk, 2015). Although these have mostly been the slow onset type of hazards and allowed time to implement successful mitigation measures, it's believed that failure in governance and extreme levels of poverty contributed to these hazards turning into disasters (Holloway, 2003). According to Olowu (2010), the poor management of disasters in Africa is the reason why hazards eventually cause enormous loss of lives and property. Extreme poverty, volatile conditions and underdevelopment in Africa have enhanced its levels of vulnerability to disasters (Olowu, 2010; Tiepolo & Braccio, 2020). Holloway (2003) supports this view by stating that the severity of disasters in Africa can largely be attributed to the poor management of the impacts of the HIV/AIDS epidemic which greatly increased the vulnerability of people in Southern Africa.

Authors such as Scott and Tarazona (2011) argued that DRR in Africa can also be hampered by political priorities. According to them, many African states were concerned with national security and fighting for independence, hence disaster mitigation was not necessarily one of the top priorities. Even in the present era, irrespective of progress in democratic governance, many states are still preoccupied with internal conflicts which notably remain the primary threat on national security agendas, with only a few countries active in DRR implementation initiatives (Holloway, 2003; United Nations Department of Economic and Social Affairs, 2013).

As for Southern Africa, Holloway (2003) criticised the development of DRR in Southern Africa to have been dominated by the emphasis placed on humanitarian aid. This hampered the development of effective, proactive, and sustainable DRR strategies suited for the countries of Southern Africa. Bhavani *et al.* (2008) argued that the region wasted resources by focusing on relief

aid assistance rather than seeking to reduce and manage the risks they face. Holloway (2003) described the 1992-1993 food security crises as one example that was treated as a humanitarian problem and hence the response was mainly the provision of relief aid. Although there was sufficient food aid response, it was not a sustainable response and did little to alleviate the crises in the long-term, and to implement preventative measures (Tiepolo & Braccio, 2020). The focus on relief aid is one of the reasons for the slow implementation of DRR in Southern Afica (Bhavani *et al*., 2008). Holloway (2003) further stressed that because of this, the field of disaster reduction in Southern Africa did not necessarily achieve sufficient levels of commitment when compared to other regions or continents worldwide.

Lastly, some researchers are also of the opinion that effective management of disasters in today's world is highly linked to a nation's capacities as well as the know-how in terms of technology (Maes *et al*., 2018). Advancement in technology in many African states is still in an incipient stage which explains why many states can only rely on outside intervention (Olowu, 2010). The next topic discusses how external relief is believed to have influenced the African risk reduction profile.

2.6. THE ROLE OF THE UNITED NATIONS INTERNATIONAL STRATEGY FOR DISASTER RISK REDUCTION IN AFRICA

Before the inception of UNISDR in 1999, organisations and policies such as the New Partnership for Africa's Development (NEPAD), African Union (AU) and the African Development Bank always supported disaster-related activities and established various platforms to enable better reaction strategies (Bhavani *et al.*, 2008). When UNISDR became fully operational, it started supporting and playing a catalytic role in the development of institutional partnerships in Africa to promote DRR (Baudoin & Wolde-Georgis, 2015). It further promoted ownership and commitment to DRR by national, regional and international stakeholders. In doing so, the Southern Africa Development Community (SADC) also started to alter its sub-regional strategy to accommodate DRR (Bhavani *et al.*, 2008).

The first-ever study on the potential of disaster reduction in Africa was conducted in 2004 together with the preparation of a primary document on African regional strategy for disaster risk reduction by the African Union (AU) (Bhavani *et al.*, 2008; Baudoin & Wolde-Georgis, 2015). This was after the inception of UNISDR and the continent has participated in most of the subsequent engagements. The African regional strategy for disaster risk reduction document provided an all-inclusive and multi-sectoral model aimed at empowering African governments to address issues relating to disaster risk reduction as per UNISDR recommendation (Van Niekerk, 2015). It was this platform that resulted in the institutionalising of disaster risk reduction at all levels of government in

Africa (Olowu, 2010; Van Riet, 2016; Tiepolo & Braccio, 2020). In the same year, Africa hosted its first African Ministerial Conference to advise ISDR Africa on DRR issues (Van Niekerk, 2015). This successful conference was held in Addis Ababa to address the HFA (Hyogo Framework for Action) agenda. In the year 2005, while adopting HFA, Africa established the African Advisory Group and also adopted the African strategy for disaster risk reduction document (Bhavani *et al*, 2008). These conferences and platforms of DRR set the course for DRR in the continent and helped DRR to gain momentum on the continent.

To ensure that DRR was mainstreamed into developmental priorities, UNISDR Africa promoted advocacy by heads of states. This effort resulted in about 25 African states establishing national platforms for DRR (Bhavani *et al.*, 2008). From this slow beginning, more African nations began to establish national disaster risk reduction platforms and established and approved disaster risk reduction policies, laws and legislation. After that, DRR became entrenched in civil society, NGOs, academia and community groups participating in DRR activities everywhere in Africa (Van Niekerk, 2015).

As more stakeholders took part in DRR, as well as local research taking a lead, the concept of disaster reduction was slowly becoming established in Africa. UNISDR continued to promote the establishment of early warning systems, risk assessments and dissemination of climate information to at-risk communities and to support countries with civil defence structures to integrate DRR (Tiepolo & Braccio, 2020). Overall, UNISDR advocated for the participation of communities that have to respond to disasters to attend DRR meetings and consultations as ways of building capacity (Baudoin & Wolde-Georgis, 2015).

Despite the reasonable achievements in the field of DRR evidenced by national initiatives, institutional frameworks, policies, legislations and DRR agencies in the region, some researchers are still critical of these developments and are of the opinion that DRR frameworks are mere formal commitments while very little happens at grassroots level (Olowu, 2010). Further criticism of disaster risk reduction frameworks in Africa alleges that although these frameworks and legislation may be effective at the national level, they still require contextualisation at grassroots level and must include step-by-step guidelines that would assist affected communities in the implementation processes. Despite this criticism, Africa took huge steps towards developing and implementing disaster risk reduction frameworks. This reflects Africa's ability to own and truly commit to DRR issues (Van Niekerk, 2015).

In this chapter, the development of strategies and frameworks to deal with disasters was discussed, and the current dominance of disaster risk reduction as the most suitable strategy, also for Africa, was explained. The most salient facts with relevance to this study which emerged from the review of literature applicable to disaster management and response are the following:

- An effective, sustainable DRR framework must be proactive as well as being concerned about continuous improment.
- Reliance on reactive measures as the sole means to deal with disasters is ineffective and unsustainable.
- The DRR framework must be informed by inputs from affected communities at grassroots level. This will ensure context-spesific DRR frameworks.
- Top-down approaches, driven by people outside of the affected area, are ineffective.
- Implementation and review of DRR frameworks must include communication with the affected communities, empowering them, and allowing their participation in activities.
- Excluding communities is counter-productive to the aims of DRR strategies.

With this in mind, it is natural to review the current approach which the Namibian government uses to respond to the recurring *Efundja.* The following section presents the national disaster risk management framework which is the blueprint applied whenever hazards occur in the country.

2.7. NATIONAL DISASTER RISK MANAGEMENT FRAMEWORK

The national disaster risk management framework is the inherited approach from the former South African colony whose effort to combat the impacts of disasters was solely emergency management through the provision relief aid. This inherited emergency management tradition was applied through the former legal framework, namely the civil defence act and civil defence ordinances which applied the national emergency management system for managing disasters (UNDP, 2014). The management of *Efundja* has always been regarded as an '*emergency*' and hence its overall management and responses have been geared towards '*reacting to an emergency.*' In 1994, after the country had gained its independence in 1990, the national emergency management system was then transformed into the current national disaster risk management system (NDRMS) which contains the national disaster risk management framework which serves to provide an enabling environment for the formation, implementation and maintenance of unified and harmonised disaster risk management in Namibia (Republic of Namibia, 2009). This section discusses the national disaster risk management framework which is articulated in the Disaster Risk Management Act (Act No.10 of 2012) as the legal document that describes how the *Efundja* is dealt with from the perspectives of the national disaster risk management offices.

The national disaster risk management framework which is also summarised in the national policy became the basis of all other national documents regarding issues pertaining to disaster risk management. The framework recognises the then Hyogo Framework for Action 2005-2015 which offers guiding principles, priorities for action and practical means for reducing risks of disasters world-wide (Hyogo Framework for Action (HFA), 2005). All the national documents on disaster risk management derive their objectives from the HFA and equally commit to other regional and international disaster risk reduction strategies such as the Africa Regional Strategy for Disaster Risk Reduction, the SADC disaster strategy, the International Decade for Natural Disaster Reduction, and the ISDR, among many (Republic of Namibia, 2009).

As the country adopted the HFA (2005-2015) and other international disaster risk management frameworks, the national disaster risk management framework was established to enable the paradigm shift in the approach of dealing with disasters and moving away from treating disasters as emergencies to a new approach of the renowned concept of disaster risk reduction (Republic of Namibia, 2009). The framework functions under a multi-sectoral structure that consists of six disaster risk management committees at different levels of government structures. These committees work to implement the framework in order to build community resilience and ensure that further developmental activities do not enhance vulnerability to *Efundja* and other disasters across Namibia (Republic of Namibia, 2009). In order to operationalise the implementation of the Disaster Risk Management Act, the National Disaster Risk Management Plan and the National Emergency Management Operational Procedures were developed in 2011. This national disaster risk management framework is structured in the sub-committees discussed next.

2.7.1. National Disaster Risk Management Committee (NDRMC)

The National Disaster Risk Management Committee (NDRMC) is the highest decision-making body that serves as the national platform with the responsibility of managing disaster risk in Namibia. The committee is chaired by the secretary to cabinet, and the committee advises the president and cabinet through the prime minister on the severity of *Efundja* or any hazard in the country (Republic of Namibia, 2009). The committee is appointed by the prime minister, and consists of permanent secretaries of all the line ministries, the permanent secretary to the office of the prime minister and the national planning commission (Republic of Namibia, 2009).

The committee makes recommendations to cabinet on the status of the national disaster risk management framework application and ensures that all its aspects are integrated into all government institutions and that they are taken as primary responsibilities (Republic of Namibia, 2009). The

committee is responsible for resource mobilisation to ensure that disaster risk assessments are conducted, it oversees the operations of early warning systems as well as the dissemination of quality information and data on disaster risk (Republic of Namibia, 2009). The committee reviews and updates the disaster risk management policies, coordinates and supervises disaster response operations and does the overall provision of advice to cabinet on disaster-related matters (Republic of Namibia, 2009). The meetings of the committee take place as per the chairperson's convenience or whenever there is a disaster or a threatening situation. Depending on what is being dealt with, the committee has the right to invite an expert on the subject matter to attend the meeting for consideration towards decision making but the expert has no right to vote towards the final decision (Republic of Namibia, 2009).

The NDRMC and all other subsequent committees may establish sub-committees whereby the sub-committees may advise the main committees on the performance of their functions. The sub-committees can exercise any power or perform any functions of the committee as delegated (Republic of Namibia, 2009). The members of these committees or sub-committees who are not fully employed by the government are entitled to remuneration or allowances payment and other benefits as per the determination of the prime minister (Republic of Namibia, 2009). All expenses for disaster-related matters are to be made from a budget specifically for disaster risk management-related matters from the parliament (Republic of Namibia, 2009).

The NDRMC receives information about the seriousness of *Efundja* or any other disaster-related matter through the bottom-up structural committees as shown in Figure 2.2 (National Disaster Risk Management Policy, 2009; Amadhila *et et al*., 2013).

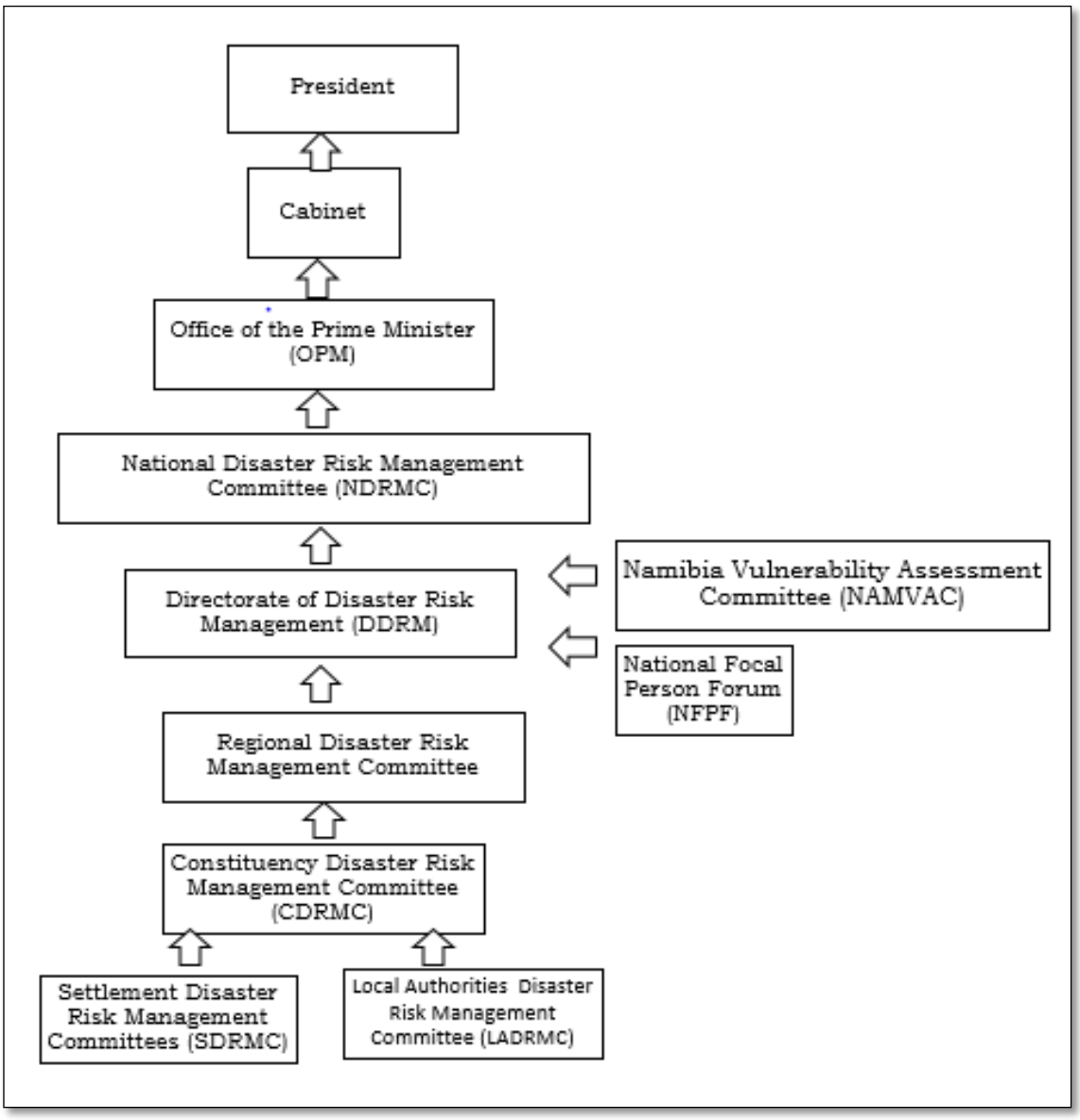

Figure 2.2. The national disaster risk management system institutional structure

Source: National disaster risk management policy (2009:107)

Depending on information received from the order of committees and the seriousness of the hazard, the chairperson of the committee may recommend to cabinet whether it is necessary or not to declare a state of national disaster (Republic of Namibia, 2009). The cabinet advises the president on whether to consider the recommendation of declaring the state of national disaster as per the constitution. Should the president be satisfied with the circumstances, and that the 'situation requires immediate action in order to avoid damage to properties and loss of lives', then the president can declare a state of national emergency (Republic of Namibia, 2009:14). Once the state of national emergency has been declared, it is a gateway for resources mobilisation and other necessary facilities such as vehicles, water and equipment to ensure that the affected people are assisted. The assistance that is offered is usually the establishment of temporary shelter and provision of relief aid to the

affected communities. Once a state of national emergency is declared, the relevant committees work together to get the necessary support to the affected people. These committees also avail personnel from the national disaster risk management offices to perform various functions under the state of national emergency up until such a time that the hazard poses no further threat (Republic of Namibia, 2009).

The NDRMC and all other subsequent committees work together to provide information leading to the decision of declaring of state of emergency or the provision of whatever the desired assistance is in the event of a hazard. Together, the committees make up the coordinated body that decides on the type of response that must take place, depending on the information provided from the bottom-up structure of the national disaster risk management framework. The remaining subsequent committees from the bottom up and their roles are discussed in the following sections.

2.7.2. Directorate of Disaster Risk Management (DDRM)

Below the national disaster risk management committee is the directorate of disaster risk management. This Directorate of Disaster Risk Management (DDRM) falls under the Office of the Prime Minister (OPM) which is the custodian of all disaster-related matters in the country. The office of the prime minister is currently the government's national disaster risk management agency and has been a coordinating body since independence. The DDRM coordinates disaster matters among stakeholders, line ministries and working sub-groups that feed information into the national disaster risk management committee decision-making process. Among several functions, the directorate of disaster risk management facilitates and coordinates the development of the existing National Disaster Risk Management Policy as well as the National Disaster Risk Management Framework (Republic of Namibia, 2009). Moreover, the directorate facilitates and cooodinates all disaster risk assessments taken-up in partnership with other various stakeholders (National Disaster Risk Management Policy, 2009). It is also responsible for specific disaster risk reduction plans and programmes that are aimed at building resilience among vulnerable communities.

The Directorate of Disaster Risk Management is responsible for executing the decisions of the national disaster risk management committee and for the development of an integrated disaster risk management system in the country. The directorate has a long list of roles and responsibilities; however, a brief summary of its notable responsibilities includes hazard monitoring, conducting of risk assessments, creating awareness and collaborating with other stakeholders to give early warning and weather forecasting. These are briefly discussed below.

2.7.2.1. Hazard monitoring, forecasting and early warning systems

As per the national disaster risk management framework, the directorate is responsible for hazard monitoring, coordination of weather forecasting as well as to coordinate the provision of early warning information. However, although the directorate works together with the Namibia meteorological services (NMS) and the hydrological services of Namibia in providing rainfall forecasting and prediction of weather forecasts for short time durations, the responsibility of providing early warning information is still not delineated to a particular entity or clearly defined. Because of the lack of ownership of this responsibility, the current provision of early warning information is still not effective and requires further development.

2.7.2.2. Vulnerability assessments

Another main responsibility of the directorate is to carry out what is called the vulnerability assessment each time a hazard strikes. These assessments act as a base for the national response. In order to ensure that these assessments are conducted, the national disaster risk management framework has made provision for the establishment of a Namibian vulnerability assessment committee (NAMVAC). The NAMVAC is an institutionalised assessment committee that carries out vulnerability assessments to reveal the possible impacts of the hazard and how the impacted people may be assisted or supported thereof (Republic of Namibia, 2009). The assessments are done in conjunction with the regions and other stakeholders who are equally affected such as the Ministry of Education or Ministry of Agriculture. The NAMVAC works together with the directorate of disaster risk management in gathering disaster-related and vulnerability information whereby the hazard and its risks are identified and assessed. These assessments are done regularly each time *Efundja* occurs and the assessments are concluded with a reports which direct the national disaster risk management committee on what action needs to be taken for an effective national disaster response.

2.7.2.3. Collaboration with other stakeholders to create awareness

The directorate also collaborates with other stakeholders such as the Ministry of Agriculture and specifically the Department of Hydrological Services of Namibia to provide early warning information. The hydrological services of Namibia particularly has a ‘daily flood bulletin board’ which tracks daily rainfall patterns for specific sites within *Efundja* hot spots of the country. This is a platform that is useful only to higher authorities such as regional and national-level disaster risk management officials in their respective responsibilities. However, it is not useful to community members because it is web-based, and hence rural communities will by no means have access or be able to use such a useful tool.

In addition to the above, the national framework makes provision for the establishment of the National Focal Person's Forum. This is a platform to collaborate with relevant role players in all government offices and institutions, by appointing a specific individual who is the focal person for all disaster-related matters in an agency, organisation or institution (Republic of Namibia, 2009). The focal person facilitates, coordinates and plans all disaster risk management aspects within their agency or organisation. In an institution, all disaster risk-related correspondence is directed to the focal person.

2.7.3. Regional Disaster Risk Management Committee (RDRMC)

Namibia is divided into 14 regions with four of those regions being the north-central regions lying within the Cuvelai-Etosha basin (as described in Chapter 4). Each of these regions, according to the national disaster risk management framework, is expected to establish a Regional Disaster Risk Management Committee (RDRMC) which advises its chief regional councillor on aspects relating to disaster risk management in that region (Republic of Namibia). The RDRMC coordinates all disaster risk management-related issues among governmental sectors, line ministries, organisations and communities and any other role players at the regional level. This is done to appropriately inform and recommend decisions to the national disaster risk management committee. The regional governor is the chairperson of this committee and oversees all activities of the committee and advises the higher committee, which is the National Disaster Risk Management Committee, on disaster-related issues affecting their region (Republic of Namibia, 2009). As per the national disaster risk management framework, at this level, a technical sub-committee that takes the lead in integrating disaster risk management issues into the development planning of relevant government sectors should be established (Republic of Namibia, 2009). Furthermore, each region is expected to appoint a disaster risk management field coordinator who coordinates disaster risk-related matters at regional and constituency levels (Republic of Namibia, 2009).

2.7.4. Constituency Disaster Risk Management Committee (CDRMC)

The next level consists of the Constituency Disaster Risk Management Committee (CDRMC) which in the same manner coordinates disaster risk management matters at the constituency level and advises the regional governor respectively (Republic of Namibia, 2009). Chaired by the regional councillor, the committee implements disaster risk management aspects at constituency level. Among many of its responsibilities, the committee is responsible for conducting disaster risk assessments in the constituency, integrating disaster risk management plans into regional disaster plans as well as preparing constituency response and recovery plans (Republic of Namibia, 2009). The committee is

responsible for mobilising resources for any disaster risk-related issues in the constituency whenever there is a need.

As per the national disaster risk management framework, this is the level where the information about *Efundja* or any hazard should originate and it is also where disaster risk programmes and plans should be implemented to raise community awareness about the most prevailing hazards. The national disaster risk management framework further emphasises the participation of community members at this level into any national or local effort of risk reduction.

2.7.5. Settlement Disaster Risk Management Committee (SDRMC)

At the lowest level, there is a Settlement Disaster Risk Management Committee (SDRMC) which coordinates disaster-related matters at the settlement level (Republic of Namibia, 2009). This committee receives the information from the headmen about how severe a particular community is affected or the affected people themselves report directly to the local-level disaster risk management official (constituency councillor). Headed by the chief control officer as chairperson, this committee coordinates disaster-related situations at the settlement level and feeds the information to the regional governor. The committee serves as an information source and the beginning of a reporting channel for the entire national disaster risk management framework (National Disaster Risk Management Policy, 2009). This is because for any information to reach the national disaster risk management committee, it must first have come from this committee or the local authority's disaster risk management committee.

Among many responsibilities, the committee is responsible for communities' sensitisation on the importance of understanding and paying attention to early warnings information for effective and appropriate disaster responses (Republic of Namibia, 2009). The committee participates in risk assessments and should develop a disaster risk management task force as well as the settlement emergency team that are both responsible for the response to emergencies at the settlement level. The committee is also responsible for establishing settlement contingency plans (National Disaster Risk Management Policy, 2009).

In addition to the above, the national disaster risk management framework expects all settlements to develop and implement disaster risk management programmes that offer training to their respective staff members about procedures to be followed in disaster response and disaster recovery situations (Republic of Namibia, 2009). The national disaster risk management system also expects settlements to create awareness and public education platforms that share information regarding the most prevailing risks in their respective settlement areas (Republic of Namibia, 2009).

Lastly, settlements are expected to develop disaster management plans stipulating procedures on how services will be provided during a disaster and the nature in which governmental and non-governmental institutions and all other persons may respond to the disaster (Republic of Namibia, 2009).

2.7.6. Local Authorities Disaster Risk Management Committee (LADRMC)

Since communities are made up of urban and rural areas, the urban areas have a local authority disaster risk management committee which coordinates disaster-related issues in urban areas of the respective local authorities. This committee is coordinated by the head of the local authority council as chairperson. The committee coordinates "disaster issues at this level by focusing on prevention and mitigation by promoting an integrated and coordinated disaster management approach" (Republic of Namibia, 2009:17). The committee is responsible for facilitating the implementation of public awareness programmes in its respective jurisdiction. It is the primary responding and mitigation agent as well as the agent of communication channel between the communities and the regional disaster management offices (Republic of Namibia, 2009). The LADRMC and the SDRMC report to the regional governors on the status of *Efundja* or any other possible threatening occurrences.

Similarly, just like at the settlement level, the national disaster risk management framework expects local authorities to develop and implement disaster risk management programmes that offer training to their respective staff members about procedures to be followed in disaster response and disaster recovery situations (Republic of Namibia, 2009). The national disaster risk management framework also expects the LADRMC to create awareness and public education platforms that would share information regarding the most prevailing risks in their respective local authority areas (Republic of Namibia, 2009). Lastly, local authorities are also expected to develop disaster management plans that stipulate procedures on how necessary services will be provided during a disaster and the nature in which governmental and non-governmental institutions and all other persons may respond to the disaster (Republic of Namibia, 2009).

To embed the voices of affected communities in disaster risk reduction frameworks, a need exists for establishing a narrative about disaster risk reduction in affected communities. This is something the present study aimed to address with regards to the rural communities of the Cuvelai-Etosha basin of northern Namibia that are impacted annually by *Efundja*. This section described the current national approach applied in dealing with *Efundja*. This national disaster risk management framework is assessed and evaluated in Chapter 8. However, the chapter that now follows describes the characteristics of the study area and the impacts associated with *Efundja.*

CHAPTER 3:
THE CHARACTERISTICS OF THE CUVELAI-ETOSHA BASIN

The Cuvelai-Etosha basin has been flooded throughout history. This chapter describes how *Efundja* has taken place in the Cuvelai-Etosha basin over the years. It narrates how *Efundja* water flows from Angola through the plains of northern Namibia and drains into the Etosha pan. The chapter gives an overview of the type of impacts experienced by vulnerable communities within the Cuveai-Etosha basin. It further explains the physical attributes of the Cuvelai-Etosha basin, its climate, land-use and the type of precipitation received in the area. The chapter also sets the background on the population of the study area, covering the type of settlements found in the study area and ends with a description of the nature of participants that took part in the study.

This chapter does not only paint the picture of how *Efundja* has affected the Cuvelai-Etosha basin but also narrates how the national government has been responding to this recurring hazard. It points out how the government has been focused on treating *Efundja* as an emergency rather than reducing the risk as per the recommendation of the global disaster risk reduction frameworks discussed in the previous chapter. Therefore, this chapter supports the overall argument of this study on the need to develop a proactive disaster risk reduction framework that reduces the vulnerability to *Efundja* rather than treating the symptoms.

3.1. THE IMPACTS OF THE *EFUNDJA* IN THE CUVELAI-ETOSHA BASIN AND ITS TYPICAL RESPONSE

Floods are one of the main hazards that can turn into a disaster over the northern part of Namibia. They cause crop failures, livestock losses and severe socio-economic interference to many Namibians. The floods are the result of two contributing factors: the Cuvelai river system, which is water flowing from Angola on its way to the Etosha Pan, and rainfall over northern Namibia itself (DDRM, 2008).

The Cuvelai river system is basically water flowing through the low-lying plains of northern Namibia and flooding businesses, homesteads, schools and all other amenities in its way. These annually recurring floods are called *Efundja* in the local Oshivambo language and the term means ‘water that rolls from Angola’. *Efundja* takes place around March to April each year and often causes not only damage to infrastructure and crops, but also causes loss of lives. The water depth varies from shallow to very deep depending on the amount of rainfall received for that particular year. The depth

has not been measured as the plain surface changes across the entire drainage system of the Cuvelai-Etosha basin, thereby making the measurement a difficult task to accomplish.

The water that originally flowed through the Cuvelai-Etosha-basin was water from Angola through the Kunene River (Tracy *et al.*, 2007; Shifidi, 2015; Cuvelai River Awareness Kit (RAK), 2018). However, the Kunene River over time changed it course and has cut back its headwaters, leaving the Cuvelai basin to be fed by the Mui and Cuvelai rivers (Newsham & Thomas, 2009; Cuvelai River Awareness Kit (RAK), 2018). These two rivers are able to maintain a supply of water to the basin as they originate in areas that receive high precipitation rates of above 900 millimetres each year (Mendelsohn *et al.*, 2013). Therefore, the *Efundja* of the Cuvelai basin is basically the water from these two rivers that is flowing through the drainage channels in the basin and eventually drains into Omadhiya Lakes and Etosha Pan, the lowest parts of the Cuvelai basin (Mendelsohn *et al.*, 2013). On its way through the basin, it mixes with the rainwater in the *iishana* on the Namibian side of the basin. It then continues flowing through the basin, spreading into the shallow channels and eventually discharges into the Etosha pan. This flow pattern causes villages that fall within low-lying areas of the basin to be heavily flooded and inaccessible whenever the *Efundja* arrives. When flooding occurs, water flows into the villages, first filling up the *iishana* then pushing into farms and homesteads as can be seen in Figure 3.1.

Figure 3.1: Farms flooded during the rainy season

Depending on the magnitude of Efundja for that particular year, water can cover the entire surface, and crops are submerged under water and stand a good chance of dying or being washed

away. The type of flooding experienced differs from year to year and at times water begins to flow through the basin with no precipitation received on the Namibian side of the basin yet.

Between the years 2008 and 2016, heavy rains fell in northern and north-eastern Namibia during the rainy season. The neighbouring countries of Angola and Zambia also experienced above-normal rainfall. This led to severe flooding in the Cuvelai-Etosha basin which is home to the majority of the rural people in the country (Kaundjua *et al.*, 2012).

The northern part of Namibia is mainly made up of rural households although there are a number of urban settlements as well. In 2008, for example, *Efundja* was reported to have impacted about 350,000 people, nearly 17% of the country's population (Republic of Namibia, 2009). Since the year 2008, *Efundja* is believed to have caused about 102 deaths and displaced over 13,500 persons per year, with about 9,200 normally relocated into temporary camps (Namibia Press Agency (Nampa), 2020).

Many health facilities and schools are either flooded or inaccessible during these flooding events (Tjitemisa, 2017). Sewage ponds overflow, posing a serious threat for increased cases of acute diarrhoea and cholera, and more than 50% of the roads in the affected area are normally submerged or damaged. During years with severe flooding, the harvest production falls by up to 63%, causing about 67% of households to face an estimated food gap of 20-30% (Ocha, 2009).

Efundja has become a recurrent problem in the country that disrupts economic activities and people cannot move around to carry out their normal duties (Tjitemisa, 2017). The impacts of *Efundja* are overwhelming, as many facilities including crops, livestock, infrastructure, and businesses are affected in different ways (DDRM, 2011).

While the impacts are usually assessed through conducting rapid assessments in the affected areas, different aspects of society are affected differently. Communities experience livelihood disruption, infrastructural damage, health and education disruption (Republic of Namibia, 2011). The direct impact of *Efundja* on livelihoods includes loss of and damage to crops and livestock as well as the loss of employment opportunities within the formal and informal sectors (DDRM, 2009). Specifically in the rural areas, there is reduced local availability of cereals and access to food among the poorest households (Itamalo, 2017). Moreover, there is a general reduction of income derived from various livelihood activities such as agricultural opportunities, casual farm labourers and self-employment opportunities that are limited during the flooding season (DDRM, 2011).

Other negative impacts include limited access to trade and markets among the population as many trading areas are covered in water (Republic of Namibia, 2011). Figures 3.2 illustrate the extent of flooding by comparing images taken during the wet and dry seasons in the same area of the Cuvelai-Etosha basin. It is clear from the figure that the Cuvelai-Etosha basin is mainly a low lying plain which makes it easy for water to accumulate in the basin.

Figure 3.2: Large scale view of the Cuvela-Etosha basin during the rainy season and the dry season

(*Image used with kind permission from John Mendelsohn*).

Overall, agricultural productivity in the flood-affected areas is usually reduced during severe floods (DDRM, 2009). This is evident from the fact that about 12 278 crop fields within the area are usually destroyed or submerged for long periods of time, resulting in crop losses (Republic of Namibia, 2010). In 2008 alone, about 989 livestock animals in the area reportedly died as a result of flooding (DDRM, 2008). Due to the major impact on crops and livestock, which make up the main source of rural livelihoods, the floods continue to lower household coping capacity and their ability to deal with the floods. This results in increased household vulnerability to other environmental risks, and economic shocks in the affected areas (Republic of Namibia, 2009).

Regarding education, schools within the basin experience several challenges during the rainy season (Itamalo, 2017). Pupils experience challenges crossing flooded areas on their way to and from

school (Shaanika, 2017). In many cases, pupils have to wade through knee-deep and deeper water on their way to and from school (See Figure 3.3).

Figure 3.3: Pupils crossing floodwater in order to get to and from schools

The photo above shows that this floodwater can be a threat to pupils, especially smaller/younger pupils. Teachers at times have to park their cars far from the schools and walk from there to the schools (Shaanika, 2017). Several schools close down and it has been reported that, on average, about 1 267 schools and 113 637 learners in the study area are affected by annual floods (DDRM, 2009). Some of the affected learners are accommodated in relocation centres while others camp at the nearest higher ground surrounding their respective schools (DDRM, 2009). Depending on the intensity of the *Efundja* of that year, classes of the lower grades are usually temporarily suspended because children in primary classes are unable to cross flooded areas. There has also been reports of textbooks destroyed as well as damage to some school materials in school libraries.

As far as health is concerned, statistics indicate that there are about 38 health facilities that are usually severely affected by annual floods. Moreover, the basin has 348 outreach points, of which about 138 are usually completely cut-off. As a result, health officials (nurses and doctors) have to be transported by helicopter or boats to render services to the affected areas as many outreach points cannot be accessed by road.

During years of severe flooding, such as was experienced during 2008, 2009 and 2011, estimated economic losses escalate to U$136.4 million (N$ 1.7 Bil) due to indirect damages and U$78.2 million (N$ 1 Bil) in direct losses were recorded (Shifidi, 2014). Over the years, the Office of the Prime Minister (OPM) and private organisations have regularly provided temporary shelters (normally tents) to the affected people. This solution has been the general response to help the impacted people and those who became homeless (DDRM, 2014).

As a way of dealing with the devastating impacts of the floods, the Directorate Disaster Risk Management (DDRM) under the OPM coordinates the response to the annual floods. The DDRM coordinates the delivery of relief aid which mainly consists of food and non-food assistance to the affected people.

If one analyses these responses over the years, it is evident that Namibia responds to the *Efundja* in an almost purely reactive manner. Reaction to the floods mainly comprises the provision of relief aid items and temporarily relocating the affected people. This indicates a lack of adequate skills, capacity, as well as finances to deal with the hazard efficiently (Tshilunga, 2014). This response mechanism has proved unsustainable and cannot provide a permanent solution to the problem.

3.2. THE CUVELAI-ETOSHA BASIN

This section deals with the physical characteristics of the study area. It describes the characteristics of the Cuvelai-Etosha basin by defining the drainage patterns of *Efundja* water accross the floodplain, the demarcation of the floodplain, its climate, the type of terrain that makes up the basin, rainfall patterns and land use. An examination of the population of the study area in terms of the distribution of the urban and rural settlements, and a description of the possible study participants conclude the section.

3.2.1. The physical characteristics of the Cuvelai-Etosha basin

The Cuvelai-Etosha basin is not a traditional river with a well-defined course, but rather a series of small, shallow waterways that occasionally channel water across the flat landscape of northern Namibia into the Etosha Pan (Mendelsohn *et al.*, 2013; Cuvelai River Awareness Kit (RAK), 2018). It is a catchment with no outflow of surface water, shared between northern-Namibia and the southern parts of Angola (Beyer *et al.*, 2018). With 64% of the basin located in Namibia and the remaining 36% in southern Angola, the Cuvelai-Etosha basin is regarded as an interconnected system of trivial watercourses, called '*iishana*', (Mendelsohn *et al.*, 2013; Cuvelai River Awareness Kit (RAK), 2018). The *iishana* that are sometimes referred to as the '*floodplain*' are the main source of livelihood for most of the rural residents of the basin (Kluge *et al.*, 2008). The water in the basin

comes from local rainfall and mainly the surface runoff from the ephemeral rivers of Mui and Cuvelai originating in Southern Angola, as discussed in Section 1.2.3. (Persendt & Gomez, 2016). These series of inter-connected watercourses form the Cuvelai drainage system that originates in Angola and spreads across the flat plains of the north-central part of Namibia, emptying into shallow ephemeral watercourses spreading throughout the area (Beyer *et al.*, 2018). The Cuvelai-Etosha basin covers most of northern Namibia, and includes the regions of Omusati, Oshana, Oshikoto, and Ohangwena as illustrated in Figure 3.4.

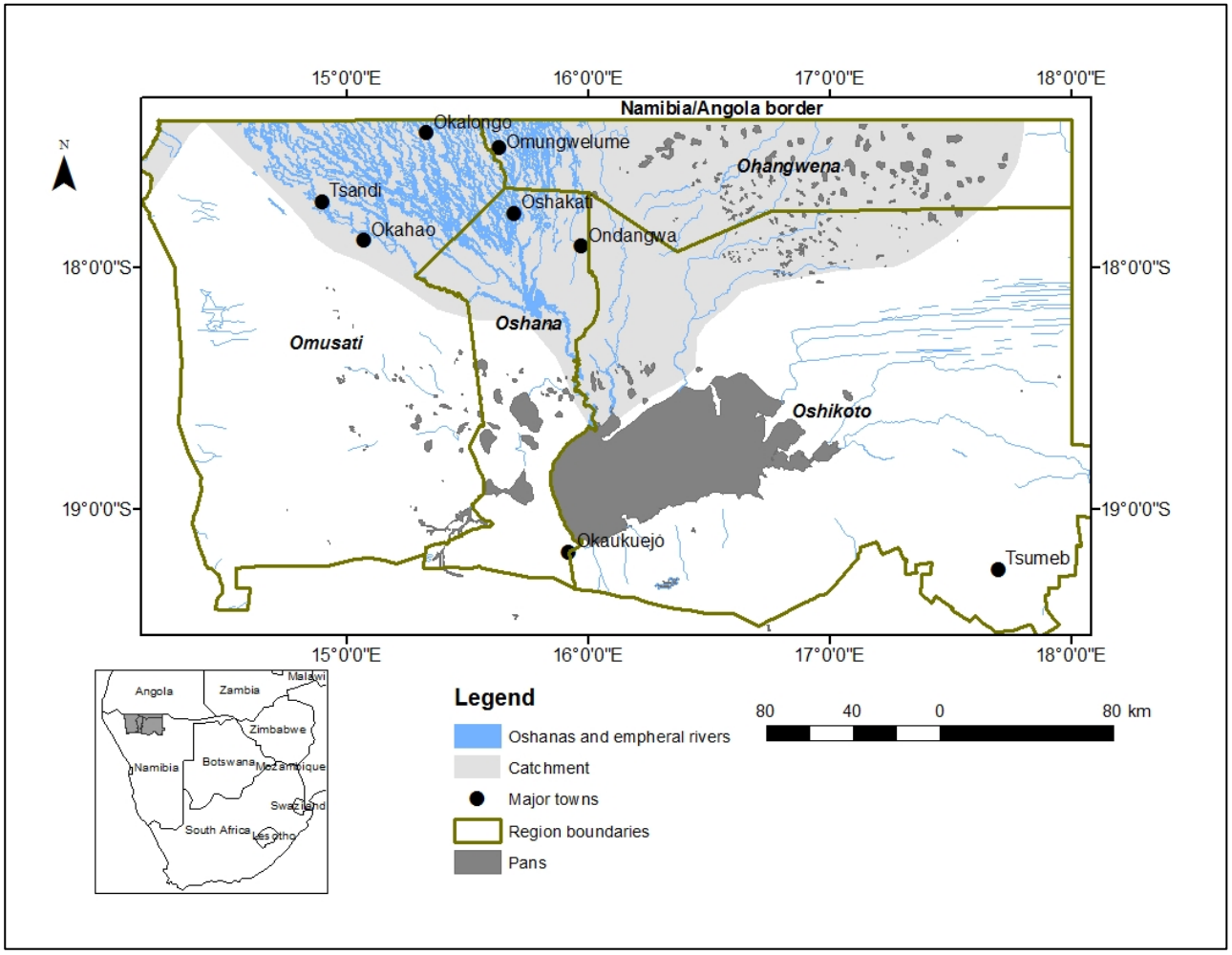

Figure 3.4: The Cuvelai-Etosha basin in northern Namibia

The *iishana,* shown in Figure 3.4 as blue linear features, make up the wide network of waterways of the Cuvelai-Etosha basin (also sometimes called the *Cuvelai Delta*) (Strohbach, 2008; Mendelsohn *et al.*, 2013). Because of the flatness of the terrain, the area is frequently flooded. While there is often an abundance of water in the Cuvelai-Etosha basin during the rainy season, most *iishana* are dry for much of the year (Research and Information Services of Namibia (RAISON), 2012). The area dries up as water is lost by evaporation, transpiration or seeping into the ground (Strohbach, 2008).

The terrain of the basin is extremely flat, varying between 1 100 and 1 200 meters above sea level, which indicates very little change in altitude or relief (Mendelsohn &Weber, 2011). This causes the water to move slowly across the area and hence water accumulates in the basin (Mendelsohn *et al.*, 2013).

The villages selected to conduct this study in are located on these flat plains. The process of selecting participants is discussed in detail in Section 4.6.

3.2.2. The climate of the basin

The Cuvelai-Etosha basin extends for about 430 km in length and over an area of 172,000 km^2, stretching from southern Angola into northern Namibia (Woltersdorf, 2010: Luetkemeier *et al*., 2017). Its climate is mostly dry and semi-arid, and is predicted to be getting drier due to overall global climate change (Hipondoka, 2005).

The water in the basin is generally salty, and is linked to the area's high potential evaporation rate of 2500 mm and low precipitation levels (Kluge *et al*., 2008). The area is characterised by high temperature averages, with average daily minimum and maximum temperatures varying between 7ºC and 17ºC in winter and 18ºC and 35ºC during summer, a factor that may be contributing towards the nationals of salinity (Hipondoka, 2005; Mendelsohn, 2008). The Cuvelai-Etosha basin receives relatively low and erratic rainfall and low surface runoff varying between no flow to 100 million m^3 /year, and an average surface runoff of less than 5.0 million m^3/year, as measured in Oshakati (Woltersdorf, 2010).

Due to the relatively low relief, high evaporation rates and the nature of the soil, water available for surface run-off after precipitation is limited (Hipondoka, 2005). The sandy type of soil is believed to influence surface run-off by soaking up water and only leaving a little that evaporates, resulting in salt accumulation (Bittner & Kleczar, 2006). The presence of salt particles has been confirmed by the communities who have stated they have noticed remnants of salt particles in their fields after the water drains out which they suspect also affects their crop production.

The Cuvelai-Etosha basin lacks permanent sources of water, despite the development of some dams and water from pipelines water remains a scarce resource (Woltersdorf, 2010). The highly erratic and variable rainfall, as well as high potential evaporation, amplifies the area's aridity and enhances its vulnerability to climate change (Woltersdorf, 2010). All of the conditions discussed above force community members to settle in close proximity to *iishana* in order to be able to make use of water whenever available. If they do not do that, they have to drill to great depths in order to

secure clean and fresh groundwater, a practice that is difficult and costly. (Mendelsohn *et al.*, 2013). The practice of settling close to *iishana*, while important for securing water during dry times, also makes the community more prone to *Efundja* damage during wet years.

3.2.3. Rainfall received over the basin

The basin receives a highly variable rainfall pattern, which occurs between November and April (Kluge *et al.*, 2008; Cuvelai River Awareness Kit (RAK), 2018). Precipitation varies both in terms of timing, amount and coverage and usually falls in the summer months when temperature levels are at a maximum (Hipondoka, 2005; Bittner & Kleczar, 2006). The area has an average rainfall of 200-373 millimetres during the poor rainfall years, while the average may go up to 500 – 830 millimetres during the good rainfall years (NSA, 2013; Mendelson *et al.*, 2013). The rainfall brings a flow of water to the basin, supplementing its few permanent water features such as local shallow aquifers (perched aquifers) (Beyer *et al.*, 2018). The highly variable rainfall explains the in-between occurrences of droughts over the years in the basin.

A study conducted in 2019 that investigated rainfall trends and variability between 1987 and 2018 in northern Namibia confirmed the variable and changing rainfall patterns. The study discovered an overall increasing annual precipitation, but with a downward decreasing trend of -0.14mm per year^{1} during dry seasons and an upward increase of about 7.7 mm/year^{1} in annual summer rainfall (Spear *et al*., 2018; Awala *et al*., 2019). This findings means the following: there is an increase in overall rainfall amounts over the central-northern part of Namibia; however the rainfall starts late and ends too soon when compared to historic data (Spear *et al.*, 2018). These findings also imply that the increase in rainfall during the rainy season means that there will be more rainfall, resulting in more intense flooding during the rainy season. At the same time, the data suggests an intensification of drought during the dry season (Awala *et al*., 2019).

3.2.4. Land use in the Cuvelai-Etosha basin

With Namibia considered to have less than 2% arable land because of limited rainfall, the land within the basin is mainly used for small-scale farming (also known as communal farming) which implies the rearing of livestock together with crop farming (Bittner & Kleczar, 2006). A common type of land use is a household that is rearing cattle, sheep, goats, donkeys and poultry and also cultivating rain-fed millet (*mahangu*), and sorghum (Government of Namibia, 2002). This is commonly known as a mixed farming approach, and is the most important livelihood securing type of activity in the area (Luetkemeier *et al.*, 2017). This type of farming is popular mainly due to the type of climate experienced and the variability of rainfall in the area (Luetkemeier *et al*., 2017). The type of climate dominant over the area has forced many livestock farmers to establish cattle-posts in

faraway places, sometimes even in the villages of southern Angola. During times of drought, livestock can then be moved temporarily to these places. This has become the ultimate climate change adaptation strategy for many households (Hipondoka, 2005).

A homeowner on his piece of land will cultivate crops on one side of the small farm (locally known as *epya*) while rearing his livestock on the other side of the farm (locally known as *ekove*) (Shifidi, 2015). In the past, residents would get large plots of land but they could not use all of it for crop cultivation. The remainder of the farm would then be used for livestock grazing (Niipele *et al*., 2015). However, in recent decades, the increasing population has forced new home owners to get by with only a few hectares of land that are sometimes inconveniently located and with poor quality soils (Shifidi, 2015). As a result, such residents may be vulnerable to *Efundja* and droughts as they continuously have to deal with climate-related impacts (Shifidi, 2015).

The area has been exposed to land degradation and deforestation that has reduced its flora and fauna and resulted into wood that was once plentiful and used as household building and fencing material, as well as a source of energy, to become a scare resource (Turpie & Visser, 2013). These has actually forced residents to consider using alternative building materials such as the current commonly used stalks of the *mahangu* plant (Niipele *et al*., 2015). Due to rapid population growth, the '*best land*' is becoming scarcer, resulting in recent settlements taking place in the low-lying areas, which are more vulnerable to *Efundja* (Shifidi, 2015).

According to the National Statistics Agency (2013), besides subsistence farming, most of the rural households live on cash income derived from wages, business profits, pensions, and remittances. Other income sources include working for other families doing work such as de-weeding, harvesting, and cattle herding which wealthier families pay for in money or payment in-kind with millet (Muhangi & Acidri, 2008; Angula & Kaundjua, 2016). There are also possibilities of non-farming income sources such as doing domestic work, small businesses such as '*cuca shops*' and '*shebeens*', trading, crafts, such as basket making, beer brewing and manual labour in the form of fencing, brick moulding and constructing huts and granaries (Spear & Chappel, 2018). The income from these sources is not always sufficient; hence, families that are fortunate to have family members who live and work for salaries elsewhere, expect such family members to send some money back home (UNDP, 2014). Although such households receive small amounts of remittance income, they continue to cultivate fields and keep livestock as their main source of livelihood (UNDP, 2014). This subsistence farming mainly consists of crops such as *mahangu millet*, sorghum, maize, beans, nuts, watermelons, squash, pumpkins and a variety of gourds (Devereux, 2001; Muhangi & Acidri, 2008; Spear *et al.*, 2018). Such a lifestyle that is directly dependent on hydro-climatic conditions makes the

rural people vulnerable to even a slight change in climatic conditions (Kluge *et al.*, 2008; Luetkemeier *et al*., 2017). This explains why food insecurity remains a challenge in the area and is believed to contribute to vulnerability of the local population to common disasters in the area, such as droughts and *Efundja*.

3.3. THE POPULATION OF THE STUDY AREA

This section sets the scene regarding the population of the Cuvelai-Etosha basin, the group investigated in this study. It describes the types of settlement found in the area, as well as the target groups from which possible participants in the study were selected.

3.3.1. Urban and rural settlements in the Cuvelai-Etosha basin

The Cuvelai-Etosha basin is a combination of both rural and urban localities. It consists of several towns as administrative centres, with surrounding rural areas. While the *Efundja* usually affects both rural and urban settlements, and can severely disrupt the informal sectors of towns, the study was focused on rural settlements. This focus is derived from the fact that a number of studies focused on flooding in urban settlements, and that it is generally believed that the risk of *Efundja* experienced in urban areas can mainly be attributed to inappropriate or lack of spatial planning (Tshilunga, 2014; Hooli, 2016; Niipare *et al*., 2020). According to Niipele *et al.* (2015), new urban settlements are being developed in *Efundja*-prone areas and existing ones tend to extend into these areas, due to bad spatial planning. Road infrastructure, business establishments and some residential suburbs associated with these new developments are situated in *Efundja*-prone areas due to planning failures (Hooli, 2016).

Large numbers of people in the basin also live in rural settlements. The rural households are established as small communities called villages. These villages vary in size, ranging from less than 20 homesteads to more than 50 homesteads per village. They are scattered throughout the basin with houses mostly positioned in close proximity to *iishana,* a strategy to gain access to water for domestic use and for their livestock. Historically, people of the Cuvelai-Etosha basin settled where water was most abundant. This is mainly the areas between the *iishana* which is made up of alluvial (clay) and aeolian sediments (sands) which have a generally fertile soil and can therefore support farming activities (Marsh & Seely, 1992; Niipele *et al*., 2015; Spear & Chappel, 2018). While settling in these zones earns them a living, it is also the area that is most vulnerable to climate related hazards such as *Efundja* (Niipele *et al.*, 2015; Shifidi, 2015). Settling in these locations puts their crops and livestock at risk due to changing climatic conditions (Shifidi, 2015). Any change in rainfall, temperature, or soil fertility rates would impact their farming and thereby their livelihood (Spear *et al.*, 2018). Since

these *iishana* dry up roughly four months after the rainy season, the population is forced to depend on underground water as their source of water supply (Marsh & Seely, 1992). The seasonal availability of fresh water and the availability of fertile soil of the basin explains the high density of 50-100 persons·km2, especially in areas surrounding the iishana (Niipele et al., 2015; Spear et al., 2018).

3.3.2. Nature of possible study participants

For this study, the population of the study area can be divided into four target groups. These groups are the local traditional authority, consisting of the headmen of villages, the heads of households in each village, the local constituency councillors (the local-level disaster risk management officials), and the government employees from central government that act as the national disaster risk management representatives that are directly involved in responding to *Efundja* in the Cuvelai-Etosha basin. This last-mentioned group includes employees of the Office of the Prime Minister (OPM), the coordinator of all disaster and risk management activities in the country. The reasons for selecting participants from each of these groups as participants in the study are briefly explained below.

These groups of participants were selected because of the roles they play when the *Efundja* arrives in the basin. The traditional authority (headmen), and local and central government employees were selected to take part in the study because of the respective roles of management they play within the affected communities. Headmen are the first key responding authority that acts whenever a need arises within communities, therefore they are the source of information on preparation and response strategies necessary to proactively reduce the risk of *Efundja*.

Whenever issues are not handled at the headmen level of the community, such issues are escalated to the local councillor's authority for resolution and decision making. The local councillor plays a major role in issues relating to provision of temporary housing, financial assistance, and ensuring that the relocated people have proper sanitation, electricity and food. They also cater for all other emergency-related issues. Therefore, it was necessary to obtain information from this group of informants since political motivation is recognised as one key aspect to disaster risk reduction at risk communities. Another reason for the inclusion of local councillors in the study was that it enabled the researcher to determine if the local government includes community members in their risk reduction activities relating to *Efundja*. This is important to the study because participation of community members in local government initiatives is considered key towards developing effective risk reduction strategies and frameworks (Wisner *et al.*, 2012).

The central government, specifically the employees from the OPM, were included for various reasons. Firstly, they are the custodians of disaster risk management in Namibia and hence it is important to understand their viewpoint concerning the *Efundja*s in the Cuvelai-Etosha basin. Secondly, because of their choice of response to *Efundja* in the basin, they are the decision-making body that decides, coordinates and delivers a response to the affected people of the basin on a strategic level. Lastly, because they are responsible for planning long-term risk reduction strategies for the area, their views and opinions had to be included in the study.

The fourth group, the local community members, were the main focus of this study. The study aimed to obtain the voice of the grassroots communities affected by the *Efundja*, therefore it was appropriate to include the rural communities in the study. Community members face the impacts of *Efundja*, they prepare, react and mitigate in the ways they are able to. In this process, they accumulate information regarding the impact of the *Efundja*, and risk mitigating strategies, not necessarily found among the other groups. To investigate the views of these communities, the heads of households were targeted because of the roles they play in individual families as well as in the community at large. A head of a household, whether male or female, is the main decision maker in terms of what should be done to respond to flooding. Mufune (2013) supported this view and stated that individual heads of households hold the power relating to all decisions at household level as well as at the community level. In this case, heads of households have knowledge of various strategies of preparation for, and responding to, *Efundja* and how the risk of flooding can be reduced, both at household and community level. In general, heads of households are the elders, both in the household and in the community at large (Mufune, 2013). This implies that this group of people have some degree of wisdom on how they perceive the risk and how it can be proactively reacted to, as well as knowledge of collective community risk reduction strategies. Including them in the study enabled the study to gain a deeper understanding of how the community perceive, and respond to, the risk posed by the *Efundja*.

As previously described, the Cuvelai-Etosha basin is an almost completely flat area, intersected with shallow watercourses, the *iishana*, that annually fill up with water during the rainy season. Most of the water originates from the southern part of Angola, where a rainfall of 900 mm is the norm. In contrast to this, the Namibian part of the basin receives irregular rainfall that can vary between 200 to more than 800 mm per year. This wide range of possible rainfall makes the area particularly succeptable to recurring episodes of drought and flooding. This study focused on the recurring flooding events, known as the *Efundja*.

The rural communities of the basin are mainly small-scale subsistence farmers, with limited other economic activities to supplement income. These communities are thus vulnerable to the effects

of the *Efundja*, hence the focus on investigating their experiences regarding the flooding, and potential risk reduction strategies.

This chapter has provided the background on how the *Efundja* takes place in northern Namibia. It has discussed the typical national response to the recurring hazard. Now attention shifts to methods used to conduct this study. Chapter 4 discusses the methodological approach and all other methods applied in this study.

CHAPTER 4:
METHODOLOGY AND METHODS TO INVESTIGATE FLOODING IN THE CUVELAI-ETOSHA BASIN

In order to fulfil the study objectives, the study made use of a methodology by applying several methods of collecting data from primary and secondary sources through a qualitative approach. This chapter discusses the various methods applied in this study. It describes the choice of a qualitative approach, the interpretive paradigm through the phenomenological research design applied in this study. The chapter further describes the methods of data collection, piloting and the use of secondary data. It further justifies the methods of data analysis applied, the issues of sampling, and concludes by discussing the ethical considerations applied in the study.

The chapter justifies and motivates the choice of each method. This is an important step in any research because it shows that the nature of the study and the data required determined the research methods used.

4.1. A QUALITATIVE RESEARCH APPROACH AS SUITABLE METHODOLOGY TO STUDY COMMUNITY RESPONSE TO *EFUNDJA* IN NORTHERN NAMIBIA

Methodology is defined to be the "theoretical, political and philosophical backgrounds to social research and their implications for research practice and for the use of particular research methods" (Creswell, 2009:45; Petty *et al.*, 2012:378). Researchers study diverse and complex phenomena and in order to describe, explore and understand their specific phenomenon of interest, they use different research methodologies and apply different research designs.

Methodologies are broadly subdivided into quantitative and qualitative research methodologies. Quantitative research methodologies are statistical methods of inquiry that are concerned about discovering facts about a phenomenon and collecting numerical data in order to be able to make numerical comparisons and statistical inferences. Quantitative research methodologies are particularly strong in studying large groups of people and making generalisation from the sample (Padgett, 2008). The quantitative research approaches are mostly used to examine relationships between variables, such as the dependent and independent variables, and where they use numbers to describe concepts (Creswell, 2009: Babbie, 2020). Quantitative research approaches possess disadvantages in studying social research problems because data is controlled and measured (Babbie, 2020). Consequently, the results of quantitative research can be statistically significant but often have limited contextual detail. However, contextual detail is what social researchers need and hence their

preference for qualitative research approaches. The quantitative methodologies articulate assumptions that are consistent with what is known as the positivist paradigm (Mouton *et al.*, 2006). The positivist paradigm is known for confirming theories and searching for generalised patterns based on an objective view of reality, while interpretive designs are subjective interpretations of social phenomena from the perspectives of the study participants involved (Bhattacherjee, 2012).

Qualitative research approaches, on the other hand, are more concerned with non-statistical methods of inquiry and deal more with analysing the social phenomenon under investigation (Babbie, 2016). Qualitative procedures draw on inductive reasoning in which themes and categories emerge through data analysis (Padgett, 2008). They are considered as more flexible since their methods can be adjusted accordingly throughout the research process and participants have wider parameters in which they can answer the questions (Babbie, 2016). A qualitative research approach gives opportunity for a detailed description from the participants' point of view when examining a specific situation (Maxfield & Babbie, 2001). Qualitative research procedures also have the advantage of comprehensive analysis and the ability to observe diverse aspects of a particular social scenario (Babbie, 2016). Qualitative methods are usually preferred by social scientists as they allow participants to have an open-ended recording of their views and demonstrating their actions (Henning *et al.*, 2004). Lastly, qualitative research methodologies have proven successful in studies investigating rural problems, making it a best fit method for this study (Mercer et al., 2008).

The nature of the present study involved the need to understand a vulnerable community's experiences of *Efundja* which is what motivated the use of a qualitative methodology over the quantitative methodology. Qualitative methodologies are known to be subjective, exploratory and focus on inductive reasoning which made this methodology suitable for the present study (Fink, 2000). Qualitative methodologies permit direct contact with participants whereby researchers can observe their behaviours in their natural settings. This grants an opportunity to researchers to gain in-depth explanations from participants while at the same time permitting the researcher's personal experience and insights to be an important part of the inquiry. This is critical to the understanding of the phenomenon (Fink, 2000; Creswell, 2008; Bernard & Ryan, 2010; Marshall & Rossman, 2014). The characteristics of qualitative methodology proved the most suitable for the case of the communities in northern Namibia where it was necessary for the researcher to engage with community members and put forward a diversity of questions on how they live with the *Efundja*, how they respond and how they believe the risk of *Efundja* can be reduced.

Furthermore, a qualitative research methodology was selected since it allows the use of open-ended questions and focus group discussions as a method of data collection. These methods yield

detailed descriptions and capture verbatim responses about people's personal perspectives and experiences (Patton, 2015). Open-ended questions and focus group discussions were found to be useful in the nature of this study and permitted the researcher to gain more in-depth understanding of the participants' situation (Padgett, 2008). Moreover, a qualitative research design through face-to-face interviews or discussions gives the researcher the opportunity to change the interview plan whenever the interviewees' responses suggest the need for extra probing (Maxfield & Babbie, 2001: Bradley *et al*., 2007; Patton, 2015).

Besides the characteristics of the methodology, the procedure has been applied by many researchers worldwide for studies on disaster-related problems. The methodology has been widely used in disaster-related investigations such as the impacts of hurricane Katrina in New Orleans in 2005, analysing the coping strategies among Mexican disaster survivors as well as preparedness of Malaysian communities for tsunamis in 2004 (Ibanez *et al.*, 2004; Said, Mahmud & Abas, 2011; Rohland, 2018). A particular example is the study which investigated the assessments of vulnerability and adaptation in a flood prone riverine area in Bangladesh (Younus, 2014). Another study in Uganda, which investigated the communities' coping strategies and the underlying causes of vulnerability to landslides and floods in the Mt. Elgon region, applied a qualitative methodology to reach its objectives (Osuret *et al.*, 2016). The study in Uganda relates well to the present study's objectives and therefore it made sense for the present study to apply a qualitative technique. This proves that qualitative methodologies are appropriate and well suited for understanding a disaster-related phenomenon in their own contexts, discovering links and enabling one to understand participant perspectives. Therefore, based on the typical characteristics of the two methodological approaches, it is apparent that a qualitative approach was the most suitable methodology for the study of the *Efundja*, as opposed to a quantitative methodology.

4.1.1. The choice of interpretive paradigm through a phenomenology research design

A research design comprises details of how the researcher has conducted the study by describing each research step accordingly (Sarantakos, 2013). The qualitative methodologies of research make use of various research designs. Through what is known as interpretive research paradigms, they start with data and apply inductive approaches of analysis in order to derive theories or understand the lived experience of participants (Onwuegbuzie & Leech, 2005). Interpretive methods are known for helping researchers to fill gaps in areas of interest (Bhattacherjee, 2012). Interpretive paradigms are exploratory in nature and employ various research designs. Among the qualitative research methodologies, Elkatawneh (2016) differentiated between five research designs

that explore research ideas, namely biography or narrative, ethnography, grounded theory, case study, and the phenomenology research design.

The biography research design takes written or spoken words of some individuals' personal stories as data for the investigation (Breuer, 2000; Elkatawneh, 2016). The research design makes use of collecting stories of life events of people and scientifically analysing them (Bretschneider, 2014). Its strength is that it is useful for investigating real life problems and that it gives access to in-depth, thick description of the event or story (Riemann, 2006). The disadvantage is that the design relies on narrated events where participants may fake the data or relate 'horrific' experiences which can negatively affect the study's outcomes (Elkatawneh, 2016).

Ethnography studies are inspired by anthropology where researchers study the phenomenon by deeply immersing themselves within the context of the phenomenon over a long period of time. The lengthy process of observation and interaction allows researchers to fully narrate the experience in detail (Bhattacherjee, 2012). Ethnographic studies pose the advantages of sensitiveness to the context, generation of rich understanding and minimal respondent bias (Onwuegbuzie & Leech, 2005). However, the research design can be time and resource consuming and its findings are usually specific to a given culture and can sometimes not be generalised to other cultures (Onwuegbuzie & Leech, 2005).

Grounded theory on the other hand investigates the experience of people and their responses and reactions to develop a theory. The research design is commonly used, especially when researchers desire to illustrate a process or how a particular system works (Elkatawneh, 2016). Grounded theory research designs are only suitable when there are no existing theories regarding the subject of interest or whenever there is a need to create one for a certain group of people (Urquhart, 2012).

Case studies usually investigate an event, a single person, problem, or process (Tetnowski, 2015). These are studies mostly done using a bounded system, where the boundaries of the case are usually defined in terms of time or space (Hancock & Algozzine, 2017). The common limitation of these types of studies is mainly in defining the boundaries of the case.

Lastly, phenomenology research designs study human experience from the perspective of the individuals of interest in the study (Lester, 1999). This type of research design explores how groups of people experience a particular situation and tries to narrate their experience (Lester, 1999). For this study, a phenomenology approach was deemed most appropriate. Justification for the use of the phenomenology approach is discussed in the following section.

4.1.2. Rationale for using a phenomenological research design

With its roots in psychology and philosophical studies, the phenomenology research design explores unique lived experiences of groups of people by exploring the meanings of a phenomenon to them (Petty *et al.*, 2012). The design is descriptive in nature and further analyses and interprets data to uncover the essence of the investigated phenomenon. The method is concerned with the systematic reflection and analysis of phenomena associated with conscious experiences (Pollio *et al.*, 1997).

There are two varieties within the phenomenology research design: the hermeneutical which assumes that research findings are mere meanings and views of the researcher rather than pure results of the study, and the transcendental type which requires researchers to exclude their views during interpretations to gain deeper understanding of a concept. This is also known as 'bracketing' (Petty *et al*., 2012:379; Eddles-Hirsch, 2015:253; Elkatawneh, 2016:4). Here, it is required that researchers eliminate any prior assumptions and personal biases, empathise the participant's situation, and tune into existential dimensions of that situation, so that they can fully understand the deep structures that drive the conscious thinking, feeling, and behaviour of the studied participants (Pollio *et al.*, 1997). This type of separation is believed to strengthen the objectivity of the interpretation though it was criticised as being humanly impossible.

Since the overall phenomenology type of research design is associated with interpretation and explanations of individual experiences, the nature of the present study did fit very well with the phenomenology design through the hermeneutical approach because it allowed the researcher to understand people's experience of *Efundja* over the past years. However, the researcher believes it is humanly impossible to set aside one's own presuppositions and beliefs about a subject matter but rather such beliefs are crucial and fundamental to the analysis of data. This is because it is the researcher's subjective skills and past experiences that guide their inquiries. Researchers such as Neubauer *et al*. (2019) agreed with this stance. It is researcher's knowledge and education base that allows them to choose a phenomenon or experience worthy of investigation in the first place. The present study opted for hermeneutics which follows an interpretive approach. This was an appropriate method for conducting the study since the research was concerned with the participants' descriptions of the *Efundja* as well as their interpretations and the meaning they attach to the experience. Using a transcendental type of phenomenology would not render the same deep understanding of the *Efundja* as is possible when using the hermeneutical approach.

The interpretive phenomenology seeks to understand the deeper layers of human experiences that are sometimes hidden behind surface awareness (Neubauer *et al*., 2019). It is rooted in the

interpretations of the experiences of individuals' consciousness. The approach seeks deeper meanings of individuals' experiences since it's believed that these interpretations shape the choices they make (Tuohy *et al.*, 2013). Phenomenological studies are approaches to research that seeks to discover the essence of a phenomenon by exploring it from the perspective of those who have experienced it. By using this method, rich and accurate data are generated (Miner-Romanoff, 2012; Matua & Van Der Wal, 2015). By studying these, new meanings and perspectives are developed which may reshape how a phenomenon is understood (Tuohy *et al*., 2013; Neubauer *et al*., 2019).

The research design has been used in various fields such as health, human sciences, psychology, sociology as well as by disaster researchers to investigate participants' experiences of disasters such as hurricane Katrina, earthquakes, volcanoes and tornadoes. An example of the use of hermeneutics research design is the study that explored community perception of community preparedness in facing floods in Mojoagung and Jombang of Indonesia, two areas affected by floods every rainy season (Priyanti *et al.*, 2019). The research design was applied in the study and identified that past experience, early warning systems, housing conditions, shelter, and resource availability greatly influenced the decision-making and disaster preparedness (Priyanti *et al*., 2019). Another example of the use of the hermeneutic design through an interpretive approach is a study that investigated the floods of Grand Forks in North Dakota in April 1997 which influenced 50, 000 people (Keene, 1998). In this case, the interpretive phenomenology research design was used to gain deeper understanding of the meaning of traumatic flood experience and its influence on the health of the residents of Grand Forks (Keene, 1998). In applying the methodology, the researchers were able to dissect and interpret the opinions of public participants, survivors of posttraumatic stress disorders as well as health workers, and to reveal that they both explained emotional exhaustion in a similar way.

This brief discussion indicates how the research design is useful in unveiling deeper meanings of events and the experiences of individuals. Participants describe such events from their perspective and the methodology allows such a phenomenon to be interpreted and reconstructed in ways that can give better understanding. The method allows researchers to understand the participants' experiences and use their experiences to interpret and reveal new meanings. The advantages of the method clearly made it suitable and appropriate to the present study, hence the selection of this method to study the *Efundja.*

4.2. METHODS

Petty *et al*. (2012) defined research methods as techniques used to acquire and analyse data to gain understanding of a research phenomenon. In quantitative research designs, methods of data collection characteristically refer to standardised questionnaires that are administered to individuals

or households, which are identified through various forms of sampling methods (Choy, 2014). Quantitative research methods use data gathering tools such as questionnaires and surveys because of advantages such as being able to be completed in a relatively short period of time or being able to cover large samples (Laxton, 2004). This is not always the case with qualitative data-gathering tools such as interviews, case studies and focus group discussions that are more time consuming and can only cover smaller samples (Laxton, 2004). A larger sample increases the representability of the sample and thus potentially increasing the accuracy and credibility of research findings (Laxton, 2004). However, the methods of data capturing used in quantitative research pose a disadvantage in the sense that they do not necessarily provide insight into subject matter but rather focus more on controlling the variables that are investigated (Choy, 2014). This motivated the decision for the present study to make use of qualitative research methods by conducting semi-structured interviews and focus groups to gain an in-depth understanding of the community members' experience of *Efundja*. This permitted the fulfilment of all study research objectives as stipulated in Section 1.3.2.

The selected qualitative research methods used for this study were combined to collect rich data. The combination of methods permitted data triangulation and allowed gathering of information from participants in a flexible manner. The study combined the use of individual interviews known as key informant interviews (KIIs) and group discussions commonly known as focus group discussions (FGDs). This next sub-sections discuss these methods, their design and structuring. They further explain the different stages through which the instruments were improved by applying the input from a panel of experts and the process of pilot testing. Further, the use of secondary data sources to supplement the primary data, the procedure used for data collection as well as how data was analysed are described. This is followed by examining the process of sampling as well as the issue of ethical considerations.

4.2.1. Interviews (key informant interviews (KII's))

According to Punch (2005), interviews are appropriate to investigate people's perceptions, meanings, and definitions of situations and construction of reality. Interviews are known to allow considerable flexibility and are believed to be a good way of sourcing large amounts of data quickly as well as being an effective way of obtaining depth in data (De Vos *et al.*, 2011). Welman *et al.* (2012) argued that if one would like to find out more about an individual's life, there is no other better way than to ask that individuals themself. It is for this reason that the present study made use of interviews as a data gathering tool.

The application of key informant interviews followed a semi-structured interview approach. While unstructured interviews commence with only a topic and develop as the interview progresses,

structured interviews limit the information strictly to what is stated in the question outline (Punch, 2005). Located between these two extremes, semi-structured interviews are more systematic and more pre-planned than unstructured interviews, but lack the rigidity of structured interviews (Olse, 2012). Because semi-structured interviews combine the best elements of unstructured and structured interviews, this was the preferred method of choice for the present study.

Semi-structured interviews consist of themes and questions to be analysed during the interviews. With predetermined questions on an interview schedule, the discussion is then guided but not dictated by that interview schedule (De Vos *et al.*, 2011). The study preferred the use of semi-structured interviews based on the advantage that they allow the researcher to gain a detailed depiction of a participant's beliefs and perceptions of predetermined aspects of interest (Carter & Henderson, 2005). Another advantage of semi-structured interviews is that they allow flexibility for both the researcher and the participant in such a way that the interview may introduce issues the researcher had not thought of (Welman *et al.*, 2012). This is because the researcher can follow up on particular interesting aspects that may emerge in the interview, and the participant is able to give more details as requested. Through semi-structured interviews, participants are perceived as experts on the subject and are allowed maximum opportunity to tell their full stories (Fylan, 2005). Another advantage of using semi-structured interviews is that they allow the researcher to probe more with a view of clearing up vague responses as well as asking for further elaborations (Carter & Henderson, 2005).

For this study, a total of 28 key informant interviews were conducted. Of these, 16 were interviews with headmen, six with local-level disaster risk management officials and six with national-level disaster risk management officials. Out of 16 headmen interviews, two were female (headwomen) because they have inherited the headship roles from their late partners. The village headship is mainly a male-dominated position in northern Namibia, but exceptions do occur. Reasons for this remain unknown though the assumption is that it is regarded as a strenuous job and that women may not necessarily fit the role. In the same manner, all six interviews with local-level disaster risk management officials had only male participants. However, interviews with national-level disaster risk management officials revealed a balanced gender distribution.

All these interviews were conducted with headmen and participants from the local-level disaster risk management officials who met the criteria of having been in their positions and experienced the *Efundja* for a minimum of three years. These criteria were to ensure that all participants were knowledgeable in the subject matter and were in a position to answer the questions in the interview schedules.

4.2.2. Focus group discussions (FDGs)

According to King *et al*. (2018), focus group discussions are group interviews which are an appropriate way of researching how people cope, feel or think about a certain issue. De Vos *et al.* (2011) defined focus groups as carefully planned discussions designed to obtain perceptions on specified areas of interest in a tolerant, non-threatening environment. Welman *et al.* (2012) defined focus groups discussions to be group in-depth interviews that consist of several individuals that are drawn together for the purpose of expressing their opinions on a specific set of open questions.

Despite different definitions, the main purpose of focus groups is to promote self-disclosure among participants by getting to know what people perceive about a particular issue (Hancock *et al.*, 2001). They further stated that focus groups are useful when multiple viewpoints or responses are needed on a specific topic which made the instrument appropriate to the present study. Since the target group for this study was communities and conducting individual interviews for entire communities would be time consuming, it was only natural to use focus group discussions for community members and conduct individual key informant interviews with headmen and officials at the local and national disaster risk management offices.

Group discussions can generate complex information at a low cost in a minimum amount of time. In a focus group, participants were selected because they have certain characteristics in common that relate to the topic of interest. The responses of the participants in the group during the discussions establish the essential data of the research study (Hancock *et al.*, 2001; Welman *et al.*, 2012). In addition to the reasons stated above, focus group discussions were used for this study because they allowed the researcher to gather information that could not be collected easily through other methods (Welman *et al.*, 2012). The researcher is aware of the disadvantages of using FGDs such as that some participants may find the focus group situation intimidating or that participants feel pressurised to agree with the dominant view (Acocella, 2012). These possible inhibiting factors were mitigated by emphasising – prior to the discussions taking place – that participants should not feel threatened by the views of others and that they should express themselves freely.

In this present study, 22 group interviews with a range of six-12 participants per group interview were conducted. The group discussions were dominated by female participants particularly because men go out for work either locally or to other towns and also due to the fact that many households are female headed. The female domination in focus groups can be seen in the Figure 4.1.

Figure 4.1: Focus groups dominated by female participants

However, the gender imbalance did not affect the interviews in any way, and all participants participated equally in the discussions. A total number of 225 participants participated in the study inclusive of all focus groups and all individual interviews with headmen and the officials of local and national disaster risk management units.

The present study affirmed the advantage of combining individual interviews with focus group discussions, when triangulating the data obtained from each set of data collection methods. In this way, discrepancies in the data between community members and the headmen and from officials of local and national disaster risk management units could be identified. As a general observation was that it was possible to ascertain that community members felt relatively hopeless and had negative perceptions regarding their abilities to face *Efundja*. They emphasised that they were not able to mitigate the impacts in any way and were unaware that the *Efundja* risk could be proactively reduced. Interestingly, community members seem cognisant of ill spatial planning of roads and infrastructure that is known to be worsening the effects of *Efundja*. Contrary to this, leaders from local disaster risk management offices and higher authorities at government level deny the existence of poor planning

and claim that all infrastructure is surveyed and planned taking the topography into consideration and that there was no way it can enhance *Efundja*. A detailed discussion of this issue is given in Chapter 5.

4.2.2.1. Further advantages of using focus group discussions

Further advantages of using focus group discussions is the ability to allow participants to agree or disagree with each other so that insight is gained into how a group thinks about the issue of interest. Group discussions also highlight the inconsistencies and variation that exist in communities regarding their experiences and practices around the subject investigated (Redmond & Curtis, 2009). Focus group discussions as data collection methods are believed to strengthen the data quality and produce concentrated amounts of data on precisely the topic of interest (Olsen, 2012). They allow the researcher to investigate a multitude of perceptions in a defined area of interest (De Vos *et al*., 2011). Focus groups are especially useful in attempting to understand diversity, since they can help one understand the variety of other experiences. Lastly, people feel relatively empowered and supported in a group situation where they are surrounded by others and they are more likely to share their experiences and their feelings in the presence of people whom they perceive to be like themselves in some way (De Vos *et al.*, 2011). All of this strengthened the motivation to use both focus group discussions and key informant interviews to ensure a comprehensive understanding of the *Efundja.*

4.2.3. The design and structuring of the key informant interviews and focus group discussion schedules

The questions of the key informants' interviews and the group interview schedules were designed based on the research questions, the aim of the study, and the research objectives. As a first step, the available literature was analysed to generate questions. These questions were then combined with possible questions sourced from the national Disaster Risk Management Act, Act number 10 of 2012 (Namibia, 2012). Open-ended, semi-structured questions were preferred in order to allow participants to express themselves freely. The questions were also designed to follow a similar structure that ensured that similar information was obtained from the four different sets of informants. Using a similar structure in instruments is known to enhance consistency and standardisation between interviews. The use of similar structures as well as the use of open-ended semi-structured questions allowed the flexibility in probing participants' responses further and permitted the interviewer to explain particular questions to interviewees. The advantage of standardising questions also promotes easier comparison between responses obtained from different interviews (Laxton, 2004). Comparing responses across informants enabled an in-depth understanding of the *Efundja* experiences of the rural community members and allowed triangulation and the construction of new meanings from the data.

Because of the advantages of a similar structure and content for the different interview schedules and focus group discussion schedules all three sets of interview schedules were constructed in a similar pattern to ensure standardisation, consistency and coherence. The questions were phrased to source information from the four groups of informants while keeping the aim of the study in mind. Although this was a difficult task to accomplish since these are four different sets of key informants, the structure was designed so as to inquire similar information from them based on the respective roles they play with regards to *Efundja* in the Cuvelai-Etosha basin.

As a basic structure, the following five sub-sections were included: demographic information (age and gender), overview of the *Efundja*-events, preparatory activities, *Efundja* management and proactive approaches. For the headmen individual interviews, it was similarly structured into five components, namely: demographic information (age and gender), headmen involvement in *Efundja*-events, headmen preparatory activities, *Efundja* risk management and proactive risk reduction. The structure of interview schedules for the local and national-level disaster risk management officials equally consisted of five sub-sections, namely demographic information (age and gender), overview of the *Efundja*-events, local and national management preparatory activities, *Efundja* risk management and proactive risk reduction.

The interviews and focus group discussion schedules were structured and sequenced in a particular order to enable a smooth flow of answers from the participants. The interview questions were arranged to start with demographic information before asking questions that required deep thinking. This was done in such a way that participants could feel more at ease and relaxed at the beginning of the interviews by asking the most obvious questions of demographic information. The demographic information questions were then followed by fact-based questions which required reflection and mere remembering of what has taken place. Questions that required deep thinking such as how the risk of *Efundja* can be reduced were placed in the last sections of the interview and focus group discussion schedules. The interviews were concluded by asking whether the interviewees wished to mention any additional information or questions which had not been discussed. This was done so that the researcher could open the floor to other issues that may be relevant to the study but had not been discussed in the interviews.

Lastly, since it was anticipated that the data collection would take place during the busy time of threshing season, the time available for residents to attend interviews and focus group discussions may have been limited. Hence the questions were designed to be straight to the point, easy and quick to answer to ensure interviewees were not kept away from work for too long. The researcher was cautious to keep the interview duration ranging between one and half hours and not more than two

hours. It was only a few cases that went beyond two hours. Interviewees were informed of the probable duration of interviews before the interviews or group discussions began. The average duration of one and half hours aligns with Krueger and Casey's (2002) recommendation of interviews not exceeding two hours.

4.2.4. Departmental workshop

After the designing and structuring of interview and group discussion schedules, the researcher, in consultation with the study supervisors, organised a departmental workshop. The workshop was a platform of gaining insight from experts in the field. The workshop invited researchers, geographers and lecturers across all fields of study to critique the interview and group discussion schedules. The instruments were presented and comments and critique were invited. The suggestions and recommendations of the panel were incorporated in a new version of the schedules to strengthen the instruments' content, length, structure, as well as the way the questions were phrased. The attendance register for the workshop is reflected in Appendix A. The workshop resulted in several changes and adjustments to the instruments. These changes are outlined in Section 4.2.5 and were incorporated before the process of pilot testing.

4.2.5. Revised interview schedules after inputs from the Departmental workshop

The first draft of the instruments (see Appendix B) was designed based on the aim, objectives and research questions as discussed in Section 4.2.3. This version of the instruments was presented to the panel of experts at the Departmental workshop as discussed in Section 4.2.4. The comments, suggestions and recommendations of the workshop resulted in the following changes:

4.2.5.1. Changes to the focus group discussion (FGD) schedule

- Question 1.1 was restructured to remove the tick boxes. This is because the question was originally structured in three tick boxes for community members to state how long they have been living in the community, with the researcher ticking the appropriate box. The question was changed and moved to Section A in the Introduction Section. This was done because in the introduction, community members introduced themselves by stating how long they have been in the village. It would be a repetition to have another question asking them how long they have been in the village in Section A when it had already been covered in the Introduction.
- Questions 1.2 and 1.4. were combined because of repetition.
- Question 1.5 was rephrased because it was deemed vague by the panel.
- Question 1.6 was rephrased and shortened, as it was too long.

- Questions 1.7 and 1.8 were combined and rephrased to become one question. This was done to eliminate repetition.
- Question 1.9 was rephrased to ensure clarity of meaning.
- Question 2.1 was rephrased to ensure that the participants could understand that they were now asked about preparatory activities.
- Question 2.8 and Question 2.9 were added in order to gain more insight into participant behavior and what influences their decisions, especially soon after the Efundja.
- Question 3.5 was rephrased to improve clarity.

4.2.5.2. Changes to key informant interview (KII) schedule – Headmen (traditional authorities)

- Question 1.1 was rephrased to improve clarity.
- Question 1.2 was rephrased to remove 'stages' in the question.
- Question 1.3 was rephrased to improve clarity.
- Question 1.4 was moved earlier to become the first question because it is more appropriate to ask a person their position in the communities at the beginning of the interview.
- Question 1.5 was added to understand how leaders prepare themselves for the upcoming Efundja.
- Questions 8 and 9 were switched. Question 7 asks about main key role players in risk reduction. It makes sense to probe any other role players immediately after this question. Hence, Question 9 was introduced immediately after Question 7.
- Questions 10 and Question 11 were added to gain more insight.

4.2.5.3. Changes to key informant interview schedules – Local and national-level disaster risk management officials

- Question 1.4 was moved to become the first question. The reason for change was that the introductory question asked the position of the participant, so it follows logically that the next question should ask about their duration or tenure.
- Question 2 was rephrased to improve clarity.
- Question 3 was added to understand how the local and national-level disaster risk management officials prepare themselves for the Efundja.
- Question 4 was rephrased to improve clarity.

- Questions 8 and 9 were interchanged. Reason: Question 7 asks about main key role players in risk reduction. It makes sense to probe any other role players immediately after this question. Hence Question 9 was introduced immediately after Question 7.
- The numbering of the entire interview schedule was changed to align the sections in the schedule.

The effect of these changes was that the interview and focus group schedules were much shorter, clearer, and more to the point. The changes resulted in the second draft of the interview and focus group schedules as illustrated in Appendix C. This version was used to pilot test the instruments.

4.3. PILOT TESTING THE INTERVIEW SCHEDULES

Pilot testing is an important step for any research, whether in social science research, nursing, pharmaceuticals or medicine. Pilot testing is regarded a crucial element of a good study design as it tests the feasibility of the study and provides valuable insights to the researcher (Teijlingen & Hundley, 2001). It is an essential way of testing whether the participants understand the instruments in the manner intended. Piloting tests the phrasing of questions, ensures validity and reliability, assesses the efficacy and the time needed to complete the interviews (Sampson, 2004). Teijlingen and Hundley (2001) concurred and stated that piloting gives advance warning about where the instruments could fail or may not be followed, or whether the instruments are simply inappropriate or too complicated. Piloting is useful in detecting problems and issues that could contribute to participants misunderstanding the questions in the instruments. Moreover, it also prepares the researcher and acts ahead of time for the challenges that are likely to arise in the substantive study (Malmqvist *et al.*, 2019). The authors further stated that a proper analysis of the procedures and results from pilot testing facilitates the identification of weaknesses that need to be addressed in the research study. This explains why a carefully organised and managed pilot study has the potential to increase the quality of the research as results from pilot testing can inform subsequent parts of the research process (Sampson, 2004). Connelly (2008) added that the testing also helps with the assessment of resources, time and costs, for the main study. Lastly, the motives of pilot testing should be focused on identifying the necessity to adjust questions or other procedures that do not elicit appropriate responses or enable the researchers to obtain rich data (Dikko, 2016).

For these reasons, the present study piloted the study instruments as a way of testing whether the instruments were indeed able to elicit the desired information from the study participants. The process was useful in correcting errors and ambiguities in questions which could have influenced the quality of data gathered. The pilot study was conducted prior to the main data collection. The instruments were piloted in the randomly selected constituency of *Etayi,* one of the identified *Efundja*

affected constituencies. The pilot study was done soon after the panel of experts' workshop critiqued the interview and focus group schedules as discussed in Section 4.2.4. Three focus group discussions and one individual interview with a headman, local disaster risk management official and a national-level disaster risk management official respectively, formed the pilot study. The results of the pilot study were analysed and used to improve the interview and focus group schedules as illustrated in Section 4.3.3.

4.3.1. Choice of location for the pilot study

The pilot study was conducted in Etayi constituency in Omusati region in the heart of the Cuvelai-Etosha basin. The constituency and village selection were a recommendation by the chief regional officer of the region who stated that the constituency was one of the worst affected constituencies in the region. This made the area eminently suited to yield rich data from knowledgeable participants for the pilot study. It was important since such information would be needed to effectively test the schedules. Individual participants were selected using the criteria discussed in Section 4.5.2. The piloting of the instruments permitted changes and adjustments to the instruments, ensuring their suitability to be used in the main data collection phase. The changes and adjustments done to the instruments are described in Section 4.3.3.

4.3.2. Procedure for piloting

The procedure for piloting of interviews took place as follows: the researcher welcomed and thanked the interviewees for agreeing to be interviewed, briefly explained the purpose of the study and dealt with all issues of informed consent. The interviewees were informed that their responses would remain confidential and anonymous, that their participation is voluntary and that the study was conducted as per Stellenbosch's policy on Research Ethics which could be made available upon request. Interviewees were asked if they needed any further clarity or had questions before the interview or group discussion could start.

The interviewees who remained for the interviews and focus group discussions then signed the consent form (see Appendix I) after the researcher had explained the content of the consent form. The focus group discussion commenced and lasted for as long as the interviewees were engaged in the conversation. The interviewees were asked to comment on the appropriateness and clarity of the questions and to suggest questions that should be included or removed from the schedule.

Most interviewees indicated that the questions were appropriate and suitable to gather the required information. They also stated that the questions were easy and simple to answer and only recommended a few changes. These suggested changes are discussed in Section 4.3.3. However, a

few respondents indicated that although the questions were easy and simple, the study may struggle to obtain suitable answers as many communities may honestly not have concrete and substantial answers about the information the study sought to gather. Upon reflecting on this, the researcher concluded that such comments reflect the ability of community members to articulate their experiences, rather than the integrity of the instruments. However, the researcher still used this as an opportunity to simplify the questions and improve their clarity.

After conclusion of the pilot study and the analysis of the results and recommendations, the changes discussed in the following sections were incorporated into the instruments.

4.3.3. Changes to the interview schedules after pilot testing

The process of pilot testing was used to improve the interview and focus group schedules. After scrutinising the responses from participants, their recommendations and queries, the interview schedules were improved in the following manner:

4.3.3.1. Changes to the focus group discussion (FGD) schedule

- Section A was removed from the section with demographic information to now constitute the first section of the focus group schedule.
- Question 1.1, which asked participants on how long they have resided in their villages, was moved to become part of the introductory question. This was done to save time and remove duplication.
- Questions 1.3 and 1.4 were switched to allow a better flow of responses.
- Question 1.4 was rephrased to improve clarity.
- The first section on Question 1.5 was removed to omit repetition.
- Question 1.6 was removed to omit repetition.
- Question 1.7 was partitioned into two separate questions to improve clarity.
- Question 1.8 and 1.9 were rephrased and formed part of Question 1.7.
- Section B was changed to start with Question 1.10. Questions were renumbered to start with Question 2.1.
- Question 1.11 become Question 2.2.
- New questions 2.3, 2.4 and 2.6 were added to ask for more clarity on how communities prepare for *Efundja*.
- The section on *Efundja* management was shifted to the start of Section C to ensure a better flow of questions.

- Under new Section C, questions 3.2 and 3.3 were added to gain more insight on how *Efundja* management function within communities.
- A new Section D was added with new questions of 4.2 and 4.5 added to understand further disaster risk management measures applied in communities.

4.3.3.2. Changes made to key informant interview (KII) schedule – Headmen

- The numbering was changed to decimal points to be consistent.
- Question 1 was rephrased to improve clarity.
- Question 3 was rephrased to improve clarity.
- Question 4 was moved to become part of the introductory question.
- Questions 8 and 9 were interchanged to ensure a better flow of information.
- A new question was introduced, to bring consistency about information obtained from both focus group and interview schedules.
- Similar to changes made to the focus group schedule, Section C with its associated questions was moved to ensure consistency.

4.3.3.3. Changes made to key informant interview (KII) schedule – Local and national-level disaster risk management officials.

- Question 1.1 was rephrased to improve clarity.
- Question 1.2 was rephrased to improve clarity.
- Question 1.3 and 1.4 were interchanged.
- Question 1.6 was added to understand roles of disaster officals.
- A new Section C on Efundja Management was added with similar questions, the same as for the focus group schedule and for the headmen.
- Just like in the focus group schedule, Section C was moved to ensure consistency.
- Under Section D, Question 3.7 was partitioned to become two questions. This improved clarity.
- A new question was introduced to ensure consistency about information obtained from both focus group and interview schedules in order to understand further risk reduction measures.

After incorporating the recommendations and suggestions from the pilot study, the instruments were finalised as the third and final version. This is the version which was used to collect data during the main survey, and is presented in Appendix D and depicted in simplified form in Table 4.1. The table shows the simplified structure of the focus group discussions and the key informants used to collect data for this study.

Table 4.1. Simplified structure and content of the focus group discussions and the key informant interviews

STRUCTURAL ELEMENT	CONTENT
Demographic information	Exploratory questions sourcing participants' personal information such as age, gender and length of stay in their respective villages.
Efundja overview items	Six items capturing the overview of the occurrences of *Efundja*.
Preparatory activities items	Eight items capturing how participants prepare for *Efundja*.
Efundja management items	Three items capturing how *Efundja* is managed and dealt with.
Proactive approaches	Eight items capturing risk reduction measures

The first section which is the demographic section consists of questions that collected participants' personal information relating to their age, gender, how long they have been in the villages and how long they have been in their leadership position in the case of the interviews. The six questions in the *Efundja* overview called for answers about how *Efundja* has taken place and how it impacted the participants throughout history. Participants were probed for detailed explanations to ensure detailed data was gathered on how the hazard has taken place throughout history. The section that followed was calling for answers on participants' preparatory measures. The section had eight questions that probed for various ways of participants preparing their possession, house content and livestock for upcoming *Efundja* events. In the case of key informant interviews, the section called for answers pertaining to how headmen, local-level and national-level disaster risk management officials prepare for the upcoming *Efundja* events. There were three questions calling for answers on how *Efundja* was managed or dealt with. The section on proactive approaches was the last section and had eight questions calling for answers on any practised or suggested proactive measures.

4.4. THE USE OF SECONDARY DATA

In addition to the use of primary data that was obtained through individual interviews and focus group discussions as discussed above, the study also made use of secondary data such as newspaper articles and national documentation on *Efundja*. The newspaper coverage was obtained from two local and two international newspapers. The local papers were *New Era* and *The Namibian,* while the international newspapers consulted were *AllAfrica.com* and *Africa.com.* Information was retrieved and traced for the period 2007 to 2020. The reason for the specified time period was to allow the researcher to access full coverage of *Efundja* related news throughout the study period.

The researcher retrieved documents from the National Archives that had any information relating to the *Efundja* in Namibia for the specified time period between 2007 and 2020. These documents ranged from national policies, national legal documents such as acts, white papers and all other national documents that reported any decisions or activities relating to the *Efundja* in Namibia.

4.5. PROCEDURES FOR DATA COLLECTION

The procedure that was followed to collect the data for this study is discussed in this section. This includes the consultations with the regional councillors, the daily organisation and the actual conducting of group discussions as well as the individual interviews.

4.5.1. Consultations with the regional councillors

The first step in the survey process was to write letters to the offices of the chief regional officers of the four regions that are usually affected by the *Efundja*. This process commenced in October 2018. The regional councils are the national electoral and administrative sections or centres that deal with all the administrative issues of a region. Under the regional council, there are constituencies which are headed by constituency councillors followed by villages that are headed by headmen. Therefore, the researcher wrote letters to all four regions (Oshana, Ohangwena, Omusati and Oshikoto) explaining the purpose of the study, its importance, and the potential benefits to the local rural communities of those regions. The letters requested the identification of severely *Efundja* affected constituencies to be the focus of the study. The letters further stated the data collection process of pilot testing the instruments and then the main data collection. All four chief regional officers gave permission for the study to proceed. Three regions, Oshana, Ohangwena and Oshikoto, gave telephonic permission, while Omusati region replied with a letter permitting the research activities to proceed as planned. The permission letter from the Omusati regional office is attached as Appendix E.

Prior to the commencement of the field work, the researcher travelled to the study area and consulted with the chief regional officers who presented the researcher with a permission letter (see Appendix F). The permission letter contained assurance that the researcher was permitted to do research work in the area. This letter was copied to all the identified constituencies' councillors, informing them about the research and the permission obtained. Traditionally, community members would reject all research activities from outsiders unless there were specific instructions from the councillor's office. This was a result of several fraudulent activities that had taken place in the past and were linked to research activities. Hence it has become a requirement to obtain permission from regional council and the local councillors before proceeding with any research in the communities.

Since the researcher had an identification letter, it was easy to approach the local councillors as well as the villagers.

In the same way, at the constituency level, the researcher approached the constituency offices with the permission letters from the regional councillors' offices. The researcher then indicated the purpose of the study and specified the need to conduct individual interviews with the councillors who are the local-level disaster risk management officials as well as with the headmen of the identified villages. It was further stated that focus group discussions with heads of households would form part of the study. Community members who had been living in the constituency for at least five years and had experienced the *Efundja* at least three times, were eligible for participation. Six to 12 people could be accommodated per group. Some of the local constituency councillors indicated permission to proceed with the study and furnished response letters as attached in Appendices G and H. Some of the councillors did not write letters but chose to inform the participants through the community radio about the research work taking place in the community. An unintended consequence of obtaining permission from the local councillors was that community members were informed, expected to be included in the research project, and trusted the researcher. This made them willing to freely participate and share their knowledge and experiences.

4.5.2. Setting up the interviews

At village level, the researcher would first consult with the headman, discuss the purpose of the study, and present the permission letters from the local councillor as well as the regional councillor, if available. The researcher would then indicate the intention of interviewing the headman as well as conducting a group discussion with six to 12 heads of households in the village. It was always clarified that the participants should consist of a combination (according to age, marital status, gender and status) of homeowners who had experienced *Efundja* at least three times and had been living in the village for at least five years. The village headman and their leadership team (deputy headmen and the secretary) keep logbooks of all the residents of their respective villages containing residents' full names, date of birth, contact details and the dates of arrival in the villages. Hence the headmen and secretary were able to determine the appropriate participants and they provided the list to the researcher to invite the participants accordingly.

The appointments for the interviews were usually set for the following day in the following manner: the individual interview with the headman commenced at 10:00 and focus group discussions at 14:00. The times were set bearing in mind the fact that community members usually work in the field in the morning. Hence, arranging the group discussions in the morning would result in poor attendance. The afternoon was regarded as a more appropriate time, since by that time, community

members have done some work in the fields, prepared lunch and learners have returned from school. When learners are back from school, it means that the parents are free to participate in social gatherings because the learners are now able watch over the *Mahangu* fields (the part of the farm where the staple grain-known as pearl millet is planted). Homeowners who lived a distance away were transported to and from the group discussion venue, to make it easier to attend.

4.5.3. Conducting the interviews

Before the commencement of group discussions, the researcher would explain all the information pertaining to the purpose of the study, informed consent and that the participants' participation in the discussion was voluntary. It was emphasised that participants were free to leave any time they wish and there would be no negative consequences for those who chose not to participate or who withdrew from the discussion. After all the explanations had been given, participants who were still willing to participate in the study were than requested to sign the consent forms before the discussion could begin. The group interviews generally took place in a public, convenient space where participants could be seated in circle around the researcher. A typical group interview can be seen in Figure 4.2.

Figure 4.2: The participants seating around the researcher

As can be seen in Figure 4.2, the participants needed to sit close to the researcher, and one another, in order to be able to hear one another clearly. The group discussions lasted between one and half hours and not more than two hours depending on how actively participants engaged in the discussion. The individual interviews with the headmen and the councillors were much shorter than the group discussions and typically lasted between 30 minutes and 1h30. After each group discussion, the researcher would offer cooldrinks and water to the participants and thank them for their time and participation.

All the group discussions and key informant interviews were recorded using a voice recorder. During the focus group discussions, since participants were seated around the researcher, the voice recorder was usually placed in the centre in order to capture all participants' voices accordingly. As for the key informant interviews, the voice recorder was mostly placed next to the interviewee in order to capture their voice adequately. A voice recorder was preferred as it allowed the researcher to capture all the communication and interaction during interviews and focus group discussions, therefore offering rich data. After the data collection had been completed, all the recorded audios were transcribed by the researcher and the transcribed data was then analysed as described in the next section.

4.6. DATA ANALYSIS

According to Smit (2002:70), data analysis is a non-linear process where data is transcribed from interviews, memos or observation notes. It is a process where the data is carefully scrutinised and analysed by observing and cross-examining all collected materials to yield meanings of the subject matter investigated. This section discusses the process of data analyses through the content analysis method, with the aid of the *Atlas.ti* software package.

4.6.1. Qualitative data analysis

Smit (2002) described the process of qualitative data analysis to consist of the taking apart of sentences, words and paragraphs in a systematic and disciplined way in order to find new meanings. The process refers to argumentation and reasoning based on the meaning resulting from the data and not necessarily based on statistical relationships between variables as done in quantitative analysis (Henning *et al.*, 2004). In qualitative analysis, one makes sense of enquiries from data in a comprehensive and rigorous manner (Holliday, 2015). Unlike quantitative data analysis that mainly focuses on the count of variables, qualitative data analysis does not count how many times something has happened but rather aims at finding patterns and reasons behind patterns (Henning *et al*., 2004). Qualitative research finds out what the actions of the people in the setting are, what they think and

perhaps what they feel, what their setting looks like and what the significance is of the dominant traits in their setting (De Vos *et al.*, 2011; Holliday, 2015). Hence, qualitative research uses methods that would allow access to such information and opportunities to work with the data in different ways using different modes of analysis to yield deeper meanings (Henning *et al*., 2004).

In the past, qualitative data analysis has been heavily criticised of biasness because of the involvement of the researcher in the analysis. Henning *et al*. (2011) contested this critique and argued that the analytical instrument in qualitative data analysis is largely the researcher. Sutton and Austin (2015) concurred and stated that the researcher's knowledge, understanding and expertise determines what happens to the data and hence it is impossible to separate researchers from their research work if they are to do in-depth analysis of their data. This is because it is still up to researchers themselves to give meaning to the results obtained from their investigative studies (Henning *et al.*, 2011).

4.6.2. Qualitative content analysis

Quantitative methods of analysis range from correlations and regressions to analysis of variance. These methods use numbers to determine the significance of a variable. Unlike the quantitative methods of analysis, qualitative methods are much more in-depth and use text to explain patterns and behaviours of variables of interest (Kawulich, 2016). There are various qualitative analysis methods such as narrative analysis, discourse analysis, grounded theory, and framework and content analysis. The narrative analysis method uses content from different sources to explain an event and focuses on using the stories and experiences shared by people to answer the research questions (Webster & Mertova, 2007; Esin, 2011). Discourse analysis examines people's interactions and uses the participant's day-to-day interactions as data to analyse and extract meaning from (Brock, 2018). Grounded theory explains motives and reasons behind certain phenomena occurring. The method investigates several similar cases in different settings and using such information to derive explanations (Urquhart, 2012). Framework analysis consists of several stages such as familiarisation, identifying a thematic framework, coding, charting, mapping and interpretation. The last method of qualitative analysis, content analysis, categorises verbal or behavioural data for the purpose of classification, summarisation and tabulation to create meanings (Kawulich, 2016). It is one of the most common qualitative analysis approaches that scrutinises texts looking for similarity and differences in order to develop themes and categories (Patton, 2015). The two main types of content analysis are quantitative content analysis which focuses on tallying the occurrences (words, phrases etc.) in text and qualitative content analysis that endevours to discern the meanings of text (Hsieh & Shannon, 2005; Neuendorf, 2016). Because of the qualitative nature of the present study, it followed naturally that qualitative content analysis was preferred as the mode of analysis. In its origin,

qualitative content analysis was initially a quantitative data analysis tool which was criticised for simplifying and distorting meaning because of the way it breaks down text into quantifiable units (Hsieh & Shannon, 2005). Responding to the critics, some researchers attempted to apply the method in qualitative analysis. This approach gained momentum and is now commonly practised because of its ability to extract the deeper insights and meaning of texts through systematic classification, coding and identifying of themes (Hsieh & Shannon, 2005; Cho & Lee, 2014).

The process of qualitative content analysis consists of five simultaneous actions which are identification of data segments, coding and matrix construction, creating memos, diagramming and reflection (Erlingsson & Brysiewicz, 2017). At the stage of segment identification, texts are carefully read, and codes are created and inserted into the appropriate data matrices, commonly called categories (Kuwulich, 2016; Erlingsson & Brysiewicz, 2017). From these categories, the researcher then uses their knowledge and experience to identify patterns and similarities in order to create memos and diagrams to visualise the data. During the stage of final reflection, the researcher creates themes, and interprets and synthesises the ideas and meanings behind the texts. This is however not a linear process but involves repeating steps and returning to the text until all meanings are clear and can be interpreted as such.

Although the process is tedious, repetitive, and complex, it possesses unique characteristics such as the flexibility to use inductive or deductive reasoning to reach conclusions (Cho & Lee, 2014). The distinction between the two approaches of inductive and deductive coding is based on how the coding of text is done. The inductive approach is applied when a researcher has limited prior knowledge of the phenomenon under investigation and draws codes directly from the texts (Thomas, 2003; Cho & Lee, 2014). The deductive approach is used when the researcher starts with preconceived codes drawn from theories or literature and then identifies which text would fit under which predetermined codes (Cho & Lee, 2014). This study made use of the inductive coding approach where codes were extracted by reading and reconstruction of participants' responses (see attached codebook in Appendix J). The inductive coding approach was preferred as it allows study findings to emerge from the leading and significant themes in raw data, without forcing data to fit in some obligatory structured, predetermined codes. Inductive reasoning is mainly used in the development of models or frameworks and since the present study aimed at understanding community experiences of the *Efundja* to develop a proactive DRR framework for northern Namibia, the use of the inductive approach was a logical consequence (Thomas, 2003). In addition, inductive reasoning was the most appropriate form of reasoning as the researcher had little predetermined knowledge and could only gain understanding from the responses of the participants.

4.6.2.1. The use of Atlas.ti software for data analysis

To aid the process of content analysis for such a large dataset, the study made use of *Atlas.ti* software. This is a program that has been used for this purpose by several social scientists in various fields including disaster risk studies (Eisenman *et al*., 2007; Burke *et al*., 2012). Although the software was developed around 1989-1992, its first commercial version was only released in 1993 and since then it gained reputation especially in the academic world where analysing large research data sets is needed (Lewins *et al.*, 2007). The software offers support in analysing data and in interpreting texts, multimedia, geospatial data, videos, pictures and diagrams using codes and annotated diagrams to provide a comprehensive view of the data analysed (Henning *et al.*, 2011). The program poses various advantages over manual analysis, such as the ability to automate various processes, cataloguing of primary documents, organising of codes and it also offers space for code descriptions (Silver & Lewins, 2014). The qualitative software tool is popular for its "network-building feature that allows researchers to connect selected texts, memo and codes and create visuals" (Smit, 2002:72; Henning *et al.*, 2011:42). This feature was found crucial as it enables the researcher to make connections and be able to identify patterns. The software offers an efficient tool in managing and analysing huge amounts of data which was the biggest challenge for many researchers in the past who tried to manually manage and sort their data (Woolf & Silver, 2017).

Although data analysis in qualitative research is an ongoing and tedious process, the use of *Atlas.ti* enables researchers to maintain an analysis that is rigorous, systematic, disciplined and carefully documented (Henning *et al.*, 2011). Since the program allows former manual procedures of analysis to be accomplished much quicker, it was used for this study to aid in data analysis. The analysis method consists of several steps. Figure 4.3 depicts the different steps taken during analysis of the data for the present study. These steps were initial coding, categorisation, determining themes and linkages creation (data visualisation).

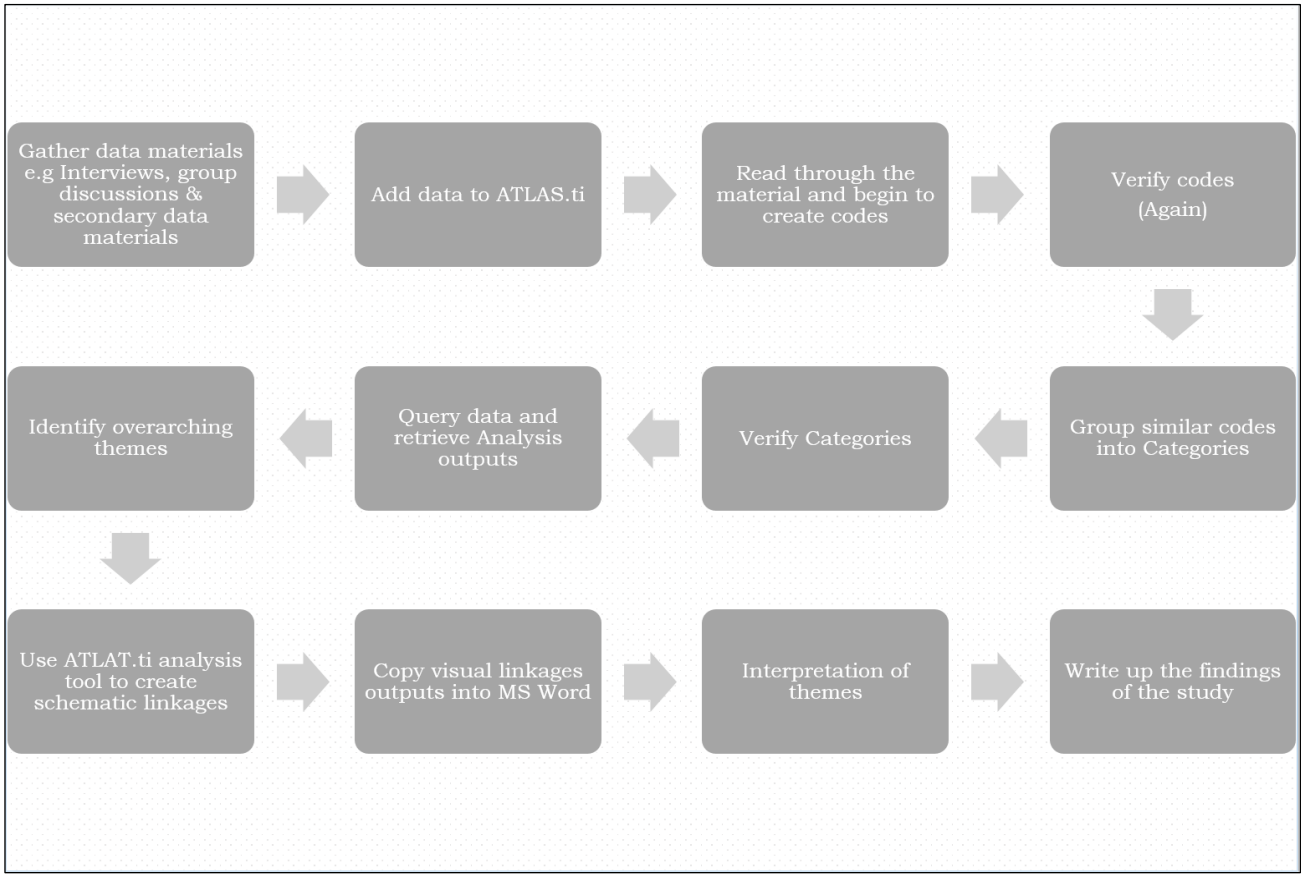

Figure 4.3: A flow chart summarising the steps applied in *Atlas.ti* to analyse qualitative data for the study

➢ Initial coding

As can be seen from Figure 4.3, after gathering all scripts from interviews, participant observation field notes, documents, videos and photos, the researcher began the data cleaning process by reading through all the scripts to make sure all grammar errors were corrected and all repetitions removed. After cleaning up the data, the researcher read through the interview transcripts a second time to familiarise herself with the content before adding the materials to *Atlas.ti* and start the coding process. The researcher then highlighted salient texts, phrases or paragraphs and assigned them codes that best described the texts. The process of coding was done in two cycles. During the first cycle, the researcher coded single words, full sentences or an entire paragraph, if not the entire page. This later proved to be problematic as the researcher realised that different sentences were highlighting different aspects of the study and could also belong to different codes. Hence, the researcher needed to embark on the second cycle of coding where each sentence was coded separately into its own code. Although the process seems repetitive, it was crucial and necessary for the next steps in the analysis process since coding was only an initial step toward even more rigorous analysis and interpretation. This concurred with the observations of Saldana (2008) who described coding as a cyclical action of highlighting texts which are rarely done right the first time.

- Categorisation

As the researcher coded all the materials, it resulted in a list of codes that she closely examined in order to identify linkages and connections between texts. She then put together similar codes into 'code groups or categories'. She then further scrutinised these codes in a second round in order to remove redundancies and decongested the codes. By this time, quotations and codes were ready to be systematically grouped and regrouped into further sub-categories, creating patterns within the data. Once again, the categories created could only be refined in the third cycle as the first and second cycles of categories were later incorporated into other categories or relabelled.

- Determining themes and linkages creation (Data visualisation)

Some categories contained bands of coded data that required further refinement. To accomplish that, the researcher had to create sub-categories to avoid crowded categories. The major categories were then compared and consolidated while sub-categories were developed to support emerging themes. At this stage, the researcher was able to see the main themes emerging and could visualise the angle of argument of the study and was able to tell the story.

The process was concluded by the researcher arriving at 26 themes which were later trimmed down to 18 themes. The 18 themes were identified in the *Atlas.ti* software but were later consolidated during the process of interpretation. Eventually only ten themes remained. These ten themes were then analysed, sorted and compared to discern possible meanings and explanations. Through further analysis of the themes, the researcher was able to create thematic linkages that were then copied, presented and are discussed in Chapters 5 to 8.

4.6.2.2. Advantages of using Atlas.ti.

Literature indicates that using *Atlas.ti* software provides a solution to data management problems caused by huge datasets that cannot be easily solved by standard database systems or manual work (Barry, 1998; Henning *et al*., 2011). The software is preferred for its ability to create order out of messy scripts, memos and various other data sources that would have required time-consuming manual analysis (Barry, 1998). It provides a formal structure of writing and permits unlimited data storage capacity while offering meticulous and several levels of coding (Smit, 2002: Grbich, 2007). The software has effective graphical network features that enable researchers to visualise graphical sketches of their data, an important step in qualitative data analysis (Henning *et al.*, 2011). However, although the software helps researchers to manage and organise their data, it still does not do the analysis on their behalf and therefore to assign meaning to and interpretation of the data remains the responsibility of the researcher (Smit, 2002).

4.6.2.3. Disadvantages of using Atlas.ti.

Although the software offers extensive benefits as discussed above, it has been criticised for various reasons. Firstly, it was alleged that it distanced researchers from their data (Smit, 2002; Friese, 2019). Although this was initially believed to be a valid critisism, over time it was proven by various researcher that it was impossible to analyse research data without reading it over and over and being familiar with it first (Barry, 1998). It has been proven that qualitative data analysis either using software or manual methods still requires a researcher to read the data repeatedly to be able to code and/or categorise texts (Friese, 2019). Secondly, according to Barry (1998), since the beginning of the software's application in analysing qualitative data, there has been some uncertainty and pessimism about the software. This resistance was proven to come from people who have not worked with the software while those who have worked with it praise it for making their work easier. *Atlas.ti* has also been criticised for forcing researchers towards a single type of data analysis. However, the present study proved that a researcher should not limit analysis to computer software but should use the software and supplement it with non-computer aided methods. Barry (1998) concurred with this and stated that the software package is not the be-all and end-all as the theoretical interpretation, data deduction, the how, the why and what that need to be answered, still remain the work of researchers themselves.

Over time, more researchers began experimenting with *Atlas.ti* and the software gained acceptance. However, besides its frequent use, there was one criticism that seemed not to be resolved. For all its functionality, the software was still not capable of comprehending or discerning the meaning of words, therefore researchers needed to understand that the final analysis still had to be conducted by the researcher (Henning *et al*., 2004). Holliday (2015:24) supported this stance and stated that "the competence of a researcher still lies in the analysis of the data, a process that requires analytical skills and the ability to capture his/her understanding of the data in writing". This implies that although the process of coding and categorising may be facilitated by software such as *Atlas.ti*, it is still the job of a researcher to define such codes and text segments and decode meanings. This places ultimate responsibility for analysis back on the shoulders of the researcher. Not only does this force researchers to be in touch with their research data but it also negates the criticism about the distancing of researchers from their research work when using *Atlas.ti*.

In conclusion it can be said that not every software package will be useful in every situation and that researchers should conduct their analysis without solely relying on technology (Smit, 2002). It should also be noted that every software package will have both advantages and disadvantages and that it is up to researchers to choose the best available method for the task at hand.

This study made use of the *Atlas.ti* package to aid in coding and categorising. However, the analysing of text from these codes was primarily done by the researcher herself. Themes creation and the interpretation of data to yield meanings were also done by the researcher herself through the use of manual methods of qualitative content analysis.

4.7. SAMPLING

Sampling is defined as the selection of specific data sources from which data is collected to reach the study objectives (Gentles *et al.*, 2015). For this purpose, the present study made use of non-probability sampling using purposive sampling with a link of tracing to select the study participants. Though there are various possible sampling techniques, both probability and non-probability, with the study selecting purposive sampling as the most appropriate type of sampling technique. This was because the participants were selected based on the justification of their positions or the knowledge they possess about the study's subject matter, a process advocated by Welman *et al.* (2012).

This section describes the use of purposive sampling with link tracing as the technique applied to select participants for the focus groups and key informants to conduct individual interviews with. It further discusses the concept of data saturation as the applied method that determined whether the information collected was sufficient or not. The section concludes by explaining the generic guidelines regarding the recommended number of interviews and how the villages that participated in the study were sampled.

4.7.1. Purposive link – tracing sampling technique

As previously explained in Section 4.5.1, the researcher targeted the constituencies that were identified by the regional councillors to be the most severely affected by *Efundja*. Therefore, these constituencies were purposively sampled with tracing networks designs, and the researcher approached the constituency councillor's office knowing that the constituency forms part of the sample. The councillor, as community leader, knows the residents within the communities under his jurisdiction. He then identified specific villages within his constituency that are usually severely affected by the *Efundja* and provided the contact details of the headmen of these villages. In the same manner, the headmen possess information about each resident particularly regarding their arrival in the village and therefore headmen were uniquely situated to identify possible participants who met the criteria for participating in the focus group discussions as stipulated in Section 4.5.2. The criteria were developed to ensure that participants were knowledgeable and could answer the questions in the focus group schedules. The researcher was then given the list of residents meeting the criteria and

invited them by visting each household individually. These participants were then included in the study and formed part of the FDGs.

The headmen were individually interviewed as the local key informants at village level. However, in some cases the headmen did not feel comfortable being interviewed alone and invited their secretary or at times the deputy headman. The researcher learned that this was the case because most headmen were usually older men, about 70 to 80 years old. The headmen are likely to be mature men as the village headship resides with a clan and is inherited from one generation to the other. Therefore, most headmen are still in power because they have inherited the leadership roles from their parents or grandparents. Traditionally, it is unlawful to remove the headship from a person unless due to death or they willingly decide to give it up. However, there are still exceptions where some villages have broken the traditional practice of leadership running through a family by collectively deciding to appoint or elect relatively younger leaders as headmen. However, although most of the headmen enjoy the power of leadership, they are usually insecure in their leadership skills since they are old. They feel they are unable to lead in a fast changing and advanced world. Therefore, they appoint a deputy headman as well as a secretary, both of whom are usually younger and perhaps more knowledgeable with current issues affecting their communities. Whenever there is a meeting or decision to make, the deputy headman as well the secretary must be present and contribute to the deliberations. Because of this, three individual interviews with headmen, became interviews with three persons adding a total of six people to participate in the study because of this situation.

As for the focus group discussion, attendance of focus groups varied from village to village from between five to 12 people per focus group discussion. The researcher made sure that attendance did not exceed 12 people per group, the recommended maximum number of a group that a facilitator is able to manage (Welman *et al.*, 2012).

4.7.2. Data saturation

The researcher continued conducting focus group discussions in the targeted villages until no further new data was being revealed from the discussions (Welman *et al.*, 2012). This was the data saturation point for the present study. According to Sandelowski (1995), data saturation entails ensuring that adequate and quality data is collected in order to carry out meaningful qualitative research. Sandelowski (1995) further stated that data saturation may have become the rule of thumb and is the acceptable standard in qualitative research. Data saturation is reached when there is enough information attained, and when no new information is obtained from interviews or focus group discussions. Defining how many interviews or focus group discussions are sufficient to reach data saturation is nearly impossible because what constitutes an adequate number to ensure data saturation

for one study may not be nearly enough for another. Fusch and Ness (2015) argued that data saturation is not about numbers of interviews or focus group discussions as such, but rather about the depth of the data. They further urged researchers to choose the sample size that has the best opportunity to reach data saturation.

4.7.3. Generic guideline on number of interviews to ensure data saturation

Sample size in qualitative research is considered less important because depth and richness of the data can be reached by interviewing one or very few participants from a population when doing qualitative research. However, Njie and Asimiran (2014:38) citing Schreiber and Asner (2011) established a generic guideline with regards to how many interviews or focus group discussions a study should conduct or how many participants a study should consult, but empasised that it remains highly dependent on the nature of study. Guidelines on the sampling size in qualitative research were provided by Krueger (1998) and Morse (1994) and were later revised by Schreiber and Asner (2011). These guidelines are presented in Table 4.2.

Table 4.2: Rule of thumb on qualitative sampling

Basic study type	**Rule of thumb**
Ethnography	30-50 interviews
Case Study	At least one, but can be more
Phenomenology	Six participants
Grounded Theory	30-50 interviews
Focus Groups	Seven to ten focus group discussions

Source: Njie & Asimiran (2014:38) citing Schreiber & Asner (2011:14)

Based on the guidance given in Table 4.2, the present study conducted 22 focus group discussions (FGDs) with the heads of households of the affected area, with each group having six to 12 participants. The study also conducted 16 individual interviews with headmen, six individual interviews with local-level disaster risk management officials and six individual interviews with national-level disaster risk management officials in order to supplement the information obtained from the focus group discussions. The guidelines on the sample sizes provided by Njie and Asimiran (2014:38) have been used worldwide by many qualitative researchers to guide them in terms of how many interviews or group discussions were sufficient for their respective studies. A specific reference is the study done in Kenya which conducted focus group discussions at different villages to explore various ways of involving local communities in Early Warning Systems (EWS). The study intended to investigate the possibility of moving away from the commonly utilised top-down approach of

dealing with disasters to a more participatory approach that involves communities (Baudoin *et al.*, 2016). The study conducted ten focus group discussions in three townships in Nairobi; five group discussions in an urban settlement and five group discussions in rural villages of Kisumu (Baudoin *et al*., 2016). Though the target area seems very large, the researchers only conducted ten focus group discussions in different regions of the area which they believed would offer rich and sufficient data.

As for the present study, according to the Namibia Household Income and Expenditure Survey (NHIES) (2016), the Cuvelai-Etosha basin has an estimated population of 665 286 people. There are about 43 723 households in the entire Cuvelai-Etosha basin with about 50 000 households that are either directly or indirectly affected by annual recurring *Efundja* (NHIES, 2016). These households represent about 30% of the country's total's population that is annually affected by *Efundja*.

Therefore, to obtain rich and sufficient data for the study, a purposive –link-tracing sampling method was used to identify participants in the study. Heads of households, headmen, as well as the officials of both local and national disaster risk management units were purposively identified to participate in the study. Twenty-two villages participated in the study and 22 focus group discussions were conducted, one in each village. Sixteen headmen were successfully interviewed while six of the interviews were omitted from the study due to the fact that the headmen insisted on attending the focus groups before they could be individually interviewed. These six interviews were discarded because the headmen become aware of the type of questions before they could be interviewed, something that is regarded as introducing bias into the data.

4.7.4. Sampling of villages

During the process of data collection, the sampling process was carried out in a specified manner as described in Section 4.7. Although the Cuvelai-Etosha basin stretches over four regions, as illustrated in Figure 4.4 below, the heart of the basin lies within Omusati and Oshana region, with the Ohangwena and Oshikoto regions usually least affected.

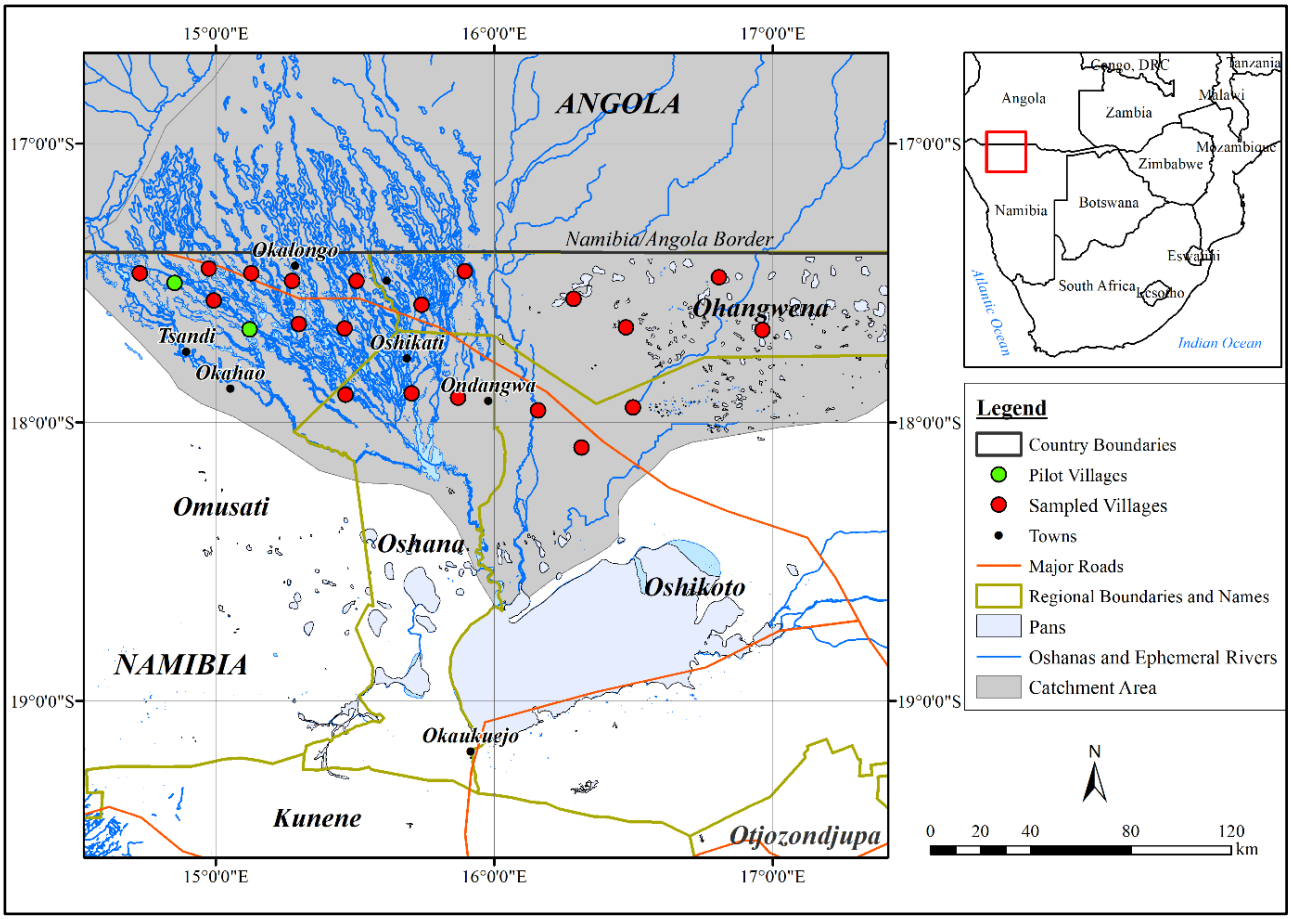

Figure 4.4: The demarcation of the Cuvelai-Etosha basin, showing the sampled villages

According to Mendelsohn *et al.* (2013), Ohangwena and Oshikoto are usually only affected when severe flooding occurs, which means that the country has received well above average precipitation for that particular year. Regarding Oshana region, the part of the region that is severely affected is the urban part which falls outside the scope of the present study. Therefore, the researcher felt that it was justifiable to conduct more interviews in Omusati region than in the other regions. The researcher would then visit all the identified constituencies based on the recommendation of the regional council by conducting three interviews per constituency: one individual interview with the councillor, another interview with the headmen and a focus group discussion with the heads of households. The breakdown of the villages as well as constituencies sampled in each constituency is presented in Table 4.3. As illustrated in Table 4.3, the study sampled 22 villages within 12 constituencies by conducting the following focus group discussions and individual interviews: 22 focus group discussions, 16 interviews with headmen, six interviews with the local-level disaster risk management officials and six interviews with the national-level disaster risk management officials. Among these 12 constituencies, 14 villages were sampled from Omusati region, three villages were sampled from Oshana and Ohangwena regions. Two villages were sampled from Oshikoto region. A

total of 197 people took part in focus group discussions and 28 people participated in individual interviews. Altogether, a total number of 225 people participated in the study.

Table 4.3: List of sampled villages

	Omusati Region		Oshana Region		Ohangwena Region		Oshikoto Region	
	Constituency	**Villages**	**Constituency**	**Village**	**Constituency**	**Villages**	**Constituency**	**Villages**
1	Etayi	Oshipya (Pilot) Onheleiwa (Pilot)	1. Okatana Constituency	1.Ombwelefuma	1.Endola	1.Onangubu	1.Olukonda	1.Okandiina
2	Outapi	Omafa		2.Omayanga	2.Engela	2.Oikalahenye		2.Oshipala
3	Tsandi	Elondo Onashitendo		3.Onanghwaya		3.Ondjengo		
4	Oshikuku	Otshima Oshitutuma						
5	Ogongo	Iipanda yambalanhu Epangu						
6	Elim	Ongongo Iiyale						
7	Anamulenge	Onyaluwili						
8	Okalongo	Onambome Epoko						
	Total	14 Villages		3 villages		3 villages		2 villages
	Grand Total	22 Villages (in which the following interviews were carried out) 22 FGD + 16 KII (headmen) + 6 KII (Constituency Councilors) + 6 KII (Disaster Experts from Office of the Prime Minister) **50 Interviews**						

4.8. ETHICAL CONSIDERATIONS FOR SOURCING INFORMATION FROM PARTICIPANTS IN THE STUDY AREA

Ethical considerations are an important part of all academic studies. In all research involving human or animal participants, an ethical committee must evaluate the study's methodologies to make sure that the study is carried out in ways that protect the participants' dignity, rights and safety. The significance of ethics in any scientific study is that it involves moral principles that guide the conduct between researchers and participants (Guillemin & Gillam, 2004). Ethical issues consider a wide variety of aspects pertaining to how research participants are treated during their participation in studies as well as how the information gathered is utilised (De Vos *et al*., 2011; Creswell, 2014; Patton, 2015). These include, but are not limited to, voluntary participation, informed consent, equal treatment of participants, no risk of harm, no violation of legal and human rights, confidentiality, data access and anonymity (Welman *et al.*, 2012; Creswell, 2014; Patton, 2015).

The aspect of ethics was revised by Bless, Higson-Smith and Sithole (2013:29) by expanding the list of principals for ethical research. They described ethics as consisting of: "non-maleficence, beneficienc, autonomy, justice, fidelity and respect for particpants rights and dignity". Non-maleficence refers to participants that should not suffer any harm during their participation in the research project while beneficence refers to the potential benefits a research study may have for a community. Autonomy on the other hand implies the freedom of participants to participate in the reseach or not without feeling obliged or forced to participate. Justice and fidelity refer to treating participants equally and keeping to all promises and undertakings and agreements made during the project. This also addresses the need to respect the rights and dignity of participants so that their legal and human rights are not violated during the research study.

These priniciples were all adhered to by the researcher by obtaining permission from the local leaders and applying for official permission from the university.

4.8.1. Permission to conduct the study

Permission to conduct this study was obtained by the researcher by writing letters to relevant authorites who responded in favour of the study by furnishing the researcher with permission letters as described in Section 4.5.1. These permission letters acted as entry ticket into villages and encouraged headmen and community members to participate in the study. However, although the researcher understood that most of the community members as well as headmen were willing to participate in the study, she decided to ensure that they were well aware that they were not in any way obliged to participate and could do so at their own prerogative. In order to achieve this, the researcher

invited heads of households by individually visiting households instead of the headmen being the one to invite them. This was done because if the headmen had invited them, the participants may have shown up out of obligation and not necessarly out of their own will, which would have impacted the principle of voluntary participation. Hence, to prevent this, the researcher opted to extend the invitations personally and ensure that all particpants were well informed about their liberty to participate or not.

4.8.2. The Stellenbosch University ethical application process

As indicated, the present study fulfilled the relevant principles by attaining permission from Stellenbosch University. The reasecher was required to apply and receive ethical approval before the commencement of the data collection process. The application was done in an official process that involved submitting a digital form to the Research Ethics Committee (REC) of Stellenbosch University. The digital form required details pertaining to the study' title, the place of study, type of participants, purpose of the study, participant selection criteria, mode and the time frame of the data collection process. The digital form also requested clarity on confidentiality matters, specification of potential risks to participants, potential benefits, how data would be secured and stored and how the results of the study were to be disseminated. It lastly requested the development of a participant information sheet and informed consent letter to be present at all times during the process of data collection. The initial application was lodged on 23/05/2019 and with constant requests of changes and documentation throughout, the researcher only received her final approval on 06/05/2020 as attached in Appendix K. However, a preliminary approval was given on 24/07/2019 which permitted the researcher to proceed with the data collection process.

During the data collection process, the privacy of interviewees was protected by ensuring that their responses remained anonymous and confidential by recording responses using codes and not their real names. The interviewees were informed of this at the onset of all the interviews and focus group discussions. It was also clearly communicated that the information they were supplying would not be traceable back to them in any way, and that they could therefore feel free to express themselves and share any information they have. All interviews and focus group discussions were successfully completed without any harm or conflict. The completed and transcribed interview schedules together with all audio recordings of the interviews are stored digitally and are password protected.

This chapter described the methods applied in this study. It explained and motivated the use of the qualitative approach, the use of data analsysis method applied as well as explaining various steps taken to ensure that instruments used gathered the appropriate information. The chapter also focused on piloting, the use of secondary sources, sampling and ethical issues. Now attention shifts

to how participants view the nature of the Cuvelai-Etosha basin exercerbating the negative impacts of *Efundja*. The next chapter demographic information of the participants, the physical and human characteristics of the study area, and demonstrates the degree of negative impacts caused by *Efundja*.

CHAPTER 5:
THE HUMAN AND PHYSICAL LANDSCAPE OF THE RURAL CUVELAI-ETOSHA BASIN

The impacts of *Efundja* experienced by the people of the Cuvelai-Etosha basin have been devastating. *Efundja* has caused loss of lives, loss of livestock, damage to property, and resulted in far-reaching consequences to the lives of residents. The persistent nature of the impacts experienced explains the affected people's plea for help over the years. Under these circumstances, this chapter demonstrates the need for urgent intervention to mitigate these problems. The chapter is the first empirical chapter and incorporates secondary sources into the analysis. It is expansive in scope and the only empirical chapter that cuts across all types of respondents (community members, headmen and local and national-level disaster risk management officials) in order to set the background of the study. It can be further distinguished from the chapters that follow because it does not only report respondents' responses but also describes and analyses the physical and human attributes relating to *Efundja* occurrences. The chapter also defines the geography of the study area, by drawing from data derived from key questions in the interviews and focus group discussions.

The chapter is outlined in such a way that it starts by highlighting the demographic characteristics of participants such as gender, age and the duration of respondents' stay in the respective villages. It further discusses the extent of the problem as experienced by the community members of the Cuvelai-Etosha basin by stipulating the negative impacts of *Efundja*. The discussion on the negative effects of *Efundja* highlights the scope of the problem by analysing impacts such as how these communities' everyday lives are changed. Other noted changes pertains to the environment and local biodiversity, the limitations caused by *Efundja* and other secondary effects such as poverty. It continues by explaining the compounding issues of physical attributes as well as other human factors that are contributing towards the negative effects of *Efundja*.

The physical attributes pointed out play a significant role in understanding the problem as they are seen as key contributing factors to the frequent *Efundja* events. In the same vein, the human contributing factors discussed in the chapter are also key problem areas and underlying factors that enhance the risk of *Efundja* in the area. As was indicated in the literature, identifying and proactively addressing these underlying factors are crucial steps in the mitigation of such disasters. Therefore, identifying these risk-inducing factors not only points to the key areas that the proposed disaster-risk-reduction framework needs to address, but also highlights the main problem areas within the Cuvelai-Etosha basin. The chapter therefore also makes the case for a proactive disaster-risk-reduction

framework as proposed in this study. Overall, this chapter demonstrates the significance of the physical and human characteristics as *Efundja* enhancers, which explains why it is important to develop a DRR framework.

5.1. DEMOGRAPHIC INFORMATION

The demographic information presented in this section is for all participants that took part in the study. This is inclusive of community members; headmen; the local-level disaster risk management officials who are the constituency councillors; and the national-level disaster risk management officials which are the government officials who coordinate disaster management in Namibia. As previously stated in Section 4.7.4, a total of 225 participants took part in the study which exceeded the recommended sampling size advocated by Njie and Asimiran (2014:38) and thereby indicates that the information collected was sufficient to attain the study objectives.

5.1.1. Gender

The study's participants were mostly female (56%), with males at 44%. The slight difference in gender percentages may be explained by the fact that males, especially in the rural settlements, often leave their immediate communities in search of employment elsewhere. Futher, in these rural areas, it is sometimes culturally forbidden for a man to spend his entire day at home. This is because men are culturally seen as providers and therefore need to be outside their homes working to provide – even if it means attending to the livestock or the farm. Although many of the traditional cultural practices are no longer used in these communities in the contemporary era, men rarely spend their days at home. The absence of males during the day and potentially over longer periods, may also be taken as a contributing factor to the vulnerability of homesteads. A male presence in a homestead is mainly associated with social and economic strength that overall improves a household's coping capacity. Therefore, a homestead without a male figure symbolises social and economic weakness which may imply limited coping capacity.

5.1.2. Age

The ages of participants are illustrated in Figure 5.1. The figure demonstrates that a large proportion of the participants were aged between 36 to 46 years, 47 to 57 years and 58 to 68 years of age, and a fair number of them were in the 69 years and above age group.

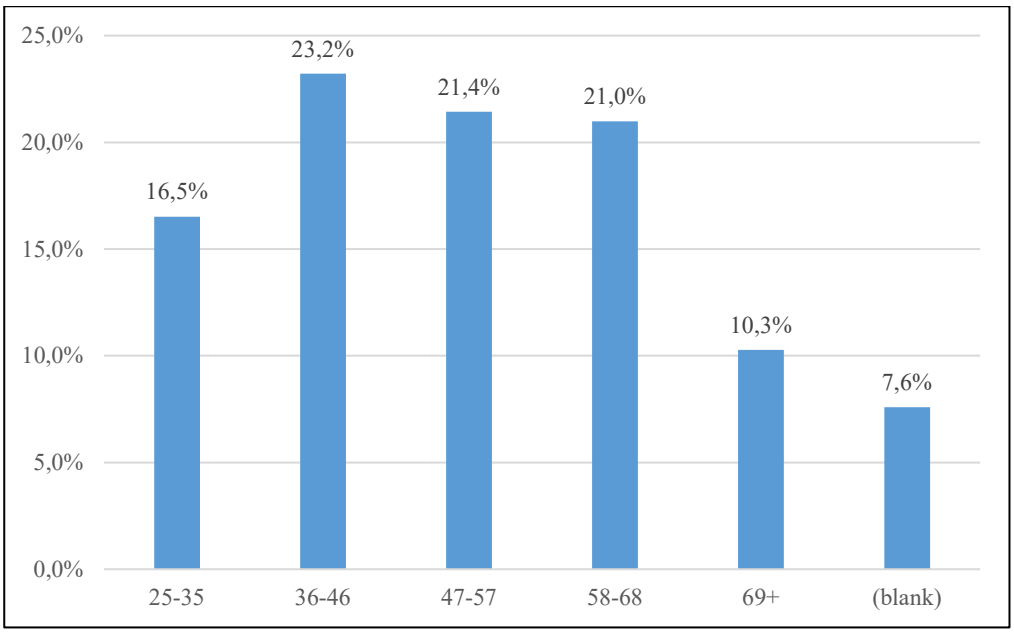

Figure 5.1: Age of participants who took part in the study

This implies that the data and findings of this study were sourced from mature, knowledgeable and experienced participants who have lived in their villages for long periods of time. The study also found that most of the older participants were born in those villages and had experienced *Efundja* as a recurring phenomenon when they were growing up. This means that these participants had comprehensive *Efundja* experiences from a young age and were able to tell their stories articulately and in an informed manner. Although some of the older participants could not remember their age, as indicated by Figure 5.1, they were still lucid and managed to contribute significantly to the study.

5.1.3. Length of stay

At the time of data collection, a qualifying criterion was used to determine whether or not participants qualify to participate in the study. As previously explained in Section 4.5.2, participants needed to have been staying in their respective villages for a minimum of five years and should have experienced at least three *Efundja* events in order to participate in the study. This information is reflected in Figure 5.2 which shows that about 81.7% of the participants have been living in their respective villages for over 16 years, while 7.14% have lived in their villages between 3 and 15 years.

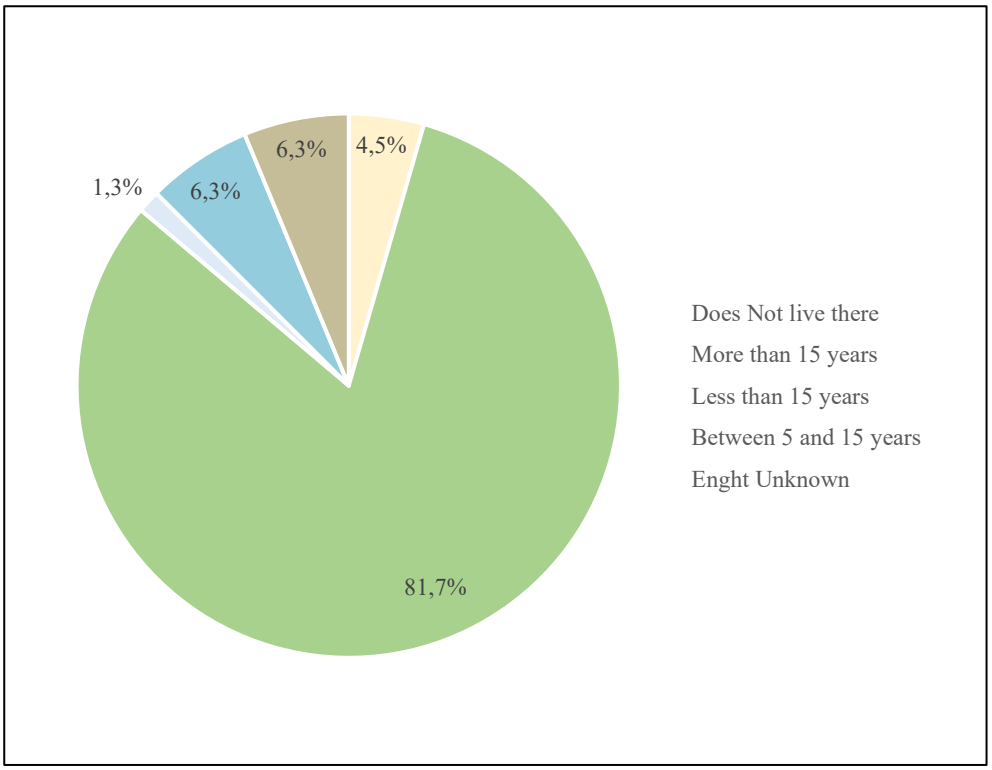

Figure 5.2: Length of stay of participants in their respective villages

Moreover, most of the participants indicated that they had lived in their respective villages since birth. Once more, since the study took place in rural areas where the level of education is very low and people may not necessarily know how to count, 6.25% of them did not know how to read or write and could not recall which year they had moved to their respective villages. Overall, the participants had lived in their villages for prolonged periods of time which means that they were well-suited to answer questions related to the *Efundja*, since they have experienced the *Efundja* on multiple occasions.

5.2. THE IMPACTS OF *EFUNDJA* IN THE CUVELAI-ETOSHA BASIN

The impacts of *Efundja* in communities of the Cuvelai-Etosha basin are diverse. This section examines the impacts of *Efundja* as experienced by the rural communities in northern Namibia. These communities expressed that the problems they face range from limited access to services, include aspects such as inhibiting their ability to move around and carry on doing their daily chores, inhibit food access, health facilities as well as their participation in social life. They also explained that the *Efundja* enhances poverty, changes their livelihoods and it is also changing the existing biodiversity of flora and fauna and the environment at large. The communities further emphasised how *Efundja* even affects their children's lives and the lives of their domestic animals.

5.2.1. Past and recent *Efundja* occurrences

The community members described the *Efundja* of the basin to be an inconsistent, unpredictable, yet recurring type of *Efundja*. It was described as a '*blessing for some years, yet a curse for other years'*. The participants described *Efundja* to be an old phenomenon of the Cuvelai-Etosha basin, something that many people had experienced since their childhood and it was regarded as '*normal*' as it was commonly referred as '*the good years of great harvest whenever it occurs*'. Participants could remember *Efundja* dating back as far as 1941, which they described to be one of the most devastating events in history. They further explained that *Efundja* of the past was more infrequent and less destructive compared to the recent type of *Efundja*. A 57-year-old participant explained that '*I first experienced a typical major Efundja in 1969 which was one of the devastating Efundja types because it wiped out most of the living organisms in my community.*' She expressed: *'I remember that year that we would be stepping on stones to get into our bedrooms and many people had difficulties even to cook in their homes because the entire surface was covered in water. Even a 7-year-old boy of 1.21 m average height would be underwater*'. She described the *Efundja* water to have penetrated into homesteads, farms, and even bedrooms and their lives were halted because of it.

The participants described *Efundja* to be characterised by an endless volume of water that only stays in the villages for a few weeks before it flows to the converging lakes such as the locally known *Lake* Oponona,'*Ooinakulu yomadhiya*, Uuvuddhiya' lake and eventually into the Etosha pan. They described the water flow to be fast which they reasoned to be because of the low lying plain which has no blockages and water can flow freely to its destination. They associated *Efundja* of the past to be '*good years*' which had great crop harvests, fattened livestock, and yielded sufficient livestock feeds, fish to eat, fruits, abundant water and generally a flourishing environment for both humans and animals. They explained that in the past, *Efundja* was celebrated, and people preferred it over the '*lean years*' because it was associated with '*good things*'.

In terms of impacts, they explained that the damage was not as severe as it is currently. They described that in the past, houses would break down because they were mostly built with weak materials such as mud and thatch-roofed type of materials, but lately the impacts of *Efundja* would even easily destroy concrete homes. Moreover, the participants indicated that in the past, communities were not so severely impacted that they would require external assistance, as is the case today. They explained that, '*we did everything on our own and suffered alone in our poverty'.* However, they reasoned that perhaps the lack of external support to the affected population was due to apartheid, implying that the government did not care about the needs of the people. Participants further reasoned that the minimal impacts of the past *Efundja* might also be associated with sparse population density,

which means that fewer people per square metre lived there and were therefore less likely to interfere with the natural flow of water.

However, they explained that since 2008, the type of E*fundja* they began to experience was of a different kind. '*It had overwhelming volume of water that washed away homesteads and silos, and had fish which could run even into bedrooms*'. They explained that they used the appearance of fish in the water to differentiate *Efundja* from the normal rainwater. They also said that the roads became very damaged as water flowed with great pressure even to the point of creating deep gullies on the ground, as shown in Figure 5.3. The figure illustrates the damages done to the environment after *Efundja* water has violently cut through the soil creating ditches. The communities expressed that such ditches are a hazard to their children, vehicles and their livestock.

Figure 5.3: The effects of *Efundja* to the environment in northern Namibia – view of gullies created by running water as water sharply cuts into the soil

From 2008 onwards, community members noticed how their lives came to a complete standstill as they could not move around because as it was a risk to cross the overflowing *iishana*. Participants described how they struggled to cook on an open fire as the surface was filled with water. Their informal sectors of business and small-scale businesses ceased to operate as customers became rare or completely non-existent. Community members also noticed that the water of recent *Efundja* events stayed in the communities for more weeks and flowed much slower than the *Efundja* events of the past. Cases of children drowning increased, and schools, clinics and churches would close due

to *Efundja*. The *Efundja* impacts were becoming unbearable to the point that the government discerned the need to intervene by proposing and erecting different relocation camps in rural and urban settings. Although initially *Efundja* was still associated with good farming harvests for some years, the negative impacts on human life were seemingly overriding its goodness. This trend repeated itself in 2009 and 2011, with a minor *Efundja* in 2010 as seen in Figure 5.4. The new pattern of *Efundja* seemed to contradict the inconsistent and intermittent *Efundja* of the past as is illustrated by the figure.

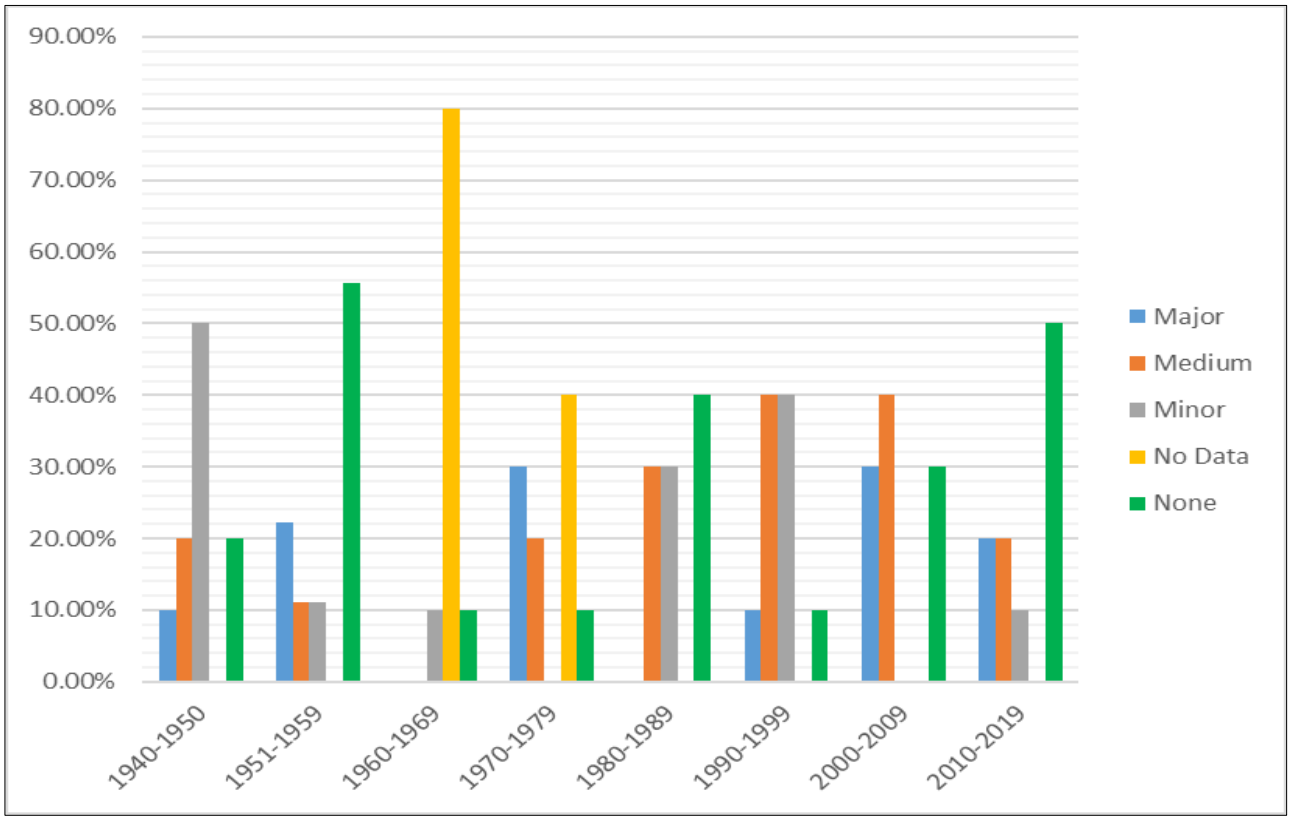

Figure 5.4: The history of occurrences of *Efundja* in the Cuvelai-Etosha basin over the years

Figure 5.4 shows the trend of how *Efundja* has taken place in the Cuvelai-Etosha basin, and it is clear that it has persisted in the basin throughout history. Shifidi (2015) described the classification of three levels illustrating the degree of impacts over the years based on the recorded negative impacts that occurred. The first classification which is major *Efundja* event has the most devastating type of impacts while the medium *Efundja* event has moderate impacts, and the last class of a minor *Efundja* event has minimal impacts. The figure clearly shows that there has been no common pattern of any of the classifications of *Efundja* throughout history. This corresponds well with the community views that the *Efundja* has always been inconsistent and unpredictable. The gap of no records during 1960-1979 is explained by the occurrence of war during that period.

According to the participants, there are visible differences in terms of the nature of *Efundja* and the impacts between the past and the recent *Efundja*. They states that in the past, the *Efundja* water was clean and potable and ready for household use. However, the recent *Efundja* water is not clean and once it mixes with rainwater it has a darkish colour making it unsuitable for any household use and only suitable for gardening or livestock drinking purposes. The communities are cautioned not to use such water for household use without treatment.

Moreover, the participants affirmed that *Efundja* in the past yielded the growth of various vegetation types including the grass in the *iishana* and thus their livestock had more than enough pasture. However, the recent *Efundja* seems to cause desertification. Building on from that, they indicated that they suspect the *Efundja* has a degree of influence over the land degradation and desertification that is taking place within their villages because the *iishana* are becoming more of a bare land each year than a grazing area as it was in the past. This concurs with Niipele *et al.* (2015) who stated that there is indeed evidence of land degradation taking place within the Cuvelai-Etosha basin and the *Efundja* may be a contributing factor. Participants lastly concluded that not only does the *Efundja* degrade the land, but it also increases the presence of new types of weed that hinder crop growth on their farms.

5.2.2. Limited mobility and access to services

Responses indicate that mobility is one of the main challenges communities face during the flooding season. Because the road infrastructure is poor or non-existing, especially in rural areas, many people remain stuck at home for some time waiting for the water level to subside in order to be able to move around. The rural residents also need access to essential services such as medical services, schools, employment, income generation markets and all other services, which becomes impossible during *Efundja* because of two main things that are lacking: proper road infrastructure and reliable transportation services. A few rural residents own vehicles, but the larger population still depends on public transportation services for timely and dependable transport to carry out their desired assignments. This was confirmed by a respondent '*Our rural areas are made up of poor people, so owning cars is not so common around here*'. The limited or non-existing road infrastructure and transport services is a problem throughout all rural areas in northern Namibia. Transport services are limited to taxis in urban areas and along paved main roads with a complement of minibuses and a few long-distance buses on major inter-urban roads (Starkey *et al.*, 2017). However, as for the rural areas, these taxis do not exist. Multi-client taxis, minibuses and buses only operate on the inter-urban roads. However, small gravel and earth roads generally lack 'conventional' transport services and hence pickup operators make use of this opportunity to carry passengers for income (Starkey *et al.*,

2017). These pick-ups are infrequent passenger transport services which also depend on the availability of customers or else the trip may be cancelled. The residents pay an average tariff of N$4.33/km and they still have to face the challenge of unreliability especially when they need to access various service providers in urban areas. Pickups are the general emergency transport available to rural residents.

With such a limitation already existing, the recurring *Efundja* poses a major threat to community members' movement options. The communities explained that during the flooding season, it is extremely difficult for them to move around to run their errands and get by doing their normal daily activities. In some cases, they were unable to leave rural areas at all and when they did, it's with the pickup that had to make several detours before reaching their destinations. Community members further explained that they could not access most service providers and many were unable to go to work because most of the infrastructures and roads were also flooded, as seen in Figure 5.5. The figure shows one of the government offices that was flooded and the employees were unable to get to their offices before the water level subsided.

Figure 5.5: Impacts of *Efundja* on some of the government infrastructures of services – example of a constituency office flooded

(*Image used with kind permission of Oshikango Constituency office*)

Many of the employees who commute daily from rural areas had difficulties getting to their respective places of work and often resorted to temporarily relocating to urban areas in order to be able to show up for work. This indicates a major inconvenience caused by the *Efundja*.

Community members explained that limited mobility is a notable challenge during the flooding season. They emphasised that mobility remains a problem to a point where the affected residents who receive relief aid through the constituency office have difficulties accessing it. Moreover, the participants explained that they are usually "*forced*" into social distancing as they could not gather anywhere for any social interaction because the ground is always covered in water. Participants described this to be a form of changed livelihood as one claimed: '*People could not even go to church or gather for any of our usual religious gatherings or even socialise at the shebeens'.*

In some instances, the road infrastructure themselves are damaged or submerged so that no vehicle can use them. Specifically, low-lying bridges are usually on the verge of overflowing or being washed away as *Efundja* water flows with great pressure. Figure 5.6 shows a small local bridge that was submerged and people had to get out of the vehicle and cross by foot. Such a tendency becomes a challenge as the local people desire to move in and out of their villages to run their errands.

Figure 5.6: One of the local small bridges that has been submerged and passengers were forced to cross on foot

Source: International Federation of Red Cross, 2008. (*Image used with kind permission of Namibia Red Cross Society*).

Not only are road infrastructures destroyed or submerged, but there are times that they are damaged by the appearance of potholes, making it difficult to use them. This can be seen in Figure 5.7.

Figure 5.7: Road infrastructures damaged as a result of *Efundja* within the Cuvelai-Etosha basin

Source: Namibian Broadcasting Cooperation news (2020). (*Image used with kind permission of Namibia Broadcasting Cooperation*).

For the rural areas it is even worse. Residents use earth roads that become unusable whenever it is flooding.

Due to the above-mentioned factors and because vehicles in rural areas are unable to drive through deep water, community members are forced to resort to the use of donkey carts as means of transport. It is through the use of donkey carts that many people arrange to get their groceries with those who manage to go to town. Due to this limitation, community members are prevented from moving around to visit friends, receive their social grant or participate in any other social activities that sustain them or make up part of their livelihood.

Moreover, even the large businesses such as shopping malls and business complexes become difficult to access as water blocks entrances to such establishments, as seen in Figure 5.8. It is clear from the figure that no business or trading could take place as the entire business complex was filled with water.

Figure 5.8: Business complexes heavily flooded during the rainy season in northern Namibia

In addition to this, all types of business enterprises become affected including local shebeens which lose customers, mainly because most of them are no longer accessible since the entire surface is covered in water and also because potential customers are completely cut off and unable to leave their homes. A local business owner confirmed "*I could not open my shebeen because it was flooded up to knee level. Even my refrigerator got damaged because of water*'. During these floods, there are a few who persist in opening their business irrespective of the circumstances; however, their overall income drops drastically.

In addition to the above, the participants explained that they experience other access-related challenges such as limited access to health facilities, difficulties in mourning their loved ones and conducting funerals. Further access-related challenges include schools closing since it becomes a risk for learners to cross high levels of water to get to their schools. These are all briefly summarised.

5.2.2.1. Limited access to health facilities, increase in disease prevalence and deaths

During the floods, many people are unable to access health facilities for their medical follow-ups. Many participants could recall various incidents where urgent medical attention could only arrive through a helicopter because the ground was covered in water and no vehicle could drive through it. Moreover, all other health needs for old age pensioners, baby immunization, and antenatal visits become impossible as residents are unable to access health centres on scheduled appointments. A participant expressed that '*Most people with chronic health conditions suffered the most because they could not travel to obtain their medications*'. This implies that the overall health status of the

population worsens because most clinics close down and patients would need to go to the main hospital which is another challenge since all roads remain submerged.

Moreover, due to limited access to health facilities and the continuous wet environment, there has been an observed increase in water-borne diseases such as cholera and diarrhoea which is most prevalent in children. Community members said they feel that the wet environment exarcabates the occurrence of diseases such as Malaria since mosquitos breed better in wet environments. One participant stated that, '*Malaria cases goes up after every flooding season. Even our children get feet sores due to constant walking in water*'.

Not only does the *Efundja* reduce the overall health status of residents and increase disease prevalence but there have been cases of deaths associated with the *Efundja*. Many deaths were related to drowning or whenever people were attempting to cross the floodplains. One gentleman added, '*my wife drowned because she attempted to cross the iishana. The body was discovered only [the] following morning*'. There were also cases of those who were ill and due to difficulties in getting timely transportation to the hospital, they eventually passed on. Lastly, even in the process of mourning, residents indicated that they had difficulties mourning their relatives due to an inability to move around. One participant explained, '*At times the mourning has to be shifted to a relative's house because the mourning home was either filled with water or inaccessibl*e'. In most cases, the funeral was conducted at graveyards far away from the home because the local graveyard was under water.

5.2.2.2. The impacts on education and schools due to limited mobility

The negative impacts of *Efundja* do not end at household level. They affect different parts of society including the school system and education for rural communities. Since community members are aware of limited mobility during the rainy season, they make use of various mitigative measures to adapt to the difficulties posed by the *Efundj*a in an effort to ensure that learning continues. In order to avoid completely closing down schools, parents move their leaners to friends and relatives who live near schools, or ask learners to camp in the school premises if schoolyards are still safe. As one participant noted, '*The other measure we do is to make arrangements with some teachers who own cars [to travel with] our school learners. At times, depending on the age of the children, we would lift the children on our shoulders for them to cross the water*'.

These are temporary measures usually at the beginning of the flooding season and before school management resort to closing down of schools once the water level becomes too high and of too great a risk to learners. As illustrated in Figure 5.9, school grounds get covered in water and in some cases even the classrooms are filled with water. As for the school illustrated in the Figure, it

was impossible to continue teaching in such an environment because all the classrooms were filled with water.

Figure 5.9: Some schools are forced to close down as they are covered in water

Source: The Namibian (2020). (*Image used with kind permission of the Namibian*).

Most of the interviews revealed that the learners' education level worsens since most schools close down due to high levels of water within schools. One councillor explained: '*In my constituency, there are 18 schools, but only 4 to 5 schools remain in operation during the Efundja. The rest of the schools close down during that time'.*

Many schools remain closed down during the flooding season especially the lower grades such as the pre-primary grades up to grade 3 or 4 as the *iishana* are usually overflowing with water and it becomes a risk for young learners to cross the water. As the schools close down for almost a month, by the time they re-open, despite the contingency planning of teaching during weekends and holidays, a lot of time has been lost and overall learning outcomes are not attained as planned. Moreover, whenever schools close down, books and all other resources remain at school, hence learners are not able to do any homework or any learning activities for the duration of the flooding season. Along with degrading the learning process, books are also damaged as water sometimes flows into classrooms and other school storage facilities. All these factors point towards poor performances by the end of the semester.

In cases of relocation camps, the camp coordinators make efforts to have volunteers who offer classes to children. However, this remains a challenge as the children are usually not all in similar grades and the volunteers have to juggle between grades to offer learning for every learner present in the relocation camp. Therefore, the learning process is still unable to continue as it would have in a normal school environment.

However, participants affirmed that although the *Efundja* has been destructive, there are a few advantages to the events of *Efundja*. They expressed their preference of *Efundja* over droughts using a local proverb '*Keyelu kuliwe*' which means that it is better to have *Efundja* than droughts. They explained the proverb by stating that the Cuvelai-Etosha basin is relatively dry during the remainder of the year, and hence water remains a scarce resource in their societies during the dry season. Therefore they stated that '*the Efundja give us a refreshing and cooling environment when there is water in the oshana. This is a condition we would not trade for droughts'.* Moreover, participants explain that *Efundja* provides a breeding and nursery ground for fish, frogs and other aquatic species that many people eat or sell for a minimum income and mainly sustain their livelihoods that way. Figure 5.10 shows several women fishing for home consumption or for selling on the local markets.

Figure 5.10: Fishing is one of the advantages of *Efundja* in northern Namibia

(*Image used with kind permission from the headman*).

However, they explained that the ecosystem of the Cuvelai-Etosha basin has changed lately and does not support many aquatic plants such as water lilies and growth of grass which was used for

basket weaving in the past. They explained that in the past, the flooding ecosystem was the source for food, traditional medicine and grass that was mainly used for thatch roofing and mainly sustained their livelihoods.

In addition to the limited access discussed above, the participants expressed that poverty is another factor that influences how different households are affected by the *Efundja*. They emphasised that poor households are usually hard hit by the *Efundja* and struggle to make a living, especially during the flooding season. The link between poverty and *Efundja* is examined below.

5.2.3. Poverty and the *Efundja*

Another key challenge experienced by rural communities is the aspect of poverty. Poverty is generally increasing the vulnerability of people to the impacts of *Efundja* all over northern Namibia. This is mainly because of the evident discrepancies between the way of life in rural areas and that in urban counterparts. Resources, development facilities, service provision, employment opportunities and education facilities are not as available in rural settings as they are in the urban areas. Rural settings are usually the last to receive any means of development which in this context has influenced their vulnerability to the impacts of *Efundja*. The results of the study indicate that the *Efundja* is indeed enhancing poverty of residents within northern Namibia which is already fighting food insecurity. The area is said to be fighting poverty and food insecurity because, according to Spear *et al.* (2018), about 21% of the rural population depends on an old-age pension and other social grants provided by the government as their main source of income. The same report further stated that about 5% of the rural population relies on relief aid for *Efundja* and droughts, and donations and gifts as supplementary sources of income (Spear *et al.,* 2018). Although these grants and donations are available to these communities, they only help families for a short period of time because relief aid is only given for as long as *Efundjas* or droughts endure. Hence the aid is only enough to provide basic needs for a short period of time and cannot be used for any other services or invested in productive resources that can help families improve their food supplies (Spear *et al.,* 2018). Therefore, for a family that is already in such a predicament, facing the impacts of *Efundja* annually just aggravates their condition.

The communities expressed that one of the main challenges they face during *Efundja* is the fear of not having enough food to eat. This is because by the time it starts raining, many households who did not have a good harvest for that year would by then have finished all their *Mahangu* reserves and would require external supplements of food products. This was confirmed by the interviews with local-level disaster risk management officials and headmen when they stated that, '*usually [the] type of assistance many community members require during the times of Efundja is mainly associated with*

food. Although there are other needs such as housing, transportation, the need to move house belongings etc., food remains the priority for most of the affected community members.

This finding reveals that the level of poverty in the Cuvelai-Etosha basin has serious implications and worsens people's ability to face the impacts of *Efundja*. This is illustrated by how some families are extremely poor and generally do not own much, including oxen to plough which explains why they are food insecure. These families are food insecure because they rely on borrowing oxen from neighbours which they are likely to get only when the owners are done ploughing – usually past the optimal ploughing time. The result of this is that they will start planting very late. Though there are tractors in most villages, not all families can afford to use them and hence still rely on the use of oxen. With the ongoing changes in rainfall patterns, planting late has implications as to how much will be harvested because of the shortened planting window. Therefore, such families will harvest very little by the end of the season and will have to rely on begging and doing work for other families to sustain themselves for the rest of the year if they are not receivers of any social grants such as old-age pensions or orphans and vulnerable children grants (Spear & Chappel, 2018).

Moreover, many households experience a poor crop harvest because the *Efundja* usually kills the crops or damages them, stunts them or washes them away. One farmer stated '*if all my crops are swimming under water, I will be naïve to expect a harvest from such plants*'. Waterlogging is found to impact crop growth by affecting the availability of nitrogen in the soil especially if leaves and stems are submerged (Shifidi, 2015). Additionally, photosynthesis is also halted once leaves are submerged and plant growth can slow down or even stop, subsequently weakening and killing the plants (Goss, 2013).

Although crops differ in their tolerance to waterlogging and how they may be impacted by water depending on the type and growth stages, participants emphasised that their overall yearly crop production output decreases because of *Efundja*. Besides this, it has been revealed that many *Mahangu* storage facilities (*silos*) break down as the ground weakens whenever it becomes wet. These incidents cause enormous waste. The moment the grains come into contact with water such *mahangu* can no longer be stored for long and has to be consumed immediately. This also implies that such a household would have little or nothing to feed on for the remainder of the year. Once more, such an occurrence enhances food insecurity, by reducing community members' ability to face the impacts of *Efundja*.

All these factors put together worsen the situation of families that are already struggling to feed themselves. The impacts of the recurring *Efundja* reduce their coping capacity and ultimately push them further into poverty.

However, although *Efundja* seems to be more destructive than constructive, the interviews and focus group discussions revealed that it also brings some benefits to the local people. The next sub-section examines the various ways in which community ways of lives are changed by the occurrences of *Efundja*.

5.2.4. Changed way of life

Besides increasing poverty and reducing people's movement, the *Efundja* also affects people's everyday lives as well as their household activities. The impact on households is diverse, ranging from houses being washed away to women having difficulties preparing meals in their homesteads because the ground is severely wet or completely covered in water, as can be seen in Figure 5.11.

Figure 5.11: A rural homestead covered in water making it difficult for residents to cook or carry on with their normal lives

(*Image used with kind permission from a village headman*).

Residents become trapped in their flooded and soaked homes as flooded roads prevent them from leaving their properties. Not only does this change their ways of life but also forces them to change certain things about the way they live. A participant noted: '*During these Efundja, a family would relocate into one room into the farm where they would live for the rest of the flooding time until the water subsides if they have not moved into the main relocation camps*'.

Participants indicated that overall, *Efundja* makes their everyday life difficult, and most of them are unable to carry out their normal daily activities. The *Efundja* at times covers the surface of

farms, homesteads and livestock kraals which makes people uncomfortable in their own homes, as can be seen in Figure 5.12.

Figure 5.12: A large portion of the surface in northern Namibia is usually covered in water during the rainy season

(*Image used with kind permission from a village headman*).

Participants further explained that the *Efundja* disturbs their way of life even to the smallest details such as chickens unable to obtain any food since the ground is covered in water. Participants further explained that the bottom part of their building loses colour and a person is able to clearly determine where the water level ends inside a homestead by looking at the building walls, as seen in Figure 5.13.

Figure 5.13: The high water level that eventually destroys most of the non-concrete structures

(*Image used with kind permission from a village headman*).

As seen in Figure 5.13, due to constant water exposure, the buildings are destroyed especially if they are built with mud bricks. Because of the constant water exposure, even the concrete buildings over time wear down and require renovations. The need for renovation indicates an extra cost resulting from frequent *Efundja* experiences. However, for families that cannot afford concrete buildings and have traditional thatch roofs and mud-brick structures, these are easily destroyed and many such houses break down after every second year of flooding. The traditional home structures are mostly unable to withstand the effect of *Efundja* and hence many are destroyed, as is depicted in Figure 5.14. The figure illustrates how traditional housing structures are easily destroyed by excess water and this poses a hazard to families since the houses can collapse even while there are people inside.

Figure 5.14: A traditional hut that has collapsed due to excessive water of *Efundja*

(*Image used with kind permission of Namibia Broadcasting Cooperation of Namibia*).

Apart from the above, many families are relatively poor and cannot afford to purchase beds for all children in the homestead, hence children usually sleep on mattresses on the floor. During the flooding season, such arrangements are disturbed and homeowners are forced to devise alternative sleeping arrangements for their children in the homesteads. In the same way, the participants indicated that they tend to lose furniture and assets such as couches and refrigerators due to constant exposure to water which destroy them down and eventually causes them to deteriorate or even break. Overall, these communities expressed that their daily lives change because most of their daily routines, behaviour and patterns change with the *Efundja*. They concluded by stating that their daily lives come to a complete standstill during the *Efundja*.

Furthermore, the participants expressed that the *Efundja* changes their everyday lives, not only at the level of individual households but even to a point of changing the environment and biodiversity. The next sub-section evaluates aspects of the changing environment and biodiversity.

5.2.5. Changes to the environment and biodiversity

In terms of the environment, participants indicated a constantly changing biodiversity. Community members explained that there were *'constantly new and emerging species of living organisms such as worms, snakes, new hybrids of birds and vegetation types.* They have also noticed '*[the reappearance of] some old types of worms and vegetation that seem[ed] to have [become] extinct'.* They further emphasised that '*it was during these Efundja events that we first saw some new type of worms that we have never seen before'.* The communities explained that these reappearing worms destroy their crops and all other vegetation and that the worms are the reason why their crop production is reducing. Participants indicated that they could notice new types of vegetation such as types of grass growing in the *iishana* after *Efundja* events. They described '*We suspect that some vegetation types [may] have healing properties but they are poisonous to our goats once they feed on it'.*

Participants further explained that the Cuvelai-Etosha basin was known for its riches in terms of fruits, insects and all sort of living organisms. However, they could notice that after years of flooding, '*the richness of biodiversity was slowly dying off'.* Many trees were being uprooted, plants were dying because of the salty remnant in the soil and overall the richness of life was degrading over time. However, they noticed an increase in snakes that pose a danger to communities, both to humans and to their animals.

The communities further reported environmentally damaging trends such as water becoming darkish in colour. They expressed that *Efundjas* are causing *'gullies and ditches in the ground which is a serious danger to our children, vehicles and even to the livestock'.* They explained that '*even palm trees that we thought was stronger than anything, have been uprooted or dried out over time*'. Lastly, participants indicated that *Efundja* water was bringing waste into their communities such as plastic bags and all types of dirt. The *Efundja* was found to further cause land degradation (locally *referred to as okuhehula*) because as water flows, it washes away the fertile topsoil that contains fertilisers and most of the soil nutrients in the farms which is altogether contributing to reduced crop harvests.

Analysing all these impacts of *Efundja* as discussed in this section, indicates that it results in significant changes to the lives of the rural people of northern Namibia. It can be inferred that poverty

which includes lack of resources, poor infrastructures such as traditionally built homes, and lack of road infrastructures and transportation services are key factors in increasing the vulnerability of people to the effect of the *Efundja*. This means that people are unable to cope with its impacts because they lack resources and food to be self-reliant during the flooding season. This explains why the government sees a need to provide relief aid because most of the households cannot meet their daily or yearly food supplies. Although relief aid is a good thing to provide, from the government's perspective, it is clear that this form of response has become the acceptable national *Efundja* response mechanism which is being applied at the cost of developing a long-term solution to the *Efundja*. This signifies the need for a proactive disaster risk reduction framework as proposed in this study.

5.3. PHYSICAL LANDSCAPE CHARACTERISTICS OF THE CUVELAI-ETOSHA BASIN THAT ENHANCE THE *EFUNDJA*

The *Efundja* of the Cuvelai-Etosha basin is a natural phenomenon, but the basin's physical characteristics make the area prone to flooding. This section examines some of the physical factors that were found to be exacerbating the *Efundja*. The effects of climate change on *Efundja* in the area are discussed as well as the mitigation measures being used. The general terrain of the Cuvelai–Etosha basin is also assessed.

5.3.1. Cuvelai-Etosha basin as a floodplain

The Cuvelai-Etosha basin is a unique seasonal wetland made up of a network of water channels interconnected to form an ephemeral ecosystem. This water delta is shared between Namibia and Angola and consists of relatively fertile soils which have attracted human settlements over the years (Niipele *et al.*, 2015). The early settlers of the basin were known to have made use of indigenous knowledge to develop land-use systems and lived in harmony with the biophysical characteristics of the basin (Mendelsohn, 2013; Niipare *et al.*, 2020). According to Niipele *et al.* (2015), such knowledge has been lost and resulted in land management problems so that residents do not seem to live in peace with the environment any longer.

The basin receives water through the Cuvelai and Mui rivers flowing from southern Angola, a flow that is locally known as *Efundja*. This water mixes with the local rainwater and fills up the *iishana* and covers the ground throughout the basin (Mendelsohn, 2013; Cuvelai River Awareness Kit (RAK), 2018). This is a trend that has of late become aggravated according to those living in the basin. Although there are few high lying spots, the large part of the basin is a low-lying plain. According to one of the participants, '*The sporadic high-lying spots were the first targets of those who first settled in, but due to ever-increasing population growth, the low lying plain becomes*

habitable which is why the impacts of Efundja are imminent'. The landscape enhances the surface run-off and increases the overall flow of water, thereby making any *Efundja* preventative measures difficult.

5.3.2. Eroded streams

The interview responses revealed that the other contributing factor to *Efundja* is the fact that *iishana* or the streams that make up the network of the basin are now eroded. The streams are filled with sediment because of various environmental damaging effects such as land degradation, soil erosion and desertification that all contribute to the sedimentation of stream channels in the catchment area. One participant added that *'the iishana are now filled with sand, which explain why most houses are now flooded since water is spilling over from the overflowing iishana into our homesteads*". Participants expressed how it is even flooding in areas that have not been flooded before and thereby increasing the *Efundja* impacts.

Sediment enters the *iishana* or the streams as a result of human activities within the catchments such as all forms of infrastructural development that are taking place, animal grazing and human movements in the catchment. The moment these *iishana* are filled with sediment, it influences the flow which turns to scour new channels especially in the event of *Efundja*. This is the reason why some of the homesteads, crop fields or businesses are suddenly being flooded whereas they were not in the past. Such behaviour is explained by the fact that the shape and slope of *iishana* or stream channels and rivers change through time due to erosion, deposition, and transport of sediments which overall influences their stability (Garde & Raju, 2000). According to Schumm (1993), stream channels are considered relatively stable when the flow of water and sediment load becomes even over time. The *oshana* stability is regulated by water flow and sediment load. If any of these factors change, it influences the *oshana* length, width, slope, and meander pattern and thereby changing the surface/base level which is the level at which erosion starts from (also known as *local base level*) (Ryan, 1991; Schumm, 1993). When years of droughts or lean years of minimal flow or no flow occur, streams and floodplains become overgrown with vegetation. This results in a reduced flow and carrying capacity of the entire stream channel which means that if *Efundja* events return, such *oshana* or streams would either scour wider, deeper or sporadically scour a new channel across the floodplain thereby flooding areas that were previously not flooded. However, this is not the only hydrological explanation of why previously safe places are now suddenly flooded. Human interaction within the *iishana* also forces streams to scour new channels across the floodplains because there are new developments in the former channels. Because of this, a large volume of water may be causing destruction in areas that were previously considered safe and because of that destroying any

subsequent properties, crop fields or assets. This is precisely the condition that explains the changing morphology of stream (*iishana*) channels within the Cuvelai-Etosha catchment and is believed to be enhancing the *Efundja* in northern Namibia.

Therefore, the Cuvelai-Etosha basin needs a strategy to minimise the sedimentation into the stream channels and thereby prevent them from scouring into new places. Literature indicates that it's a difficult and expensive exercise to remove sedimentation once it enters into streams of channels and rivers (Schumm, 1993). It has therefore been recommended that preventive measures aimed at reducing further sedimentation are usually the better alternative (Schumm, 1993). As for the Cuvelai-Etosha basin, though it may be impossible to prevent channel sedimentation from animal grazing, humans fetching water and drinking livestock, avoiding intentional developments within the stream channels would serve the purpose. Establishing measures to avoid people settling within these areas will not only prevent sedimentation but also generally reduce the risk of people being flooded.

5.3.3. Climate change

According to Angula and Kaundjua (2016), there are signs of changing climate all over the world and Namibia is no exception to this. It has been revealed that some countries are becoming hotter while others are becoming colder. In Namibia, there has been evidence of the rainfall season starting later than in the past and whenever it rains, it has been so heavy that it causes damage to the environment. The changing climate has increased the frequency of *Efundja* and droughts in the area. The participants stated that lately they have observed the rainy season to only start later in December through to April while in the past the rain season started as early as October or November. An elderly lady remarked that '*the change in rainfall timing has affected our harvests which is all rainfall-dependant and generally negatively impacted all our farming practices*'. This change in the timing of the *Efundja* means that the *Efundja* water reaches the study area when the crops are still small and can easily be washed away. This pattern has only been emerging recently because in the past decades by the time *Efundja* hit, the crops were big enough to withstand the water flow.

Having their crop and livestock productions negatively affected means that their resources are reduced and they sometimes have to spend money on securing food for their households while in the meantime their incomes have stopped because they cannot access local markets where they usually earn their incomes. The Cuvelai-Etosha basin is a wetland-based type of ecosystem, which is said to be struggling to adapt to the changing climate because the soil has become infertile and with limited water, the yields can no longer sustain the people's livelihood. By the time the *Efundja* hits, it affects households that are already struggling to feed themselves. At the same time, the Cuvelai-Etosha basin apparently houses some of the poorest people, according to a National Statistical Agency (NSA)

report (2018), hence it is these poor people who are struggling to earn a livelihood from their farms because of the effects of climate change. The literature indicates that this group of poor people in the Cuvelai-Etosha basin is already struggling with food insecurity and thus the recurring *Efundja* events usually worsen their situation.

5.4. HUMAN INDUCED RISK CONTRIBUTING FACTORS

Although the physical characteristics of the Cuvelai-Etosha basin discussed in the previous section are of a natural wetland, it is believed that there are human factors that are enhancing the occurrences of *Efundja* in northern Namibia. The risk of *Efundja* in northern Namibia is enhanced by various human behavioural patterns that are discussed in this section. These factors range from human behaviour, policies and laws that neglect disaster risk management measures, to place-based cultural beliefs and the development of recent infrastructure. These factors are illustrated in Figure 5.15.

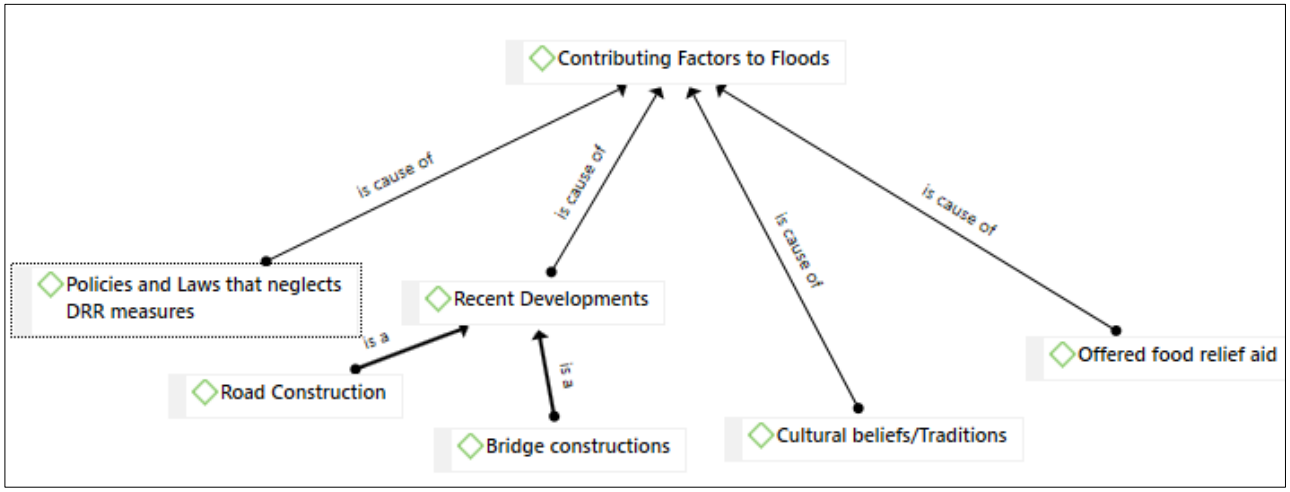

Figure 5.15: Factors contributing to increased risk of *Efundja* in the Cuvelai-Etosha basin

This section discusses the factors illustrated in Figure 5.15, starting with policies that neglect disaster risk management measures.

5.4.1. Policies, laws and community behaviour which neglects disaster risk management measures

Most participants indicated that the *Efundja* risk in the Cuvelai-Etosha basin is greatly influenced by human behaviour. All participants inclusive of national-level disaster risk management officials agreed that the behaviour of community members and of authorities both at the national and local levels were found to contribute towards the risk of *Efundja* in the Cuvelai-Etosha basin. They pointed out that this to takes place in the following manner. The behaviour of national level authorities was found to increase the risk by enforcing policies and laws that promote the development of

infrastructures in *Efundja* prone areas. Participants gave examples of policies which stipulate that clinics or schools can only be established outside a certain radius which often falls within *Efundja* prone areas. For example, a participant stated that '*sometimes it's the law that states that in your village you cannot have a clinic or school because it will be too close to the next clinic or school, hence it should be moved to the next village which may be heavily flooded'.* Such policies, although meaning well, contravene the principles of disaster risk reduction. This is taken to have two meanings: either the policy makers are not aware of DRR issues which explains their lack of consideration of DRR matters when devising policies and strategies, or, DRR is simply not prioritised on policy and strategy platforms.

In the view of the above, development of schools or clinics proceeds with no consideration of DRR issues because of the need to adhere to policy regulations. Although most of the local-level disaster risk management officials may sometimes be aware of and understand the potential risks of such developments, they are usually unable to go against the rule of law of national policies and regulations.

In addition to the above, certain community members' behaviours were also found to contribute to the risk of *Efundja* by choosing to settle in *Efundja* prone areas either knowingly or unknowingly. Such behaviours were found to have cost many community members their assets. An example of this is shown in Figure 5.16 where an individual insisted on settling in a *Efundja*-prone area and his structure was eventually flooded even before the construction process was complete.

Figure 5.16: A resident choosing to build his house in an *Efundja* prone area

(Image used with kind permission of the village headman).

The habit of residents choosing to settle in *Efundja*-prone areas has been observed by several headmen. It was noted that, *'If you look at the landscape, one can see how the blockage of water flows within the basin is being caused by individuals' developing in the iishana, at times even to a point of collecting sand blocks to elevate their new developments within the floodplains'.*

It was further explained that there were community members who would insist on setting up their structures in specific *Efundja*-prone areas because of deliberately choosing to live in a specific location. These individuals would insist on settling irrespective of the counsel from the authorities and would first increase the elevation of their land by using sand blocks before the commencement of the construction. Such a practice was found to only benefit these developers, yet disadvantage the neighbours by shifting the *Efundja* water into their properties and hence increasing their vulnerability. The neighbours who have existing structures do not always have the means of doing the same and hence they suffer the consequences of increased water volumes collecting in their properties. This was found to be a common practice which is continually becoming a challenge as the effect of *Efundja* has now shifted and enhanced those living in the peripheries.

Such a behavioural practice indicates a lack of understanding of the risk and its consequences among residents. Therefore, it highlights the need for risk reduction measures to consist of awareness creation programmes targeting behavioural and mind-set changes to effectively reduce the risk. It also highlights the need for DRR measures that would encourage communities to begin to view the *Efundja* as an opportunity that needs to be subtly handled to reap its fruits. These educative programmes should educate communities on how to appropriately handle water and how it can be used to their benefit. acknowledge that though the physical attributes of the landscape may be low lying, the land can still be utilised in a way that does not only cause harm to residents but also benefits them.

5.4.2. Inappropriate planning of developments

The tendency of developments contributing towards the risk of *Efundja* is not only practised in small scale developments but also in the development of large-scale infrastructure such as bridges and road construction. Community members, headmen and the local-level disaster risk management officials emphasised that recent developments of bridges and roads took place in the middle of *iishana* with minimal or no consultations with community members and lacked proper spatial planning. Such developments are found to exacerbate the impacts of *Efundja*. This is because they are placed within depressions and built with few drainage features or culverts that could permit easy flow of water. These participants explained that as water flows through the basin, whenever it reaches the *iishana*

of the Namibian side, it begins to encounter obstructions of new developments, houses and businesses which altogether hinder its natural flow.

It is in this manner that water flow is disturbed, diverted from its natural course and forced to disperse into different directions where it is then forced to disturb people's livelihoods as described in Section 5.3.2. The tendency of scouring new stream channels was also found to decrease the *iishana* carrying capacity, causing stream channel flow to spill water into neighbouring areas and hence cause more harm to more livelihoods. These statements were echoed in many responses and one woman expressed: '*The infrastructural developments of housing and road construction are somehow blocking the flow of water. This is why we are flooded'.*

Participants referenced Okalongo village settlement as an example of inappropriate planning. Since the village council has been developed with no spatial planning and limited drainage culverts, whenever it rains it is always submerged in water. The study could verify poor architectural designs and ill spatial planning of the village council by observing the degree of *Efundja* that occurs in the area. However, the responses from the national disaster management officials repudiate this viewpoint and they asserted that all infrastructural developments are done with appropriate spatial planning policies and are designed cognisant of the nature of the environment.

5.4.3. Cultural beliefs and traditions

Besides the human behaviour and ill spatial planning of developments, cultural beliefs were also found to contribute towards the risk of *Efundja* within the basin. This was confirmed by the community members themselves and even the headmen and both local-level and national-level disaster risk management officials who emphasised that cultural beliefs were found to have an influence on how and where people live and whether they will decide to permanently relocate or not. Culture is defined as a way of life that is expressed in certain beliefs, values, customs and morals, and is believed to influence the decisions of some of the people of northern Namibia. Culture is differentiated between material culture which consists of social reality that is embedded in tangible matters such as objects and buildings, while non-material culture comprises non-physical ideas that people have such as beliefs, morals, networks, values and behaviours (Kulatunga, 2010). These beliefs, morals and values sometimes affect how people react to disasters. As for the Cuvelai-Etosha basin, many residents residing in vulnerable areas were advised to relocate and many refused to relocate by claiming that they were unable to move from their ancestral land that they have inherited from their clans. A 62-year-old female stated: '*We have buried my mother and grandmother here, how do I leave them to go live in a foreign region?*'

At the same time, others refuse to relocate because of the fear of changing tribal authorities. Residents would claim that they have always belonged to one tribal area, mastered its practices and forged relationships with the kings and the people. However, should they move, they will have to start over and do the same which is something they are not keen on doing. They added that by relocating they would would need to change the type of livelihood they were accustomed to and adapt to a new way of living in their new home. These were found to be some of the primary reasons why many vulnerable residents feel permanent relocation is not the best option for them. In many of the interviews, participants expressed that '*If I relocate, then I run out of salt, to whom do I go to ask for help when I don't know anybody there?*'

These quotes indicate the strong cultural ties and attachments community members have to their places of residence which they are not willing to break. Adding to that, the attitude of being reluctant to relocate implies that they have identified and rated the significance attached to ancestors as much higher than the threat from *Efundja*. This indicates that the places where people live become more than just a village, but a strong bond that ties them to their respective societies. Though the *Efundja* may be a significant risk, communities are willing to overlook that over their existing cultural ties. This concurs very well with literature which argues that the way vulnerable communities perceive the risk of hazards can also be shaped by their culture or behaviour (Kulatunga, 2010). Kulatunga (2010) claimed that despite the causes of the damage by disasters, some vulnerable communities may not always attach much value to the occurrences of hazards. He argued that amid a hazard, cultural factors influence people's behaviour and decisions. This happens in such a way that in an event of a hazard, people may not always consider the possibility of loss or damages they may experience but rather attach a greater importance to their social values such as religious belief, rituals and attachment to a location (Kulatunga, 2010).

5.4.4. Offered flood relief aid

There is a perception among several national-level disaster risk management officials that the idea of government dispensing flood aid relief is making the affected population lazy to work on their own and thereby increasing their vulnerability to *Efundja*. The flooded communities are perceived as becoming more vulnerable because they are believed to strictly live on the provided relief aid. Some leaders expressed that because of the provided flood aid relief, many vulnerable households do nothing for themselves but rather sit and wait on the government to provide for all their needs through relief aid, therefore creating what they referred to as a '*dependency syndrome*'. A number of the local and national-level disaster risk management officials repeatedly expressed: '*If the government can*

reduce or stop all emergency relief food aid, the people would have no choice but to revert to their coping mechanisms of dealing with the Efundja'.

The participants who affirmed this insisted that the government is spoiling the people by providing what was not even needed in the first place. They claim that when people are relocated to the camps, they are provided with tents, food, blankets, medication and other items which are apparently labelled as '*unnecessary provisions*'. A number of participants expressed the need to reduce the amount of assistance offered to *Efundja* impacted people otherwise it may begin to attract views of being privileged.

However, this study contrasts with the notion of the '*dependency syndrome'.* The results of the study present a different view on this matter. The study found that there are more cases of extreme poverty which means that the *Efundja* worsens the livelihoods of the people that were already struggling to make a living. This is also evident in the national household and expenditure survey of 2018 which states that about 18% of the population is living under the poverty line. Therefore, the provision of *Efundja* relief aid cannot encourage people to become poorer by choosing to do nothing. In addition to this, the relief aid items provided are not items that can enrich or fulfil one's needs in such a way that they sit back and relax. Moreover, the aid relief is only provided for the duration of the *Efundja* event and households have to find means to survive for the remainder of the year.

The view of extreme poverty is further supported by the Namibian livelihoods assessment report which states that most of the poor rural households rely on disaster relief aid and social grants as their main source of income (Spear *et al.*, 2018). This livelihood assessment is a vulnerability assessment that is conducted nation-wide on the state of food security as a way of monitoring national food security (Spear *et al.*, 2018). The findings of these assessments for some years revealed that there is a segment of the population that cannot sustain themselves throughout the year and cannot make it to the following cycle of harvest. The assessments mostly recommended that this group receives food aid supplements to make it to the next cycle of harvest (Spear *et al.*, 2018). Therefore, it can be inferred that, instead of the *Efundja* or drought relief aids enriching these households, it supplements their food availability and only offers temporary relief. These households still need to find means to survive for the remainder of the year. Hence it can be concluded that the provision of *Efundja* or drought relief aid only offers temporary social protection or temporary food safety nets and should not be seen as another factor increasing vulnerability.

This chapter has stipulated the demographic information of participants, the physical and human characteristics of the study area and demonstrated the degree of negative impacts caused by *Efundja*. The chapter also revealed how the affected people themselves are contributing towards the

risk of *Efundja*. The suggestions on how the associated negative impacts can be mitigated and proposed mechanisms on how to overcome the stipulated challenges are described in the proposed proactive disaster risk reduction in Chapter 8. These suggestions and mechanisms discussed in Chapter 8 exhaust the underlying factors that need to be addressed in order for the country to attain reduced levels of *Efundja* risk. The approach to address these underlying risks is a combination of effort from both the government, stakeholders and the communities themselves. Chapter 6 presents the views and experiences of *Efundja* in northern Namibia from a community perspective.

CHAPTER 6:
COMMUNITY VIEWS AND EXPERIENCES OF *EFUNDJA*

This chapter presents the findings on the responses of community members, the main target of this study. The chapter specifically deals with the responses, views and experiences of the study participants. It discusses the views of the heads of households who are the community members who participated in the focus group discussions. Further, this chapter examines various ways in which the communities respond to *Efundja*, their mitigation strategies, their capacities and the resources they utilise to fight the impacts of the prevailing hazard.

The chapter commences by discussing the various response mechanisms which the communities apply in order to protect themselves, their households as well as their livestock. Furthermore, it explains communities' perceptions of their capacities and whether they are ready to face future *Efundja* events as compared to past events. It analyses the capacities and resources of the communities and how these resources can be used to enhance and promote their resilience and strengthen their ability to face *Efundja*. The chapter further examines these communities' views on the issue of permanent relocation and continues to discuss the various collective measures which these communities engage in to deal with *Efundja*.

The findings indicate that the communities demonstrate a low level of capacity and resources required to face *Efundja* and they generally have a negative outlook on their capabilities. Therefore, there is a solemn need for capacity building in order to enhance their ability to face the future *Efundja* events. The chapter concludes by evaluating various practical mitigation measures that communities apply to overcome the day-to-day *Efundja* difficulties.

6.1. COMMUNITIES' RESPONSE TO *EFUNDJA*

The heads of households were asked to discuss their ways of responding to the recurring events of *Efundja*. They indicated that, besides the temporary relocation offered by the government, they have no standard response. However, they explained that over time they have developed ways of mitigating the effects of *Efundja* and have had to learn to live with it by engaging in various activities which are done at household level as well as at community level. This section examines these various activities. The participants explained that these measures of response to *Efundja* usually take place between the onset of the rainy season and well before the establishment of the relocation camps by the government. These responses include moving to relocation camps, seeking pasture for

livestock, responding to difficulties as they come, and generally finding adaptive measures to the changing environment.

6.1.1. Moving to relocation camps

The most common and usual type of response is the regular relocation to the temporary pitched tents. The residents whose homes are filled with water are normally temporarily accommodated in temporary shelter camps which mainly comprise tents, as seen in Figure 6.1.

Figure 6.1: The temporary camps that accommodate the relocated residents

The decision to relocate is taken as the last resort when all mitigation measures fail. Relocation is a measure taken when the water level exceeds people's capacity to the extent that there is nothing else they can do but move to the temporary shelters. The participants explained that they get to relocate by first reporting themselves to the headmen who then approaches the local-level disaster risk management officials and requests assistance. Once the local-level disaster risk management officials are informed, depending on the number of people affected, he would relay the information to the regional governor who endorses a relocation camp. The headmen are then tasked with the responsibility to identify a suitable area at which the temporary shelters may be erected. At the pitched tents, sanitation facilities, food and water are provided by the government in conjunction with local or international donors.

While many homesteads may relocate to the common relocation camps, there are still several individual households who do not like to join the temporary shelter at the tents. They prefer to move by themselves within their farms by identifying a high lying spot which is where they stay for the

duration of *Efundja* time. The participants explained that such a practice is adopted from traditional practices of a long history of relocation during the years of *Efundja.* As one participant, a 67-years-old community member, recalled: '*throughout the long history of Efundja*, o*ur forefathers would relocate to different spots within the farm or choose to relocate into one room into the farm where they would live for the rest of the flooding time until the water subsides'.* Another one adds '*During the course of the year, we had to learn to observe within our farms which spots are relatively safe/high elevated with a thought of earmarking it for relocation during the rainy season. We would sleep and do everything in that room while waiting for water to subside and return to our homestead'.* However, currently such a practice poses a challenge because the nature of building materials such as concrete makes it impossible to relocate in such a manner. This is because concrete buildings cannot be moved like the thatch and stalk types of materials that could get relocated easily.

Besides the temporary relocation, participants revealed that some residents in different villages of the basin have permanently relocated to places that are not affected by *Efundja*. Many of these households relocated under the government relocation initiative that offered transport means to those who were willing to permanently relocate. The government came up with an initiative to facilitate relocation for those who were willing to relocate by transporting their goods to their new homes. Individuals who needed this service only had to report their names to their local-level disaster risk management officials and the transport would be provided. Although this was a good initiative, communities responded that it was not positively received as relocation is not a commonly practised cultural norm.

Although temporary relocation is the most common immediate form of response that protects many families from the immediate impacts of *Efundja*, it has other negative outcomes such as overcrowding, needing to adjust to a new living environment of tents, increased alcohol abuse and theft – both at the tents and the abandoned homesteads.

6.1.2. There is no standard response, everything is done as it happens

Participants from the affected communities stated that there is no standard mitigation approach or response approach to *Efundja*. As one participant said '*There is no fixed response approach that we apply, but we respond as we go along depending on the need at a time'.* They emphasised that every response mechanism is usually applied as problems come or whenever convenient or practical. The participants stated that most of the mitigative measures they practise are done out of desperation and out of not knowing what exactly to do. They added that in most cases, whatever measure they practices is most probably what they have seen done elsewhere or adopted

from traditional practices. As one participant claimed: '*Nobody thinks of something new unless they saw it before. Hence, one only thinks of doing something we have seen or heard that was applied somewhere'*. They emphasised that on their own, they are still not able to appropriately mitigate or respond to the impacts without being formally trained to do so. For this reason, they are requesting for educative programmes to teach them about the hazard and how they can prepare and respond appropriately to the *Efundja*.

In support of the above quotes, besides not having a defined standard form of response, there are still those who indicated that they do nothing because they feel they have no means of helping themselves. These community members claimed that they do not have any way of fighting back. One of them stated: *'For us, we didn't (and still don't) have any way to fight back with. Our houses are made out of wood & thatch roofs which makes it more easily washable by Efundja. Also when water comes, it comes from different directions (not one specific point). One does not even realise how water gets into the homestead and would wake up to a homestead engulfed by water and there is little that can be done'*.

This was a common response from homeowners who had a relatively low socio-economic standard. These were mostly female-headed households, widowed or homesteads that had nobody with a formal source of income. Such homesteads are mostly built with mud and the participants explicitly explained that in their condition they feel hopeless as they watch the *Efundja* destroy their homes as it is beyond their ability to manage. They explained that they have no male support or resources to help fight the *Efundja* and to improve their situation. Hence their only hope is that the government assists them in any way possible.

The plight of widows and female-headed households in these communities illustrates an increased level of vulnerability. This increased level of vulnerability is linked to the average income a household lives on. The average income per household directly influences the type of housing material that can be used for that household.

Historically, rural homesteads were built of wood known as *iifini*. A room was constructed using *iifini* as a wall and grass (straws) as thatching for the roof. Houses that are still built of this type of material are most vulnerable to *Efundja* as they can easily be washed away compared to all other types of building materials. This view is supported by Shifidi (2015) who differentiated between high, medium and low economic vulnerable households. In her classification, high-socioecomic vulnerable households are homesteads that are built of bio-degradable building material such as grass, stalk and mud. The medium-socioeconomic vulnerable households are homesteads built of wood that lasts a

bit longer than grass, stalks and mud (Shifidi, 2015). The low-socioeconomic vulnerable households are permanent structured homesteads that are built of concrete and cement walls. The high and medium socioeconomic vulnerable households are more at risk of *Efundja* as the building materials are not strong enough to withstand the impacts of moving water. The low-socioeconomic vulnerable homesteads that are built of bricks and mortar are the least impacted as they are stable and strong enough to withstand the water pressure.

The average income per household influences what type of building materials will be used. The higher the average household income, the greater the likelihood for such a household to use concrete and stable materials which are less likely to be impacted by *Efundja*. Therefore, it can be said that the type of housing-material and average income per household may be regarded as forms of vulnerability that can generally predict how a household may be impacted by *Efundja*.

6.1.3. Seek livestock grazing land

Community members explained that as soon as the *Efundja* season commences, many livestock farmers begin to search for elevated grazing land to keep their livestock. These local farmers are willing to take their livestock as far as 100km away if there are no suitable places in their surrounding areas. This has resulted in many farmers seeking grazing land for their livestock as far away as Angola in some cases. One farmer stated, '*We would make our cattle wade in the over-flowing flood plains (iishana) and take them to afar places where there is at least a grazing land'.* Figure 6.2 shows several farmers returning home from southern Angola in search of grazing land.

Figure 6.2: Cattle farmers from some parts of the Cuvelai-Etosha basin returning with their animals from Angola

Source: NBC News, 4 March 2020 (*Image used with kind permission of the Namibian*).

This practice has been adopted from one of the old farmers' traditional practices of establishing what is known as *cattle posts*. Owing to the fact that the basin is equally prone to droughts, farmers would travel long distances looking for pasture during the drought years. Once they found reasonable pasture, they would create a temporary shelter to settle for as long as the pasture is good and repeat the cycle by travelling to different places until such a time that the pasture has regrown back home when the rainy season has commenced. Cattle posts have been one of the common traditional farmer practices that is still practised to date because of the inconsistent climatic conditions of the Cuvelai-Etosha basin which does not support consistent growth of pasture. Farmers in the study area thus adopted and practise this habit because *Efundja* causes the surface to be covered in water which reduces pasture for their livestock.

6.1.4. Find adapting measures to changing environment

The focus group discussions revealed that community members respond to *Efundja* by changing their ways of life in order to adapt to the changing environment. They do this by finding adaptive mechanisms to readjust their household's daily activities. Some of the mitigation measures meant doing things differently, doing new things which at times was uncomfortable and implied changed everyday lives. Some of these measures and practices are described below.

- Since the surface becomes covered in water, including the homestead grounds, many households have to change their way of cooking or preparing their daily meals. Cooking is usually done on an open fire on the ground and thus during Efundja, households need to find empty steel containers to make the fire to prepare meals. This is a change that many described as inconvenient but necessary.
- Households collect sand to make sand embankments to surround individual rooms within their homesteads, hoping that only a minimum or no amount of water can penetrate the rooms.
- Households that have pensioners move them to their relatives and family members that reside in the non-flooded areas.
- When water enters the houses, many people place their valuable goods higher and their beds on top of bricks so that they don't get wet.
- In most cases, the local school boards recommend for the schools to either close completely or for learners to camp inside the school grounds. Schools with only lower grade learners and where water poses a real threat close completely. Schools with unflooded grounds usually remain open instead of losing all the time of teaching when

schools close. The decision of allowing learners to camp at the school depends on the dynamics of schools and cannot be applied to schools with lower grades with young children. In addition to this, some take their learners to relatives who are closer to schools or to those who live in non-flooded areas.

- Community members usually travel in groups whenever they need to leave their homes for safety reasons.
- Once the water begins to collect inside homesteads, kraals or farms, many community members dig trenches which allows the water to flow away. Such trenches are usually dug in the direction leading to iishana so that water flows back to iishana. Community members explained that this was one way that helped many residents not to live in soaked homesteads.
- As the ground becomes wetter, it becomes weaker – to the extent that the Mahangu storage facilities (silos) stand a risk of breaking down. Therefore, as a preparation measure, people try to elevate the Silos (Mahangu storage facilities) to prevent them from getting wet or breaking down.
- Whenever people in villages, and who own vehicles, hear reports of Efundja approaching in the neighbouring regions, they their vehicles upland next to the tarred road. This is done because the water level sometimes remains too high to drive through and it would mean that vehicles would not be able to move until the water subsides. The elevation of the tarred road is slightly higher and hence the vehicles are safer than in the villages.
- There are times the roads are submerged and community earth roads are invisible and cannot be used. Homeowners with properties adjacent to earth roads then permit residents to walk through their farms.
- Homeowners conduct house renovation for the subsequent year to elevate the rooms that need to be repaired. This is done in preparation for *Efundja* in the following year. The renovation done depends on the type of rooms. For thatch rooms, they renovate the ceiling as well as fill it up with sand to increase its elevation while the concrete type of rooms is renovated by increasing the foundation level.
- Overall, since the entire surface is usually covered in water, residents find means of coping with life during *Efundja* by using their logic. For example, if a resident goes shopping, they will have to carry groceries on their head in order to cross the *oshana* to avoid the groceries getting wet.

Considering these responses and mitigative measures, it is evident that they are practical measures with the potential to mitigate some of the impacts of *Efundja*. These forms of responses also indicate the degree of abilities within communities especially that they are willing to collectively engage in some of the activities. However, these communities expressed their lack of confidence in executing these measures and stated that they lack empowerment and need to be shown the right way of responding and mitigating the impacts of *Efundja*. This means that there is a need for empowerment of community members through public education and *Efundja* awareness programmes.

Considering the manner in which community members respond to *Efundja*, it only partly aligns with the headmen responses but completely deviates from the national disaster risk management officials' responses which came from government officials that are concerned about organising temporary shelters swiftly. On the other hand, the headmen responses discussed in Chapter 7 deviate from the responses of the national-level disaster risk management officials. The misalignment between headmen responses and national-level disaster risk management officials is most probably because although headmen are expected to carry out their authoritative roles in their position as headmen, they are also community members and their responses are mostly practical just like the rest of the community members. The gap between the community and headmen responses and the responses of national-level disaster risk management officials indicates the need for integration of these three types of responses into the overall national governmental *Efundja* response approach.

Besides the response measures to *Efundja*, community members were asked about the process involved to receive any type of assistance from the government including temporary shelters. The responses indicate that the participants are aware of the procedure they have to follow in order to receive government assistance. The procedure is simply reporting themselves to the headmen who relay the information to higher authorities until the assistance is received. However, no mention of community-based committees was made at any point as a way of assessing the risk among the vulnerable communities and making a decision which is then taken up to higher offices. While this is true, the responses from the local-level disaster risk management officials indicated a limited understanding of risk reduction and revealed the non-existences of the constituency disaster risk management (DRM) committees. This statement concurred with community members' responses stating that the local-level disaster risk management offices are focused on provision and coordination of temporary shelter more than anything else.

The lack of awareness of community members, headmen and local-level disaster risk management officials with regards to the operations and existence of community-based DRM

committees shows a huge gap within the overall *Efundja* response by the national-level disaster risk management officials. The national response team needs to be cognisant of community members' responses to *Efundja* and use them as a knowledge base for its overall response.

Lastly, the lack of awareness by community members, headmen and local-level disaster risk management officials regarding the operations and existence of community-based DRM committees indicates another gap in the implementation of the national-level disaster risk management framework as stipulated Disaster Risk Management Act, Act number 10 of 2012 which was discussed in Chapter 2. This gap is due to the fact that the national-level disaster risk management framework ignores community-based mitigation or responses in its targets and key performance areas. The framework needs to be cognisant of community voices by actively engaging them. If the national disaster risk management framework was appropriately implemented, communities, headmen as well as local-level disaster risk management officials should have been able to explain the existence of community-based DRM committees as well as their operations. A detailed description of the national-level disaster risk management officials' response to *Efundja* is given in Chapter 8.

6.2. COMMUNITIES' RESOURCES AND CAPACITIES

The capacity of community members refers to the assets and resources that they use to cope with and recover from hazards (Wisner *et al*., 2012). It also involves opportunities and resources ranging from natural resources, physical resources, and human resources to social resources, economic resources and political resources. According to Gaillard (2010), natural resources involve aspects of having enough food to eat while physical resources involve safe housing and infrastructure. Human resources include strength, knowledge and skills to face hazards while social resources include solidarity and social networks. Economic resources refer to financial means and political resources include leadership and decision-making abilities. Delica-Willison and Gaillard (2012) emphasised that these six forms of capacities describe the resources and assets a community will use to resist, cope with and recover from disasters. Communities employ these resources in order to prevent, resist, cope with and recover from the impacts caused by hazards. Wisner *et al.* (2012) further stated that although both reducing vulnerability and strengthening capacities are effective risk reduction measures, it is easier to enhance capacities than to reduce vulnerability. Hence, Wisner *et al.* (2012) advised that capacities must be recognised and used because the more a community has a sturdy capacity, the more it will be able to become self-reliant and face the hazard with minimal external assistance or support.

Therefore, the present study adopted these six capacities to determine the capacity of the communities in northern Namibia. This section examines the findings relating to these capacities by

discussing the type of resources the communities of the basin identify with the most. This section further deliberates on community members' mitigation measures which underline any of these resources that are essential for achieving resilience.

6.2.1. Communities' capacity to deal with the *Efundja*

Community members were asked if they believe they have the capacity to face the risk of *Efundja*. The concept of "capacity of community members" was clearly explained to them and it was also clearly elaborated that it includes the ability to use or access the needed resources and is not only limited to the availability of these resources, as per Wisner's (2012:28) definition. The results showed that 55% of the participants indicated '*Yes*', they believe they have the capacity to face *Efundja*, while 45% said '*No'*. Each group of participants was asked to motivate their answers. The group of participants that indicated a positive response towards possessing capacity motivated their answers with the following reasons:

- Communities are able to face *Efundja* provided that they could avoid purposively settling in prone areas. That way vulnerability to *Efundja* will be minimised which implies that minimal effort will be required to fight it.
- Owing to the fact that they were in a position to raise funds and initiate community projects of constructing access roads within their respective communities indicates a degree of capacity. The study verified that indeed certain villages have attempted to construct pedestrian bridges or dig earth dams but could not succeed as it required specialised digging equipment that they could not afford.
- The ability of community members to help one another during relocation indicates a degree of capacity and cohesion among community members.
- As no form of training is offered, and people are still using their inborn knowledge and logic to mitigate the impacts they experience illustrates another degree of capacity. Should they receive formal training and guidance on risk reduction matters, it may enhance their ability to face the hazard. Along with this, participants explicitly requested that they need to be taught how to deal with *Efundj*a, what to do, how to do it, and when. As one participant attested: '*There is no way local people will be able to effectively reduce the risk without training and being showed what to do. People need to be trained and showed that: "this is what you do when faced with a particular problem". Then that way they can be aware and ready to act whenever Efundja come*'.

The required formal training can include equipping children with swimming lessons as well as educating community members on how the flow of water works which may bring about an attitude change. In addition to this, they stated that they need to be trained on how to use weather as a preparation tool and be able to take up measures on the conditions of the weather that is expected.

- Local people work together to collect sticks, sandbags, bricks and all types of building materials to repair the destroyed roads. Although they lack skills, this shows their willingness and eagerness to work together and thus indicates a degree of capacity.

The above reasons indicate that community members are indeed aware of their social capacity. While social capacity is described as "sets of knowledge skills, commitments, and resources required to effectively plan and implement a particular common goal" (Mumford *et al*., 2000:25), it can be implied that the ability of these communities to work together as described above is a good indicator for stronger social cohesion that strengthens social resources. Chaskin (2001) explained that the presence of social capacity in a society may also be expressed by the existence of relationship networks, availability of leadership and the ability of such a community to do collective activities and problem-solving. These communities also show strength to face *Efundja* as well as have the ability to apply their knowledge from past experiences which altogether highlights the presence of human resources.

However, besides those who believed that the communities have capacity to face *Efundja*, there were those who indicated that they do not think they have the capacity to face *Efundja* and motivated their answers with the following reasons:

- Communities are facing a challenge of diminishing safe land for settlement.
- They cannot reduce the risk in any way but believe the solution can only come from the scientific world. They believe that *Efundja* is beyond their ability to confront and do not see themselves contributing to the permanent solution in any way.
- *Efundja* still causes panic, stress, discomfort and turmoil with some people getting admitted to hospitals with complaints pointing to its effects. This can be taken as an indication of the inability of community members to handle *Efundja*.
- The fact that people consider relocating to temporary shelters can also be considered as an indication of inability to face *Efundja*.
- Whenever *Efundja* comes, participants don't have the means of fighting back which can also be taken as another indication of inability to face the hazard.

- *Efundja* in the basin is like the world-wide type of floods such as Louisiana floods in Texas–Oklahoma in the United States. Participants expressed their incapacity and discouragement in fighting it in a view that, '*if the Americans, who are the most educated and knowledgeable people on Earth are failing to proactively curb their flood, who do we think we are?'*

The reasons above indicate discouragement which may explain why some communities are feeling hopeless and that *Efundja* is beyond their knowledge and ability to handle. Furthermore, these reasons highlight the need for establishing community development programmes in order to enhance the existing capacity and promote resilience. For the Cuvelai-Etosha basin, enhancing community capacity may include various activities both at household or community level which strengthens people's strategies to face *Efundja*, such as agreeing on weather warning signals, improving infrastructures, enhancing livestock protection, provision of heavy-duty vehicles and preparing resources to cope with the disruption of daily life.

6.2.2. Ability of the communities to cope with *Efundja*

Literature indicated that community resilience can be viewed through a series of different lenses, such as institutional, infrastructural, psychological, social, economic, cultural, environmental and coping or adaptive lenses (Garde-Hansen *et al.*, 2017). Concurrently, the complexity and occurrence of disasters have proven how experts of scientific knowledge on hazards may not fully solve all disaster problems but may perhaps make use of community lay knowledge to shed some lights. These communities' lay knowledge is known to supplement the various forms of community resilience as stated by Garde-Hansen *et al.* (2017). Particularly, literature has indicated that remembering the past experiences of hazards provides a platform for developing lay knowledge. Lay knowledge is closely linked to the adaptive or psychological lenses of community resilience. With this in mind, communities in the basin were asked whether they were now better prepared for *Efundja* compared to the past. Their responses as shown in Figure 6.6, show that 57% of them indicated that they were ready by stating '*Yes*'. The remaining 43% indicated that they were not ready for *Efundja* by stating '*No*'. The reasons and motivations for each of their responses are analysed below.

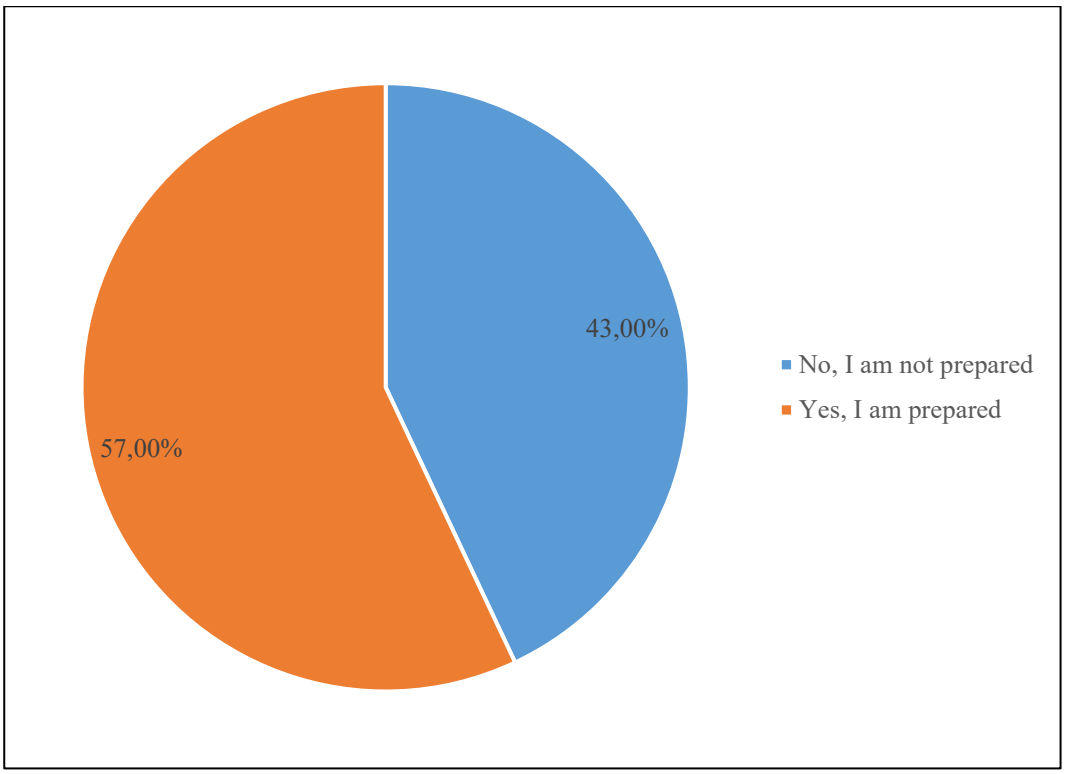

Figure 6.3: Responses on whether community members were in a better position compared to the past occurrences of *Efundja*

The participants who indicated that they are ready to face *Efundja* explained that they feel ready because they see that the government is now in a position to help them whenever *Efundja* strikes, unlike in the past when every household depended on its resources to make it through the impacts. Furthermore, they reasoned as follows:

- The government made an effort in some villages by constructing road infrastructure with sufficient water ways. Developments such as road infrastructure with pedestrian bridges were recently constructed in a few of the affected villages which has drastically reduced the impacts of *Efundja* in those villages. The construction of these roads allowed water to flow freely and also gave people access in and out of their villages which was something not possible during the rainy season. These roads were constructed under the '*Access roads for climate adaptation in northern Namibia' programme*' which was a joint project between the Namibian and German governments. The programme funded the construction of roads that give access to places of essential services such as schools and health clinics which were usually inaccessible during the times of *Efundja*.
- Moreover, community members further explained that they feel ready as they are becoming habituated to *Efundja* and expecting it annually. They explained they have experienced *Efundja* several times now, and they are consciously becoming aware of it.

A participant recalled: *'Yes, we are slightly better prepared because we now have seen Efundja before and somehow know what to expect. Unlike in those years when it appeared for the first time and we did not know any better*'.

- Participants further explained that because they have experienced *Efundja* before, they are able to navigate a few things by simply recalling what happened or what they did in the previous years. They are able to devise ways and mitigation measures to live with *Efundja* such as strategically moving households within their farms, or changing the type of building materials from thatch to concrete. Participants stated that their impact could not be compared to those who were experiencing the event for the first time. One participant explained: '*The other thing worth mentioning is that people are becoming more aware and cautious of Efundja even with the type of materials they build with. Nowadays people no longer use wood to construct their homes anymore. They use steel instead, for me that's adaptation measure*'.
- Lastly, they explained that people are slowly transitioning to a stage where they prepare themselves for the upcoming *Efundja* event. Although their preparation measures are not necessarily preventative but rather mitigative, there is a shift taking place. A participant confirmed this stance by stating that: '*Other preparation measures include buying groceries in bulk knowing that when Efundja come, they are not able to go out for shopping frequently. Or even in terms of livestock, we also relocate the kraals to higher grounds (pokatunu)'.*

The remaining 43% of the participants revealed that they do not feel any more ready than in the past. This is because nothing has changed for them, their everyday lives and livelihood remain the same and they have been in exactly the same position throughout the history of *Efundja* in the basin. They explained that although they can recall their past experiences which they apply to current *Efundja* events, it still does not completely remove the impacts. One participant said: *'Because nothing has changed, we are exactly in the same position as we were years ago'.* They further reasoned that:

- They think they are even "*worse off*" than their first experience of *Efundja* events. This is because they felt they "*can never be prepared as they don't know what is ahead*". Some of the communities feel *Efundja* is a natural phenomenon and a human-being can never master how to effectively prepare for it. Another participant explained: *'We are not better off at all, currently if Efundja hit, it will impact us more badly than before. We are not better prepared at all'.*

- Other communities feel they are not ready because they are too dependent on the government for all types of assistance in dealing with *Efundja*. As the 52-year-old participant said: **'***We are not better off, but rather more depend[ed] on the government to assist us'*.
- Another reason why community members feel they are not ready is that their coping capacity is decreasing each year that they experience *Efundja*. Community members revealed that their coping abilities are getting old and no longer make a difference. As one participant stated: '*We are worse off because our coping capacity has been decreasing ever since. Our coping capacity decreases each time Efundja hit since we are not capacitated or given any form of training since then*'.
- Communities feel that if they are given formal training on several hazard-related aspects of how to prepare for *Efundja*, or how to take precautions during events, then it should improve their coping capacity.
- Though the greater percentage of the group discussion participants believe that they are better prepared now than in the past, they emphasised their dissatisfaction with their present living conditions. They feel that permanent relocation is not necessarily an option. A resident stated: '*it's difficult to move from a place where you have been living all your life, plus knowing that Efundja are temporary, it gives us a relief that "it's going to get better" Hence the way of living is basically to find means of living with Efundja but not necessarily permanently relocate*'.

These views are consistent with Garde-Hansen *et al*.'s (2017) argument on how lay knowledge and the use of memory are crucial in engaging in coping and adaptive measures. More than half of the participants expressed the importance of recalling past experiences in order to navigate the present *Efundja* difficulties. Although some of the community members could not rely on their memory to deal with the present effects of *Efundja*, the conclusion is that remembering is an important resource for enhancing community members to become self-reliant. This makes it an important resource for building community resilience.

The vulnerable communities' perception of how they view their own capabilities matters because this perception shapes their ways of preparation as well as their responses. Once this is known, it easier to direct community capacity strengthening programmes. Community views about hazards should shape the actual government interventions. Understanding the perceptions of communities is crucial because not only will it greatly contribute to the development of effective community-based disaster management strategies but will also direct the government response

approach to establish *Efundja* risk management strategies that are cognisant of community ideas and experiences.

As mentioned, the communities of northern Namibia indicated a negative perception about their ability to deal with *Efundja*. Besides the reasons stated above, their negative outlook is also linked to these four main reasons: firstly, their general view that the *Efundja* is beyond their capacity to comprehend; secondly, they believe that the most appropriate type of response strategies would require large financial investment; thirdly, that there is no longer safe land to settle in; and lastly, they are still shaken up by the past occurrence of *Efundja*. The communities feel that the recent *Efundja* was beyond their ability to understand and that they have no idea of how to face a hazard that they cannot even begin to imagine. They explained that they do not have the means to fight back and hence they have a general view of hopelessness.

These communities also feel that the appropriate measures that will effectively reduce *Efundja* negative impacts require extensive financial investments which they do not have. In their views, the only effective risk reduction measures involve building retrofitting measures, building of large dams to accommodate the water or deepening the *iishana* which are all costly activities. Since these communities know they do not have such financial means to carry out these activities and that the government will not be keen on making such a huge financial investment just to reduce *Efundja,* they conclude that there is no other way of reducing the risk and they will have to continue bearing the *Efundja* impacts for a lifetime. They believe that besides retrofitting which involves adding new technology or features to buildings and deepening of *iishana there are no other effective measures* and any other risk reduction measures are secondary and will not be as *effective*. This has greatly contributed to community members' overall negative outlook and feelings of hopelessness.

These communities' negative view of their own capacity is also linked to how they believe there is no more safe land to settle on. They feel that because the population is growing, people are forced to settle in prone areas which will worsen the *Efundja* negative impacts among communities and which will make all other risk reduction efforts ineffective. They feel that as their numbers increase, the negative impacts intensify and the communities will suffer even more. These communities feel that since they consider temporary relocation as an option and they still get shaken by the occurrence of *Efundja* after many years of the same experience, it indicates limited capabilities to deal with hazard. They explained that fleeing from their homesteads looking for temporary shelter indicates that they are not capable enough to face the hazard on their own. All these reasons explain why community members have an overall negative outlook on their own capacity to face the recurring *Efundja* events.

Furthermore, these communities' negative outlook is also linked to what they believe is the root cause of the impacts of *Efundja*. Community members perceive that most of the *Efundja* impacts they experience are attributed to the effect of climate change and the anthropogenic influences relating to inappropriate spatial planning of urban and rural settlements which they have no control over. They explicitly indicated how the climate has changed over the past decades and attributed the frequency of *Efundja* to the changing climate. They pointed out changes relating to reduced rainfall duration that has caused frequent droughts and high rainfall with instantaneous intensity which is responsible for severe *Efundja* events. Community members further explained that the changes of climate such as temperature changes and wind intensity changes are causing wind storms which damage their crop fields as the root causes of *Efundja* which they can do nothing about. The change they described aligns well with the changes discussed in Section 5.3.3 and with Angula (2010) who stated that rainfall season duration is decreasing yet high intensive rainfall events are increasing causing heavy *Efundja* events. The communities explained that all the climatic changes they have experienced do not only diminish their ability to cope, but also threatens their source of livelihood because it directly decreases their livestock and crop productions (Kaundjua *et al.*, 2012). The decreased productions have been due to crop-water logging, reduced pasture, shortened growing and cultivation duration.

These perceptions have clearly been shaped by what they have observed around their communities, what they know and have assessed, and generally their experiences over the years. This concurs with Williams and Noyes (2007) and Wei *et al.'s* (2019) argument that states that risk perception is seen as an individual's way of assessing the risks they face which is a product of risk information they possess. It is also further stated that how risk is perceived influences people's decision-making process and thereby shaping their responses to and preparation for the hazards they face. Therefore, a good way to understand how risk is perceived is to understand how much information is available, how it is communicated and how it is received by individuals.

Analysing these facts against the risk in the rural Cuvelai-Etosha basin, the following deductions can be made. People's negative perception of the risk they face and how unconfident they are in the knowledge and experiences they have acquired can be attributed to limited information they have about the risk of *Efundja*. Therefore, in order to change this negative outlook among community members of northern Namibia, there is a need for risk awareness programmes that teach and help these communities to recognise their own potential and capacities in dealing with *Efundja*. There is a need for improved information sharing methods that spread information about the risk of *Efundja*. These improved information sharing methods should ensure that information is communicated in the local languages, communicated through different trusted platforms and include actions of what should

be done next. This is listed in the developed proactive disaster risk reduction framework presented in Chapter 8 as part of the study's main recommendations.

6.2.3. Perspective on permanent relocation

Participants were asked whether they are willing to permanently relocate since they are constantly faced with the risk of being flooded. About 67% indicated that they are not willing to relocate while only a third, representing 36%, indicated that they are willing to relocate. The reasons for unwillingness to relocate varied. Firstly, they reasoned that *Efundja* is not predictable in any manner, which discourages them from relocating permanently because they fear that even where they might be relocating to, may still be a flooded area. This is because they know that the entire northern part of the country is a relatively flat low-lying area and they believe that wherever they relocates to, they are likely to experience *Efundja* in one way or the other.

Secondly, it was revealed that many people view *Efundja* as a temporary challenge which will soon pass and their lives will get back to normal. A participant claimed: '*Efundja water only last for a few weeks if not a month, so we can endure it and our life will go back to normal soon'.*

Along with that, they indicated that culturally, it is not a norm to simply choose to permanently relocate when you have stayed in a place for a long time. Permanent relocation was only practised in the past by livestock farmers who were continually seeking grazing land for their livestock. This practice has slowly been phased out of cultural practices.

Thirdly, others believed that even if they relocate, they are not certain about the safety of the places they are relocating to which could be the same or even worse. They also expressed that they fear to permanently relocate because although they may move away from *Efundja*-related problems, they may find different types of problems and may regret their decision to relocate. Hence, many people resort to remaining with what they are familiar with. They explained that it's better to stay and face the problems you are familiar with than going to start over and face new problems.

Fourthly, many community members reasoned that it is better for them to remain in the *Efundja*-prone area because permanent relocation is considered to be complex and unmanageable. They will rather find means of living with *Efundja* rather than giving up completely and choosing to relocate.

Mainly, older participants indicated that permanent relocation is only an option for young couples who are still in the process of establishing homes. But for them who have fully established homes, it does not make sense to consider relocating permanently unless a homestead is completely

washed away. They indicated that building a home is a process and not many people are willing to restart the process unless there is a strong pushing factor. These older participants further emphasised that traditionally, people are not keen on relocating, even those that are temporarily relocating to tents only do so because circumstances force them to do so.

Moreover, in addition to relocation not being a cultural norm, participants further explained that they do not think of relocating because they have developed homes in a manner that cannot be relocated by using concrete building materials that are immovable. They feel they have financially invested too much into developing their homes to just throw it all away. Therefore, they would rather resort to mitigating the *Efundja* impacts than consider the option of permanent relocation. They explained that in the past, households could easily relocate because they were mainly built of grass, thatch and straws. These types of building materials could easily be abandoned without thinking twice about their investment, unlike buildings with concrete and corrugated iron which are much more costly.

Analysing the above indicates that although relocating permanently is the most proactive measure for northern Namibia, not everyone is willing to do so because it is simply not culturally practised, hence communities simply reject this option. Behind this rejection, there are deeper reasons of community ties, values and relationships that hold the people together and put them in a position where they cannot consider permanent relocation as a viable option in reducing *Efundja* risk. Hence it is only considered as the last option when heads of households have exhausted all possible options and would then resort to permanently relocating. Communities generally perceive *Efundja* to be a temporary problem, hence they will rather suffer its impacts for the few months it lasts and have their lives back to normal for the remainder of the year.

Although the above responses are the overall perception of most of the study's participants, the cultural practice of residents refusing to relocate mostly disadvantages the underprivileged in this context. The choice of not being willing to relocate only benefits households that can be categorised by low-socioeconomic vulnerability, which are households with stable incomes, have means of access to services and have productive resources and permanent built structures such as concrete walls. These types of homesteads are not hard hit by *Efundja* when compared to the poor, high-socioeconomic vulnerable households whose structures are usually built of biodegradable materials such as grass and pure mud, and who also have limited access to services and with no particular technical skills nor productive resources. The highly socioeconomic vulnerable do not benefit from avoiding to permanently relocate because they have no stable incomes and each time *Efundja* hits, their capacity to face it decreases and their structures are destroyed with no possibility of rebuilding.

This means that such a household will face difficulties in dealing with future *Efundja* events. Despite this, a few participants indicated they are willing to overlook the culture and relocate but could not do so due to a lack of resources that will enable them to rebuild in the new places of residence. Although the low to medium socioeconomic vulnerable households are frequently hit, their housing structures remain intact and their resources are least exhausted since they are occasionally replenished. Therefore, it can be inferred that the cultural practices that hinder people from permanently relocating disadvantaged groups of society depends on their socioeconomic status. This indicates the need for further research in determining how culture influences people's decision in dealing with *Efundja* impacts. Most importantly, this indicates the need for the national government response approach to consider the socioeconomic status of households when addressing the risks of *Efundja*.

6.3. COLLECTIVE COMMUNITY MEASURES

Besides the capacity of human resources described in the previous section, the study tested the strength of social resources by asking whether the communities participate in any of the collective activities aimed at reducing the risk of *Efundja*. Their responses indicate that they participate in collective work and they emphasised that it was by doing so that they were able to survive the past *Efundja* events. They listed several collective activities that they take part in together as communities. These are: working together to repair community roads and pedestrian bridges as well demarcating landmarks within *iishana* in order to enable others to walk through.

6.3.1. Working to repair roads in the communities

As discussed in Section 5.2.2, pedestrian movement and movement by car are two of the major challenges during *Efundja*. This is because the ground is covered in water and sometimes the roads are washed away in the process. Figure 6.3 shows a common situation of roads being washed away or destroyed during the rainy season. The figure shows how the school children have to cross the road by swimming because the road has been washed away.

Figure 6.4: An example of a road that has been washed away during the rainy season

Due to this situation, community members usually organise themselves to repair these roads, by collecting materials such as bricks, heaps of sand and sticks and repairing the damaged part of the road. They explained that although the work they do may not be professional work and they cannot repair the road to be in its original state, they do manage to repair it so that it can be used again.

In order to get everyone involved, the headmen usually announce publicly that whoever has unwanted bricks or any sort of building materials should bring it forth for repairing of the road. In some communities there are skilled builders who volunteer to assist in the building while other communities use their logic. It is through such practices that many communities have been able to use their roads during *Efundja* and enabled movement in their respective communities.

6.3.2. Working on pedestrian bridges

As for the pedestrians, community members work toward constructing man-made pedestrian bridges to allow mobility of residents in and out of the villages. The participants revealed that this is indeed practised in various villages which have experienced similar mobility challenges. Though these community man-made 'pedestrian bridges' usually do not withstand more than one *Efundja* event due to weakness of the materials used, it helps these communities in various ways to deal with *Efundja*. The outputs of this collective work usually do not last long because it would require specialised equipment which these communities cannot afford because of the limited funds that they raise. As one participant stated: '*We then asked the government to assist us in that area, however, we did not receive any response until today*'.

Although these communities do not receive the support they need from the government, their activities reveal unity among themselves and their potential to engage in activities that benefit all the people of the community. This concurs with authors like Shaw (2012), who stated that communities that work together towards a common goal indicates good social cohesion and they just need to be supported and shown how to effectively reduce the risks they face. In support of this view, the interviews further revealed that not only do community members participate in building pedestrian bridges, but they also try to dig earth dams to accommodate water that destroys their assets. Once more, although these man-made dams cannot be successfully established due to lack of appropriate tools, it still indicates unity among communities which is an asset for community resilience.

6.3.3. Demarcate landmark with sticks in the *iishana*

Since there are different dynamics of communities, the collective work discussed in the previous section is not necessarily practised in all the villages that are faced with the same challenge. There are communities who could not repair their roads because they lack the means to do so. Some of these communities have found ways of land-marking the *iishana* with wooden poles which acts as guidance to whoever is crossing the *iishana* channel. Figure 6.4 illustrates the process of land marking in the *iishana*.

Figure 6.5: Landmarks in the flood plain – also used as water level measuring tools

A person crossing the *iishana* can then follow the landmarks to get to the other side. By looking at these marks in the water, the people of the communities can tell which spots are safe to walk. The landmarks also assist learners who still need to get to school. Though this is a risky

initiative, it is one way these communities have applied to cross fast flowing stream channels or *iishana*. Unfortunately, it is also through these attempts of crossing stream channels that accidents of people drowning or being washed away occur. Though it is risky behaviour, communities persist in using these methods as they have no other means of existing in their villages.

Before a decision is taken to temporarily close some schools due to overflowing stream channels, the under-aged children still need to cross *iishana* in order to go to school. In such cases, the people of the village look for somebody who is tall and can carry the children on their shoulders to get them across the *iishana* by making use of this land marks. Community members arrange shifts to carry the under-aged children on their backs to enable them to cross the river to get to schools, as shown in Figure 6.5.

Figure 6.6: Learners crossing a fast flowing river and an older person must carry the under-aged children

(*Image used with kind permission from constituency councillor*)

This is usually only done at the beginning of the rainy season before the announcement of schools' closure. These efforts show the unity of community members and their willingness to engage in activities aimed at mitigating the impacts of *Efundja* within their respective communities. It shows a strong degree of social capital which is a key resource for building community resilience.

While these communities may have a general negative outlook on their capabilities to face *Efundja*, the activities and collective measures they engage in indicate various forms of capacities and resources, as per Wisner *et al*.'s (2012) criteria. According to Wisner *et al*. (2012), community capacities and resources are stepping stones for success for any type of risk reduction effort to be implemented in such a community. The communities of northern Namibia collectively work together to repair local roads and pedestrian bridges, they raise funds, they demarcate landmarks in the *iishana*

to be able to cross, and use their logic to mitigate the impacts, all of which illustrate the presence of human resource which is a crucial resource in sustaining community resilience. Moreover, these communities' experiences of the recurring *Efundja* events over the years have substantiated the presence of human resources which authors like Rumbach and Foley (2014) described to be imperative in building the resilience among vulnerable communities. The presence of human resources in a vulnerable community is a form of capacity that is crucial because it is what enables people to use their knowledge, their understanding and experiences in order to participate in community activities. At the same time, the ability of these communities to organise themselves through their social networks and be able to participate in all the above-mentioned activities represents solidarity which highlights social resources. The presence of social resources in a vulnerable community enables harmony whereby community members work together to achieve common goals and form social networks. The presence of social resources is equally crucial for vulnerable communities to become capacitated to overcome the hazards they face.

Overall, the researcher identified social resources which is depicted by community perception about their own capacity and their ability to work together. The study further identified human resources which is depicted by communities' use of local knowledge and their ability to apply their knowledge gained from past experiences to deal with the present *Efundja* impacts.

6.4. MITIGATION MEASURES APPLIED BY COMMUNITY MEMBERS

While the affected community members wait for relocation to temporary shelter, they practise some mitigative measures in the meantime. These mitigative measures help them live with *Efundja* while they wait for a government response. These mitigation measures range from changing types of construction materials used (this is done before *Efundja* hit), changing *Mahangu* storage (*silos*) facility type, digging trenches to channel water away, lifting valuable goods higher, creating sand embankments, buying groceries in bulk and travelling in groups. These mitigation measures are examined below.

- Change material type used for construction – Participants indicated that since they are becoming more aware and cautious of *Efundja*, they are changing certain practices in their daily lifestyles. It is found that lately, people are slowly moving away from the use of wood and thatch materials for construction. Many are found resorting to the use of steel and concrete types of materials for building. Because this is understood by almost everybody, even those who cannot afford to purchase concrete or cement for the entire building are laying a foundation and building halfway with concrete and finishing off with mud. This is done in such a way that whenever the water level is high, it should

still be within the part of the building that is built in concrete. This is done to avoid the structure being destroyed by water.

- Another way communities are mitigating *Efundja* impacts is by adopting the practice of building their homes with elevated foundations with the hope that water does not get inside the building easily when it rains.
- Change *Mahangu* storage (*silos*) facility type – After realising the danger of using the traditional wood *silos*, many community members have resorted to change the type of *Mahangu* storage facilities by buying plastic storage containers to store their *Mahangu* cereals.
- Dig trenches to channel water away from homesteads and farms as a mechanism of redirecting water back towards the *iishana*.
- Participants also lift their valuable goods higher in their homesteads as a way of avoiding water damage.
- As for traditional rooms made out of mud, community members create sand embankments surrounding the rooms to avoid water from entering.
- Many community members prepare themselves by stocking up their grocery needs so that they do not have to be moving up and down during *Efundja* and thereby they avoid the risk of drowning.
- Whenever attempting to cross the river channels or *iishana*, it is recommended that people do so in groups. That way they can look out for one another and avoid the risk of being washed away.

These measures have been used to reduce the detrimental negative impacts of *Efundja* and to some extent relieve the effects of *Efundja* on these communities. These measures are not preventative measures and do not completely take away all the negative harm, but allow community members to live with *Efundja*.

These mitigation measures such as changing *Mahangu* storage facility type, resorting to buying groceries in bulk and travelling in groups, changing the building materials of houses, digging trenches, lifting their valuable goods higher and creating sand embankments, if properly analysed, reveal the root issues of impacts these communities face.

The buying of the groceries in bulk, lifting of goods higher and travelling in groups means that the water level remains high which is why the people resort to partaking in those activities. It

means that the residents are not able to move around due to poor road infrastructures or lack thereof. In the same manner, the digging of trenches, building sand embankments, changing building materials and *Mahangu* storage facilities are measures that all relate to large volumes of water that penetrate homesteads and crop fields and thereby destroying assets.

This means that to effectively reduce the risk posed by large volumes of stagnant water, the government's approach should be to consider addressing these root causes by providing proper road infrastructures, as discussed in Section 8.5.7, besides all other suggested risk reduction measures. The provision of proper road infrastructures would substantially address the large volume of water that remains stagnant in the villages which ends up destroying people's properties and assets as well as preventing people from moving around. Water remains stagnant because of recent infrastructures that were developed within the *iishana* and that block the flow of water as these infrastructures lack drainage channels which could permit continual water flow. If proper road infrastructures with sufficient drainage are provided, residents will not see the need to spend resources renovating or building since the water volumes will no longer present a threat. Ultimately, addressing the stagnant water by provision of proper road infrastructures will have other advantageous ripple-effects in the long term and address all other problems caused by stagnant water. Hence it is recommended that the national government response mechanism needs to consider the provision of road infrastructure with appropriate drainage channels as one of the effective risk reduction measures.

Evaluating these communities' practical mitigation measures, shows potential in dealing with *Efundja* but also the fact that they require strengthening of their existing capabilities, as recommended by Wisner *et al*. (2012). Based on the present study's analysis of the capacity of community members, it is clear that the communities of the basin only possess two forms of resources, namely the social and human resources among the common six capacities. This indicates the need for further strengthening of these communities to be able to develop the rest of the resources as a way of them becoming self-reliant and in facing the impacts without needing external support.

Furthermore, analysing these communities' activities and responses described in earlier sections, the following interpretations can be made. These communities lack the economic resources as they are unable to access financial resources or find means of raising more finances. Chapter 5 described how residents lost their income since local markets and trade closed down because of water, customers to cuca-shops (local shebeens) were lost and people could not sell their products due to limited mobility options. This indicates the lack of economic resources and highlights the need for the establishment of community development programmes that aim to diversify local market opportunities as well as income streams for the rural population.

Furthermore, these communities indicate the lack of physical resources in addition to how they lack skills that could secure homesteads from *Efundja*. It has been stipulated how certain types of traditional building materials such as mud bricks, grass thatching and *iifini* increased vulnerability to *Efundja* since they could easily be destroyed by water. Similarly, this highlights the need to strengthen physical resources of these communities by creating awareness of how safe land tenure can be achieved as well as teaching them sustainable ways of building cost effective permanent housing structures. Furthermore, the results presented in Section 5.2.3 revealed the lack of enough food to eat and the lack of hazard-resistant crops which indicates the lack of natural resources for these communities. It has been revealed that the land productivity was diminishing due to lack of fertilisers, shortened planting window as well as the increasing population growth which cannot be supported by declining soil quality. All these represent the lack of natural resources and hence indicate the need for preparing resources to cope with the disruption of daily life and the disturbed sources of livelihoods. Lastly, these communities lack decision-making ability and power as well as leadership skills which represent the lack of political resources. This is illustrated by how traditional authorities could not ensure that no resident will permanently settle in the prone areas although they are regarded as leaders with authoritative power. This issue of traditional authorities struggling to exercise power over land allocation is another indication of slacking political resources. This indicates the need to strengthen power relations among these communities.

Therefore, among the six types of capacities, the communities of the Cuvelai-Etosha basin portray only the presence of two types of resources, social and human resources. The huge gap in terms of community capacity indicates the need for capacity building. Capacity is necessary for northern Namibia communities to become self-reliant and resilient. Therefore, programmes that are aimed at developing the lacking resources and developing resilience are needed. The deliberation of this recommendation is done in the developed proactive disaster risk reduction framework as stipulated in Chapter 8.

Overall, the mitigation measures of the rural residents indicate a degree of capabilities to respond and mitigate the immediate, short-term and perhaps mid-term risks of *Efundja*. However, they still cannot respond and mitigate the long-term risks of *Efundja*. Some of the mitigation measures used such as digging trenches, creating sand embankments and travelling in groups, although indicating the presence of various forms of resources, may lead to further vulnerabilities and drowning accidents. This indicates the need for the national response approach to focus on including the vulnerable communities' views and ideas into the national disaster risk management framework in order for the framework to substantially address the underlying issues faced by communities. The

national response mechanism needs to become cognisant of these measures to implement further non-structural *Efundja* mitigation measures aimed at reducing vulnerability and improving preparedness such as raising awareness through promotion of education programmes on *Efundja*. Moreover, the present study recommends the complete implementation of the national disaster risk management framework which has some long-term strategies that have not yet been implemented due to lack of resources. The ongoing relief aid and temporary shelter only provide medium- to short-term solutions but such efforts are not addressing any long-term *Efundja* risk issues. The provision of relief aid and temporary shelter neither reduces the loss of human lives or assets as the national disaster risk management framework envisioned it to do.

This chapter presented the responses of heads-of-households in the affected communities. In Chapter 7, the responses of headmen and local-level disaster risk management officials are presented.

CHAPTER 7:
HEADMEN AND LOCAL-LEVEL DISASTER RISK MANAGEMENT OFFICIALS' PREPARATION AND RESPONSE TO *EFUNDJA*

The occurrences of *Efundja* in the Cuvelai-Etosha basin involve a diversity of key stakeholders that work together to help the affected people deal with the effects of the flooding. This chapter presents the findings of the study on the views of the headmen and the local-level disaster risk management officials who are the local authorities that took part in the key informant interviews. It outlines their viewpoints and experiences and examines various ways in which they prepare and respond to *Efundja*.

The chapter begins by discussing the various ways in which headmen prepare for *Efundja*. It describes various measures the headmen use to prepare and aid the community, such as observing their community members' status, giving them warnings and encouraging them to work hard in order to improve their food security which has been a persistent challenge. It also explains how the headmen respond to *Efundja*, something which they described to be limited due to lack of equipment and resources.

The chapter further discusses the local-level disaster risk management officials' response to *Efundja* which involves conducting needs analysis, observing river flow and dam levels and organising and preparing temporary shelters. It analyses the significance of the role of headmen and the local-level disaster risk management officials in managing *Efundja* as well as building resilience among the affected communities. Chapter 7 further illustrates the challenges the headmen and the local-level disaster risk management officials experience when preparing and responding to *Efundja*.

This section of the dissertation is important because it discusses the views of the headmen and the local-level disaster risk management officials who are important role players at the local level in responding to and managing *Efundja*. Their responses not only point out the need for empowering these local authorities but also uncover the important role they can play in building resilience among the vulnerable communities. This chapter also highlights existing gaps in the national disaster risk management approach, such as the need for building institutional capacity at local disaster risk management offices as well as improving resource allocation for both headmen and the local disaster risk management offices. In the final instance, this chapter uncovers the reactive approach adopted by the local-level disaster risk management officials which is mainly due to a lack of knowledge, skills and resources. Therefore, the chapter builds on the main premise of this study, which is the

need for a proactive disaster risk reduction framework for the Cuvelai-Etosha basin. This framework is explained in Chapter 8.

7.1. HEADMEN PREPARATION MEASURES

The headmen[2] of villages were asked how they prepare themselves to assist their respective communities in the face of the recurring *Efundja*. Their responses indicated a general feeling that they do not have much confidence or means to prepare themselves or to support their respective communities for the recurring events of *Efundja*. They explained that they play major roles in the management and coordination of whatever takes place during *Efundja* as well as in other hazards. However, they are the least recognised in terms of remuneration, resource allocation and fund provision in order to assist their communities. They emphasised that all the resources and relief aid assistance they offer is usually taken from their personal income. They explained that they offer assistance in terms of goods and services ranging from *Mahangu* cereals, transport money or even availing their private vehicles to travel around for meetings whenever it is required of them. Those who own vehicles further explained that they prepare for *Efundja* by ensuring their vehicles are functional to be able to offer transportation services whenever required, even though the vehicles may sometimes be unable to move due to the high level of water. Besides this, they listed several ways of how they prepare themselves. The responses from the headmen are discussed in the following sub-sections.

7.1.1. Preparation for *Efundja* is not standardised

The majority of headmen alleged that they do not know how to prepare for *Efundja* because they lack skills and knowledge to do so. One headman stated: '*Efundja is too big for us [to] prepare for. We do not even know how we can prepare for it since its volume exceeds our capacity*'. Another headman added: '*The problem is, even if you want to prepare, you do not really know what to do. One just thinks of all of the water that covers our villages, how can one ever prepare for that?*' They described *Efundja* to be a major event that is greater than their comprehension and hence they cannot even attempt to prepare for it. These headmen responses indicated that no standard form of preparation for *Efundja* events exists. They explained that people would find ways of living with *Efundja* by finding adaptive measures such as creating sand embankments surrounding rooms and raising their valuable goods higher, as per the themes explored in Chapter 6. However, the headmen explained that these measures are not standard preparation activities by definition, but more of

[2] Out of 16 headmen interviewed, two were headwomen.

'*residents doing everything they could do to prevent their assets from being damaged'.* Besides these minor efforts, headmen responses echoed the remark '*We* just *hope that it would not flood this time*' which vividly shows that no defined form of preparation is taking place. Lastly, some indicated that from their perspective the way *Efundja* occurs in their villages is too sudden for anyone to actually prepare for it and hence justified their lack of preparation. One headman testified: '*Efundja does not give warnings. We would wake up to overflowing homes and iishana. One can never prepare for that*'.

7.1.2. Vulnerability assessment and consultation

Besides those who said they do little to prepare themselves, there were some headmen who said they walk through the village to identify residents that may be affected and liaise with the local-level disaster risk management officials on how they can be supported. At times, the headmen may organise assistance from other residents or himself without needing to engage the local disaster risk management office. However, this depends on the type of assistance required such as food or money which can be offered by headmen but not when relocation is required since relocation is completely outside headmen capacity to provide. The headmen indicated that, as they monitor their respective villages, over time they become aware of vulnerable households and as soon as the rainy season commences, they frequently monitor such households and caution them to prepare. A headman stated: '*As for me, I have two households that I constantly need to keep an eye on. I would always caution them to relocate early enough to avoid more damage*'. Headmen usually give warnings to such homesteads and urge them to take precautions beforehand rather than wait to be flooded and only act when damage has already been done.

In addition to monitoring, the headmen indicated that most of them prepare for *Efundja* by sharing their contact details with residents and encourage community members to contact them whenever it is necessary. However, though this may be a good initiative for easier communication, not everyone in the villages has cell phones and only a few can afford airtime occasionally. Some villages do not have access to reliable network coverage, hence it was emphasised that communication during the *Efundja* season remains a serious challenge. Headmen recommended that perhaps they and their deputies as well as their community representatives should be issued with walkie-talkies or any other affordable communication device that could permit easier communication between themselves and community members especially during *Efundja* events.

7.1.3. Work hard to improve food security

The headmen emphasised that one of the main impacts of *Efundja* is the lack of food to eat. They explained that many households fear not having enough food to eat during the time of *Efundja* especially when they may be relocated. One headman added "*One of the main impacts of Efundja is not having anything to eat. In a normal circumstance, a head of household would go asking for food from neighbours or conduct piece-jobs in order to get something to eat. When Efundja hits, these types of opportunities are taken away*'. Since food security is an existing concern in most communities of northern Namibia, headmen having observed this over time, encourage households to work hard to improve their food security as a form of preparing for *Efundja*. Another headman stated: "*I mostly host community meetings to encourage people to work hard and not depend on the government*'. Some headmen encouraged this to a point of lending their ploughing equipment to households that do not own ploughing equipment. A headman affirmed: '*I would volunteer to offer my ploughing equipment to those who do not have. Because if I do not, they will still return in the course of the year looking for food*'.

This indicates how *Efundja* is becoming a factor in increasing vulnerability. This is owed to the fact that the occurrences of *Efundja* enhance food insecurity among many households that are already struggling to feed themselves. In relation to this, the study observed how in most discussions, participants conflated issues of poverty and *Efundja* vulnerabilities. In most cases, they referenced '*poverty*' when meaning flood-related difficulties. Moreover, since transportation is one of the main challenges during the *Efundja* season, headmen preparation measures involve repairing their vehicles to transport residents at nominal rates whenever necessary, while some encourage their residents to repair the roads that are usually in a bad condition.

7.1.4. Create awareness and issue warnings

Most of the headmen indicated that they host community meetings and raise awareness on how households can take precautions as ways of preparation. These meetings are used as general information sharing platforms where headmen share all kinds of information, such as encouraging people to improve their way of building by ensuring that their building foundations are elevated high enough or taking their livestock elsewhere (if possible) and generally taking precautions. Remarkably, a few headmen indicated that in their villages they have a routine of hosting meetings every second week for information sharing. These headmen stated that these are their regular meetings with community members apart from the committee-related meetings such as the Community Development Committee (CDC), health committee or any other such meetings.

At the same time, headmen liaise with their respective local-level disaster risk management officials to announce over the radio general awareness to the people in the villages. The announcements are made to ensure that households that were previously flooded are advised to relocate beforehand and take precautions to avoid repeating the cycle. The announcements also include general precautionary measures around water, for instance not crossing the *iishana* alone but always in the company of others.

Although these are the preparation measures of various headmen, some responses indicated a general feeling that many headmen do not necessarily prepare for *Efundja* as such, but rather wait, hoping it would not flood for that particular year. One headman stated: '*It is impossible to prepare for Efundja, where would you even start to prepare?*' The headmen feel that since *Efundja* is sporadic and unpredictable, their preparation efforts would be a waste of time and resources if the flooding does not happen in a given year. Another headman added: '*We don't always know when Efundja is coming, hence we cannot prepare for something which we do not know if it's coming or not. Additionally, there were times we would prepare but it does not flood. So, our time and resources are wasted*'. They indicated that if it starts to flood, then they react to the emergency as they have always done, irrespective of whether they have prepared or not. The remark '*one will always have to respond to an emergency, whether [you] attempted to prepare or not'*, was echoed in most of their responses. This indicated the general view among certain headmen concerning preparation. They believe that one cannot prepare for *Efundja* because it is not really possible to do so. Lastly, headmen emphasised that the type of impacts they experience are not reduced or affected by any of their preparation measures. One headman added: "*Whether you prepare for Efundja or not, the negative impacts will still be devastating*'. Hence, they do not see any value in preparing because it does not mitigate the effects of the *Efundja*.

Evaluating these headmen preparation measures to the *Efundja*, it is clear that little effort is spent on preparation as it is viewed as making no difference to the impacts experienced. Although headmen make efforts to encourage precautions and urge communities to work hard to increase their food security, which has been described to be one of the main challenges many residents face, all these efforts do not lead to reduced vulnerability or reduced negative impacts.

This highlights the need to empower these headmen through training and awareness programmes on how to reduce the vulnerability of their people. Moreover, although headmen seem to be struggling to effectively prepare for *Efundja*, they still play a crucial role in their communities since they play two roles at the same time. The headmen are firstly part of the vulnerable communities and equally experience *Efundja* impacts; yet they are also expected to fulfil their leadership roles in

their respective communities. The headmen are the link between the communities and the government and thereby facilitate everything that takes place in the communities during *Efundja* events. Headmen warn the frequently flooded homesteads to take action early and not wait until severe damage is done. Moreover, all activities such as the provision of relief aid or the establishment of relocation camps are done through the headmen. Besides them being the link between the government and the communities, they are also actively involved in community affairs. In some cases, the headmen practically collect the relief aid from the local-level disaster management offices and deliver it to the affected people's homes. Even in the case of temporary shelter, it is usually the headmen who identify the appropriate place for establishing the relocation camp. The headmen also carry out other roles and responsibilities such as allocating land, resolving conflicts and facilitating socio-economic development activities. All these activities indicate that headmen are invaluable assets in their respective communities and can play a major role in the fulfilment of the national disaster risk management framework as well as in building resilience among the vulnerable communities.

7.2. HEADMEN RESPONSE MEASURES TO *EFUNDJA*

The above section described the measures headmen take to prepare for *Efundja* events, while this section discusses their actual responses and reactions during and after the flooding event has occurred. The headmen indicated that their response to *Efundja* is limited as they believe they lack the equipment and resources needed to effectively respond to the hazard. They indicated that they do not have the knowledge and skills to appropriately respond to *Efundja*. One headman quoted: '*Even if we wish to effectively respond, we do not know how. We do not have what it takes to effectively respond to this prevailing hazard. This is the reason why we are requesting for trainings. If we can be taught on what to do and how to do it?*'

They feel they do very little in their leadership capacity in terms of actual response as they mostly focus on coordinating the interaction between the local-level disaster risk management officials and the community members, when they should be doing more than that. The headmen indicated that the only form of response they know which they also advocate among their communities is the temporary relocation to the shelter camps. They added that they have been imploring the government for a permanent solution. A headman alleged: '*We have been asking, when are we going to get a permanent solution to Efundja? We are tired of relocating every year*'. They have expressed that '*our response should be aiming to finding a permanent solution and not focused on getting people out of water every rainy season*'. Headmen indicated that it has become general knowledge that whoever is severely impacted reports themselves to the headmen, who then liaise with the local-level disaster risk management official and determine whether a relocation camp can

be organised. A headman affirmed: '*Among our communities, everyone knows what they need to do if they are flooded severely. They all know that relocating to the shelter camps is the only option'.* Whenever a community member approaches the headmen and indicates that they have been severely affected and require assistance, the headman reaches out to the local disaster management official explaining the situation and the type of assistance required. The local disaster management official then visits the village to assess the level of impact. Their assessment determines whether the assistance required exceeds their capacity, and if so, they request for external help from the regional office – only then may the person be assisted. A headman added: '*Whenever community members report themselves to me, I would inform the local disaster risk management office. This office then sends a representative or the councillor himself comes and assesses the level of damage in order to determine whether there is a need to organise a relocation camp or not*'. The headmen stated that residents are not assisted by the local disaster risk management offices every time, but there are times individuals simply need food, transport money or urgent transportation to the hospital which headmen provide out of their resources. Overall, the headmen feel overwhelmed by their responsibilities and the problems of their villages, but they indicated they still manage to navigate through the problems. '*We are the most undervalued leaders in this country, although our contribution is the most significant'.*

In addition to the above, headmen also share wisdom and knowledge on how to deal with *Efundja*. They encourage people to work hard and not to be too dependent on the assistance from the government because it arrives very late. Moreover, headmen also facilitate community collective measures whenever necessary. A particular frequently used example is when local roads and bridges are destroyed, and the headmen facilitate the local people to repair such infrastructure. A headman affirmed: '*I remember one flooding season, we could not move out of this village because the road was washed away. I had to organise people to repair it and that was the only time we could move in out and of the village*'.

When asked about the existence of community-based DRM committees, the overall headmen response revealed limited knowledge and awareness of these committees. The remark '*We are not aware of a committee by that name. We know the Community Development Committee (CDC), but not any committee that deals with disasters'* was captured in most of their responses. The few who were aware of it indicated that such committees only meet whenever there are cases of chronic poverty that need to be dealt with or when several households are affected and a decision needs to be made whether the households are to be relocated using the local disaster risk management office resources

or through a formal request to the regional council. These responses affirm the lack of proper implementation of the national disaster risk management framework.

Evaluating these headmen roles and responsibilities relating to *Efundja* events, it is apparent that their responses consist of two aspects. One aspect of their response is mainly coordinating and being a link between the government and the vulnerable communities in the event of *Efundja*. This side of their response is geared towards coordinating to '*get individuals out of water*' and less about any activities that may reduce people's exposure to *Efundja*. Hence, this part of headmen responses speaks to the governmental form of response which is mainly concerned about coordinating the management of activities to react to *Efundja*. The other side concurs with the practical community members' response strategies. This is because the headmen are equally part of the affected communities, and they equally experience *Efundja* and witness its damaging impacts. Therefore, these traditional authorities need to be capacitated in the same manner the community members need to be capacitated and also empowered in terms of their leadership roles.

However, despite the critical roles they play, a number of them are not confident in their roles and do not value their own contribution in the affected communities. First, because they feel any appropriate form of *Efundja* response or preparation would require large financial investments which they do not have. Second, because they feel *Efundja* is beyond their ability to deal with and hence no one can effectively prepare for it, let alone effectively respond to it. Moreover, they expressed feelings of not being recognised or valued because they are not being remunerated for their work or for any of their contributions in their respective societies. Their responses indicated that they have raised these grievances several times but the issues have not been attended to in any manner. Altogether the responses highlight the need for capacity building for these traditional authorities in order for them to feel empowered in their roles as well as confident in leading their communities. This suggests a need for programmes to empower headmen through training and awareness programmes. This is one key recommendation further discussed in Chapter 8, leading to the proposed proactive disaster risk reduction framework.

With the responses of the headmen dealt with, attention now turns to the other local-level role players, the local-level disaster risk management officials. Their responses are captured in Section 7.3.

7.3. LOCAL-LEVEL DISASTER RISK MANAGEMENT OFFICIALS' RESPONSE TO *EFUNDJA*

The local-level disaster risk management officials referred to in this study consist of the constituency councillors who are involved in *Efundja*-related coordination at the community level. These are the politically appointed officials who have the responsibility to oversee all community affairs. Not only are they involved in the management of and response to the *Efundja*, but they are also the leaders in terms of socio-economic development at the community level. These local-level disaster risk management officials include all other authorities in other non-governmental sectors and institutions that contribute to the overall *Efundja* response such as those who give early warning information as well as those who offer support in the provision of emergency response. This section presents their responses on how they react to *Efundja* and how their responses relate to the overall national governmental response.

7.3.1. *Efundja* no longer distress local authorities

After experiencing *Efundja* several times now, many authorities are not alarmed at the sight of *Efundja* any longer. Instead, they act normally with no sense of urgency since they have become used to the events of *Efundja*. Some referred to it as '*part of our lives*'. One local-level disaster risk management official stated: '*It is not unusual for the towns and villages to be underwater when it rains, because of the low elevation of the area, it floods. Flooding around here is normal and there's nothing new. There is no need to blow a fuse over it*'.

Besides the attitude of normalising *Efundja*, some of the local-level disaster risk management officials indicated that their offices lack equipment and resources needed to appropriately respond to *Efundja*. Many of them stated that in their capacity as local-level disaster risk management officials, '*we are currently doing very little in our leadership roles to support the vulnerable people because we are not equipped to do so*'. Their responses revealed that their offices are under-equipped and lack resources such as basic emergency supplies, something usually sourced from the higher-level regional offices when the need arises.

These local-level disaster risk management officials were asked how they can be capacitated. They responded by indicating that their offices need to be equipped with the emergency response equipment which would enable them to swiftly respond to emergencies when the need arises. They listed the following: blankets; food products with long shelf lives; mosquito nets; first aid medical supplies; tents and heavy-duty vehicles as some of the equipment appropriate to be held at their offices. In addition to equipment, these local leaders emphasised the need for fixed budget allocations

on emergency responses to *Efundja* across all local disaster risk management offices in the Cuvelai-Etosha basin. They explained that their offices have no budget allocation at the moment and blame the ineffectiveness of their work on the fact that they have to rely on the central government for any form of response. A local-level disaster risk management official explained: '*Decentralisation should enable our offices to immediately respond to the needs of our communities. The lack of it is costing us way too much. There is a need to change how things are done around here*'. They emphasised that if this is done, there will be no need to wait for assistance from the central government from Windhoek which still has to be translated to the governor's office and passed through the regional office before it reaches the local disaster risk management offices. They criticised the current procedure of assistance to be a lengthy procedure which worsens the *Efundja* impacts.

However, the focus group discussions revealed that some community members criticised their local-level disaster risk management officials for being minimally involved in community affairs. This criticism indicated that officials only visit the villages after receiving reports of damaged households from headmen. A community member stated: '*Our councillors do not come into the villages on a regular basis. Some do not even know where the village boundaries end because they are not involved [in] issues that affect us'.* Community members feel that the local-level disaster risk management officials should be continuously assessing the situation by doing regular monitoring and assessments for all the villages under their jurisdiction.

7.3.2. Conduct rapid needs assessments

Once the *Efundja* commences, the regional governors and the local-level disaster risk management officials, in consultation with the Directorate of Disaster Risk Management (DDRM), and all other affected line ministries usually conduct a rapid assessment which guides the overall government response to the needs of the affected population. The needs assessment guides the decision-makers within different ministries such as education, transport, health, and trade and industry on the appropriate way of response that would best suit their clients. An example is that the ministry of education would decide on contingency plans that suit learners, parents as well as teachers by temporarily closing the schools and allowing teaching to continue during the school holiday period. This is done because the water level at times poses a serious threat to pupils and teachers, hence the need to temporarily close some schools. The results of the rapid assessment inform the development of disaster management plans as well as contingency plans to mitigate the impacts of *Efundja.* A school principal stated: '*When the water level subsides to a manageable level, schools are reopened and a way found to compensate for the time lost by teaching during weekends and school holidays'.* Teaching during weekends and school holidays is a by-product of contingency planning.

Similarly, needs assessments are conducted to determine the overall impact level of the hazard and a recommendation is made on how best to assist the community members. Should the impacts be devastating, it is the results of the needs assessment that eventually culminate into a declaration of a national (or regional) state of emergency.

7.3.3. Monitor dam levels

The DDRM collaborates with various stakeholders such as the Namibia metrological services (NMS) and the hydrological services of Namibia which share rainfall projections as well as monitor dam levels. This information is received, announced and shared over radio platforms to assist communities in their daily decision making. A local-level disaster risk management official stated: '*We would announce dam levels information over the radio in the local languages. We would also issue warnings to people not to attempt crossing some notable iishana that are known to be dangerous.*'

However, the communities have criticised this form of information sharing stating that it does not help them in any way because it does not come with instructions or guidance on what to do. They criticised that, '*it is still up to us to do whatever we are able to do irrespective of the information we received from the local-level disaster risk management officials*'. Therefore, according to community members' views, this information sharing does not make any contribution to their preparation or responses to *Efundja*. '*For us, it does not mean anything to receive information they are forever repeating over the radio because it does not tell us what to do. We are overwhelmed by not knowing what to do, yet they go on about us being prepared whenever Efundja is approaching. They must tell us what to do'.*

The hydrological services of Namibia also have what is called *The Daily Flood Bulletin* website which reports daily temperatures and rainfall patterns for some *Efundja* hotspots across Namibia. The bulletin is usually useful to institutions and sectors that use weather information daily but not necessarily for individual families at community level who do not have access to these platforms and still require direction and guidance.

7.3.4. Organisation and preparation of temporal relocation camps

The Omusati and Oshana regions of the Cuvelai-Etosha basin are usually most affected by *Efundja*. In these regions, temporary relocation is prioritised as the optimal form of response, even in urban settlements where informal settlements are usually severely affected by the hazard. The local disaster risk management offices in these regions publicly announce that community members who are affected should report themselves to the authorities so that they can be relocated to relocation

camps. They have a responsibility to organise and prepare these relocation camps and thus the provision of relocation camps has become a common practice among the severely flooded communities. All community members in these communities are well aware of the procedures as many remarked '*We know that if your household is flooded and the water level is high, we know that the only assistance we can get is to be relocated to the temporary shelter camps'.* However, some of these relocation camps over time can become hubs for theft and criminal activities, sometimes to such an extent that many families hesitate to go there because they are unsafe.

Analysing the local-level disaster risk management officials' responses above indicates their overall response towards *Efundja* correlates well with the national reactive response. This is visible in how they over-emphasize relocation camps and being in possession of emergency materials as the appropriate form of response more than any other preventative or risk reduction activities. It is clear that local-level disaster risk management officials lack institutional capacity and knowledge on disaster risk reduction. These local units lack the overall ability to perform the expected risk reduction measures due to a lack of knowledge, skills and resources.

The local-level disaster risk management officials lack of institutional capacity is reflected by how they place a huge emphasis on maintaining emergency budgets, giving information on dam levels with no actions attached, organising relocation camps and keeping of emergency equipment. These types of responses signify their primary focus in responding to *Efundja*. Despite their willingness to assist the people, their focus is still largely on emergency management and less on reducing the exposure of people. They are concerned about '*being able to timely evacuate the people*' just like the overall government national response. However, it is only natural that their focus aligns well with the national government *Efundja* response approach because they are the appointed disaster risk management officials at local level in the bigger framework of the national disaster risk management framework structure as explained in Chapter 2. Hence, it can be concluded that emergency and reactive responses are the only ways of dealing with the *Efundja* that they know. This is because they lack the knowledge and skills, and also because it is what is expected of them by the government. This once again indicates the need to build institutional capacity in terms of knowledge and skills for leaders to become well informed and be able to differentiate between disaster risk reduction, emergency management and all other emergency-related concepts. This way, there will be a transition from an emergency management approach to a disaster risk reduction approach, something stated as the initial aim of the national disaster risk management framework.

Moreover, these local-level disaster risk management officials' operations and their activities at community level were said to be lacking capacity both in terms of human resources, finance, and

all other resources. These officials emphasised the nature of the challenges they experience, such as offices being under-equipped, having limited financial assistance and limited qualified personnel. This indicates the need to strengthen resources of these offices by allocating more funds, supplying equipment and training their personnel. This will still be part of building institutional capacity which is found to be a determining factor for implementing disaster risk reduction initiatives. This is because it has been confirmed by research that the capacity of local authorities or disaster risk management officials to develop and implement disaster resilience initiatives is closely linked to their understanding of the concept of disaster risk reduction, their capacities, resources and how they can prioritise these activities (Manyena, 2006; Malalgoda *et al.,* 2010).

More so, the literature emphasises the use of local knowledge in community-based disaster risk reduction initiatives to attain resilience of communities and this can only be achieved if local authorities are knowledgeable and aware of the significance of the use of local knowledge and all other crucial dimensions that are enablers for the success of their work in reducing the risk of disasters. Since these local disaster risk management offices are '*decentralised*' units of government at the local level and are expected to fulfil national development goals, equipping these offices with resources would make them equally responsible for development as well as building resilience among vulnerable communities which will enable the government to achieve two goals for the price of one (Manyena, 2006).

This stance is also supported by the UNISDR (2010) which argues that the local authorities are critical service providers to local communities. It is argued that achieving risk reduction and resilience of vulnerable communities is a multi-sectoral responsibility. UNISDR (2010) identified the local-level disaster risk management officials as one of the key stakeholders in the implementation of programmes aimed at developing society's resilience. This is because they are responsible for critical development functions that are essential in reducing disaster risks as they carry out land-use planning, urban and rural development planning and also respond to all other needs of communities under their leadership. Moreover, it has been argued that disasters are local events and it is only natural that local-level disaster risk management officials require better knowledge to address the local vulnerabilities that are leading to these local hazards (Malalgoda *et al.*, 2010).

This chapter has presented the results pertaining to preparation and response of the local authorities. It explained the headmen responses regarding the role they play in preparing their community members for the recurring *Efundja* and how they respond to it. Headmen struggle to prepare for *Efundja* because they lack knowledge and skills to do so. This aligns with the views of the community members, explored in Chapter 6. The chapter analysed headmen's responses, and

identified gaps such as lack of knowledge, skills, trained personnel and limited financial resources as some of the key factors that hinder them from effectively responding to the hazard. These are the points that national flood response frameworks need to address. These points also reveal the reactive response approach applied by the local-level disaster risk management officials which aligns well with the national response approach. Further, they emphasised the need for capacity building, empowerment and training for the local authorities.

Attention now shifts to the responses of the national-level disaster risk management officials who are the high-level decision makers with regards to *Efundja*. Chapter 8 outlines their responses and presents the proposed proactive disaster risk management framework.

CHAPTER 8:
ENHANCED NATIONAL DISASTER RISK MANAGEMENT FRAMEWORK FOR NAMIBIA: LESSONS FROM THE CUVELAI-ETOSHA BASIN

The occurrence of *Efundja* in northern Namibia has recurred over the past decades. Because of its persistence, the national government became involved to assist the affected communities. The way in which the national government handles this was discussed in Chapter 2. Assistance to disaster impacted communities is co-ordinated through the national disaster risk management framework, implemented by the Office of the Prime Minister (OPM) in conjunction with the regional and constituencies offices.

This chapter discusses and analyses the present national disaster risk management framework in Namibia. It also presents the responses of the national-level disaster risk management officials, the key actors in developing and employing the national disaster risk management framework. To their views are added the responses from the community members, headmen and local-level disaster risk management officials, whose input was presented and analysed in Chapters 6 and 7. The national government's reactive approach is evaluated against the internationally prescribed approach of dealing with disasters, namely disaster risk reduction, and a framework to deal with the *Efundja* in the Cuvelai-Etosha basin is proposed. Adding the lessons learned from the respondents in this study encapsulated in this framework to the present Namibian national disaster risk management framework will enhance this framework and bring it closer to international best practice. This will be accomplished by changing the present reactive approach into a more proactive approach and allow for capacity building and more input from affected communities.

This chapter does not only combine all the responses and information collected by this research, but also specifies the key areas that the proposed proactive disaster risk reduction framework needs to address. It examines the various sections of the operational framework, its structure, focus, functions and critically analyses whether the framework is fully implemented on the ground or not. The weaknesses of the framework, such as having an emergency management focus although containing some disaster risk management goals, are investigated. Other weaknesses identified include the lack of involvement of community members in the national disaster response approach and weak information dissemination regarding the risk these communities face. The present framework is also assessed in terms of the its alignment to the Hyogo framework for action, 2005-2015, from which it is initially adopted from.

In the last part of the chapter the proposed proactive disaster risk reduction framework, developed from the information gathered during this study, is introduced and explained. The proposed proactive disaster risk reduction framework is one of the most important theoretical contributions of this study.

This proactive disaster risk reduction framework for the Cuvelai-Etosha basin is not an independent disaster risk reduction framework but should be used together with the present national disaster risk reduction framework to enhance the Namibian national disaster risk reduction framework.

8.1. NATIONAL DISASTER RISK MANAGEMENT FRAMEWORK AS THE RESPONSE MECHANISM TO *EFUNDJA* IN NAMIBIA

At the time of data collection, only six national-level disaster risk management officials from the OPM were interviewed as the rest were not available because they were travelling nationwide for official duties. The officials who were interviewed were requested to describe how they deal with the *Efundja* of the Cuvelai-Etosha basin. They all responded by indicating that the way they deal with the *Efundja* is guided by the national disaster risk management framework (Chapter 2), which is stipulated in the National Act No.10 of 2012 on disaster risk management, as well as the national policy on disaster risk management. Most of their responses echoed a common theme: '*look into our national policy on DRM and the act for the framework we use, it clearly outlines the procedure on what happens during the time of Efundja'*. The interviews with the national-level disaster risk management officials confirmed the processes and structure described in the national disaster risk management framework.

As described in Chapter 2, the national disaster risk management framework was established to enable the paradigm shift in the approach of dealing with disasters and move away from treating disasters as emergencies to the new concept of disaster risk reduction (National DRM policy, 2009). The national disaster risk management participants confirmed this by stating that: '*the establishment of the framework in the national act was done in an effort to answer to the international disaster risk reduction bodies to shift the way we do things'*. The international bodies on disaster risk reduction recommended to governments that face disasters to apply the new and emerging disaster risk management (DRM) and disaster risk reduction (DRR) concepts as a new approach of managing and reducing risks rather than managing emergencies. In response to this call, the Namibian government responded by developing its national disaster risk management framework which became the guideline on how to manage the recurring *Efundja* of northern Namibia. Another national-level disaster risk management official affirmed: '*The development of the national disaster risk*

management framework was a response to the international disaster risk reduction bodies call on shifting from emergency management to risk reduction'. This newly developed framework is believed to be implementing disaster risk reduction as per views of some of the national disaster risk management participants.

These national disaster risk management participants further indicated that in addition to the existence of a Disaster Risk Management Act, Act number 10 of 2012, and the national policy on disaster risk management, after few years of persistent hazards, '*we realised that although we had the act and the policy that guided our response to Efundja, there was no direct plan and procedures that directed the specific activities that are implemented. So, we needed to develop the plan and procedures accordingly*'. This realisation led to the development of the National Disaster Risk Management Plan and the National Emergency Management Operational Procedures in 2011 to operationalise the disaster risk management legislation and policy. These documents supplemented the existing national act and '*guided our specific activities that takes place during the implementation of the national disaster risk management framework each time Efundja occur'*, according to a national-level disaster risk management official interviewed during the study.

8.2. ANALYSING THE NATIONAL DISASTER RISK MANAGEMENT FRAMEWORK

The discussion of the national response to *Efundja* through the national disaster risk management framework in Chapter 2 shows a top-down form of response which is centred on key government decision-makers coordinating other officials to provide swift relief aid and temporary shelter to the affected people. Figure 1.2 of Chapter 2 Section 2.7.1 illustrates this top-down reactive approach applied by national-level disaster risk management officials to respond to the recurring *Efundja*.

In this top-down reactive approach, although *Efundja* impacts are taken seriously throughout the well-established national disaster risk management structures, there are major implementation gaps and several shortcomings that need serious attention to achieve the envisioned and desired DRR outcomes. The following are key gaps that need addressing: lack of institutional capacity; limited funding or budget allocation; limited knowledge and awareness of disaster risk reduction issues by local-level disaster risk management officials, traditional authorities and community members.

Moreover, even the committees of the national disaster risk management framework show several shortcomings and challenges. For example, the Settlement Disaster Risk Management Committee lacks the disaster risk management plans and disaster risk management programmes although these are required as per the national disaster risk management framework. The local-level

disaster risk management participants explained that it is well known that most settlements are still in the process of developing these plans and programmes and many do not yet have these plans and programmes ready as expected. In addition to the lack of plans and programmes, most of the officials at the local disaster risk management offices did not sound confident in their knowledge of the existence of the national disaster risk management framework as well as general issues pertaining to risk reduction. Particularly, some could not get the name '*Directorate of Disaster Risk Management*' right. Therefore, these local-level disaster risk management participants' overall responses displayed limited knowledge of risk management and risk reduction matters. They were more versed in emergency management issues. Several participants from this group explained that they have attended several training opportunities presented by external experts such as the Red Cross and Red Crescent Societies. However, they indicated that these training opportunities mostly focused on emergency preparedness, camp management and camp coordination. In other words, the training mainly covered what should be done during an emergency and not necessarily on managing or reducing the risks before the time.

Therefore, it is apparent that local-level disaster risk management participants have a '*reactive perception'*. These participants used phrases like '*We require training about the procedure to be followed in a disaster response situation'* to describe the type of training they need. This implies that their expectations of the ideal way to respond to the *Efundja* is through the reactive approach which is managing emergencies and not the globally desired risk management or risk reduction approach as stipulated in the national disaster risk management framework.

As for the Local Authorities Disaster Risk Management Committee (LADRMC), their responses indicated that most of the local authorities have indeed developed the disaster risk management plans. However, the implementation of the disaster risk management programmes is still emerging, according to the participants consulted. Unfortunately, the present study could not go into greater detail as the urban local authorities fall outside the scope of the study, since the study was limited to rural settlements of the Cuvelai-Etosha basin.

Regarding the Constituency Disaster Risk Management Committee (CDRMC), responses from participants at this level gave a vague picture of the existence of these community-based disaster risk management (CBDRM) committees. Only a few of the key informants at constituency level had an idea of the existence of this committee, but they could not explain its roles and functions. They sounded unsure of the responsibilities of these committees.

About the work of the DDRM as discussed in Chapter 2, the directorate together with the Namibia meteorological services (NMS) and the hydrological services of Namibia carry out hazard monitoring, coordination of weather forecasting as well as coordinating the provision of early warning information. However, the responses of the national disaster risk management participants indicated that the early warning systems are still to be developed fully. This is because, for example, the hydrological service of Namibia only provides the daily short-term weather conditions such as river and dam level projections and does not necessarily forecast extreme hazardous climatic conditions that pose a threat. This has been criticised to be ineffective. Even the communities regarded this form of early warning information provision ineffective because although the local-level disaster risk management officials repeat these forecasts through radio platforms to raise awareness about river and dam levels among communities, the communities complained that '*it still does not mean anything to us because it simply says "there is a possibility of Efundja" without indicating how much water may be coming, or how we can prepare ourselves or respond*'. Community members explained that the early warning information will be more useful if it was accompanied by specific measures of preparation, measures of response and clear directions on what must be done. Moreover, the community members also criticised the platforms used in issuing of this information as they believe not everybody has a functional radio to be able to receive the information.

Besides the provision of early warning information, the directorate of disaster risk management also conducts vulnerability assessments. A national disaster risk management participant confirmed: *'We carry out these vulnerability assessments in order to determine who needs our help at that time and even for the remainder of the year because we have households that may be able to deal with only immediate damages but their food to sustain them for the remainder of the year is destroyed for instance'.* The national disaster risk management participants described the importance of the vulnerability assessments to be '*offering the vantage point of extrapolating how Efundja is likely to affect communities' access to basic needs such as sanitation services and access to water*. The vulnerability assessments seem to serve a bigger purpose as they reveal the type of services required by affected people.

Overall, although theoretically the national disaster risk management framework seems to describe the recommended disaster risk management and disaster risk reduction approaches to disasters, what is practised and implemented on the ground remains emergency management. The responses from participants at community level (Chapter 6) revealed that in practice, the national disaster risk management framework is not yet being successfully implemented at ground level. They attributed the lack of implementation to a lack of funding. The responses from the national disaster

management officials also concurred with the views of communities on the lack of implementation of the national disaster risk management framework. They equally attributed the lack of implementation to lack of funding as well as lack of institutional capacity as the two key factors hindering the full implementation of the national disaster risk management framework.

Moreover, this lack of proper implementation also means that there is now a misalignment between the national disaster risk management framework and the world-wide frameworks on disaster risk management and reduction, namely the Hyogo framework for action and the current Sendai framework for action. Since there is a gap between what is implemented on the ground and what is stipulated as goals of the national disaster risk management framework, this means that the framework and the Hyogo framework for action are also not aligned. Furthermore, part of the national disaster risk management framework contains some serious generalisations of goals, key performance areas and terminologies that make it difficult for implementation especially by the officials who are still learning about the DRR concept. The outdated focus of the national *Efundja* response and the lack of involvement of community members in the national disaster risk management framework are discussed in the following sub-sections.

8.2.1. The current national response to *Efundja* disaster

The national response to *Efundja* is mainly centred on offering relief aid and temporary shelter to the affected communities. The process leading to the establishing of these temporary camps and the provision of relief aid starts by the affected community members having to report themselves to their respective headmen. The headmen consult with the local-level disaster risk management officials and the information escalates through the disaster risk management committees as explained in Chapter 2 up until the president declares a state of national emergency. Once a national emergency is declared, then the coordinated work to provide temporary shelter and relief aid begins.

In practice, the relief aid goods and services come from the central government offices in Windhoek and are distributed top-down to all respective communities through various committees of the national disaster risk management system, as discussed in Chapter 2. Recently, since *Efundja* has been more frequent, the government resorted to establishing several storeroom warehouses in the frequently flooded regions, with these storerooms used to stockpile the emergency goods as a way of shortening the procedure of accessing the resources whenever they are needed. All the resources offered, such as water provision, electricity, sanitation, food and medical supplies and all other necessities that are essential to sustain livelihoods including the material for setting up temporary shelters such as tents, equally fall on the government's shoulders and any possible donors. This is a costly exercise and is draining the already depleted government financial resources.

The affected individuals remain at these tented camps until it is safe for them to return to their homes when the water has dried up. Although it marks a joyful moment when the affected people return to their homes and their lives return to normal, it also marks the last time they get to hear from the government. All forms of support and communication from the central government, local-level disaster risk management officials or all other authorities cease once they return to their homes. Communication only resumes once it floods again in the following year. This has been the repetitive form of *Efundja* response ever since it has been recorded in history up to date. The lack of following up on the affected people after the water dries up highlights the need for recovery and rehabilitation services.

The provision of flood relief aid and temporary relocation does not bring major relief to the financial and productive resources of the affected communities. It does not protect them from further impacts of *Efundja* or enable them to recover from its impacts. Therefore, these communities' productive assets continue to be depleted after each flooding season without recovery and thereby decreasing the people's ability to face *Efundja* the following year.

Moreover, this form of response is not only unsustainable over the long term, but it also does not truly involve the vulnerable communities. It does not consider vulnerable communities' ideas and experiences or their way of dealing with the flooding. It also does not offer recovery and rehabilitation services to the vulnerable communities. This reactive approach does not consider community members' response strategies in the overall response approach. This is a serious gap that needs to be addressed. The community members' response strategies are practical and have more to offer to the national response mechanism, yet they are not in any way considered. This indicates the need for integration of community responses into the overall national response approach and a better communication strategy between the government and the vulnerable communities to ensure proper inclusion and integration of their ideas and experiences. This implies that the present governmental response is failing to address the underlying risks of *Efundja* and it is not the envisioned or stated risk reduction approach many government officials perceive it to be.

8.2.2. Lack of involvement of community members in the execution of the national disaster risk management framework

As previously alluded to in Chapter 6, there is a lack of awareness of *Efundja*-related issues among community members. Specifically, the rural communities of the Cuvelai-Etosha basin, the high-risk area, lack awareness of *Efundja*-related issues compared to their urban counterparts (Niipare *et al.*, 2020). The rural areas remain unaware of the nature of the risk they face which also contributes to their inability to prepare or respond appropriately (Shaamhula & Van Rooy, 2019; Niipare *et al.*,

2020; Shaamhula *et al*., 2021). Participants from the affected communities indicated that they respond to *Efundja* by engaging in several coping strategies as ways of dealing with it. These communities apply coping strategies such as temporary relocating, finding adaptive measures for different things at household level, seeking grazing land for their livestock and generally dealing with problems as they come on an ad hoc basis. These measures are applied together with other community collective measures which are mostly short-term mitigation as discussed in Sections 6.1 and 6.3. All these mitigation and response measures only address the immediate problems caused by *Efundja* and do not necessarily reduce the long-term risks.

These mitigating and coping mechanisms that community members have are a misalignment from the overall national *Efundja* type of response. Community members are trying to find ways to live with the impacts of the *Efundja* and minimise its negative impacts, while the national response is mainly concerned with being rapid and effective at providing temporary shelter and relief aid whenever the *Efundja* strikes. There is a misalignment between these two forms of responses which indicates the need for better communication and re-alignment so that these two stakeholder responses complement each other and offer the possibility of reducing the risk of *Efundja* in the long term. It is possible that the misalignment may be taking place because the national response is still reactive in nature and does not offer an opportunity for involvement of community members. This highlights how far the current national response approach is from the envisioned risk reduction strategies contained in it. There is a serious and urgent need for incorporation of communities' views, ideas and mitigation measures into the national disaster risk management framework. This is stipulated in the proposed proactive disaster risk reduction framework developed in this study.

The fact that community members participate in the described mitigative and responsive activities shows their willingness and ability to work together towards achieving the common good, which indicates a level of capabilities and strength within community members (Winser *et al*., 2012). Although these communities take part in the activities, these are only short-term mitigative measures and offer no relief of long-term impacts. This emphasises the gap in knowledge and skills within communities in terms of applying long-term *Efundja* risk reduction measures.

Despite communities' efforts illustrating strength, unity and solidarity which exhibit the presence of social and human resources critical to resilience, there are still gaps that need to be addressed. In order to make community resilience a reality, these communities require support from government and all other civil societies. First, there is a need to actively engage community members in the national governmental response as a way of supporting them and enabling them to have a voice in what is being done for them. Second, these communities require support such as educative

programmes and formal training and teaching that will empower them to realise long-term risk reduction measures needed to improve their ways of dealing with *Efundja*. In addition to the support needed, there is a need for inclusion of these communities' ideas, activities and opinions into the national disaster risk management framework in order for it to address the main underlying issues as well as to be able to actively promote community participation. It is these communities' ways of responding and mitigating the impacts that should inform the overall national flood response. It is from their activities that the central government is supposed to learn what their main issues are and to develop programmes that respond to such needs.

The main targets, activities, and focus of the current national disaster risk management framework are discussed in the next section. The section analyses the targets and activities implemented and the defined focus of the current national disaster risk management framework.

8.3. TARGETS AND ACTIVITIES OF THE CURRENT NATIONAL DISASTER RISK MANAGEMENT FRAMEWORK

According to the Disaster Risk Management Act, Act number 10 of 2012, the national disaster risk management framework defines disaster risk management as "*a continual and unified multi-sectoral planning and implementation of strategies"* which has the following targets.

(1) "Prevention or reduction of risk of disasters;

(2) Mitigating the intensity or ramifications of disasters;

(3) Emergency preparedness;

(4) Rapid and effective response to disasters; and

(5) *Post-disaster recovery and rehabilitation"*

However, when analysing the activities implemented on the ground and the defined focus of the national disaster risk management framework, it is evident there are some shortcomings worth deliberating. The activities of the national disaster risk management framework mainly focus on the following targets:

- target number (2) which is focused on mitigating the intensity of disasters,
- target number (3) which is focused on emergency response, and
- target number (4) which is focused on rapid and effective response to disasters.

However, it completely neglects both target number (1) which is focused on prevention and risk reduction and target number (5) which is focused on post-disaster recovery and rehabilitation.

The activities of the national disaster risk management framework do little about risk prevention, risk reduction as well as reducing the vulnerability of communities. The activities do not address the question of '*what makes people vulnerable*' or how their vulnerability can be reduced as per the worldwide risk reduction framework recommendations. In addition to this, the overall national disaster risk management framework is structured based on a '*reporting structure*' that is applied whenever a disaster strikes and not necessarily structured to initiate programmes aimed at reducing the vulnerability or the risk thereof. This means that the framework's targets, activities and all of its implementation show minimal effort on risk prevention, risk reduction as well as post-disaster recovery and rehabilitation. These are serious deficiencies, also captured by the responses from the various participants in the study.

The responses from community members (Chapter 6), as well as the local-level disaster management officials (Chapter 7), concur with the above stance. They indicated that the response to *Efundja* is still seen as an emergency and taken to mean whenever there is a state of emergency, specifically when water is flowing through households and washing away their assets, then, and only then steps must be taken to alleviate the impacts. Most of them confirmed that the current response to *Efundja* happens whenever there is water and it does not extend beyond when the water has dried up. These participants further stated that the main focus of the governmental response is geared towards evacuating and assisting the affected individuals or communities, but that little effort is made to find permanent solutions.

Interestingly, even some national-level disaster risk management officials agreed with the community members' stance on this issue. They confirmed that their response to *Efundja* needs to be extended to offer programmes of rehabilitation and recovery of the affected people. A number of the national-level disaster risk management officials emphasised that currently their focus is mainly on getting the affected people out of the water for that specific period but that they care less about what happens after the water has dried. One of them stated *'Once we see that the water is gone and people have gone back to their homes, then we leave it there, we drop everything and wait again the following year to see if there will be another Efundja'.* This indicates that even the national-level disaster risk management officials themselves know of or are aware of the gaps identified in the current national disaster risk management framework. These officials also outlined the need for counselling services and programmes aimed at amplifying residents overall resilience to *Efundja*. They stressed the need to focus on recovery and rehabilitation services as follows: '*Prevention (avoidance) is even something that does not exist in our management vocabulary. I also think the floods in Namibia are managed through the main 3 cycles: Response, Preparedness and Recovery. I believe the way we are managing*

the floods in the basin, is by placing more weight on the response than preparedness and recovery. We only act once something happens'. Originating from one of the people responsible for implementing the national disaster risk management framework, these are telling remarks.

National-level disaster risk management participants further stated that the disaster risk management framework should not only need focus on prevention, rehabilitation and recovery, but it also needs to start emphasising preparedness so that people adapt various preparedness measures as part of their livelihoods. Another national-level disaster risk management official expressed the need to focus on preparedness by quoting that: '*we give so much attention to response whenever Efundja is here, but we neglect everything else especially preparedness which entails making people get ready for Efundja. And even now that we are talking about preparedness, this preparedness is taken in the context of authorities being ready to respond to help the affected people whenever Efundja strike and not necessarily on communities being prepared such that they won't need our intervention'.*

As can be seen from these statements, there is a serious need to redirect the effort and activities of the national disaster risk management framework and its implementation. The UNDRR (2005) recommends that in order to achieve disaster-free communities, risk prevention and risk reduction are key contributing factors toward such goals. If Namibia aims to achieve reduced losses from *Efundja* in the Cuvelai-Etosha basin, there is a need for the national disaster risk management framework to develop and implement programmes of both risk prevention, preparedness, and risk reduction, as well as programmes focusing on recovery and rehabilitation.

The next section discusses several challenges observed and expressed by community members and local authorities during the data collection process. The community members expressed challenges they believe need to be addressed in order to reduce the risk of *Efundja*.

8.4. CHALLENGES FACED BY COMMUNITY MEMBERS AND LOCAL-LEVEL AUTHORITIES THAT ARE DEEMED TO INCREASE THE RISK OF *EFUNDJA*

The study observed a combination of challenges affecting the local people of the Cuvelai-Etosha basin. The challenges highlighted in this section indicate the areas the proposed proactive disaster risk reduction framework needs to address.

8.4.1. Settlement in flood-prone areas

Headmen expressed that, although they have some power over land allocation, they have been faced with a challenge of preventing certain individuals from settling in the flood-prone areas. They explained that sometimes individuals insist on settling at specific flood-prone areas within the

floodplain irrespective of the counsel they are given not to do so. They said that they have no means of removing such individuals from flood-prone areas. Headmen explained that this was becoming an increasing challenge which they fear will increase conflict in their communities.

8.4.2. Poor land surveying and lack of proper consultations

Some respondents identified inappropriate land surveying or the lack thereof as an issue that increases the risk associated with the *Efundja*. It has been revealed that some developments or infrastructure projects commence without proper land surveying or lack of consultations with the affected communities, resulting in ill-planned developments. The communities expressed that currently they are paying the price for lack of consultations by developers. Communities claimed that some risks they are currently facing would have been avoided should there have been proper consultations. This has been found to disadvantage the communities in various ways and continue to affect their everyday lives. It was indicated that this is not exclusive to *Efundja* but applicable to all other hazards as well. A particularly relevant example was given as the development of *Okalongo* village settlement which was established in a floodplain and was developed without sufficient architectural drainage installations. As a result, the village settlement is one of the most severely flood-impacted communities within the Cuvelai Etosha basin.

In support of the above views, community members further explained that the current developments are not properly assessing the flood risks and thus constructing roads without sufficient culverts, causing the roads to either be washed away or be submerged under water, or to impede the natural flow of floodwater. Such a tendency exacerbates the flooding situation and highlights the need for future consultations with community members. The communities established that this is a challenge that will continue to persist for more upcoming developments if nothing changes regarding community consultations and proper spatial planning.

However, there seem to be discrepancies between the information obtained from community members and that from national-level disaster risk management officials. The government employees denied the existence of developments done without proper consultations with local communities. The communities claimed that various road sections are exacerbating the impacts of *Efundja* in their communities because they do not have enough culverts to permit water to flow through. This is something that the national-level disaster risk management officials did not agree with and claimed that it is impossible for a development to take place without proper surveying as well as consulting with the affected parties.

In addition to the above-mentioned challenges, the present study observed the following challenges.

8.4.3. National policies challenge

Overall, the participants observed a challenge of having good policies which are not properly implemented. This seems to be the general sentiment regarding many of the national policies which even the local-level and national-level disaster risk management participants agreed to: '*Our laws are usually good and accepted by many global platforms. However, the situation on the ground does not always reflect what is stipulated in these laws*'.

8.4.4. Misunderstanding the difference between poverty eradication and risk reduction issues

There is conflicting understanding between poverty eradication and risk reduction activities. Especially among community members and among the local-level disaster risk management officials, there is a misunderstanding and confusion between addressing *Efundja* response activities and poverty eradicating-related activities. The interviews with headmen and the local-level disaster risk management officials revealed that there is confusion between what their role should be in terms of addressing *Efundja* risk reduction and what is happening which is mainly addressing poverty eradication. In many of the discussions during the data collection process, there was inter-exchange between issues of poverty and *Efundja* risk reduction measures. Most aspects of *Efundja* mitigation measures or activities were taken to mean poverty alleviation.

The next section discusses the most applicable disaster risk reduction measures for the Cuvelai-Etosha basin. These measures are discussed to set the scene for one of the most important theoretical contributions of this study, the proactive disaster risk reduction framework as proposed in Section 8.6.

8.5. MOST APPLICABLE RISK REDUCTION MEASURES FOR NORTHERN NAMIBIA

The ISDR (2006:5) defines disaster risk reduction as "the systematic development and application of policies, strategies and practices aimed to minimise vulnerabilities and disaster risks throughout a society, to prevent, to limit, mitigate and prepare for adverse impacts of hazards, within the broad context of sustainable development". Although the implementation of disaster risk reduction measures and policies seems to be requiring more effort from the government, it is a multi-sectoral process requiring effort from all sectors and institutions in the country to support the effort and make the goal attainable. It is not a task for one person, institution or organisation, but an

integration of efforts from all government stakeholders, private institutions, institutions of higher learning and especially the vulnerable communities themselves. Implementation of these strategies would require vulnerability assessments together with government and private institutional capacities and operational abilities to execute disaster risk reduction functions effectively. Hence, an effective disaster management system that integrates and coordinate all these efforts is crucial. As for northern Namibia, this system exists as the national disaster risk management framework described in the national Disaster Risk Management Act, Act number 10 of 2012 considered in Chapter 2. However, this system lacks both institutional capacity, resources and operational abilities to carry out its stipulated functions and key performance areas. In addition to these inadequate conditions, there is a need to consider further risk reduction measures that will strengthen the capacities of community members and address all gaps that were identified in this study. This includes removing unsafe conditions such as:

- avoiding settling in flood-prone areas,
- strengthening and improving early warning systems,
- improving the provision of information and awareness about the risk,
- empowering headmen and local-level disaster risk management officials to promote resilience,
- improving spatial planning for development,
- enhancing the provision of appropriate road and transportation infrastructure,
- eradicating poverty which enhances the capabilities of the vulnerable communities themselves and strengthens them to be able to face disasters.

These measures are discussed in detail in the following sub-sections and set the scene for the proactive disaster risk reduction framework presented in Section 8.6.

8.5.1. Avoid settling in flood-prone areas

Participant responses in Chapter 6 revealed that the risk in the Cuvelai-Etosha basin is greatly enhanced by human behaviour which means that part of the solution should involve radical change of human behaviour. A complete mind-set change starting with community members, headmen, local-level disaster risk management officials (councillors) as well as everyone else involved in the national disaster risk management system will go a long way in reducing the risk of *Efundja* in northern Namibia. If communities have sufficient knowledge about the hazards they face, it will also influence their decision on where they choose to settle. Avoiding settling in flood-prone areas is one of the most effective proactive measures that could reduce the risks of *Efundja* within the Cuvelai-Etosha basin. However, this mitigating measure is difficult to implement due to an increasing population in the

Cuvelai-Etosha basin. Due to a shortage of high lying land, people are forced to settle wherever they can, even when it is in or near flood-prone areas. Headmen who allocate land to residents need to be capacitated to understand the risk of allowing people to settle in flood-prone areas. This risk will be reduced by changing people's attitudes through education and creating awareness of the risk as well as empowering headmen to control land allocation and ensure that no allocation is done within the flood-prone areas.

8.5.2. Strengthen and improve early warning systems

The global assessment report on disaster risk reduction of 2011 indicates that investing in effective and timely early warning systems has the potential to save lives, protect infrastructure and help countries' economies to recover faster after events of weather- and climate-related hazards (Rogers & Tsirkunov, 2011). The report further emphasised that the provision of efficient and timely early warning systems is the preferred approach to risk reduction although such warnings do not take away the hazards (Rogers & Tsirkunov, 2011). These are regarded as the best approach because early warnings do not only offer residents time to flee but also allow them to prepare, decide on other preventative measures, decide on climate-appropriate crop seeds to plant as well as offer local authorities time to either evacuate the people or offer a swift response. Effective early warning protects livelihoods because once residents use appropriate weather crops, it enhances productivity and hence their livelihoods are less impacted by the hazard. Early warning information also helps residents make appropriate social, physical or economic decisions, with the resultant advantages in terms of their livelihoods, safety and financial wellbeing.

A study conducted in Germany illustrates the effectiveness of early warning systems for flash-floods and reveals that there is a relationship between receiving a warning, people being prepared, and the effectiveness of mitigation measures they use. A positive relationship between effectiveness of mitigation measures and early warning information has been proven by the study which states that whenever people received warnings 12 hours before it flooded, they managed to reduce the actual damage to about 60% of the potential damage (Schroter *et al.*, 2008). This highlights how crucial the provision of early warning is and how much destruction can be prevented if people are alert and expect the flood. This then affirms the need for the national disaster risk reduction framework to consider improving the existing early warning systems as a way of enhancing preparation and effective use of mitigation measures. In this study, Section 8.2 discussed how the Namibian early warning systems are yet to be fully developed. It is recommended that the country should invest in providing real-time early warning information that is well interpreted and disseminated to the people of the basin on time, in a language they understand, and through all relevant information channels.

Effective and timely early warning systems should not be mistaken with daily weather forecasts that simply predict the daily short-term weather conditions and do not necessarily forecast extreme hazardous climatic conditions that pose a threat. The ISDR (2006) explained that early warnings should not be limited to forecasting but should involve the transformation of the forecasts into warning information, transmitting warning information to local decision-makers and converting warnings into action. That way early warning information is used and applied to enable vulnerable communities to respond better and thereby reducing the damage to their assets and infrastructure. The Department of International Development (DFID) (2004) has recommended cost-effective regional multi-hazard early warning systems that can be shared between various geographically bounded countries who can share in the cost as well as the benefits. This can be a sustainable option for Namibia who can partner up with South Africa, Angola and Mozambique where floods are frequent.

8.5.3. Improving information dissemination and *Efundja* risk awareness

Literature has identified that climate-related hazards negatively affect poor households, and especially those that are dependent on agriculture and related activities for survival, to a larger degree than more affluent households (DFID, 2004). This is because even a slight change in climate can influence their crops and hamper their survival. Climate and weather-related hazards can also push people further into poverty (Paul Jr *et al*., 2020). This implies that reduction measures for climate and weather-related hazards should seek to address both livelihood protection, climate change impacts and improve vulnerable communities' capacities by improving their knowledge base to develop resilience towards climate-induced hazards (Paul Jr *et al*., 2020). The knowledge base offered should cover both information about risks they face as well as information on how they can improve their livelihoods.

As discussed in Section 6.2.2, household resilience can be achieved through improved access to knowledge and information which will enhance households' capacities and prevent them from falling back into the same cycle of shocks. Paul Jr *et al.* (2020) argued that experience and education are key factors in sustainable and long-term coping and adaptive strategies to overcoming disasters. This implies that there is a causal relationship between knowing the risks, experiencing the disasters and the mitigation strategies employed by different households. A study conducted in Germany revealed that heads of households who were knowledgeable and experienced about the risk before the disaster struck, engaged in a variety of mitigation and responsive measures unlike those who were the least knowledgeable and faced the disaster for the first time (Grothmann & Reusswig, 2006).

The present study did not assess the knowledge and level of education of participants and could therefore not make any inferences regarding the level of education and its influence on how

people respond to the *E*fundja. However, the study in Germany shows that education and awareness about the risk will help to build resilience in vulnerable communities, improve their ability to make risk assessments, enhance their responses, as well as generally strengthen their adaptation capabilities. Knowledge about the hazard will shape their perception and guide their activities and behaviour towards the hazard. Moreover, providing information and awareness about the risk needs to be extended beyond the community members themselves. Information sharing and awareness programmes must include local traditional leaders (headmen), as well as local-level and national-level disaster risk management officials that are responsible for developing and implementing policies that were found to be ineffective.

In addition to the need to improve the provision of information, the issues discussed above also confirm the need for a complete implementation of the national disaster risk management framework as already explained in Chapter 2. This framework consists of goals that promote increasing awareness among leaders of institutions as well as in the communities themselves. However, this framework has not been fully and successfully implemented to date.

8.5.4. Empower local-level disaster risk management officials to promote resilience

Responses captured in Chapter 7 revealed that the local-level disaster risk management officials lack knowledge in community resilience and the concept of disaster risk reduction. Community resilience through CBDRM has received substantial attention over the last decades as a bridge towards risk reduction in vulnerable communities. The concept of community-based disaster risk management invites the local people to take charge of disaster risk reduction initiatives and programmes. Community-based disaster risk management programmes are programmes that are implemented in communities aimed at enhancing communities' capacities and thereby strengthening their ability to face the hazards. However, CBDRM can only be successful if local-level disaster management officials together with traditional authorities (headmen) are drivers of these agenda since they are the authorities that are rooted in the local communities and sufficiently close to community problems where these hazards take place (Manyena, 2006). Hence, it is important to equip local-level disaster management officials to be able to lead and sustain CBDRM programmes. Local-level disaster management officials are the role players closest to disaster-related problems in communities and that makes them the best suited to establish long-term solutions to risk reduction. To do that, government must realise that local-level disaster risk management officials and traditional authorities (headmen) are indispensable components in establishing disaster resilient communities (Manyena, 2006).

Moreover, it has been found that when local authorities are engaged in community affairs, the vulnerable communities tend to trust them. This strengthens community cohesiveness and increases the community's confidence in their respective authorities (Wei *et al.*, 2019. When trust is established, cohesive communities are more likely to prepare for the hazards they face and execute various coping mechanisms and comply with instructions or measures from their respective authorities when compared to those who do not trust the authorities (Wei *et al.*, 2019). This is an opportunity for local-level disaster management officials to run successful DRR initiatives. Therefore, it is necessary to build institutional capacity among these officials as a way of empowering them to take the leading role in disaster risk reduction at the local level.

8.5.5. Empower traditional authorities (headmen)

Despite the important roles the traditional authorities play in their respective communities, as highlighted in Chapter 7, they are not confident in these flood response roles. Their responses indicated that though they are leading the communities, they are not confident in any of the preparation or response strategies they are currently utilising. This also explains why some headmen opt to do nothing and hope that the flooding is not so severe in that particular year. Moreover, this also explains why some headmen do not value their leadership responsibilities and displayed a feeling of hopelessness. This highlights the need for their empowerment to grant authoritative power and empowerment in the overall traditional leadership to be able to boldly guide and offer direction to their respective communities in times of disasters. This important issue was discussed in Sections 7.1 and 7.2. Supporting the idea of traditional authority empowerment, Rumbach and Foley (2014) stated that traditional authorities play crucial roles to reduce risk as well as in building community resilience. Although both traditional and governmental institutions are needed for the success of any developmental or risk reduction effort, headmen are key in sustaining these efforts since they are part of the communities (Swidler, 2013). Rumbach and Foley (2014) further stated that if headmen are properly capacitated, they will be capable of positioning their communities to work together to achieve greater goals. The authors further emphasised that headmen and any other traditional authorities, if properly empowered, can assign roles and responsibilities, mobilise groups to work together and also provide a system of accountability for their respective communities. Headmen can do this because the vulnerable communities trust them more than any other external leaders. Moreover, hazards are local and context specific. This places traditional authorities in a better position to coordinate people as they navigate these hazards that are deeply embedded in the context of the societies they have an impact on.

Traditional authorities are an integral part of the daily lives of communities, and they have been tried and tested across various social interactions and in different contexts. Therefore, it is only natural that during periods of disaster, community members will instinctively rely on them to direct their course of action. This confirms the presence of social capital that is made up of social trust and cohesion and can facilitate the unity, coordination and teamwork necessary to effectively deal with a hazard.

8.5.6. Improve spatial planning for developments

According to Johnson (2011), land-use planning and management as well as how buildings are developed provide an enabling environment for disaster risk management, yet the lack thereof can create new risks. Regulated planning and management of land-use and the application of building practices that consider disaster risks are key milestones towards disaster risk reduction (Johnson, 2011). The study findings presented in Chapter 6 discussed how the lack of or ineffective spatial planning has resulted in several communities being flooded soon after various infrastructural developments have taken place. It was also highlighted that in most of these infrastructural developments the local communities were not consulted.

This underscores the need for emphasis on the importance of spatial planning and valuing traditional knowledge when dealing with risk assessments for new developments. The literature on disaster risk reduction emphasises the importance of the integration of traditional knowledge and scientific knowledge as an important tool in addressing the different forms of risks (Wisner *et al.,* 2012). Local communities who have lived in their respective locations for years have valuable knowledge on issues pertaining to the impacts of the disasters they face, something scientific experts from outside these communities must include if they do only desk top assessments. Hence, it's recommended that community consultations should form an integral part of flood risk reduction measures in northern Namibia. Traditional knowledge has been acclaimed for aiding scientific knowledge to overcome hazards by incorporating the traditional knowledge into their risk reduction efforts.

Inappropriate or lack of topographical assessments and spatial planning stresses the need for implementing regulations, laws and plans that are mindful of DRR in all developmental efforts. These DRR conscious regulations, land-use plans and active participation of vulnerable communities in all new developments are actually stipulated in the national disaster risk management framework but they are not implemented. The fundamental principle of the national disaster risk management framework states that it aims to ensure that "further developmental efforts do not increase vulnerability to hazards" (National DRM policy, 2009:16). This is an aim that has not been reached.

Therefore, it is recommended that one way to address inappropriate spatial planning and the lack of consultation with vulnerable communities is by fully implementing the national disaster risk management framework, something already referred to in Chapter 2.

8.5.7. Provide appropriate road infrastructure and transportation services in rural areas

Section 5.2.2 described the extent to which people's movements are limited during the *Efundja.* This is, at least partly, due to underdeveloped road infrastructure in the rural areas. Despite Namibia being classified as an upper-middle-income country, both road infrastructure and transport services in the rural areas are sometimes almost non-existent. The country is known of having reasonably good asphalt (paved) roads connecting urban areas. However, gravel roads and sand paths which connect most semi-urban and rural areas are not always in good condition. Most rural settlements lack proper road services and where roads do exist, they are badly maintained. Due to the practice of agricultural subsistence farming done on large crop fields, homesteads are sparsely scattered around with no road connections between them (Starkey *et al*., 2017). It has been found that about 24% of the Namibian population live more than six kilometers away from roads and 11% live more than 10 kilometers from roads (Starkey *et al*., 2017). In the rural Cuvelai-Etosha basin, some rural villages are more than 30 kilometers from the nearest proper road. This emphasises the poor transport and road infrastructure in rural areas and suggests the need for the development of sustainable road infrastructure and transport services to improve mobility. Especially during the flooding season, this is of critical importance.

Rural residents also need to be able to access health facilities, education facilities, various government services, and to take part in religious gatherings, even during the flooding season. This is not possible at present due to the inappropriate road infrastructure and transport services. Therefore, there is a need for improvement in road infrastructure in the rural areas of the Cuvelai-Etosha basin, as well as the provision of efficient transport services. Elevated roads need to be extended to all villages to allow people access. These roads should have appropriate culverts to allow floodwater to flow unimpeded so as not to cause unneccessary impacts on communities.

Moreover, the current lack of sufficient road infrastructure in the rural areas does not only influence mobility but it also has an inhibiting effect on the economy, the income of local people, and investment opportunities. This situation corroborates the research of Starkey *et al.* (2017) who argued that rural transport services have always been neglected as an important part of the development with the assumption that rural people do not need transportation services and that their informal and local entrepreneurs would meet all their needs.

The lack of road infrastructure and transport services limits access to markets and prevents investors from identifying and realising investment opportunities in rural areas. Even rural residents who want to sell their goods and earn income are impeded. According to Nwagbara and Iyama (2019), road infrastructure and transport services provide access and can help to reduce poverty, promote rural economic growth, social integration and the better performance of rural markets. Overall, road infrastructure and proper transport services also enhance globalisation and encourage jobs and business opportunities, something crucial to develop Namibia.

The issues discussed above emphasise the need for adequate road infrastructure and viable transport services to ensure sustainable mobility options and access to markets and services for rural residents of the Cuvelai-Etosha basin. These transport services need to be mindful of distances between resident homes and their local transportation hubs or the next place where they can access other transport services. The planned transport services should aim to allow households to reach a road within a radius of two to three kilometres, should be affordable and well suited for both short and long-distance journeys, and be able to accommodate fairly large numbers of people. Lastly, both the provision of road infrastructures and transportation services need to take the annual flooding into consideration.

8.5.8. Adaptation of Cuvelai-Etosha basin communities to changing climate and *Efundja*

The Intergovernmental Panel on Climate Change (IPCC) (2007) defines adaptation to climate change as processes that improve communities' abilities to deal with the envisaged changing climate over time. Therefore, climate change adaption measures would mean activities relating to changing the types of crops grown, livestock mix-breeding, creating a feasible environment for rural farmers and households to respond to change, as well as adopting institutional strategies and policies that promote adaptation measures (Dirkx *et al*., 2008). Africa is known to generally have a low adaptive capacity because of its dependence on natural resources for survival, high levels of poverty, unfair distribution of land and resources as well as rising impacts of HIV/AIDS. Namibia is no exception since its economy is primarily dependent on climate-sensitive sectors such as eco-tourism, fisheries and agriculture (David *et al*., 2013). Section 5.3.3 discussed how a changing climate can possibly increase the frequency of *Efundja* in the area. Therefore, the country needs to invest in strategies and policies that promote adaptation to climate change in order to help its vulnerable communities. Adapting to implement climate change is not easy because it involves changing people's way of life, something not easily accomplished. Therefore, the country should follow the IPCC (2007) recommendation that promotes the implementation of adaptation mechanisms as accumulative actions that include options relating to behavioural, technological and even policy-oriented changes

in such a way that it is not seen as a complete change of the way people live. These adaptation measures should begin at the national level, where policies to support adaptation measures should be incorporated into the development agenda. This should be followed by education and awareness programmes aimed at raising awareness about the risks and promoting the need to change the way of farming. A study by Kaundjua *et al*. (2012) showed that the concept of climate change does not exist in the local language spoken in the Cuvelai-Etosha basin, a possible reason why people living in the basin are not really aware of the risks associated with it. Therefore, the first step towards climate adaptation should be the creation of awareness, followed by practical measures such as crop species diversification and breeding more hardy types of animals. It's advised that communities experiment with the planting of different new types of crops in order to identify those that thrive in the changing climatic conditions. The successful crops can then be incorporated into the present farming practices. It is also recommended that communities can attempt crop management practices such as modifying the length of the growing period, changing planting and harvesting dates (Dirkx *et al*., 2008). Irrigation is another adaptation option that has the potential to improve crop productivity by complementing the scarce rainwater and lengthening the already shortened growing season. However, this option needs to be combined with the use of crops that are highly water-efficient because the Cuvelai-Etosha basin is already faced with water deficits.

The livelihood in the Cuvelai-Etosha basin is mainly derived from subsistence farming, based on crop cultivation and livestock rearing which are sustained by the availability of water in the Cuvelai streams and are severely impacted by the changing climate. Therefore, adapting to climate change is necessary so that people can recover from disasters and are protected from its effects, increases their capacity, improve their livelihoods and at the same time avoid future risks.

8.5.9. Eradicate poverty to reduce vulnerability to *Efundja*

The occurrences of disasters are found to be exacerbated by the existing challenges of poverty and poor populations experience more difficulties in coping with disasters (David *et al*., 2013: Hooli, 2016). Poverty enhances conditions of disaster risk, more especially in the cases of environmentally-related hazards that lead to environmental degradation, residents settling in unsafe conditions or compromising on standard building techniques because they are unable to afford anything better (Lavell, 2008). On the other hand, weather and climatic hazard events are believed to push people back into poverty (Birkmann *et al.*, 2013). This indicates that there is a relationship between disaster risk and poverty, something most of the previous literature failed to sufficiently address. The picture of the situation in the Cuvelai-Etosha basin that emerged from the results of the present study correlates well with literature about the effects of hazards on poor communities. This was discussed

in Section 5.2.3. Hooli (2016) investigated the use of indigenous knowledge as coping strategies to face floods in northern Namibia and confirmed that indeed poverty in northern Namibia is a stressor that makes the rural residents more vulnerable to *Efundja*.

Poverty in Namibia is a national concern and not only a problem of the Cuvelai-Etosha basin. About 18% of the population of Namibia is classified as living below the poverty line. Most of these poor people live within the Cuvelai-Etosha basin (NSA, 2018). This high level of poverty negatively affects how people cope with *Efundja*, how they prepare for it and ultimately their economic situation increases their vulnerability to *Efundja*. Adding to the communities' vulnerability to poverty is that most of them depend on crop production and livestock farming to make a living. Climate change has caused reduced rainfall duration, increased temperatures and reduced the planting window. This drastically reduces the overall crop and livestock production. Reduced production of crops and livestock implies that the families that depend upon them for survival are impacted and their coping capacity has been reduced. It means that they do not have sufficient food to cope with the recurring impacts of *Efundja*. All these dimensions of poverty reduce families' capacity to face the *Efundja* and accentuate the need for external assistance.

Poverty within the rural areas of the Cuvelai-Etosha basin manifest in different dimensions such as the lack of resources which includes lack of productive resources such as ploughing equipment, type of housing structures, high levels of unemployment and dependence on crop and livestock production to survive. All these dimensions of poverty influence how a particular family lives, how they deal with the impacts of the *Efundja* and also call attention to their vulnerabilities.

The lack of resources inherently influences several areas in people's livelihoods. This is depicted by how some people are depending on social grants (such as old-age pension grants or the foster care grant) and drought relief aid as their main source of income. In the same manner, the lack of resources also influences how homesteads are built. Due to a lack of money, most houses are built with highly vulnerable materials such as stalks, bio-degradable grasses, and mud or thatch roofs which means they can be more easily destroyed by *Efundja* and thereby increasing their vulnerability. The lack of equipment, such as ploughing equipment, is illustrated when a family does not own oxen to plough their farm for cultivation and they depend on borrowing oxen to plough. Such a family is likely to only get oxen to plough and plant when the rainfall season is almost over. This almost automatically reduces their harvest at the end of the season, a vicious cycle that is difficult to break. With the effect of climate change shortening the rainy season, it reduces the planting window meaning that such a family would only have minimal germination that will yield a small harvest by the end of the season. This means that such a family will have little to live on and if the *Efundja* strikes, they are

not in a position to cope well with the impacts because their capacity to do so has already been reduced by the fact that they lack food resources.

Adding to the vulnerability of rural communities in the Cuvelai-Etosha basin is the high rate of unemployment. Only a small percentage of people have formal jobs, and most youths depend on casual labour, making and selling crafts, and operating cuca-shops as their source of income. These conditions force the migration of young people to urban areas in search of better living conditions. The climate change vulnerability and adaptation report of 2008 supports this view by stating that the unemployment rate in the rural area is considered an inaccurate measure of how households may respond to the impacts of *Efundja* (Dirkx *et al*., 2008). This is because unemployment is equally spread throughout all rural areas and the only way to determine different levels of household poverty is to determine if a household has a member with a formal job or not. If a household has several people with salaried jobs, then they are likely to build concrete rooms which can withstand the *Efundja*. Families without salaried people will mainly build with mud, stalks and grass which are damaged easily by floodwater. Therefore, families without any salaried members are more vulnerable to the *Efundja* because they lack concrete rooms that can withstand the *Efundja* better. All these factors are associated with a lack of resources that worsen the people's ability to face the *Efundja*.

In summary, vulnerability to floods is being exacerbated by existing high levels of poverty, caused by the high unemployment rate and reliance on subsistence farming in an area regularly impacted by flooding or drought. The differing levels of income manifest in the type of housing structures, availability of farming equipment and dependence on crop and livestock production as main sources of livelihood. These factors do not only increase people's vulnerability, but it also influences how these communities prepare, cope and respond to *Efundja*. This concurs with literature that argues that disaster risk reduction is also a developmental issue and that poverty aggravates the severity of disaster impacts. This indicates the need for disaster risk reduction efforts in the Cuvelai-Etosha basin to include poverty alleviation in an effort to reduce the risk of the *Efundja*. For this reason, it is imperative to consider creating a synergy between social protection (improved poverty reduction measures) and DRR in order to help increase resilience against risks.

It is evident that there is a need for further education and training programmes to teach community members various methods of creating sustainable livelihood, how they can invest in their local markets and extend their existing market opportunities. By doing so, they are addressing the root causes of poverty, reducing their vulnerability, and enhancing their capacity to deal with flooding.

The interrelated issues discussed in this first part of the chapter underline the need for closer scrutiny of the existing Namibian disaster risk reduction framework. In the next section, a proactive disaster risk reduction framework for the Cuvelai-Etosha basin is proposed. The proposed framework encapsulates the results of this study and is one of the most important theoretical contributions of the research reported on in this dissertation.

8.6. PROACTIVE FRAMEWORK FOR DRR IN THE RURAL CUVELAI-ETOSHA BASIN

This section presents the proposed proactive disaster risk reduction framework for the rural Cuvelai-Etosha basin. As illustrated in Figure 8.1 below, the framework presents the areas that require improvement for Namibia to effectively deal with the impacts of *Efundja.* This is done with regards to the four involved key stakeholders, namely community members, headmen, local-level and national-level disaster risk management officials.

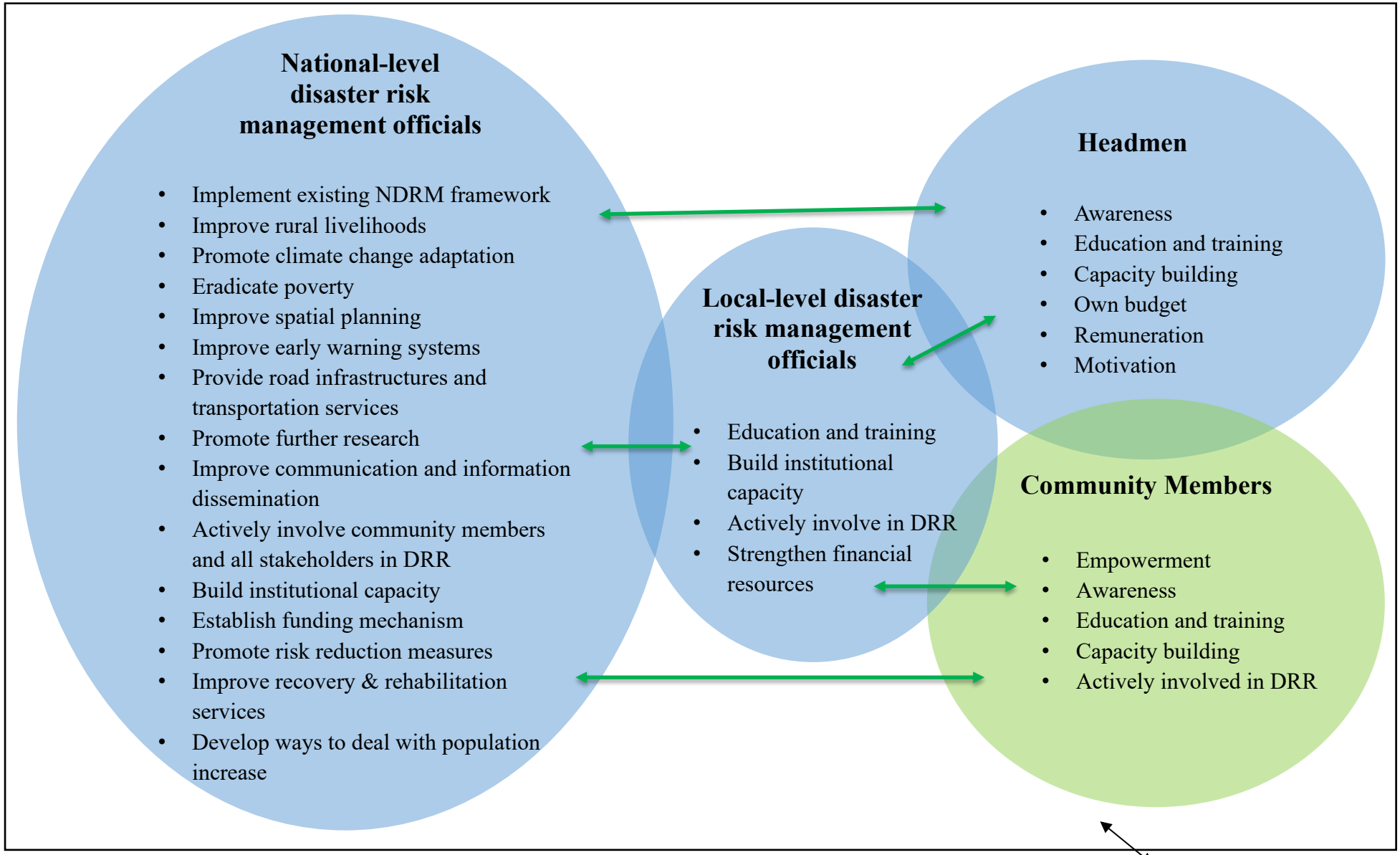

Figure 8.1: Graphical illustration of proposed disaster risk reduction framework for the Cuvelai-Etosha basin

For Namibia to reach the desired goals of disaster-risk reduction, the present study recommends the proactive disaster risk reduction framework for the Cuvelai-Etosha basin depicted in Figure 8.1 above. This framework is not a step-by-step guide on how to reduce *Efundja* risk in northern Namibia, nor an attempt to replace the current national disaster risk reduction framework, but rather an endeavour to highlight the gaps within the existing national response to *Efundja*.

This study acknowledges the existence of the national disaster risk management framework and recognises the efforts to deal with risks through the application of this framework. However, some shortcomings and limitations still need to be addressed. It is the aim of the proposed proactive disaster risk reduction framework to do that. Consequently, the proposed framework is not an attempt to supersede the existing national disaster risk reduction framework but it intends to complement it. This new framework flowing forth from the research in the Cuvelai-Etosha basin should therefore be used together with the current national disaster risk management framework.

As shown in Figure 8.1, the proposed framework addresses all four stakeholders involved, with the green arrows indicating the free flow of information and constant communication and interaction between the four stakeholders. In this framework, the national-level disaster risk management office, the central office dealing with *Efundja,* interacts with community members (who are the centre of this framework) directly (represented by the green arrow) or through the local-level disaster risk management officials or the headmen. This means that the national-level disaster risk management office communicates with community members by constantly sourcing their views and opinions on any risk reduction plans or programmes. Moreover, the national-level disaster risk management office interacts with communities by supplying early warning information, disseminating any other important information as well as offering empowering and educational training to build their capacity. This will enhance communities' knowledge and awareness of DRR issues and eventually bring about a radical change in human behaviour and change their overall perception of the hazard. A radical change of behaviour means that their overall perception of *Efundja* is transformed for the better and they will understand the significance of avoiding settling in flood-prone areas, for example. The national-level disaster risk management office also needs to activate community-based disaster risk management committees as a way of further involving community members in decision making, soliciting their preparation, response and mitigation measures. This way the national-level disaster risk management team can develop and implement community-based programmes and strategies that are cognisant of community members' ways of doing things.

In the same way, the national-level disaster risk management office also interacts with the traditional authorities (headmen) directly (represented by the green arrow) or through the local-level

disaster risk management officials. The national-level disaster risk management officials interact and communicate with the headmen by offering them training and empowerment opportunities as a way of building their capacity. Through these interactions, educational and risk awareness programmes on disaster risk reduction issues are developed and presented to the headmen. This will bring about headmen motivation and confidence in their leadership roles and allow them to confidently and effectively guide and offer direction to their respective communities in times of disasters. Moreover, the national-level disaster risk management office needs to begin allocating a discretionary budget to headmen and remunerate them for their work and contribution to their society's overall well-being. This will strengthen them and may also promote control over land allocation issues as identified in this study.

The local-level disaster risk management officials are an important link between the communities and the national-level disaster risk management office. Therefore, the national-level disaster risk management office needs to maintain communication with these offices so that they become well-versed and actively involved in disaster risk reduction activities. By doing this, they can develop and lead community-based disaster risk reduction programmes. These local-level disaster risk management offices also require institutional capacity and empowerment to promote resilience among their respective communities. They need training programmes on the concept of DRR and must be able to raise awareness of disaster risk issues among their communities. Futher, these local-level disaster risk management offices require increased financial resources in their operational budgets which would enable them to prioritise risk reduction activities.

As for the national-level disaster risk management officials, these officials have a lot that still needs to be done. First, the national disaster risk management framework is not comprehensively implemented. It contains various risk reduction goals that could have been implemented, enabling the country to do better at reducing the risk.

Second, there is a need to improve rural livelihoods. This can be done through promoting local income from natural products, developing and investing in local markets and assisting local people to venture into such markets. Promoting income-generating opportunities, and increasing welfare and promotion of resilient livelihoods are also options of improving livelihoods. Moreover, other ways can be to promote small scale water harvesting and small gardening of individual households to supplement their current protein and starch-filled diets. The national agricultural production can also consider using agro-ecological technologies to improve the overall food production. Improving people's livelihoods would help reduce the number of resources that are currently prioritised for eradicating poverty rather than addressing flood risks and impacts.

Third, there is a need to promote climate change adaptation by investing in strategies and policies that promote this adaptation to climate change. In addition to establishing policies, creation of awareness about climate change, promoting crop species diversification and breeding of hardy types of animals can be other options to adapt to climate change. Households can also consider adopting varieties of seeds that are suitable for shortened growth seasons in order for the communities to improve their food security. One method to promote crop diversification would be irrigation because it enables farmers to cultivate and grow crops throughout the year and thus, diversify their crops. Other crop diversification methods can include experimenting with winter crops (due to increased winter temperatures), crop rotation and the use of machinery for ploughing. Adapting to climate change is necessary as it will enable households to improve their food security which has been found to be a challenge hampering these households to deal with the risk of *Efundja*.

Fourth, there is a need to eradicate poverty in the Cuvelai-Etosha basin. This can be achieved by promoting education and training programmes to teach community members methods of creating sustainable livelihoods and investing in local markets to increase their income streams. Eradicating poverty would enable vulnerable communities to be empowered and be able to resist disasters and face further risks. Moreover, creating a synergy between social protection (improved poverty reduction measures) and disaster risk reduction would promote resilience against risks.

Fifth, the national response mechanism needs to improve spatial planning for developments. This can be done by introducing strict building codes and standards aimed at avoiding infrastructures aggravating the risk. This will also help avoid further developments in flood-prone areas. Regulating land-use planning and the application of building codes and practices, improving the planning of rural road infrastructures as well improving consultation with local communities for any infrastructural developments can be other options. Prioritising the use of traditional knowledge in risk assessments for new developments, and establishing strict road construction standards to ensure the natural flow of water are some of the options to achieve this.

Sixth, the national response approach should improve and strengthen the early warning systems. Improving early warning systems is a way of enhancing preparation and effective use of mitigation measures. When communities receive timely early warning information, they become clear on when the start of the rainfall season is expected and whether rainfall is expected to be higher or lower than the normal averages. This will help people become aware of what is coming and that influences how much they will be impacted in the end, and how they should respond. Early warning information should be provided in real-time as well as interpreted in languages that communities understand and should reach them on time and through credible and trusted sources.

Seventh, there is a need to provide proper road infrastructure and transportation services by extending elevated and culvert-fitted roads to all villages to allow people access to services during the flooding season. Moreover, suitable transportation services for the rural areas to enhance their mobility during *Efundja* are also required.

Eighth, there is a need to promote more research and the development of further risk reduction measures. Research would shed more light on various issues such as how culture can enhance or hinder risk reduction efforts in the Cuvelai-Etosha basin. The promotion of further risk reduction measures can include raising awareness about the dangers of land degradation and desertification which lead to unsafe conditions and increase vulnerability among communities.

Ninth, the national-level disaster risk management team needs to improve communication with and among its stakeholders. This means keeping a constant interaction between the team itself and the headmen, community members and the local-level disaster risk management officials. Constant interaction and communication would promote these stakeholders' active involvement in the planning and implementation of any risk reduction programmes and activities. Community members also lack knowledge and information relating to the hazard they face which was also found to contribute to their inability to prepare or respond to *Efundja*. Therefore, the national-level disaster risk management team needs to actively engage community members by activating the community-based risk reduction committee as a base for creating the communication link between themselves and these communities.

Tenth, it is necessary to build institutional capacity among the national-level disaster risk management team. Since disaster risk reduction is still a new and emerging concept, it is appropriate that all national-level disaster risk management officials are trained and equipped on DRR issues. This will help them be able to effectively implement the national disaster risk management framework. The national response team is pivotal in reducing the *Efundja* risk and it is only natural that they are knowledgeable and well equipped in this field.

Eleventh, the national-level disaster risk management office needs to establish an alternative funding mechanism. This is necessary so that the national budget is relieved from funding all disaster risk reduction activities country-wide.

Twelfth, the national disaster risk management office is found to only pursue some of the target goals of the national DDR framework while neglecting others. It has been found that it is lagging in implementing of activities targeting post-disaster recovery and rehabilitation services.

Therefore, this office needs to design physical and social reconstruction and rehabilitation plans for affected communities.

Lastly, the national disaster risk management office needs to develop a mechanism to deal with socio-economic and political issues emanating from population increase due to migration.

This framework is important because it addresses the underlying causes of what makes people in northern Namibia vulnerable. One of the key recommendations by the international disaster risk reduction frameworks is that countries facing disasters need to address the underlying risks rather than reacting to the symptoms. This framework is also important because it has the potential to revolutionise how *Efundja* is dealt with in Namibia whereby this knowledge can also be applied to hazards the country may face. The framework is also important because, if added to the present national disaster risk management framework, it will ensure empowerment and capacity building, the use of proactive measures and social upliftment of communities which altogether translates into a holistic approach.

A holistic approach to disasters is the optimal and recommended approach of dealing with disasters as opposed to the partial, fragmented implementation of the prescripts of the current framework. Moreover, the framework can also be applied by other neighbouring countries with similar problems of recurring disasters, especially flooding. Countries such as South Africa and Mozambique are specific examples of countries that can make use of the framework since they are also faced with recurring floods. However, with adaptation, the issues raised in the framework can be utilised to test and improve the disaster response policies of most countries of the Global South.

This chapter has outlined the enhanced the national disaster risk management framework for Namibia. It has stipulated the most applicable risk reduction measures for Cuvelai-Etosha basin and has presented the proactive disaster risk reduction framework for the study area. The concluding chapter, Chapter 9, reviews the study objectives, highlights salient findings and presents the recommendations of the study.

CHAPTER 9:
CONCLUSION

The investigation presented in this dissertation has its roots in the occurrences of *Efundja* in the Cuvelai-Etosha basin of northern Namibia which continue to negatively impact lives. It also emanates from the manner in which this hazard has been dealt with which seems to offer no long-term solution to the problem. The area has experienced the recurring *Efundja* events over the past decades and the government's overall response approach to these events has been almost solely reactive. This response consists mainly of the provision of relief aid and temporary shelter, at best only addressing the immediate consequences and impacts of the flooding.

This costly and unsustainable form of response has ignored the voices of the vulnerable communities at grassroots level who are directly impacted by the hazard. Their voices are largely lacking in the discussions about, and development of frameworks and policies to deal with the *Efundja*. This form of response has not only failed to reduce the vulnerability of the affected population but has also lacked in addressing the underlying root causes of the risk of *Efundja*. Importantly, community members practise various risk reduction measures which are not considered in the national response to the hazard. This is an important lacuna in the governmental response to the recurring *Efundja*.

In spite of these gaps in the governmental response, the government has taken the occurrences of *Efundja* seriously by becoming signatories to regional and international disaster risk reduction strategies. These strategies includethe International Decade for Natural Disaster Reduction, the International Strategy for Disaster Reduction (ISDR) and the Africa Regional Strategy for Disaster Risk Reduction as well as the Southern African Development Community (SADC) Disaster Strategy. As a result of becoming signatories to these frameworks, the country developed and structured coordinated mechanisms of responding to the hazard. This has been done through developing several policies and national documents that are aimed at addressing the problem. The country developed a disaster risk management policy in 2009 and the Disaster Risk Management Act of 2012, both of which are excellent national documents guiding the governmental response mechanism to all disasters, including the *Efundja*. Within these national documents, a framework known as the national disaster risk management framework has been developed as the guiding framework that directs the government response activities in the event of *Efundja* or any other disaster.

The government response to *Efundja* has been based on this framework, which at face value appears to align well with the requirements of global standards and expectations of disaster risk

reduction. However, two important discrepancies were identified prior to the beginning of this study. Firstly, the national response mechanism seems to have been mostly reactive throughout the past decades. This poses the question, what is a possible risk reduction framework that can assist the country in reducing the risk of *Efundja* over the long-term? Secondly, the country has an existing national disaster risk management framework that addresses some of the proactive measures, yet the disaster risk managers continue practising a reactive response by mainly providing relief aid and temporary shelter. Moreover, the existence of this national disaster risk management framework seems to imply that Namibia is moving in the right direction to develop a long-term risk reduction strategy to deal with the hazards it faces. But then why do the negative impacts seem to increase annually? These dilemmas were some of the fundamental issues confronted by the research project presented in this dissertation.

To investigate the issues deliberated in the preceding paragraphs, interview schedules were developed to survey four groups of key stakeholders involved with and impacted by the *Efundja* of the Cuvelai-Etosha basin. These groups are heads of households in the rural communities of the basin, headmen of these communities, local-level disaster risk management officials from the basin, and national-level disaster risk management officials. The selected participants from the heads of households were surveyed through focus group discussions, while the responses of the other three groups were solicited through key informant interviews.

In this chapter the aim and objectives of the study are revisited, the salient findings are presented, their implications explained, and conclusions are drawn. In the final sections of the chapter, the value and contributions of the research are discussed, and recommendations made for enhancing and improving the government response approach to proactively and effectively reduce the risk of the recurring *Efundja* in northern Namibia. Finally, directions for future research are identified.

9.1. AIMS AND OBJECTIVES REVISITED

This study commenced with the formulation of research questions emanating from the prevailing negative impacts of *Efundja* and the response by the national government. These research questions were as follows:

- From the overall literature concerning disaster risk reduction, what is the appropriate approach to deal with the recurring *Efundja* in northern Namibia?
- How are the Cuvelai basin and the study area demarcated? How do communities cope with *Efundja* and what are their mitigation strategies of reducing the risk?

- What is the role of local leaders towards responding, mitigating the impacts, and reducing the risk of *Efundja*?
- What is the current national response mechanism of dealing with *Efundja* in northern Namibia? What is the appropriate DRR proactive framework for the study area aimed at reducing future impacts of flooding in northern Namibia?
- How should the inputs of the rural communities affected by the *Efundja* be incorporated into such a framework?

The aim that emanated from the research questions and guided this research was to develop a DRR proactive response framework for the recurring *Efundja* in rural areas within the Cuvelai-Etosha basin of northern Namibia. The following six objectives were identified to realise the research aim:

- To study the available literature on disaster risk reduction and determine the applicable risk reduction approach for the study area.
- To identify and demarcate the study area.
- To examine how community members cope with the *Efundja* and to understand their mitigative strategies.
- To analyse the role of local traditional leaders when responding to *Efundja*.
- To evaluate the current national response to *Efundja.*
- To recommend an appropriate proactive disaster risk reduction framework for the study area aimed at reducing future impacts of *Efundja* in northern Namibia.

The outcomes of pursuing each objective are summarised in the next six sub-sections.

9.1.1. The applicable risk reduction approach for the study area – based on literature

The literature reviewed on disaster risk reduction differentiates between disaster management and disaster risk management. Disaster management is defined as '*the body of policy and administrative decisions and operational activities which pertain to the various stages of a disaster at all levels* (Van Niekerk, 2007:4). Disaster management is described to consist of reactive approaches of dealing with hazards. Reactive approaches are the types of approaches that primarily focus on dealing with emergencies after a disastrous event has already occurred. It has been determined that reactive approaches to disasters focus on preparedness which entails getting ready to respond and which means doing most work after a disastrous event has taken place. All resources are geared toward emergency management and on what should be done during and after a catastrophic event has occurred while neglecting the underlying key factors such as the risks and vulnerabilities. This has been determined as an inappropriate approach of dealing with *Efundja* of northern Namibia.

The unsuitability of the approach was judged by the fact that this is the same approach that has been used over the past decades and that still has not alleviated the problem. Therefore, it is only natural to recommend a different approach.

Contrarily, disaster risk management is described as the '*application of disaster risk reduction policies and strategies to prevent new disaster risks, reduce existing disaster risk and manage residual risk, contributing to the strengthening of resilience and reduction of disaster losses*' (UNDRR, 2020:5). Disaster risk management can be applied through disaster risk reduction which is defined as the '*systematic development and application of policies, strategies and practices to minimise vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) adverse impact of hazards, within the broad context of sustainable development*' (ISDR, 2005:2). Although it has been highlighted that disaster risk reduction derives its significance from the practices in the field of disaster management, which mainly focuses on preparedness and response, it has been determined that disaster risk management is the application of disaster risk reduction, the preferred approach to disaster response.

Disaster risk reduction through disaster risk management uses proactive approaches to deal with disasters. Proactive approaches are concerned with addressing the root causes of a disaster and are focused on determining what makes people vulnerable to the hazards and these approaches try to reduce their vulnerability and their exposure to such hazards. Proactive approaches seek to understand why hazards happen by applying integrated approaches to reduce their impacts (Bankoff, 2012).

These types of approaches consider the underlying root causes of a hazard by engaging in activities aimed at reducing risks that are implemented well before a disastrous event occurs. Literature supplies examples of proactive approaches in terms of floods to be developing building codes and standards aimed at building infrastructures with elevated foundations or completely avoiding settlement in flood-prone areas (Gaillard *et al.*, 2008). This clearly indicates that the impacts of floods should not only be addressed in the short term, but that long-term solutions should be the focus.

Applying this knowledge to the *Efundja* of northern Namibia, the present study has determined that indeed applying disaster risk reduction using proactive approaches will be the most appropriate form of approach for the study area. Proactive approaches were determined to be appropriate because not only will they lead to understanding the underlying risk factors of *Efundja* but will also incorporate the views and opinions of community members into the overall

governmental response approach. Further information on how this objective was achieved was reported in Chapter 2.

9.1.2. Identification and demarcation of the study area

The achievement of this objective was deliberated in Chapter 3. The objective of identifying and delineating the study area was realised through studying and understanding the entire Cuvelai-Etosha basin, a process also described in Chapter 3. The delineation and description of the Cuvelai-Etosha basin consist of a map illustrating its borders, an explanation of its climate, terrain, drainage systems, rainfall, temperature, relief, evaporation and land use found in the area. The population of the area and the type of localities found within the area were also deliberated upon. The discussion concluded by highlighting the type of livelihood sources found in the Cuvelai Etosha basin.

9.1.3. Examining how community members cope with *Efundja* and understanding their mitigative strategies of reducing the risk

The third objective entailed extracting from the focus group discussions how community members cope with *Efundja* and building a picture of how they mitigate its impacts as well as how they practise risk reduction. This objective has been achieved by presenting the results and discussion on community members' responses to *Efundja* in Chapter 6. The discussion reveals that these communities engage in various response mechanisms to protect themselves, their households, as well as their livestock. Although they do not have a standard form of response to *Efundja,* they find adaptive measures to the changing environment such as changing their way of preparing their daily meals, creating sand embankments to prevent water from entering rooms as well as seeking pasture for their livestock outside flooded areas. The communities resort to moving into the temporary shelter when they run out of options to deal with *Efundja*. They also collectively work to repair local roads and pedestrian bridges, raise funds, demarcate landmarks in the *iishana* to allow people to cross safely, and use their logic to mitigate the *Efundja* impacts. These measures illustrate the presence of human and social resources which are crucial in sustaining community resilience.

Chapter 6 also examined the communities' views on the issue of permanent relocation. Although permanent relocation is sometimes seen as a good proactive measure, not everyone is willing to permanently relocate because it is not culturally practised, hence communities simply reject this option. These communities have a generally negative outlook on their capabilities to face *Efundja*, the activities and collective measures they engage in generally concur with the measures proposed by Wisner *et al*. (2012). The findings indicate that the communities generally demonstrate a low level of capacity and have few resources to enable them to effectively deal with the hardships

imposed by the *Efundj*a. Therefore, there is a legitimate need for capacity building to enhance their ability to deal with future *Efundja* events. A detailed explanation of coping capacity and mitigation measures was provided in Chapter 6.

9.1.4. Analysis of the role of local leaders (headmen) and local-level disaster risk management officials in mitigating the impacts and reducing the *Efundja* risk

The fourth objective analysed the role of local leaders and local-level disaster risk management officials in responding and mitigating the impacts and reducing the risks of *Efundja* as considered in Chapter 7. The chapter presented the interview data that demonstrated that headmen are indeed invaluable assets to their respective communities and play a crucial role in the response and mitigation of the impacts of *Efundja*. These leaders respond to the hazard by monitoring the status of the vulnerability of their community members, encouraging them to work hard to improve their food security and also avoid being too dependent on the government's assistance because it invariably arrives late. The headmen also arrange for relocation camps whenever the need arises. The headmen issue warnings and advocate general precautionary measures around *Efundja* issues such as not crossing the *iishana* alone but always in the company of others. Moreover, they facilitate collective community measures such as repairing local roads and bridges damaged by the floodwater. However, they admit that they do not spend too much effort on preparing for *Efundja* events because they believe that preparation makes no difference in the impacts. Headmen emphasised that they do not know how to prepare for *Efundja* as they see it beyond their capacity to comprehend and request training on appropriate ways of preparing for it.

This confirms that these headmen are not confident in their knowledge and skills in preparing and responding to the hazard. First, because they feel any appropriate form of *Efundja* response or preparation would require large financial investments which they do not have. Second, because they feel *Efundja* is beyond their ability to deal with and hence no one could effectively prepare for it. Last, they expressed feelings of not being recognised or valued because they are not being remunerated for their work or any of their contributions in their respective societies. Altogether these responses underscore the need for capacity building for these traditional authorities in order for them to feel empowered in their roles as well as confident in leading their communities.

In addition to the headmen, local-level disaster risk management officials also contribute to the way *Efundja* is managed. These are constituency councillors who are politically appointed officials to oversee all community affairs. These local-level disaster risk management officials include all other authorities in other non-governmental sectors and institutions that contribute to the overall *Efundja* response. This includes those who issue early warning information as well as those

who offer support in the provision of emergency response. These local-level disaster risk management officials usually conduct rapid assessments which guide the overall governmental response about the needs of the affected population. The needs assessment guides the decision-makers within different ministries such as education, transport, health, and trade and industry on the appropriate way of response. Furthermore, the local-level disaster risk management officials share rainfall projections with community members as well as monitor dam levels and organise and prepare the relocation camps. The overall response of these local-level disaster risk management officials towards *Efundja* correlates well with the national reactive response. Their response activities are mainly geared toward the establishment of relocation camps and supplying emergency materials as the appropriate form of response, but they do not spend much time on preventative or risk reduction activities.

Therefore, it can be deduced that these local-level disaster risk management officials equally lack institutional capacity and knowledge on disaster risk reduction. They lack the ability to perform the expected risk reduction measures due to a lack of knowledge, skills and resources. This highlights the need to build institutional capacity in terms of knowledge and skills for local-level disaster risk management officials to become well informed and be able to differentiate between disaster risk reduction, emergency management and all other emergency-related concepts. Capacitating local-level disaster risk management officials will enable them to effectively fulfil their role as disaster managers at the grassroots level.

9.1.5. Evaluation of the current national response strategy of dealing with *Efundja* of the Cuvelai-Etosha basin

The fifth objective was argued in Chapter 8 by analysing the current national response mechanism of dealing with *Efundja* in the Cuvelai-Etosha basin. The results presented show that the current national response to *Efundja* of the Cuvelai-Etosha basin is mainly reactive and mostly consists of evacuating the people impacted by the *Efundja* to temporary shelters and providing them with relief aid. This response mechanism is guided by the national disaster risk management framework which is stipulated in the National Disaster Risk Management Act, Act number 10 of 2012 and discussed in Chapter 2. The discussion of the national response to *Efundja* through the national disaster risk management framework shows a top-down form of response that is centred on key government decision-makers coordinating other officials to provide swift relief aid and temporary shelter to the affected people. Moreover, the national *Efundja* reactive approach has major implementation gaps and shortcomings that need serious attention in order to achieve the envisioned and desired DRR outcomes. The key gaps include the following: lack of institutional capacity; limited funding or budget allocation; limited knowledge and awareness of disaster risk reduction issues by

local-level disaster risk management officials, traditional authorities and community members; and incomplete implementation of the framework itself.

Moreover, the national response to *Efundja* is primarily concerned with offering relief aid and temporary shelters to the affected community members. The relief aid goods and services are distributed from the central government offices in Windhoek (some 700 km from the Cuvelai-Etosha basin) and are allocated top-down to all respective communities through various committees of the national disaster risk management system. This is a costly exercise and is draining the already depleted government financial resources.

Besides this approach being costly and having a long lead-time due to the distance from Windhoek, it is also unsustainable over the long term, ineffective, and neglects the voices of the vulnerable communities. It does not consider vulnerable communities' ideas and experiences or their way of dealing with *Efundja*. It also does not offer proactive measures or recovery and rehabilitation services to vulnerable communities. The lack of active involvement of community members stresses a need for integration of community responses into the overall national response approach and a better communication strategy between the government and the vulnerable communities. By doing this, governmental response will address the underlying risks of *Efundja* and improve the current risk reduction approach.

9.1.6. An appropriate DRR proactive framework for the Cuvelai-Etosha basin aimed at reducing future impacts of *Efundja* in northern Namibia

The last objective was to develop an appropriate, proactive disaster risk reduction framework for the Cuvelai-Etosha basin aimed at reducing further impacts of the *Efundja* in northern Namibia. The development of this framework was discussed in the last section of Chapter 8. The proposed proactive disaster risk reduction framework is made up of disaster risk reduction measures, targeting the identified stakeholders, namely community members, headmen, local-level and national-level disaster risk officials and is derived from their responses.

For Namibia to reach the desired goals of disaster-risk reduction, the present study recommends proactive disaster risk reduction for the Cuvelai-Etosha basin. The proposed proactive framework is not a step-by-step guideline on how to reduce *Efundja* risk in northern Namibia but rather a guideline that complements the gaps within the existing national response to *Efundja* and should be used with the current national disaster risk management framework.

The proposed framework advocates full implementation of all the stipulations of the current national disaster risk management framework, development and implementation of an effective early warning system, capacitating all roleplayers through education and training, including the voices of the communities at the grassroots level through activating the community-based disaster risk management committees and integrating them into the current system, and improving the funding of disaster risk response activities, if needs be, through a revised funding model.

More details pertaining to the proposed proactive disaster risk reduction framework were presented in Chapter 8.

9.2. FINDINGS, IMPLICATIONS AND CONCLUSIONS

Four important outputs emanate from this research. First, the views of the vulnerable communities on *Efundja* mitigation and response have been ignored in the governmental response mechanism. This study captures the voices of these neglected and vulnerable sectors of society, the group most directly impacted by the *Efundja*. This can serve as baseline data for further studies in flood-prone areas. The research also highlights the urgent need for capacity building and active participation of community members in all aspects of disaster response activities. Second, a set of qualitative data collection instruments that can be used to study similar and other hazards in Namibia and elsewhere in the Global South were developed, validated and used in a large study. Third, the need to empower local traditional leaders to promote community resilience, and fourth, the national response to *Efundja* that is guided by the national disaster risk management framework remain reactive and this study proposes a proactive disaster risk reduction framework to counter this, and to be used in conjunction with a fully implemented national disaster risk management framework.

In this section, the main research results are highlighted, summarised and interpreted in the four sub-sections. Their implications for the central government, specifically the national disaster risk management committee through the Office of the Prime Minister, are also outlined. The reporting is done in the following manner: community responses lack of input into the national response to the *Efundja*, the qualitative data collection instruments, empowerment of local traditional leaders, the reactive national response approach and the proposed proactive disaster risk reduction framework.

9.2.1. Community responses and lack of input into the national response to the *Efundja*

Results from the focus group discussions established that the community members' main way of responding to *Efundja* is by relocating to temporary shelters offered by the government and besides this, there is no standard form of response. Community members explained that over time they have learned to mitigate the impacts of *Efundja* although they are not confident that these mitigation

measures are effective. Respondents alleged that they have learned to live with the effects of the *Efundja* and that is why they lack a standard response approach. Most of them stated that, although they have no effective response mechanism, permanent relocation is not a viable option to them.

These communities reported that they have learned to mitigate the impacts of the recurring flooding by developing ways of living with it on a daily basis. These mitigation measures include seeking alternative pastures for their livestock from non-flooded areas, changing their way of cooking, creating sand embankments around households or individual rooms, as well as moving older or frail family members temporarily to relatives or friends that live outside the flooded areas. They also store their valuable or perishable items in places out of reach of the floodwater and elevate their beds to prevent them from getting wet. Other mitigation measures include letting learners camp at schools if school grounds are not flooded, travelling in groups, digging trenches and ditches to channel water away. They also elevate their *silos* higher and carry out household renovations as a way of preparing for *Efundja*. These communities also engage in collective adaptive measures such as working to repair broken roads and bridges in their respective communities as well as demarcating landmarks with sticks in the *iishana*.

However, despite all these efforts, most of the respondents expressed a lack of capabilities and skills. This is because none of these mitigation measures or any of their ideas are part of the governmental response to *Efundja*. They have expressed that, if they were practising any appropriate mitigation measure, it would have been included in the activities the government implements in their villages. They further explained that the government response activities are not addressing what they perceive as the main problems they face during the *Efundja* events. They explained that these main problems range from their inability to move in and out of their villages, damaged assets, loss of crop harvest and declining livestock production.

The communities' ways of responding and mitigation should have been included in the governmental response to the problems caused by *Efundja*. Up to now, this has not been the case and the voices of these vulnerable, rural communities are not heard. This study has changed this. The response and mitigation narrative of these communities are now available and can and should be incorporated into future governmental disaster risk management frameworks for dealing with the *Efundja* in the Cuvelai-Etosha basin and elsewhere in Namibia. This baseline data, and how it was sourced, can also be used in other areas of the Global South.

9.2.2. Development, validation and use of data collection instruments to study the response of various groups of respondents to flood hazards

This study has developed, validated and used a set of instruments that can be used to study diverse groups of role players affected by floods and other disasters in Namibia and beyond. The focus group discussion schedules that were used to obtain data from the community members and interview schedules that were used to gather data from headmen and local- and national-level disaster risk reduction officials were developed through the formal process of draft development, expert panel scrutiny and pilot testing. As a first step, the literature was scrutinised and first drafts were developed for each of the four groups of targeted respondents. After several iterations, these instruments were scrutinised during a panel session by researchers and lecturers at the Faculty of Military Science of Stellenbosch University, situated at the South African Military Academy in Saldanha. The panel of experts critically analysed the focus group and key informant interview schedules and provided input to ensure valid and suitable instruments, able to gather relevant, reliable and meaningful qualitative data. After corrections and adaptations, the pre-final version of the instruments was piloted by conducting three focus groups and interviewing three key informants in a village within the study area. The pilot test outcomes were used to further improve the set of instruments and yielded the final version of the instruments used to collect data for the study, as reported on in this dissertation.

This final set of instruments consist of a focus group schedule and interview schedules for headmen and the local- and national-level disaster risk management officials. The focus group schedule was made up of five components, namely the demographic information (age and gender), overview of the *Efundja*-events, preparatory activities, *Efundja* management and proactive approaches. The headmen's interview schedule was also structured into five components, namely demographic information (age and gender), headmen involvement in *Efundja*-events, headmen preparatory activities, *Efundja* management and proactive risk reduction. The structure of the local-level and national-level disaster risk management officials was structured into five components, namely demographic information (age and gender), an overview of the *Efundja*-events, preparatory activities, *Efundja* management in the Cuvelai-Etosha basin and proactive risk reduction. These versions of the instruments are attached in the appendices to this dissertation.

The comprehensive, valid and reliable qualitative focus group and key informant interview schedules developed for this study constitute a second important output of the study. These instruments can be adapted and used in various settings and for various hazards and will undoubtedly be utilised in future studies on hazard mitigation in Namibia and elsewhere in similar settings to those of northern Namibia.

9.2.3. The need to empower local traditional leaders to promote community resilience

The role of local traditional leaders who are the headmen and local-level disaster risk management officials is significant, as they play the important and unique role of being the link between communities and the higher-level disaster risk management institutions. If the national disaster risk management decision-making body is to implement community-based programmes aimed at promoting resilience of communities then it is only appropriate that it is done through the headmen and local-level disaster risk management officials. However, headmen need to be capacitated, as they lack the necessary knowledge and skills on disaster risk reduction and feel inadequate and overlooked.

Even though both traditional leaders and governmental institution leaders are equally fundamental in determining the success or failure of any risk reduction measures, headmen are key in sustaining them since they are part of the communities. Headmen have earned the trust and confidence of their respective community members more than any other type of leader. Therefore, it is only natural that during times of disasters, community members may instinctively rely on them to direct the course of action. Headmen and any other traditional authority can, if properly empowered, best assign roles and responsibilities, and mobilise their communities to work together in times of disasters. This enhances a system of accountability for their respective community members. The literature on appropriate approaches to disaster risk reduction reported in this study overwhelmingly concurs that hazards are local and context-specific, something which places traditional authorities in a better position to coordinate local people during a disaster. Therefore, empowering these local traditional leaders will not only be building capacity but also actively practising best practice disaster risk reduction as well as promoting the resilience of communities.

The identification of this need for empowerment and capacity building among local leadership can enhance the governmental disaster risk management strategy and lead to more resilient communities and more effective short, medium and long-term plans to deal with the effects of hazards. Investigating, analysing and presenting the narrative on the *Efundja* from the perspective of local traditional leadership is another important contribution emanating from this research in the Cuvelai-Etosha basin. As was the case with responses from the community members, the responses from the headmen and local-level disaster risk management officials make an important contribution to an all-inclusive understanding of the dynamics of disaster risk management in rural communities. Their responses collected in this study will likewise serve as the baseline for future studies of a similar nature.

9.2.4. National reactive response approach to *Efundja* of northern Namibia and the proposed proactive disaster risk reduction framework

The results presented in Chapter 8 show that disaster risk reduction is still a relatively new concept in Namibia. The national disaster risk management framework has good goals, though relatively broad, and difficult to contextualise for ease of implementation. This is especially true for a country that lacks institutional capacity. The current framework contains disaster-related terminologies such as '*promotion of holistic disaster risk reduction approaches*' or '*participatory approach to ensure the involvement of communities*'; however, there is no designation of how most of these generalised goals can be fulfilled. Therefore, further capacity-building is recommended at different structures of both government and partner institutions which will enhance the implementation of the current framework much more efficiently.

In addition to this, this framework is still mainly focused on disaster response and relief aid provision. It is primarily only focused on two aspects of the national disaster risk management framework, namely: '*being prepared for emergencies* and *being swift and effective at reacting to those emergencies*' (National DRM policy, 2009:16). This is evidenced by how it focuses on coordinating different levels of government to be able to swiftly respond when *Efundja* strikes. This means that the national disaster risk management framework is currently not fully implemented. This, in turn, implies that the governmental response to *Efundja* is also not entirely concurring with the international disaster risk reduction framework best practice as this can only be realised by a fully implemented national framework.

Implementation is affected by the lack of institutional capacity and the financial situation of the country. This highlights the need for the establishment of a suitable funding mechanism in order to appropriately address the lack of funding, as well as focus on building capacity for the local, regional and national-level disaster risk management officials.

Although this national disaster risk management framework was developed with the aim '*to build community resilience and ensure that further developmental activities do not enhance further vulnerabilities of hazards all over Namibia'* (National DRM policy, 2009:10), at the present moment this aim has not been realised. Therefore, this study proposes a proactive disaster risk management framework as presented in Chapter 8.

The proposed framework builds on the limitations and shortcomings of the existing national disaster risk management framework and encapsulates the results of the study reported in this dissertation. It addresses issues reducing the vulnerability of communities, the inclusion of

community voices into the national response strategy as well as the empowerment of local leaders. It also promotes the improvement of the provision of road infrastructures and transportation services, strengthening the provision of information relating to the hazard the communities face, improvement in the provision of early warning information, improving spatial planning for development as well eradicating poverty. The proposed proactive disaster risk management framework should not be used in isolation but should be used complementary to the national disaster risk reduction framework.

This fourth and final major contribution originating from the study is arguably the most important of the four contributions. The proposed framework encapsulates the research results and provides a visual portrait of the most salient points relevant to the future development and implementation of an improved, proactive disaster risk management framework for Namibia. As such it has theoretical as well as practical value that can make a difference not only in a theoretical sense but in the real world of the rural communities of the Cuvelai-Etosha basin and their recurring struggle with the impacts of the *Efundja*.

Collectively, the contributions from the research in the Cuvelai-Etosha basin systematically and comprehensively capture the experiences of all relevant stakeholders involved in disaster risk management in rural communities in the Cuvelai-Etosha basin. The methodology used, and the size and scope of the study ensured relevant, valid and reliable data that contributes significantly to the body of literature on disaster risk management in vulnerable communities. Importantly, it addresses both theoretical and practical issues that can be used to improve disaster risk management in the Cuvelai-Etosha basin and elsewhere.

9.3. VALUE AND CONTRIBUTIONS

Disasters continue to affect different nations globally and countries continue to redirect financial and human resources into addressing the impacts of disasters when such resources were initially meant for development. In many countries, a lot of developmental projects had to be side-lined because of the frequency of hazards. The concept of disaster risk reduction was developed to counter this. After realising that scarce resources are being lost by addressing only the immediate impacts of disasters while not addressing the future impacts which may persist for a lifetime if not properly addressed, countries faced with disasters accepted that they need to change their way of doing things. The concept of disaster risk reduction caused many countries to realise how much they have lost in reacting to emergencies and trying to react to disasters instead of addressing the root causes by reducing the vulnerabilities of the affected people. Although many countries are still in the process of fully comprehending and implementing the concept, a lot of positive results have been reported worldwide.

The countries that have adopted the concept have not only reduced disaster impacts but also improved the lives of their vulnerable communities and all associated partner institutions. These communities' lives are improved because they have gained knowledge and skills that can be used in other areas of their lives. Most often they have received training and have been empowered to use readily available resources to deal with the hazards they face. This is a privilege denied to communities that still only react to emergencies and still rely on their governments to do everything for them.

Moreover, countries adopting the concept of disaster risk management as their appropriate approach of dealing with hazards reported various advantages that accrued to local headmen, and local-level disaster risk management units, as well as all other involved civil societies and partner institutions. Through the application of the concept of disaster risk reduction, headmen are also granted an opportunity of being capacitated through training. Through training, they gain knowledge and skills which enhance their leadership skills and make them more effective in leading their respective communities.

Furthermore, civil societies and all other partner institutions usually involved in emergency responses are also relieved of the financial and human resources burden put on them by reacting to disasters. They are now able to redirect their resources to other goals and responsibilities, such as promoting the advancement of their nations at large instead of routinely focusing on reacting to disasters. This is especially true for recurring, predictable hazards such as the regularly occurring *Efundja*. The present study developed a proactive disaster risk reduction framework which is a product of the concept of disaster risk reduction.

This study makes the following contributions to the body of knowledge on disaster risk management:

- The results of this study show that the occurrences of *Efundja* in the basin are a combination of various factors. Although *Efundja* of northern Namibia is mainly a natural phenomenon that is common in most floodplains, there is also the human-induced risk factor of ill-planned infrastructure throughout the floodplain. This is coupled with the increasing population due to migration and the departure of societies from indigenous land-use systems that seems to exacerbate the hazard. Recent infrastructural developments such as rural and urban developments and road infrastructure are creating new risks. This study highlights the need to pay attention to these physical attributes of the areas especially regarding new and upcoming

developments as a way of reducing the impacts of *Efundja*. This can only be accomplished through proper spatial planning.

- The results of this study further contribute to a wider body of literature about the significance of the voices of vulnerable communities in the debate about best practices on how to address the problems they face. In terms of rigorous methodology, scope and size, this study is unique in the rural Namibian context, since no comparable study in terms of size, scope and rigour could be found in the Namibian literature on the subject matter. Consequently, this study forms the baseline for future studies on understanding appropriate mechanisms in addressing hazards in the Namibian, African and wider Global South contexts.
- The occurrences of floods are found to be exacerbated by the existing national challenges of poverty. Poverty within the rural areas of the Cuvelai-Etosha basin manifest in different dimensions. Lack of farming equipment, fragile housing structures, high levels of unemployment, and dependence on subsistence crops and livestock production to survive are all manifestations of poverty in the area. All these dimensions of poverty influence how a particular family lives, how they deal with the impacts of *Efundja* and overall it enhances the vulnerability of such a family.
- The traditional and cultural ties of people of the Cuvelai-Etosha basin have been found to influence their responses to *Efundja*. Many residents were found to be reluctant or completely refused to relocate to safer places because of the ancestral connection they have to their places of residence. The present study recommends further research into this aspect to understand possible ways of dealing with this important factor, especially since it is the only viable long-term solution in some areas.
- Although early warning systems exist in the country, they are insufficient,inefficient and provide limited information, sometimes disseminated through media not available in the most vulnerable rural communities. The information provided can actually not be regarded as early warning information but rather as normal daily weather forecasts. This study accentuates the need for a reliable, comprehensive, early warning system that will provide useful information in time for impacted communities to prepare for the expected impacts. This information must be disseminated to all relevant roleplayers timeously.
- Although disaster risk reduction is now becoming a well-known concept globally, many countries are still struggling to conceptualise it and apply it to the hazards they face. As for Namibia, convincing evidence was found that the current national *Efundja* response mechanism is still utilising a mainly reactive approach. Consequently, a proactive disaster risk reduction framework for the Cuvelai-Etosha basin of northern Namibia was

developed to counter this. When used in conjunction with the current national disaster risk management framework, this constitutes a major contribution to disaster risk management literature and practice nationally and potentially globally.

- Lastly, the study has discovered that there is a disconnection between the current national disaster risk management framework for Namibia and the implementation thereof. While the framework contains many proactive measures, the implementation focuses mostly on the reactive elements. This study recommends the urgent comprehensive implementation of the existing framework. Furthermore, the results of this study should be taken into consideration in addressing present shortcomings. Comprehensive implementation of the national disaster risk management framework is not just for the sake of aligning the country with the international standards of disaster risk reduction but has long-term benefits for the Namibian government as well as all communities that are affected by *Efundja*. It will save costs and allow the country and its involved partner institutions to focus their resources on development rather than regularly having to redirect its resources to combating the impacts of *Efundja*.

9.4. LIMITATIONS

In the process of conducting this study, some limitations were identified. First, measuring the effectiveness of a disaster risk reduction framework is a daunting task that is influenced by complex, sometimes contrasting, socio-economic and political factors that are difficult to account for comprehensively. This makes disaster risk reduction difficult to measure since what constitutes a sufficiently reduced level of risk for one country is not necessarily sufficient for another.

Second, it was difficult to account for all the complexities of participant responses and data capturing. To counter this limitation, best practices were meticulously followed in the development of the data collection instruments, during the data collection process, and while triangulating the sources of data from different sets of informants.

Another limitation worth noting was the exclusion of the youth, including all persons under the age of 25. This group represents an important part of the population and gaining their perception on how they are affected and how they see the risk being reduced may have brought an added perspective to the study. The rationale for excluding this group from the study was because of their limited exposure to the *Efundja*. However, the absence of their voices from the results is a recognised limitation. Despite the limitations mentioned in this sub-section, adequate motivations were provided, or steps taken to ensure that they did not impact the validity of the study.

9.5. RECOMMENDATIONS

Recommendations to be made, based on this study, are mainly directed to the National Disaster Risk Management Committee (NDRMC) and the Office of the Prime Minister (OPM), the highest decision-making bodies and custodians of managing the risks of hazards in Namibia. Recommendations addressed to future scholars and researchers who wish to pursue research studies in rural communities in northern Namibia, as well as other parts of the country are also included.

9.5.1. Recommendations directed to the NDRMC and OPM

The following recommendations for the national disaster risk management committee and the office of the prime minister have been formulated from the results of the research:

- Aim to fully implement the current national disaster risk management framework and all its stipulated goals as well as all the proactive measures outlined in this study such as the establishment of community-based disaster risk management committees.
- Incorporate the proactive framework proposed in this study into the current national disaster risk management framework.
- Empower and capacitate headmen and the local-level disaster risk management officials by developing strategies to improve their knowledge and understanding of disaster risk reduction issues.
- Raise risk awareness among the vulnerable community members and consider actively involving them in all disaster risk reduction programmes and activities.
- Develop and implement a comprehensive early warning system for the Cuvelai-Etosha basin.
- Investigate an alternative funding mechanism to deal with disaster risk reduction in Namibia to alleviate pressure from the already depleted government budget.
- For risk assessments in the Namibian context, include climate change as a threat enhancing vulnerability to disasters. It is clear that disaster risk management and climate change are indeed interconnected, and cannot be considered in isolation.
- Consider programmes that distribute relevant and free *Efundja* information across rural communities. Empower the rural communities through awareness programmes to educate them about the hazard, its risks, vulnerabilities and how they can use what they already know (or are doing) to lessen the impacts of *Efundja*. Information sharing should explore various platforms such as local language translated pamphlets, community meetings, churches, schools and not only through radio platforms.

- Begin to promote the sustainable use and management of the Cuvelai-Etosha ecosystem. The conflicts between community members and headmen on land allocation within the area indicates no sustainable management regarding the use of land. Hence, there is a need to promote awareness of how the Cuvelai-Etosha basin can be preserved as a resource.
- Consider promoting further risk reduction measures that include poverty eradication, climate change adaptation, improving livelihoods because poverty worsens people's ability to face hazards. Therefore, eradicating poverty implies that people are empowered and strong to face further risks.
- Improve spatial planning for development by strengthening local communities' consultations, regulating land-use planning and promoting disaster risk assessments for any new development.
- Provide elevated and culvert-fitted road infrastructures to affected villages to allow mobility during the flooding season.
- Consider providing suitable transportation services for the rural communities.
- Improve and strengthen recovery and rehabilitation services among the affected communities.
- Develop a mechanism to deal with socio-economic and political issues emanating from population increase due to migration.

9.5.2. Recommendations for conducting research in the rural settlements of Namibia

The difficulties and extended time spent on obtaining permission from the regional councils to do research in northern Namibia must be taken into account when planning research in rural settlements. It took many hours of preparatory work and then months of waiting and endless follow-up phone calls to secure permission from some of the regional council offices. Although some regions responded immediately, others took time before they issued the required permission. If research is taken to be a gateway for regional development as it is said to be, then the process of obtaining permission for research studies must be streamlined, but until then, researchers should take cognisance of these processes. One positive outcome of these lengthy processes was that, once permission was secured, conducting the research was easier than anticipated since the communities had been informed that they would be approached by a researcher. Consequently, a measure of trust had already been established, making it easier to recruit participants.

Although much has been written about providing incentives for respondents to participate in research studies globally, in this study a reward of a cooldrink proved to be a successful

encouragement to respondents to participate in the focus group discussions. This was because most of these respondents indicated that they were often required to participate in studies that required mental and time investments from them, yet they never received any form of appreciation. They indicated that this study was the first where they were materially appreciated and rewarded for their time. This small and almost insignificant effort showed appreciation to the respondents and when the news spread, aided in securing sufficient participation, an unintended consequence, but still something many researchers struggle with.

With the salient recommendations presented, attention now shifts to directions for future research. Some unanswered questions remain which point to avenues for future research as suggested in the next and final section.

9.6. DIRECTIONS FOR FURTHER RESEARCH AND FINAL WORD

A notable unanswered question emerging from the research is why the residents of affected rural communities do not consider permanent relocation as a viable long-term risk reduction option. Although some explanations for their motivations have been provided by this research, a comprehensive study is required to identify all the factors responsible for this. A full investigation will enable the government to develop well-informed policies and strategies for the region.

The present study focused strictly on the conditions of *Efundja* of the Cuvelai-Etosha basin. A similar study conducted to research the floods that affect the north-eastern part of Namibia will further elucidate the complex interaction between rural communities and recurring flood events. More research is needed to establish the reasons behind the changing nature of *Efundja*. There is the perception among some respondents of this study that the hazard keeps changing in terms of various aspects such as timing, volume, purity of water. This perception is worth investigating since it can have far-reaching implications for the inhabitants of the basin if found to be true.

Further research is also necessary to determine how climate change is impacting severe events of *Efundja* in northern Namibia. Another area worth exploring is the applicability of the developed proactive disaster risk reduction framework to other flooded areas inside and outside of Namibia.

Moreover, another area worth exploring is the views of all persons under the age of 25. This group represents an important part of the population and gaining their perception of how they are affected and how they see the risk being reduced could reveal a new dimension of risk reduction. Interestingly, in northern Namibia, this age group is one of the most affected as they cross high flowing *iishana* to get to schools, hence adding their views may have brought an added perspective to the study.

It may be appropriate to conclude this dissertation with the words of one of the participants. *'The Efundja is a blessing for some years, yet a curse for other years'.* In this pronouncement, the crux of this research and its results are encapsulated. The *Efundja* will always be a reality of life in the Cuvelai-Etosha basin. It has always been that way. Some years it will bring the benefits of bountiful harvests, but some years it will bring suffering and misery. Incorporating the results and recommendations of this study into the way disaster risk management is practised in Namibia will aid in bringing more resilience and less suffering to the Cuvelai-Etosha basin during the worst *Efundja* years. This is something the vulnerable rural communities of the basin will celebrate.

REFERENCES

Acocella I 2012. The focus groups in social research: advantages and disadvantages. *Quality & Quantity* 46, 4: 1125–1136.

Amadhila E, Shaamhula LV, Van Rooy G & Siyambango N 2013. Disaster risk reduction in the Omusati and Oshana regions of Namibia. *Jàmbá: Journal of Disaster Risk Studies* 5, 1: 1-9.

Angula MN & Kaundjua, MB 2016. The changing climate and human vulnerability in north-central Namibia. *Jàmbá: Journal of Disaster Risk Studies* 8, 2: 1-7.

Angula MN 2010. Gender and climate change: Namibia case study. Cape Town: Heinrich Böll Stiftung.

Arku G 2009. Rapidly growing African cities need to adopt smart growth policies to solve urban development concerns. *Urban Forum* 20, 3: 253-270.

Arnold M 2012. *International planning systems for disaster: The Routledge Handbook of Hazards and Disaster Risk Reduction.* London: Routledge.

Ashipala V & Simasiku O 2017. Over 100 schools closed due to floods. *New Era Newspape*r 05 May 2017.

Asian DRC 2002. *Living with risk. A global review of disaster reduction initiatives.* Geneva: ISDR Secretariat.

Attride-Stirling J 2001. Thematic Networks: An analytic tool for qualitative research. *Qualitative Research* 1, 3: 385-405.

Awala SK, Hove K, Wanga MA, Valombola JS, & Mwandemele OD 2019. Rainfall trend and variability in semi-arid northern Namibia: Implications for smallholder agricultural production. *Welwitschia International Journal of Agricultural Sciences* 1: 5-25.

Babbie ER 2016. *The basics of social research*. 7th ed. Belmont: Cengage Learning, Inc.

Babbie ER 2020. *The practice of social research*. 13th ed. Belmont: Wadsworth Publishing.

Bankoff G 2012. Historical concepts of disaster and risk. *The Routledge Handbook of Hazards and Disaster Risk Reduction.* London: Routledge.

Barry CA 1998. Choosing qualitative data analysis software: *Atlas/ti* and Nudist compared. *Sociological research online* 3, 3: 16-28.

Baudoin MA & Wolde-Georgis T 2015. Disaster risk reduction efforts in the Greater Horn of Africa. *International Journal of Disaster Risk Science* 6, 1: 49-61.

Baudoin MA, Henly-Shepard S, Fernando N, Sitati A & Zommers Z 2016. From top-down to "community-centric" approaches to early warning systems: exploring pathways to improve disaster risk reduction through community participation. *International Journal of Disaster Risk Science* 7, 2: 163-174.

Bernard HR & Ryan GW 2010. *Analyzing qualitative research: Systematic approaches.* Thousand Oaks: Sage Publications.

Beyer M, Hipondoka M, Hamutoko J & Wanke H 2018. Water resources in the Cuvelai-Etosha Basin. *Biodiversity & Ecology* 6 (April): 84–85.

Bhattacherjee A 2012. *Social Science Research: Principles, Methods, and Practices*. 2nd ed. Tampa: Creative Commons Attribution-NonCommercial.

Bhavani R, Vordzorgbe S, Owor M & Bousquet F 2008. *Status of disaster risk reduction in the sub-Saharan Africa region.* Nairobi: The World Bank.

Birkmann J (eds) 2006. *Measuring vulnerability to natural hazards: towards disaster resilient societies*. Tokyo: United Nations University Press.

Birkmann J, Cardona OD, Carreño ML, Barbat AH, Pelling M, Schneiderbauer S, Kienberger S, Keiler M, Alexander D, Zeil P & Welle T 2013. Framing vulnerability, risk and societal responses: the MOVE framework. *Natural hazards* 67, 2: 193-211.

Bittner A & Kleczar ML 2006. *Cuvelai-Etosha groundwater investigation.* Windhoek: Dept. Of Water Affairs and Forestry, Bittner Water Consult.

Bless C, Higson-Smith C & Sithole SL 2013. *Fundamentals of social research methods: An African perspective*. Cape Town: Juta.

Bradley EH, Curry LA & Devers KJ 2007. Qualitative data analysis for health services research: developing taxonomy, themes, and theory. *Health services research* 42, 4: 1758-1772.

Bretschneider PJ 2014. *Biographical research: methodological insights*. Thousand Oaks: Sage Publications.

Breuer F 2000. Qualitative methods in the study of biographies, interactions and everyday life contexts: The development of a research style. *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research* 1, 2.

Brock A 2018. Critical techno-cultural discourse analysis. *New Media & Society* 20, 3: 1012-1030.

Bullock JA, Haddow GD & Coppola DP 2017. *Introduction to emergency management*. 6th ed. Oxford: Butterworth-Heinemann.

Burke S, Bethel JW & Foreman BA 2012. Assessing Disaster Preparedness among Latino Migrant and Seasonal Farmworkers in Eastern North Carolina. *International Journal of Environmental Research and Public Health* 9, 9: 3115–3133.

Carter S & Henderson L 2005. Approaches to qualitative data collection in social science. In Bowling A & Ebrahim S. *Handbook of Health Research Methods: Investigation, Measurement and Analysis*. New York: McGraw-Hill Education.

Carter WN 2008. *Disaster management: A disaster manager's handbook*. Metro Manila: Asian Development Bank.

Chaskin RJ 2001. Building community capacity: A definitional framework and case studies from a comprehensive community initiative. *Urban affairs review* 36, 3: 291-323.

Cho JY & Lee EH 2014. Reducing confusion about grounded theory and qualitative content analysis: Similarities and differences. *Qualitative Report* 19, 64: 1-20.

Choy LT 2014. The strengths and weaknesses of research methodology: Comparison and complimentary between qualitative and quantitative approaches. *IOSR Journal of Humanities and Social Science* 19, 4: 99-104.

Coetzee C & Van Niekerk D 2012. Tracking the evolution of the disaster management cycle: A general system theory approach. *Jàmbá: Journal of Disaster Risk Studies* 4, 1: 1-9.

Coetzee C 2010. The development, implementation and transformation of the Disaster Management Cycle. Doctoral dissertation. North-West University.

Comfort L, Wisner B, Cuter S, Pulwarty R, Hewitt K, Oliver-Smith A, Wiener J, Fordham M, Peacock W & Krimgold F 1999. Reframing disaster policy: the global evolution of vulnerable communities, Global Environmental Change Part B: *Environmental Hazards* 1, 1: 39-44. doi: 10.3763/ehaz.1999.0105

Comfort LK 2005. Risk, security, and disaster management. *Annual Review of Political Science* 8: 335-356.

Connelly LM 2008. Pilot studies. *Medsurg Nursing* 17, 6: 411.

Coppola DP 2006. *Introduction to international disaster management*. Oxford: Elsevier.

Coppola DP 2015. Hazards. In Coppola DP (ed) *Introduction to international disaster management*. Oxford: Elsevier.

Cresswell J 2014. *Research design: Qualitative, Quantitative and Mixed Methods Approaches.* 4th ed. Thousand Oaks: Sage Publications.

Creswell J & Miller DL 2000. Determining validity in qualitative inquiry. *Theory into practice* 39, 3: 124-130.

Creswell JW 2008. *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks: Sage Publications.

Creswell JW 2009. Editorial: Mapping the field of mixed methods research. *Journal of Mixed Methods Research* 3, 2: 95-108. doi:10.1177/1558689808330883.

Creswell JW 2015. Revisiting mixed methods and advancing scientific practices. In Hesse-Biber, SN & Johnson RB (eds.) *The Oxford handbook of multimethod and mixed methods research inquiry*. Oxford: Oxford University Press.

Datry T, Bonada N & Boulton A 2017. Intermittent rivers and ephemeral streams: Ecology and management. *Croatian Waters* 25: 102.

David A, Braby J, Zeidler J, Kandjinga L & Ndokosho J 2013. Building adaptive capacity in rural Namibia. *International Journal of Climate Change Strategies and Management* 5, 2: 215-229.

Davies O 1975. Excavations at Shongweni South Cave: the oldest evidence to date for cultigens in Southern Africa. *Annals of the Natal Museum* 22, 2: 627-662.

DDRM (Directorate Disaster Risk Management) 2008. Report on national response to the 2008 flood disaster. Windhoek: Office of the Prime Minister.

DDRM (Directorate Disaster Risk Management) 2009. Report on the 2009 flood disaster response. Windhoek: Office of the Prime Minister.

DDRM (Directorate Disaster Risk Management) 2011. Report on national response to the 2011 flood disaster. Windhoek: Office of the Prime Minister.

DDRM (Directorate Disaster Risk Management) 2013. Namibia drought relief response plan for July 2013-March 2014. Windhoek: Office of the Prime Minister.

DDRM (Directorate of Disaster Risk Management) 2010. Livelihood Baseline Profiles. Windhoek: Office of the Prime Minister.

De la Poterie AT & Baudoin MA 2015. From Yokohama to Sendai: Approaches to participation in international disaster risk reduction frameworks. *International Journal of Disaster Risk Science* 6, 2: 128-139.

De Vos AS, Strydom H, Fouche CB & Delport CS 2011. *Research at Grassroots: for Social Science and Human professions*. Pretoria: Van Schaik Publishers.

Delica-Willison Z & Gaillard JC 2012. Community action and disaster. In Wisner B, Gaillard JC & Kelman I. *Handbook of hazards and disaster risk reduction*. Milton Park: Routledge.

Devereux S 2001. Livelihood insecurity and social protection: a re-emerging issue in rural development. *Development policy review* 19, 4: 507-519.

DFID (Department for International Development) 2004. Disaster risk reduction: A development concern. A scoping study on links between disaster risk reduction, poverty and development. Geneva: UN Office for Disaster Risk Reduction.

Dikko M 2016. Establishing Construct Validity and Reliability: Pilot Testing of a Qualitative Interview for Research in Takaful (Islamic Insurance). *Qualitative Report* 21, 3.

Dirkx E, Hager C, Tadross M, Bethune S & Curtis B 2008. Climate change vulnerability and adaptation assessment Namibia. Windhoek: Desert Research Foundation of Namibia & Climate Systems Analysis Group for the Ministry of Environment and Tourism.

Djalante R, Thomalla F, Sinapoy MS & Carnegie M 2012. Building resilience to natural hazards in Indonesia: progress and challenges in implementing the Hyogo Framework for Action. *Natural Hazards* 62, 3: 779-803.

Douglas I, Alam K, Maghenda M, Mcdonnell Y, Mclean L & Cambell J 2008. Unjust wasters: Climate Change, flooding and the urban poor in Africa. *Environment & Urbanization* 20: 187-205.

Dube E, Mtapuri O & Matunhu J 2018. Managing flood disasters on the built environment in the rural communities of Zimbabwe: Lessons learnt. *Jàmbá: Journal of Disaster Risk Studies* 10, 1: 1–11.

Eddles-Hirsch K 2015. Phenomenology and educational research. *International Journal of Advanced Research* 3, 8.

Eisenman DP, Cordasco KM, Asch S, Golden JF & Glik D 2007. Disaster Planning and Risk Communication with Vulnerable Communities: Lessons from Hurricane Katrina. *American Journal of Public Health* 97, 1: 109-115.

Eiser JR, Bostrom A, Burton I, Johnston DM, McClure J, Paton D, Van Der Pligt J & White MP 2012. Risk interpretation and action: A conceptual framework for responses to natural hazards. *International Journal of Disaster Risk Reduction* 1: 5-16.

Elkatawneh H 2016. Comparing Qualitative and Quantitative Approaches. *SSRN Electronic Journal* 10, 2.

El-Masri S & Tipple G 2002. Natural Disaster, Mitigation and Sustainability: the case of developing countries. *International Planning Studies* 7, 2: 157-175.

Erlingsson C & Brysiewicz P 2017. A hands-on guide to doing content analysis. *African Journal of Emergency Medicine* 7, 3: 93-99.

Esin C 2011. Narrative analysis approaches. *Qualitative research methods in psychology* 1: 92-118.

Fatti CE & Patel Z 2013. Perceptions and responses to urban flood risk: Implications for climate governance in the south. *Applied Geography* 36: 13-22.

Ferdinand I, O'Brien G, O'Keefe P & Jayawickrama J 2012. The double bind of poverty and community disaster risk reduction: a case study from the Caribbean. *International Journal of Disaster Risk Reduction* 2: 84-94.

Fernandez G, Uy N & Shaw R 2012. Community-based disaster risk management experience of the Philippines. In Shaw, R. (eds) *Community based disaster risk reduction*. Bingley: Emerald Group Publishing.

Fink AS 2000. The role of the researcher in the qualitative research process. A potential barrier to archiving qualitative data. *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research* 3, 1.

Friese S 2019. *Qualitative data analysis with ATLAS. ti*. New York: Sage Publications.

Fusch PI & Ness LR 2015. Are we there yet? Data saturation in qualitative research. *The qualitative report* 20, 9: 1408.

Fylan F 2005. Semi-structured interviewing. In Jeremy M & Paul G. *A handbook of research methods for clinical and health psychology*. Oxford: Oxford University Press.

Gaillard JC 2010. Vulnerability, capacity and resilience: perspectives for climate and development policy. *Journal of International Development: The Journal of the Development Studies Association* 22, 2: 218-232.

Gaillard JC, Pangilinan MR., Cadag JR & Le Masson V 2008. Living with increasing floods: insights from a rural Philippine community. *Disaster Prevention and Management: An International Journal* 3, 17: 383-395.

Galindo G & Batta R 2013. Review of recent developments in OR/MS research in disaster operations management. *European journal of operational research* 230, 2: 201-211.

Garde RJ & Raju KR 2000. *Mechanics of sediment transportation and alluvial stream problems*. Milton Park: Taylor & Francis.

Garde-Hansen J, McEwen L, Holmes A & Jones O 2017. Sustainable flood memory: Remembering as resilience. *Memory Studies* 10, 4: 384-405. doi.org/10.1177/1750698016667453

Gentles SJ, Charles C, Ploeg J & McKibbon KA 2015. Sampling in qualitative research: Insights from an overview of the methods literature. *The qualitative report* 20, 11: 1772-1789.

Goldschmidt KH & Kumar S 2016. Humanitarian operations and crisis/disaster management: A retrospective review of the literature and framework for development. *International Journal of Disaster Risk Reduction* 20: 1–13.

Goss JA 2013. *Physiology of Plants and Their Cells: Pergamon Biological Sciences Series*. Amsterdam: Elsevier.

Gratwa W & Bollin C 2002. Disaster Risk Management; Working Concept. Eschborn: GTZ.

Grbich C 2007. An introduction: Qualitative data analysis. Predictors of parental emotional adjustment to childhood cancer. *Psycho-Oncology* 6, 2: 115-128.

Grothmann T & Reusswig F 2006. People at risk of flooding: why some residents take precautionary action while others do not. *Natural hazards* 38, (1-2): 101-120.

Grove KJ 2013. From emergency management to managing emergence: A genealogy of disaster management in Jamaica. *Annals of the Association of American Geographers* 103, 3: 570–588.

Guha-Sapir D, Hargitt D & Hoyois P 2004. *Thirty years of natural disasters 1974-2003: The numbers*. De Louvain: Presses University.

Guillemin M & Gillam L 2004. Ethics, reflexivity, and "ethically important moments" in research. *Qualitative inquiry* 10, 2: 261-280.

Gwimbi P 2009. Cotton farmers' vulnerability to climate change in Gokwe District (Zimbabwe): impact and influencing factors. *JAMBA: Journal of Disaster risk studies* 2, 2: 81-92.

Hallegatte S, Vogt-Schilb A, Rozenberg J Bangalore M & Beaudet C 2020. From Poverty to Disaster and Back: a Review of the Literature. *Economics of Disasters and Climate Change* 1: 25.

Hancock B, Ockleford E & Windridge K 2001. *An introduction to qualitative research*. Trent: Trent focus group.

Hancock DR & Algozzine B 2017. *Doing case study research: A practical guide for beginning researchers*. New York: Teachers College Press.

Henderson LJ 2004. Emergency and disaster: Pervasive risk and public bureaucracy in developing nations. *Public Organization Review* 4, 2:103–119.

Henning E, Van Rensburg W & Smit B 2004. *Theoretical frameworks. Finding your way in qualitative research.* Pretoria: Van Schaik Publishers.

Hipondoka MHT 2005. Development and Evolution of Etosha Pan, Namibia. Doctoral Dissertation. Universität Würzburg.

Holliday A 2015. Qualitative research and analysis: Research methods in applied linguistics*: A practical resource* 2: 49-62.

Holloway A 2003. Disaster risk reduction in southern Africa: hot rhetoric—cold reality. *African Security Studies* 12, 1: 29-38.

Hooli LJ 2016. Resilience of the poorest: coping strategies and indigenous knowledge of living with the floods in Northern Namibia. *Regional Environmental Change* 16, 3: 695–707.

Hsieh HF & Shannon SE 2005. Three approaches to qualitative content analysis. *Qualitative health research* 15, 9: 1277-1288.

Ibanez GE, Buck CA, Khatchikian N & Norris FH 2004. Qualitative analysis of coping strategies among Mexican disaster survivors. *Anxiety, Stress & Coping* 17, 1: 69-85.

Innocenti D & Albrito P 2011. Reducing the risks posed by Natural Hazards and Climate Change: The need for a participatory dialogue between the Scientific Community and Policy Makers. *Environmental Science & Policy* 14, 7: 730-733.

IPCC (Intergovernmental Panel on Climate Change) 2007. Climate Change 2007: Impacts, Adaptation and Vulnerability. Cambridge: Cambridge University Press.

ISDR (International Strategy for Disaster Reduction) 2006. Platform for the Promotion of Early Warning Systems. Geneva: United Nations disaster risk reduction programme.

Itamalo M 2017. Inside Efundja-affected areas. *The Namibian* 24 March 2017.

Izadkhah YO & Hosseini M 2008. Using proactive means in reducing vulnerability to natural disasters. Proceedings of the 14th World Conference on Earthquake Engineering held October 12-17, 2008. Beijing, China.

Izumi T & Shaw R 2012. Role of NGOs in community-based disaster risk reduction. In In Shaw R (ed) *Community-based disaster risk reduction*. Bingley: Emerald Group Publishing Limited.

Jacob M 2011 Flood risks and their impact on insurance companies: The case of George local municipality, at the South coast of South Africa. George: Disaster Management Training and Education Centre for Africa.

Jigyasu R 2002. *Reducing Disaster Vulnerability through Local Knowledge and Capacity. The Cace of Earthquake Prone Rural Communities in India and Nepal*. Nepal: Fakultet for arkitektur og billedkunst.

Johnson C 2011. Creating an enabling environment for reducing disaster risk: Recent experience of regulatory frameworks for land, planning and building in low and middle-income countries. Background Paper for the Global Assessment Report on Disaster Risk Reduction. London: University College London.

Jonkman SN 2005. Global perspectives on loss of human life caused by floods. *Natural hazards* 34, 2: 151-175.

Kapolo IN 2015. Drought conditions and management strategies in Namibia. Windhoek: Office of the Prime Minister.

Kapucu N 2008. Culture of preparedness: household disaster preparedness. *Disaster Prevention and Management: An International Journal* 4, 17: 526-535.

Karim A & Noy I 2016. Poverty and natural disasters: A regression meta-analysis. *Review of Economics and Institutions* 7, 2: 26.

Kaundjua MB Angula M & Angombe ST 2012. Community perceptions of climate change and variability impacts in Oshana and Ohangwena Regions. *Journal for Studies in Humanities and Social Sciences* 1, 1: 21-32.

Kawulich B 2016. The role of theory in research. In Garner M, Wagner C, & Kawulich B (eds) Teaching research methods in the social sciences. London: Ashgate Publishing.

Keene EP 1998. Phenomenological study of the North Dakota flood experience and its impact on survivors' health. *International Journal of Trauma Nursing* 4, 3: 79-84.

Kelman I 2003. Defining risk. *FloodRiskNet Newsletter* 2: 6–8.

Kelman I 2015. Climate change and the Sendai framework for disaster risk reduction. *International Journal of Disaster Risk Science* 6, 2: 117-127.

Khan H Vasilescu LG & Khan A 2008. Disaster management cycle-a theoretical approach. *Journal of Management and Marketing* 6, 1: 43-50.

Khan MR & Rahman MA 2007. Partnership approach to disaster management in Bangladesh: a

critical policy assessment. *Natural Hazards* 41, 2: 359–378.

King N, Horrocks C & Brooks J 2018. *Interviews in qualitative research*. New York: Sage Publications.

Kluge T, Liehr S, Lux A, Moser P, Niemann S, Umlauf N & Urban W 2008. Integrated Water Resource Management concept for the Cuvelai Basin in northern Namibia. *Physics and Chemistry of the Earth, Parts A/B/C* 33, (1-2): 48-55.

Kreimer A & Munasinghe M 1991. Managing natural disasters and the environment: selected materials from the Colloquium on the Environment and Natural Disaster Management. Washington: The World Bank

Krueger RA & Casey MA 2002. Designing and conducting focus group interviews. In Krueger, RA, Casey MA, Donner J, Kirsch S & Maack JN (eds) *Social analysis: selected tools and techniques.* Washington: Social Development Department.

Krueger RA 1998. Focus Groups: *A practical guide for applied research*. Thousand Oaks: Sage Publications.

Kulatunga U 2010. Impact of culture towards disaster risk reduction. *International Journal of Strategic Property Management* 14, 4: 304-313.

Lavell A 2009. Relationships between Local and Community Disaster Risk Management & Poverty Reduction: A Preliminary Exploration. A Contribution to the 2009 ISDR Global Assessment Report on Disaster Risk Reduction. Geneva: United Nations disaster risk reduction programme.

Laxton D 2004. The research process. In Coldwell D & Herbst FJ (eds) *Business research.* Cape Town: Juta.

Lazarus NW 2011. Coping capacities and rural livelihoods: challenges to community risk management in Southern Sri Lanka. *Applied Geography* 31, 1: 20–34.

Lechat H 1990. The International Decade for Natural Disaster Reduction: Background and Objectives. *Disasters* 14, 1: 1-6.

Lester S 1999. *An introduction to phenomenological research.* Taunton: Stan Lester Developments.

Lettieri E, Masella C & Radaelli G 2009. Disaster management: findings from a systematic review. *Disaster Prevention and Management: An International Journal* 18, 2: 117-136.

Lewins A & Silver C 2007. *Using software in qualitative research: A step-by-step guide*. London: Sage Publications.

Lindenmaier F, Miller R, Fenner J, Christelis G, Dill HG, Himmelsbach T, Kaufhold S, Lohe C 2014. Structure and genesis of the Cuvango Megafan in northern Namibia:Implications for its hydrology. *Hydrogeology Journal* 22, 6:1307–1328.

Longhurst R 2003. Semi-structured interviews and focus groups. *Key method in geography* 3, 2: 143-156.

Luetkemeier R, Stein L, Drees L & Liehr S 2017. Blended drought index: integrated drought hazard assessment in the Cuvelai-Basin. *Climate* 5, 3: 51.

Maes J, Parra C, Mertens K, Bwambale B, Jacobs L, Poesen J & Kervyn M 2018. Questioning network governance for disaster risk management: Lessons learnt from landslide risk management in Uganda. *Environmental Science & Policy* 85: 163-171.

Malalgoda C, Amaratunga D & Pathirage C 2010. Role of local governments in disaster risk reduction. *Proceedings of the Construction, Building and Real Estate Research Conference of the Royal Institution of Chartered Surveyors.* Paris: Royal Intsitution of Chartered Surveyors.

Malmqvist J, Hellberg K, Möllås G, Rose R & Shevlin M 2019. Conducting the pilot study: A neglected part of the research process? Methodological findings supporting the importance of piloting in qualitative research studies. *International Journal of Qualitative Methods* 18. doi. 1609406919878341.

Manyena SB 2006. Rural local authorities and disaster resilience in Zimbabwe. *Disaster Prevention and Management: An International Journal* 15, 5: 810-820.

Marsh A & Seely M 1992. Oshanas: Sustaining People. *Environment and Development in Central Owambo, Namibia.* Gobabeb: Desert Research Foundation of Namibia.

Marshall C & Rossman GB 2014. *Designing qualitative research*. New York: Sage Publications.

Matua GA & Van Der Wal DM 2015. Differentiating between descriptive and interpretive phenomenological research approaches. *Nurse researcher* 22, 6.

Maxfield MG & Babbie E 2001. *Research methods for criminal justice and criminology* (3rd ed.). Belmont: Wadsworth Publishing.

McRoy R 2008. Rigorous Qualitative Methods. *Forum Qualitative / forum: Qualitative Social Research. Sozialforschung* 1, 2.

Mendelsohn J & Weber B 2011. CUVELAI: The Cuvelai Basin, its water and people in Angola and Namibia. Luanda, Angola: Rua Rei Katyavala 113 & RAISON.

Mendelsohn J 2008. An assessment of flooding in Luanda: risks and damage. *Proceedings of the Development Workshop held March 2008.* Luanda: Development workshop France.

Mendelsohn J, Jarvis A & Robertson T 2013. *A profile and atlas of the Cuvelai – Etosha Basin*. Windhoek: RAISON, Gondwana for the Sustainable Integrated Water Resources Management Project & Ministry of Agriculture, Water and Forestry.

Mendelsohn J, Jarvis A, Roberts C & Robertson T 2009. *Atlas of Namibia; a portrait of the land and its people*. Cape Town: Jonathan Ball Publishers.

Mendelsohn J, Jarvis A, Roberts C & Robertson T 2002. *Atlas of Namibia*. Cape Town: David Philip.

Mercer J, Kelman I, Lloyd K & Suchet-Pearson S 2008. Reflections on use of participatory research for disaster risk reduction. *Area* 40, 2: 172-183.

Midgley G, Hughes G, Thuiller W, Drew G & Foden W 2005. *Assessment of potential climate change impacts on Namibia's floristic diversity, ecosystem structure and function.* Windhoek: Ministry of Agriculture, Water and Forestry.

Miner-Romanoff K 2012. Interpretive and Critical Phenomenological Crime Studies: A Model Design. *Qualitative report* 17: 54.

Mitchell TC 2006. *Building a disaster resilient future: lessons from participatory research in St. Kitts and Montserrat*. University of London: University College London.

Moe TL & Pathranarakul P 2006. An integrated approach to natural disaster management success factors. *Disaster Prevention and Management* 15, 9: 396-413.

Mojtahedi S & Lan-Oo B 2012. Theoretical framework for stakeholders' disaster response index in the built environment. *Proceedings of the 28th Annual ARCOM Conference held 3-5 September 2012, Edinburgh, UK*. Edinburgh: Association of Researchers in Construction Management.

Morse JM 1994. The significance of saturation. *Qualitative Health Research* 5, 3: 147-149.

Mouton J, Auriacombe CJ & Lutabingwa J 2006. Problematic aspects of the research, design and measurement process in Public Administration research: conceptual considerations. *Journal of Public Administration* 41, 3: 574-587.

Mudavanhu C 2014. The impact of flood disasters on child education in Muzarabani District, Zimbabwe. *Jàmbá: Journal of Disaster Risk Studies* 6, 1: 1–8.

Mufeti P 2014. Namibian experiences coping with floods and droughts. *Proceedings of the UNESCO G-WADI Geo-Server use held 18 June 2014, Alexandria, Virginia*. Virginia: UNESCOUCI ,G-WADI workshop.

Mufune P 2013. Factors Affecting Women's Participation in Namibia's Workforce: Evidence from the 2009/10 Namibia Households Incomes and Expenditure Survey. *International Journal of Business and Management* 8, 22: 40.

Muhangi P & Acidri J 2008. North Central Namibia upland cereal and livestock zone, upland cereal and non-farm income zone: baseline livelihood profiles. *Livelihoods assessment main report.* Windhoek: Office of the Prime Minister - Directorate Emergency Management.

Mumford MD, Zaccaro SJ, Harding FD, Jacobs TO & Fleishman EA 2000. Leadership skills for a changing world: Solving complex social problems. *The Leadership Quarterly* 11, 1: 11-35.

Muttarak R & Pothisiri W 2013. The role of education on disaster preparedness: case study of 2012 Indian Ocean earthquakes on Thailand's Andaman Coast. *Ecology and Society* 18, 4.

Namibia (Republic of) 2009. Namibia sub-National Food Security and Vulnerability Assessment and Monitoring Report 2009-2010. Windhoek: Office of the Prime Minister.

Namibia (Republic of) 2009. National disaster risk management policy. Windhoek: Office of the Prime Minister.

Namibia (Republic of) 2012. Constitution of the Republic of Namibia, Act No. 10 of 2012.

Government Gazzette 228, 5029.

Namibia Agronomic Board. 2017. *Annual Report.* Windhoek: Ministry of Agriculture and Water Services.

Namibia Press Agency (Nampa) 2020. Floods predicted for northern Namibia. *The Namibian* 02 March 2020.

Namibia Statistics Agency (NSA) 2011. *Namibia 2011 Population & Housing Census Main Report.* Windhoek: Namibia Statistics Agency.

Namibia Statistics Agency (NSA) 2013. *Namibia Labour Force Survey 2013 report.* Windhoek: Namibia Statistics Agency.

Namibia Statistics Agency (NSA) 2018. *Namibia Labour Force Survey 2013 report.* Windhoek: Namibia Statistics Agency.

Neubauer B, Witkop C & Varpio L 2019. How phenomenology can help us learn from the experiences of others. *Perspectives on Medical Education* 8, 2: 90.

Neuendorf KA 2016. *Measurement and validity: The Content Analysis Guidebook*. Los Angeles: Sage Publications.

Newsham A & Thomas D 2009. *Agricultural adaptation, local knowledge and livelihoods diversification in North-Central Namibia.* Tyndall: Tyndall Centre for Climate Change Research.

NHIES (Namibia Household Income and Expenditure Survey) *2015/2016 Annual Report.* Windhoek: Namibia Statistics Agency.

Niipare A –Marie, Jordaan A & Siyambango N 2020. Flood Impacts in Oshana Region, Namibia: A Case Study of Cuvelai River Basin. *Journal of Geography and Geology* 12, 1: 17.

Niipele JN, Kaholongo KI & Njunge J 2015. Departure from Indigenous Land Use System and the Consequential Impacts: A Case of Cuvelai Basin, North-Central Namibia. *Journal of Environmental Science and Engineering A* 4, 3: 143–153.

Njie B & Asimiran S 2014. Case study as a choice in qualitative methodology. *Journal of Research & Method in Education* 4, 3: 35-40.

NRCS (Namibia Red Cross Society) 2017. Namibia: Floods DREF Operation. ReliefWeb. [Online]. Available: https://reliefweb.int/report/namibia/namibia-floods-mdrna007-dref-operation-final-report [Accessed 15 May 2018].

Nwagbara VU & Iyama WA 2019. Assessment of the Environmental Impact of Road Infrastructure in Countries: A Study of the Namibia Scenario. *Journal of Geoscience and Environment Protection* 7, 12: 86-101.

Nyakundi H, Mwanzo I & Yitambe A 2010. Community perceptions and response to flood risks in Nyando District, Western Kenya. *Jàmbá: Journal of Disaster Risk Studies* 3, 1: 346–366.

O zden AT 2004. Evaluation of post-disaster housing in Senirkent. Master Thesis. Istanbul Technical University: Institute of Natural and Applied Sciences.

O'Brien G, O'Keefe P, Gadema Z & Swords J 2010. Approaching disaster management through social learning. *Disaster Prevention and Management: An International Journal* 19, 4: 498-508.

OCHA (Office for the Coordination of Humanitarian Affairs) 2009. *Climate Change—Campaign Toolkit.* New York: Office for the Coordination of Humanitarian Affairs.

Olowu D 2010. The Hyogo Framework for Action and its implications for disaster management and reduction in Africa. *JAMBA: Journal of Disaster Risk Studies* 3, 1: 303-320.

Olsen W 2012. *Data collection: Key debates and methods in social research.* London: Sage Publications.

Onwuegbuzie A & Leech N 2005. Taking the ‘‘Q’’ out of research: Teaching research methodology courses without the divide between Quantitative and Qualitative paradigms. *Quality & Quantity* 39: 267–296. doi 10.1007/s11135-004-1670-0.

Osuret J, Atuyambe LM, Mayega RW, Ssentongo J, Tumuhamye N, Bua GM, Tuhebwe D & Bazeyo W 2016. Coping strategies for landslide and flood disasters: a qualitative study of Mt. Elgon Region, Uganda. *PLoS currents* 8. doi:10.1371/currents.dis.4250a225860babf3601-a18e33e172d8b.

Oxley MC 2013. A “people-centred principles-based” Post-Hyogo framework to strengthen the resilience of nations and communities. *International Journal of Disaster Risk Reduction* 4: 1-9.

Padgett D 2008. *Qualitative methods in social work research*. Los Angeles: Sage Publications.

Palinkas LA 2006. Qualitative approaches to studying the effects of disasters. In Norris F (eds) *Methods for Disaster Mental Health Research*. New York: Guilford Press.

Pandey B & Okazaki K 2005. Community-based Disaster Management: Empowering communities to cope with disaster risks. *Regional Development dialogue* 26, 2: 52.

Patterson O, Weil F & Patel K 2010. The role of community in disaster response: conceptual models. *Population Research and Policy Review* 29, 2: 127-141.

Patton MQ 2015. *Qualitative research and methods: Integrating theory and practice*. Belmont: Sage Publications.

Paul Jr M, Boakye JA & Muliro M 2020. Mitigating the impacts of floods using adaptive and resilient coping strategies: The role of the emergency Livelihood Empowerment against Poverty program (LEAP) in Ghana. *Journal of Environmental Management* 270: 110809. doi.org/10.1016/j.jenvman.2020.110809.

Pearson L & Pelling M 2015. The UN Sendai framework for disaster risk reduction 2015–2030: Negotiation process and prospects for science and practice. *Journal of Extreme Events* 2, 1: 1571001.

Peek L A & Mileti DS 2002. The History and future of disaster research. In Bechtel RB & Churchman A (eds) *Environmental Psychology*. New York: John Wiley & Sons.

Penuel KB & Statler M 2011. *Encyclopedia of disaster relief* (2). New York: Sage Publications.

Persendt FC & Gomez C 2016. Assessment of drainage network extractions in a low-relief area of the Cuvelai Basin (Namibia) from multiple sources: LiDAR, topographic maps, and digital aerial orthophotographs. *Geomorphology* 260: 32-50.

Petty NJ, Thomson OP & Stew G 2012. Ready for a paradigm shift? Part 2: Introducing qualitative research methodologies and methods. *Manual therapy* 17, 5: 378-384.

Pica V 2018. Beyond the Sendai framework for disaster risk reduction: Vulnerability reduction as a challenge involving historical and traditional buildings. *Buildings* 8, 4: 50.

Pollio HR, Henley TB, Thompson CJ & Thompson CB 1997. *The phenomenology of everyday life: Empirical investigations of human experience*. Cambridge: Cambridge University Press

Priyanti RP, Hidayah N, Rosmaharani S, Nahariani P, Asri, Mukarromah N & Mundakir M 2019. Community preparedness in flood disaster: a qualitative study. *International quarterly of community health education* 40, 1: 67-68.

Punch KF 2005. *Introduction to Social Research – Quantitative & Qualitative Approaches*. London: Sage Publications.

Quarantelli EL 2000. Disaster planning, emergency management and civil protection: The historical development of organized efforts to plan for and to respond to disasters. University of Delaware: Disaster Research Center.

Rebele F 1994. Urban Ecology and Special Features of Urban Ecosystems. *Global Ecology and Biogeography Letters* 4, 6:173-187.

Redmond RA & Curtis EA 2009. Focus groups: principles and process. *Nurse researcher* 16, 3.

Research and Information Services of Namibia 2012. Surface Water of the Cuvelai-Etosha Basin. Windhoek: RAISON.

Riemann G 2006. An introduction to" doing biographical research". *Historical Social Research/Historische Sozialforschung*, 6-28.

Rogers D & Tsirkunov V 2011. Costs and benefits of early warning systems. Global Assessment Report on Disaster Risk Reduction. Geneva: The World Bank.

Rohland E 2018. Adapting to hurricanes. A historical perspective on New Orleans from its foundation to Hurricane Katrina, 1718–2005. *Wiley Interdisciplinary Reviews: Climate Change* 9, 1: 488.

Rooney JJ & Heuvel LNV 2004. Root cause analysis for beginners. *Quality progress* 37, 7: 45-56.

Rumbach A & Foley D 2014. Indigenous institutions and their role in disaster risk reduction and resilience: evidence from the 2009 tsunami in American Samoa. *Ecology and Society* 19, 1.

Ryan PA 1991. Environmental effects of sediment on New Zealand streams: a review. *New Zealand journal of marine and freshwater research* 25, 2: 207-221.

Said AM, Mahmud AR & Abas F 2011. Community preparedness for tsunami disaster: a case study. *Disaster Prevention and Management: An International Journal* 3, 20: 266-280.

Sampson H 2004. Navigating the waves: the usefulness of a pilot in qualitative research. *Qualitative research* 4, 3: 383-402.

Sandelowski M 1995. Sample size in qualitative research. *Research in nursing & health* 18, 2: 179-183.

Sarantakos S 2013. *Social research*. Cape Town: Basingstoke Palgrave Macmillan.

Satterthwaite D 2007. *Adapting to climate change in urban areas: the possibilities and constraints in low-and middle-income nations*. London: International Institute for Environment and Development (IIED).

Schmuck H 2012 Flood. In Wisner B, Gaillard JC & Kelman, I. *The Routledge Handbook of Hazards and Disaster Risk Reduction*. New York: Routledge.

Schreiber J & Asner-Self 2011. *Educational Research*. Hoboken: John Wiley & Sons, Inc.

Schröter K, Velasco C, Torres D, Nachtnebel HP, Kahl B, Beyene M & Gocht M 2008. *Effectiveness and efficiency of early warning systems for flash-floods.* London: University of Natural Resources and Applied Life Science (BOKU), Pro Aqua-Water & Finance.

Schumm SA 1993. River response to base level change: implications for sequence stratigraphy. *The Journal of Geology* 101, 2: 279-294.

Scott Z & Tarazona M 2011. Study on disaster risk reduction, decentralization and political economy. *Global Assessment report on disaster risk reduction.* Switerzland: United Nations Development Programme.

Shaamhula L & Van Rooy G 2019. Here comes the water: Risk assessments, observation and knowledge of Ompundja village. *Jàmbá: Journal of Disaster Risk Studies* 11, 1: 1-9.

Shaanika T 2017. Floods shut down 64 Omusati schools. *The Namibian* 10 March 2017.

Shaw R 2012. Overview of Community-Based Disaster Risk Reduction. In Shaw R (ed.) *Community-Based Disaster Risk Reduction Community, Environment and Disaster Risk Management*. Bingley: Emerald Group Publishing Limited.

Shifidi VT 2014. Socio-economic assessment of the consequences of flooding in Northern Namibia. Masters thesis. Stellenbosch: Stellenbosch University. Department of Geography and Environmental Studies.

Shifidi VT 2015. The current state of operations at the Namibia Hydrological Services: Progresses, challenges and opportunities. *Proceedings of the 4th Biennial University of Oklahoma International WaTER Conference and International Water Prize Award held Sept. 21-23, 2015 in Norman, Oklahoma, USA.*

Shikangalah R N 2020. The 2019 drought in Namibia: An overview. *Journal of Namibian Studies* 27: 37–58.

Silver C & Lewins A 2014. *Using software in qualitative research: A step-by-step guide*. London: Sage Publications.

Smit B 2002. *Atlas. ti* for qualitative data analysis. *Perspectives in education* 20, 3: 65-75.

Spear D & Chappel A 2018. Livelihoods on the Edge without a Safety Net: The case of Smallholder crop farming in north-central Namibia. *Land* 7, 3: 79.

Spear D, Zaroug M, Daron J, Ziervogel G, Angula M, Haimbili E, Hegga S, Baudoin MA, New M, Kunamwene I & Togarepi C 2018. *Vulnerability and responses to climate change in drylands: The case of Namibia.* Windhoek: Ministry of Environment and Tourism.

Sperling F & Szekely F 2005. *Disaster risk management in a changing climate*. Washington: Vulnerability and Adaptation Resource Group (VARG).

Starkey P, Riehle EB, Ambunda R, Sheehama R & Ekandjo H 2017. Promoting rural access and mobility in Northern Namibia: an integrated approach. *Proceedings of the 8th Africa Transportation Technology Transfer Conference held in May, 2017, Avani Victoria Falls Resort Livingstone.*

Stewart DW & Shamdasani PN 2014. *Focus groups: Theory and practice*. New York: Sage Publications.

Stewart DW, Shamdasani PN & Rook DW 2009. *Group depth interviews: Focus group research*. New York: Sage Publications.

Steytler DJ 2013. *The Namibia Labour Force Survey 2012 Report.* Windhoek: Namibia Statistics Agency (NSA).

Strohbach BJ 2008. Mapping the major catchments of Namibia. *Agricola* 18: 63-73.

Strömberg D 2007. Natural Disasters, Economic Development, and Humanitarian Aid. The *Journal of Economic Perspectives* 21, 3: 199-222.

Susman P, O'Keefe P & Wisner B 1983. Global disasters, a radical interpretation. *Interpretations of Calamity*, 263-283.

Sutton J & Austin Z 2015. Qualitative research: Data collection, analysis, and management. *The Canadian journal of hospital pharmacy* 68, 3: 226.

Sutton J & Tierney K 2006. *Disaster preparedness: Concepts, guidance, and research*. Colorado: University of Colorado.

Swidler A 2013. Lessons from chieftaincy in rural Malawi. In Hall PA & Lamont M (eds.) *Social resilience in the neoliberal era.* Cambridge: Cambridge University Press.

Tazen F, Diarra A, Kabore RF, Ibrahim B, Bologo/Traoré M, Traoré K & Karambiri H 2019. Trends in flood events and their relationship to extreme rainfall in an urban area of Sahelian West Africa: The case study of Ouagadougou, Burkina Faso. *Journal of Flood Risk Management* 12: 1-11.

Tetnowski J 2015. Qualitative case study research design. *Perspectives on Fluency and Fluency Disorders* 25, 1: 39-45.

The Cuvelai River Awareness Kit (RAK) 2018. Source of the Cuvelai River. Available from: https://cuvecom.maps.arcgis.com/apps/MapJournal/index.html?appid=1ee325ed3a63410480e967f0e78970bf. [Accessed 04 April 2020].

Thomas DR 2003. *A general inductive approach for qualitative data analysis.* Auckland: University of Auckland.

Thurmond VA 2001. The point of triangulation. *Journal of nursing scholarship* 33, 3: 253-258.

Tiepolo M & Braccio S 2020. Mainstreaming disaster risk reduction into local development plans for rural tropical Africa: A Systematic Assessment. *Sustainability* 12, 6: 2196.

Tjitemisa K 2017. Ohangwena under water. *New Era Newspape*r 20 March 2017.

Tracy AR, Dungca AC, Pendleton NL & Dragnich PA 2007. The *Cuvelai-Etosha Basin Management Approach.* Worcester: Worcester Polytechnic Institute.

Tshilunga SE 2014. A study of the 2011 floods on human security in Namibia: A case study of the Oshoopala informal settlement in Oshakati. Master's thesis. University of Namibia, Department of Security and Strategic Studies.

Tuohy D, Cooney A, Dowling M, Murph K & Sixsmith J 2013. An overview of interpretive phenomenology as a research methodology. *Nurse researcher* 20, 6.

Turpie J & Visser M 2013. The impact of climate change on South Africa's rural areas. *Financial and Fiscal Commission* 14: 100-160.

Twigg J 2004. *Disaster risk reduction: mitigation and preparedness in development and emergency programming*. London: Overseas Development Institute (ODI).

UNDESA (United Nations Department of Economic and Social Affairs) 2013. *World economic and social survey 2013: sustainable development challenges.* New York: UNDESA

UNDP (United Nations Development Programme) 2004. *Reducing Disaster Risk: A Challenge for Development-a Global Report.* United Nations, New York: Bureau for Crisis Prevention

UNDP (United Nations Development Programme) 2014. *How Law and Regulation Support Disaster Risk Reduction. Namibia country case study report.* New York: IFRC Disaster Law Programme.

UNDRO (United Nations Disaster Relief Organization) 1991. *Phenomena, Effects and Options. A Manual for policy makers and planners.* New York: United Nations Disaster Relief Organisation.

UNDRR (United Nations Office for Disaster Risk Reduction) 2019. *Global Assessment Report on Disaster Risk Reduction.* Geneva: UNDRR.

UNDRR (United Nations Office for Disaster Risk Reduction) 2020. *Annual report 2020.* Geneva: UNDRR.

UNISDR (United Nations International Strategy for Disaster Reduction) 2005. Hyogo framework for action 2005–2015: Building the resilience of nations and communities to disasters. In *Extract from the final report of the World Conference on Disaster Reduction.* Geneva: UNISDR.

UNISDR (United Nations International Strategy for Disaster Reduction) 2015. *From a reactive to proactive then people centered approach to DRR.* Geneva: UNISDR.

UNISDR (United Nations International Strategy for Disaster Reduction) 2009. *Making Disaster Risk Reduction Gender Sensitive: Policy and Practical Guidelines.* Geneva: UNISDR.

UNISDR (United Nations International Strategy for Disaster Reduction) 2010. *United Nations International Strategy for Disaster Reduction.* Geneva: UNISDR.

Urquhart C 2012. *Grounded theory for qualitative research: A practical guide*. New York: Sage Publications.

Vaismoradi M, Jones J, Turunen H & Snelgrove S 2016. Theme development in qualitative content analysis and thematic analysis. *Journal of Nursing Education and Practice* 6, 5: 100-110.

Van Niekerk D 2005. *A comprehensive framework for multi-sphere disaster risk reduction in South Africa*. Doctoral dissertation, North-West University.

Van Niekerk D 2007. *Local government disaster risk management. Municipal management: Serving the people.* Potchefstroom: African Centre for Disaster Studies.

Van Niekerk D 2008. From disaster relief to disaster risk reduction: a consideration of the evolving international relief mechanism. *The Journal for Transdisciplinary Research in Southern Africa* 4, 2: 355-376.

Van Niekerk D 2015. Disaster risk governance in Africa: A retrospective assessment of progress against the Hyogo Framework for Action (2000-2012). *Disaster Prevention and Management* 24, 3: 397-416.

Van Niekerk D, Coetzee C & Nemakonde L 2020. Implementing the Sendai Framework in Africa: Progress against the Targets (2015–2018). *International Journal of Disaster Risk Science*, 1-11.

Van Riet G 2016. *The institutionalisation of disaster risk reduction: South Africa and neoliberal governmentality*. London: Routledge

Van Teijlingen ER & Hundley V 2001. *The importance of pilot studies.* Aberdeen: University of Aberdeen.

Vyas-Doorgapersad S & Lukamba TM 2012. Disaster risk reduction policy for sustainable development in the Southern African Development Community: a policy perspective. *Journal of Public Administration* 47, 4: 774-784.

Webster L & Mertova P 2007. *Using narrative inquiry as a research method: An introduction to using critical event narrative analysis in research on learning and teaching*. London: Routledge.

Wei HH, Sim T & Han Z 2019. Confidence in authorities, neighbourhood cohesion and natural hazards preparedness in Taiwan. *International Journal of Disaster Risk Reduction* 40: 101265.

Weichselgartner J & Bertens J 2000. Natural disasters: acts of God, nature or society? On the social relation to natural hazards. *WIT Transactions on Ecology and the Environment*, 45.

Weiss TG & Wilkinson R. (eds) 2013. *International organization and global governance*. Oxfordshire: Routledge.

Welman C, Kruger F & Mitchell B 2012. *Research Methodology*. Cape Town: Oxford University Press.

Williams DJ & Noyes JM 2007. How does our perception of risk influence decision-making? Implications for the design of risk information. *Theoretical issues in ergonomics science* 8, 1: 1-35.

Williams S & Jacobs K 2011. Introduction: Disasters, Housing Actuarialism and the Securitization of Risk. *Housing Studies* 26, 2:185-195.

Wisner B, Blaikie PM, Blaikie P, Cannon T & Davis I 2004. *At risk: natural hazards, people's vulnerability and disasters*. East Sussex: Psychology Press.

Wisner B, Gaillard JC & Kelman I (eds) 2012. *Handbook of hazards and disaster risk reduction*. London: Routledge.

Wisner B, Kent G, Carmalt J, Cook B, Gaillard, JC, Lavell A, Oxley M, Gibson T, Kelman I, Van Niekerk D & Lassa J 2011. *Political Will for Disaster Reduction: What Incentives Build It, and Why Is It So Hard to Achieve? A Contribution to the Review of the Draft Global Assessment Report on Disaster Reduction 2011.* London: University College London.

Woltersdorf L 2010. Sustainability of Rainwater Harvesting Systems Used for Gardening in the Context of Climate Change and IWRM: An Example from the Cuvelai-Etosha Basin in Namibia. Doctoral dissertation. Univ.-Bibliothek Frankfurt am Main.

Woolf NH & Silver C 2017. *Qualitative Analysis Using ATLAS. ti: The Five-Level QDATM Method*. New York: Routledge.

Yan Y & Bissell K 2018. The sky is falling: Predictors of news coverage of natural disasters worldwide. *Communication Research* 45, 6: 862-886.

Yodmani S 2001. Disaster risk management and vulnerability reduction. Bangkok: Asian Disaster Preparedness Center.

Younus MAF 2014. *Vulnerability and adaptation to climate change in Bangladesh: Processes, assessment and effects*. New York: Springer.

APPENDICES

APPENDIX A: ATTENDANCE REGISTER FOR PANEL OF EXPERTS WORKSHOP

PANEL OF EXPERTS WORKSHOP [INTERVIEW SCHEDULES – DISASTER RISK REDUCTION FRAMEWORK]

Africa Hall, Military Academy, 29 July 2019

Loide Shaamhula

09h00 – 10:55

Name and surname	Appointment	Telephone number	e-mail address
HAP Smit	Lecturer, Mil Geo	084 2057174	hennies@ma2.sun.ac.za
J.v.d. Merwe	Researcher, Cemis	072 3852698	jutvandermerwe@gmail.com
I. Henrico	Lecturer, Mil Geo	083 460 5841	ivanh@ma2.sun.ac.za
B. Mtshawu	Mil Geo lecture	0810466259	mtshawu@ma2.sun.ac.za
MC Mkhize	Researcher, Cemis	0827528562	[illegible]@ma2.sun.ac.za
L.M. [illegible]	[illegible]	022 702 3064	[illegible]@ma2.sun.ac.za
J. Bezuidenhout	Lecturer Physics	084 581 4925	jab@ma2.sun.ac.za

APPENDIX B: THE FIRST DRAFT INTERVIEW SCHEDULES

Focus group discussions – Interview Schedule

Section A Demographics information

Note: The information you provide us with will be kept confidential. We will only look at correlations between demographic information and your views on Efundja risk issues. Information about individuals or households will not be released to anybody outside this research project.

Person A_____

Person B _____

Person C_____

Person D_____

Section B OVERVIEW OF THE *EFUNDJA*-EVENTS

1.1. How long have you been living here in this location? (*Tick the appropriate answer*)

☐ Moved here recently

☐ Less than 5 years

☐ More than five years

1.2. Since you have been living here, how many times have you experienced flooding?

1.3. How do you respond when the flooding event happens?

1.4. In your own opinion, in which of the years has your household experienced the worst *Efundja*-event?

Yes in 2008, 2009, 2010, 2011, 2015, 2017

In that year, what have been the main impacts of the flooding?

_____

1.5. Are there households which were not usually flooded in the past but are now flooded?

1.6. If you have been flooded more recently, what would you say are the reasons for more frequent flooding than before?

1.7. For those that experiences the flooding event regularly, how did you deal with it in the past? Is that any different from how you deal with it now?

1.8. For those who lived here for longer periods, tell us more on how *Efundja* have taken place in the past? What do you think caused it?

1.9. Have you traditionally taken any measures to prepare your household for *Efundja*?

__ No ___Yes – If yes, please describe what and how?

_____

Since the last *Efundja* event, have you or any of your household in this community undertaken any measures to prevent or reduce the risk of being flooded?

(*If the discussion does not raise any measure, then the interviewer probe with the following?)*

	Yes	No	Don't Know
Raised the floor level	1	2	0
Kept ditches and trenches around the house clean	1	2	0
Constructed new trenches or ditches around to the house	1	2	0
Plant trees or plants to the yard	1	2	0
Placed valuable goods higher	1	2	0
Collected emergency survival items or compiled a preparedness kit	1	2	0
Made a plan what will you do if *Efundja* is threatening	1	2	0
Did any other preventive measures, please explain in detail?	1	2	0

1.10. Do you think you are now better prepared for a possible *Efundja* event than you were before the last *Efundja* event?

___No ___Yes

If yes ,what is the main reason for that you are now better prepared?

_____

***Efundja* Management**

2.1. When you think of your households, please evaluate the importance of the following actors (e.g Namibian Defence Force (NDF)) to your management to cope with *Efundja*:

	Not Important	Important	Very Important	Don't Know
A. Your Neighbors	1	2	3	0
B. Relative living in the same area	1	2	3	0
C. Friend living in the same area	1	2	3	0
D. Relative living a distance away	1	2	3	0
E. Friend living a distance away	1	2	3	0
F. Church	1	2	3	0
G. Headmen	1	2	3	0
H. Clinic	1	2	3	0
I. Local Councilor	1	2	3	0
J. Regional office	1	2	3	0
K. National government	1	2	3	0
L. Non-Governmental Organization	1	2	3	0
M. International donors e.g. Red Cross, USAID etc.	1	2	3	0

2.2. Any suggestions what would make the *Efundja* management easier to you?

_____

Proactive Approaches

3.1. Have any of your ancestors or relatives (parents, grandparents, uncles, aunts etc.) told you what they did to cope with *Efundja*? (Predict, adapt, prepare etc.)

___ No they haven't

___ Yes they have - If yes, could you describe who and what?

____How can you use such knowledge today to mitigate today's *Efundja*?

_____

3.2. Are there some particular activities/behavior's that were practiced in the past that are no longer practiced that you can say influenced the effect and occurrence of *Efundja*? Explain in details?

3.3. Do you think this practices can be re-introduced back into society? If yes - Explain how.

3.4. Which other ways/behaviors/practices do you think can help reduce the flooding in this area?

3.5. The worldwide Disaster Risk Reduction are now advocating for nations to reduce the risk of disasters. How do you think the risk of *Efundja* can be proactively reduced in your communities?

3.6. Mention and discuss various ways/strategies in which the risk of *Efundja* in this area can be reduced? (Thereafter we will see the visual representation of the impact and discuss it).

3.7. In your views, what will be your step by step approach that will really work in reducing the risk of *Efundja* in this area? (Discuss each step by using the flip chart to visualize the stages as discussed by the respondents)

3.8. Is there anything else you would like to add to any of the issues we have discussed during the meeting?? interview?

_____

Thank you for your time and have a pleasant day!

Date _____ Place _____

Interview ended _____ hour's _____minutes

END

Key Informant Interview (KII) – Traditional Authorities (Headmen)

Section A Demographics information

Note: The information you provide us with will be kept confidential. We will only look at correlations between demographic information and your views on *Efundja* risk issues. Information about individual households will not be released to anybody outside this research project.

Name of the Local Authority

Can you mention the name of your position?

Section B OVERVIEW OF THE *EFUNDJA*-EVENTS

1. As a headmen, since when did you started experiencing *Efundja* in your village?
2. As a headmen, how do you deal with the *Efundja*? (What are the stages, first procedures etc., all the way up until the problem is resolved?
3. Describe your role with regards to involvement in *Efundja* related issues.
4. How long have you been working in this position?
5. Ever since you have been working in this position, how many times did the flooding event occur in your village?
6. From a headmen perspective, how do you see the risk of flooding being reduced effectively and efficiently?
7. Who do you see as main key role players in the reduction of this risk?
8. Do you think the community members themselves has potential in reducing the risk of this hazard that continue to face them?
9. Apart from the main key role player (you mentioned above), who else do you think has a key role to play and can contribute in this, and how?

Section C *EFUNDJA* MANAGEMENT

Now, let's talk about *Efundja* management in this area.

2.1. How does the *Efundja* management work in this area?

2.2. With regards to *Efundja* management, what is your function as a village headman?

2.3. Do you also help in the areas outside your village or in any other parts of the affected region?

2.4. In your view, do you believe your role as a headman has an impact?

2.5. Or perhaps you feel there is a better way in which your roles can effectively address the hazard?

Section D PROACTIVE RISK REDUCTION

3.1. How do you think the risk of flooding in this communities can be effectively reduced?

3.2. Whose responsibility will this be? (Probe: Community members themselves, or headmen, or the local authorities or perhaps any other agencies not mentioned here?)

3.3. Which other ways/behaviors/practices do you think can help reduce the flooding in this area?

3.4. The worldwide Disaster Risk Reduction are now advocating for nations to reduce the risk of disasters. How do you think the risk of *Efundja* can be proactively reduced in your communities?

3.5. Mention and discuss various ways/strategies in which the risk of *Efundja* in this area can be reduced? (Thereafter we will see the visual representation of the impact and discuss it).

3.6. In your views, what will be your step by step approach that will really work in reducing the risk of *Efundja* in this area? (Discuss each step by using the flip chart to visualize the stages as discussed by the respondents)

3.7. Is there anything else you would like to add to any of the issues we have discussed during the interview?

Thank you for your time and have a pleasant day!

Date _____ Place _____

Interview ended _____ hour's _____minutes

END

Key Informant Interview (KII) – Local and national disaster risk management units

Section A Demographics information

Note: The information you provide us with will be kept confidential. We will only look at correlations between demographic information and your views on *Efundja* risk issues. Information about individual households will not be released to anybody outside this research project.

Name of the Local Authority

Can you mention the name of your position?

Section B OVERVIEW OF THE *EFUNDJA*-EVENTS

1.1. How long have you been working in this position?

1.2. Ever since you have been working in this position, how many times did the flooding event occur in this area?

1.3. From a local government perspective, how do you see the risk of flooding being reduced effectively and efficiently?

1.4. Do you think the community members themselves has potential in reducing the risk of this hazard that continue to face them?

1.5. Who else do you think has a key role to play in this, and how?

Section C *EFUNDJA* MANAGEMENT

Now, let's talk about *Efundja* management in this area.

2.1. How does the *Efundja* management work in this area?

2.2. How do you come in as a local disaster official in the entire *Efundja* management of the affected region?

2.3. In your views, do you think believe your role id impacting sufficiently? Or perhaps you feel there is a better way in which your role can effectively address the hazard??

Section D PROACTIVE RISK REDUCTION

3.1. How do you think the risk of flooding in this communities can be effectively reduced?

3.2. Whose responsibility will this be? (Probe: Community members themselves, or headmen, or the local authorities or perhaps any other agencies not mentioned here?)

3.3. The worldwide Disaster Risk Reduction are now advocating for nations to reduce the risk of disasters. How do you think the risk of *Efundja* can be proactively reduced in your communities?

3.4. Mention and discuss various ways/strategies in which the risk of *Efundja* in this area can be reduced? (The key role players, their respective responsibilities).

3.5. In your views, what will be your step by step approach that will really work in reducing the risk of *Efundja* in this area?

3.6. Is there anything else you would like to add to any of the issues we have discussed during the interview?

Thank you for your time and have a pleasant day!

Interview ended _____ hour's _____minutes

END

APPENDIX C: THE PILOT INTERVIEW SCHEDULES

Focus group discussions – Interview Schedule

Section A Demographics information

Note: The information you provide us with will be kept confidential. We will only look at correlations between demographic information and your views on Efundja risk issues. Information about individuals or households will not be released to anybody outside this research project.

Person A_____

Person B _____

Person C_____

Person D_____

Section B OVERVIEW OF THE *EFUNDJA*-EVENTS

1.1. How long have you been living here in this location? (*Tick the appropriate answer*)

☐ Moved here recently

☐ Less than 5 years

☐ More than five years

1.2. Since you have been living here, how many times have you experienced flooding?

1.3. How do you respond when the flooding event happens?

1.4. In your own opinion, in which of the years has your household experienced the worst *Efundja*-event?

Yes in 2008, 2009, 2010, 2011, 2015, 2017

1.5. In that year, what have been the main impacts of the flooding?

_____

1.6. Are there households which were not usually flooded in the past but are now flooded?

1.7. If you have been flooded more recently, what would you say are the reasons for more frequent flooding than before?

1.8. For those that experiences the flooding event regularly, how did you deal with *Efundja* in the past?

1.9. Is that any different from how you deal with it now?

1.10. For those who lived here for longer periods, tell us more on how *Efundja* have taken place in the past? What do you think caused it?

1.11. Have you traditionally taken any measures to prepare your household for *Efundja*?

__ No ___Yes – If yes, please describe what and how?

_____

Since the last flood event, have you or any of your household in this community undertaken any measures to prevent or reduce the risk of being flooded?

(*If the discussion does not raise any measure, then the interviewer probe with the following?)*

	Yes	No	Don't Know
Raised the floor level	1	2	0
Kept ditches and trenches around the house clean	1	2	0
Constructed new trenches or ditches around to the house	1	2	0
Plant trees or plants to the yard	1	2	0
Placed valuable goods higher	1	2	0
Collected emergency survival items or compiled a preparedness kit	1	2	0
Made a plan what will you do if a flood is threatening	1	2	0
Did any other preventive measures, please explain in detail?	1	2	0

1.12. Do you think you are now better prepared for a possible flood event than you were before the last flood event?

___No ___Yes

1.13. If yes ,what is the main reason for that you are now better prepared?

_____

Flood Management

2.1. When you think of your households, please evaluate the importance of the following actors (e.g Namibian Defence Force (NDF)) to your management to cope with floods:

	Not Important	Important	Very Important	Don't Know
A. Your Neighbors	1	2	3	0
B. Relative living in the same area	1	2	3	0
C. Friend living in the same area	1	2	3	0
D. Relative living a distance away	1	2	3	0
E. Friend living a distance away	1	2	3	0
F. Church	1	2	3	0
G. Headmen	1	2	3	0
H. Clinic	1	2	3	0
I. Local Councilor	1	2	3	0
J. Regional office	1	2	3	0
K. National government	1	2	3	0
L. Non-Governmental Organization	1	2	3	0

M. International donors e.g. Red Cross, USAID etc.	1	2	3	0

2.2. Any suggestions what would make the flood management easier to you?

_____

Proactive Approaches

3.1. Have any of your ancestors or relatives (parents, grandparents, uncles, aunts etc.) told you what they did to cope with floods? (Predict, adapt, prepare etc.)

___ No they haven't

___ Yes they have - If yes, could you describe who and what?

____How can you use such knowledge today to mitigate today's flood?

_____

3.2. Are there some particular activities/behavior's that were practiced in the past that are no longer practiced that you can say influenced the effect and occurrence of floods? Explain in details?

3.3. Do you think this practices can be re-introduced back into society? If yes - Explain how.

3.4. Which other ways/behaviors/practices do you think can help reduce the flooding in this area?

3.5. The worldwide Disaster Risk Reduction are now advocating for nations to reduce the risk of disasters. How do you think the risk of floods can be proactively reduced in your communities?

3.6. Mention and discuss various ways/strategies in which the risk of floods in this area can be reduced? (Thereafter we will see the visual representation of the impact and discuss it).

3.7. In your views, what will be your step by step approach that will really work in reducing the risk of floods in this area? (Discuss each step by using the flip chart to visualize the stages as discussed by the respondents)

3.8. Is there anything else you would like to add to any of the issues we have discussed during the meeting?? interview?

Thank you for your time and have a pleasant day!

Date _____ Place _____

Interview ended _____ hour's _____minutes

END

Key Informant Interview (KII) – Traditional Authorities (Headmen)

Section A Demographics information

Note: The information you provide us with will be kept confidential. We will only look at correlations between demographic information and your views on flood risk issues. Information about individual households will not be released to anybody outside this research project.

Name of the Local Authority

Can you mention the name of your position?

Section B OVERVIEW OF THE FLOOD-EVENTS

1.1. As a headmen, since when did you started experiencing floods in your village?

1.2. As a headmen, how do you deal with the floods? (What are the stages, first procedures etc., all the way up until the problem is resolved?

1.3. Describe your role with regards to involvement in floods related issues.

1.4. How long have you been working in this position?

1.5. Ever since you have been working in this position, how many times did the flooding event occur in your village?

1.6. From a headmen perspective, how do you see the risk of flooding being reduced effectively and efficiently?

1.7. Who do you see as main key role players in the reduction of this risk?

1.8. Do you think the community members themselves has potential in reducing the risk of this hazard that continue to face them?

1.9. Apart from the main key role player (you mentioned above), who else do you think has a key role to play and can contribute in this, and how?

Section C FLOOD MANAGEMENT

Now, let's talk about flood management in this area.

2.1. How does the flood management work in this area?

2.2. With regards to flood management, what is your function as a village headman?

2.3. Do you also help in the areas outside your village or in any other parts of the affected region?

2.4. In your view, do you believe your role as a headman has an impact?

2.5. Or perhaps you feel there is a better way in which your roles can effectively address the hazard?

Section D PROACTIVE RISK REDUCTION

3.1. How do you think the risk of flooding in this communities can be effectively reduced?

3.2. Whose responsibility will this be? (Probe: Community members themselves, or headmen, or the local authorities or perhaps any other agencies not mentioned here?)

3.3. Which other ways/behaviors/practices do you think can help reduce the flooding in this area?

3.4. The worldwide Disaster Risk Reduction are now advocating for nations to reduce the risk of disasters. How do you think the risk of floods can be proactively reduced in your communities?

3.5. Mention and discuss various ways/strategies in which the risk of floods in this area can be reduced? (Thereafter we will see the visual representation of the impact and discuss it).

3.6. In your views, what will be your step by step approach that will really work in reducing the risk of floods in this area? (Discuss each step by using the flip chart to visualize the stages as discussed by the respondents)

3.7. Is there anything else you would like to add to any of the issues we have discussed during the interview?

Thank you for your time and have a pleasant day!

Date _____ Place _____

Interview ended _____ hour's _____minutes

END

Key Informant Interview (KII) – Local and national disaster risk management units

Section A Demographics information

Note: The information you provide us with will be kept confidential. We will only look at correlations between demographic information and your views on flood risk issues. Information about individual households will not be released to anybody outside this research project.

Name of the Local Authority

_____

Please mention your position.

Section B OVERVIEW OF THE FLOOD-EVENTS

1.1. How long have you been working in this position?

1.2. Ever since you have been working in this position, how many times did the flooding event occur in this area?

1.3. From a local government perspective, how do you see the risk of flooding being reduced effectively and efficiently?

1.4. Do you think the community members themselves has potential in reducing the risk of this hazard that continue to face them?

1.5. Who else do you think has a key role to play in this, and how?

Section C FLOOD MANAGEMENT

Now, let's talk about flood management in this area.

2.1. How does the flood management work in this area?

2.2. What is your function as a Local Disaster Expert in the flood management of the affected region?

2.3. In your view, do you believe your role is impacting sufficiently?

2.4. Do you feel there is a better way in which your role can effectively address the hazard??

Section D PROACTIVE RISK REDUCTION

3.1. How do you think the risk of flooding in this communities can be effectively reduced?

3.2. Whose responsibility will this be? (Probe: Community members themselves, or headmen, or the local authorities or perhaps any other agencies not mentioned here?)

3.3. The worldwide Disaster Risk Reduction are now advocating for nations to reduce the risk of disasters. How do you think the risk of floods can be proactively reduced in your communities?

3.4. Mention and discuss various ways/strategies in which the risk of floods in this area can be reduced? (The key role players, their respective responsibilities).

3.5. In your views, what will be your step by step approach that will really work in reducing the risk of floods in this area?

3.6. Is there anything else you would like to add to any of the issues we have discussed during the interview?

Thank you for your time and have a pleasant day!

Date _____ Place _____

Interview ended _____ hour's _____minutes

END

APPENDIX D: FINAL INSTRUMENTS

Focus group discussion – Interview Schedule

DEMOGRAPHIC INFORMATION (Gender and Age ONLY) (On gender, participants are free to express their choice of gender).

Note: The information you provide will be kept confidential. I will only look at correlations between demographic information and your views on flood risk issues. Information about individuals or households will not be released to anybody outside this study.

As we begin, I would like you to introduce yourselves, indicate your gender (If possible, *do not use your real name*), how old you are and for how long you have been living in this village. The interview then express the age range as follow: 18-24 years old, 25-34 years old, 35-44 years old, 45-54 years old, 55-64 years old & 65 + years old.

PersonA_____

PersonB_____

PersonC_____

PersonD_____

SECTION A - OVERVIEW OF THE *EFUNDJA*-EVENTS

1.1. Since you have been living here, how many times have you experienced the flooding event?
1.2. Which year was the worst flooding event?
1.3. In those years of the flooding, can you recall how did you respond to the flooding event?
1.4. Tell me more on how *Efundja* have taken place in the past?
1.5. How does it takes place now? (*Probe*: Step by step from its onset all the way through to the time the water subside).
1.6. What are the impacts of the flooding event in your community?

SECTION B - PREPARATORY ACTIVITIES

Now let's talk about your preparatory activities.

2.1. In the past, have you traditionally taken any measures to prepare your household and livestock for flooding event? (*Probe: When do you do this?)*

Yes _No

If yes, please describe what did you do and how?

2.2. Are these measures working in preparing your household and livestock for flooding event?

2.3. Has your community collectively taken any measure to prevent or reduce the risk of flooding event

(*After the discussion then the interviewer probe with the following)*

	Statement	Yes	No	Don't Know
1.	Raised the floor level	1	2	0
2.	Dig ditches and trenches around the house	1	2	0
3.	Plant trees in the yard or surrounding the house	1	2	0
4.	Placed valuable goods higher	1	2	0
5.	Collected emergency survival items or compiled a preparedness kit	1	2	0
6.	Made a plan what will you do if a flood is threatening	1	2	0
7.	Temporary relocation	1	2	0
8.	Did any other preventive measures, please explain in detail	1	2	0

2.4. Did you learn or read about any other way of preparing or responding to the flooding that you believe can be considered for your community?

2.5. Do you think you are now better prepared for possible flooding events as compared to the last flooding event?

Yes___No

What is the main reason for your answer?

2.6. During the times of *Efundja*, do you consider permanently relocating? (Do you think of permanently relocating?)

Yes __ No

If Yes where and why? If No, why not?

(If answer to 2.6. is No, *then Probe)* So you are satisfied with the living environment of your household? ____Yes ___No (Explain your answer).

SECTION C - *EFUNDJA* MANAGEMENT

3.1. When you think of flooding event affecting your households or the community at large, please evaluate the importance of the following actors [e.g Namibian Defence Force (NDF) to your ability to manage flooding].

	Very Important	Important	Not Important	Don't Know
Your Neighbors	1	2	3	0
Relative living in the same village	1	2	3	0
Friend living in the same village	1	2	3	0
Relative living a distance away	1	2	3	0
Friend living a distance away	1	2	3	0

Church	1	2	3	0
Headmen	1	2	3	0
Clinic	1	2	3	0
Local Councilor	1	2	3	0
Regional office	1	2	3	0
National government	1	2	3	0
Non-Governmental Organization	1	2	3	0
International donors e.g. Red Cross, USAID etc.	1	2	3	0

3.2. How do you think the key actors you mentioned above could help improve to *Efundja* management?

3.3 Any other suggestions on what would make *Efundja* management easier to you?

SECTION D - PROACTIVE APPROACHES

4.1. Have any of your relatives, friends, headmen or neighbors told you what they did to cope with flooding event? (Predict, adapt, prepare etc.)

___ Yes they have - If yes, could you describe clearly?

___ No they haven't

4.2. How can you use such knowledge to mitigate today's flooding event?

4.3. Are there some particular activities or behaviors /practices that were practiced in the past that are no longer practiced that can still influence the effects of flooding event? Explain in detail.

4.4. Do you think these practices can be re-introduced back into society? If yes - Explain how.

4.5. Which other ways or behaviors or practices you think can help mitigate or reduce the flooding event in this area?

4.6. The Worldwide Disaster Risk Reduction frameworks are now advocating for nations to reduce the risk of disasters before they happen. How do you think the impacts of *Efundja* can be reduced in your community before they happen?

4.7. Mention and discuss various ways and strategies in which the impacts of flooding event can be reduced in this community? (Discuss each step by using the flip chart to visualize the stages as discussed by the respondents).

4.8. Is there anything else you would like to add to any of the issues we have discussed during the meeting/interview?

Thank you for your time and have a pleasant day!

Date: _____

Place _____

Interview Duration:

END

Key Informant Interview (KII) – Traditional Authorities (Headmen)

DEMOGRAPHIC INFORMATION

Note: The information you provide will be kept confidential. I will only look at correlations between demographic information and your views on Efundja risk issues. Information about individuals or households will not be released to anybody outside this study.

Name of the Village.

Mention the name of your position and how long you have been working in this position.

_____

SECTION A HEAD MEN INVOLMENT IN *EFUNDJA*-EVENTS

1.1. In your leadership tenure, which year did you started experiencing flooding event in your village and how many times after that?.

1.2. As a headmen, how do you deal with the flooding event in your community? (*Probe*: What are the steps and some of the activities that you engage in until the problem is resolved?).

1.3. Apart from what you described above, what other roles do you play relating to your involvement in *Efundja* related issues?.

1.4. As the village leader, how do you prepare yourself to lead the village to respond to the flooding event?.

1.5. From a headmen perspective, how do you see the risk of flooding being reduced effectively and efficiently?.

1.6. Who do you see as the main key role players in the reduction of this risk?.

1.7. Apart from the main key role players (you mentioned above), who else do you think has a contribution to make in this?.

1.8. Do you think the community members themselves has potential to help in reduce the risk of this hazard?

1.9. Has your community collectively taken any measure to prevent or reduce the risk of *Efundja*?.

1.10. During the times of flooding event, do you consider permanently relocating? (Do you think of it) if Yes where and why?

1.11. (**If** answer to 10 is No, **then *Probe***) So you are satisfied with the living environment of your household? ____Yes ___No (Explain your answer).

SECTION B – PREPARATORY ACTIVITIES (FOR YOUR HOUSEHOLD)

Now let's talk about your preparatory activities.

2.1. In the past, have your people traditionally taken any measures to prepare their household and livestock or flooding event? (*Probe: When do you do this?).*

Yes _No.

If yes, please describe what they did and how?

2.2. Are these measures working in preparing the households and livestock of your people for flooding event?.

(*After the discussion then the interviewer probe with the following)*

	Statement	Yes	No	Don't Know
1.	Raised the floor level	1	2	0
2.	Dig ditches and trenches around the house	1	2	0
3.	Plant trees in the yard or surrounding the house	1	2	0
4.	Placed valuable goods higher	1	2	0
5.	Collected emergency survival items or compiled a preparedness kit	1	2	0
6.	Made a plan what will you do if *Efundja* is threatening	1	2	0
7.	Temporary relocation	1	2	0
8	Did any other preventive measures, please explain in detail	1	2	0

2.3. Did you learn or read about any other way of preparing or responding to the flooding that you believe can be considered for your community?

2.4. Do you think your community (people) are now better prepared for possible flooding events as compared to the last flooding event?.

Yes___No

What is the main reason for your answer?

SECTION C *EFUNDJA* MANAGEMENT

Now, let's talk about how *Efundja* are managed in this area.

3.1. How does the *Efundja* management work in this area?.

3.2. With regards to *Efundja* management, what is your function as a village headman?.

3.3. Do you also help in the areas outside your village or in any other parts of the affected region?.

3.4. In your view, do you believe your role as a headman has an impact in managing the flooding event?.

3.5. (***If** answer to **3.4 is negative**, then probe :)* Do you feel there is a better way in which your roles can effectively address the hazard?.

3.6. When you think of flooding events affecting your households or the community at large, please evaluate the importance of the following actors (e.g Namibian Defence Force (NDF) to your ability to manage flooding.

	Very Important	Important	Not Important	Don't Know
Your Neighbors	1	2	3	0
Relative living in the same village	1	2	3	0
Friend living in the same village	1	2	3	0
Relative living a distance away	1	2	3	0
Friend living a distance away	1	2	3	0
Church	1	2	3	0
Headmen	1	2	3	0
Clinic	1	2	3	0
Local Councilor	1	2	3	0
Regional office	1	2	3	0

National government	1	2	3	0
Non-Governmental Organization	1	2	3	0
International donors e.g. Red Cross, USAID etc.	1	2	3	0

3.7. How do you think the key actors you mentioned above could improve the *Efundja* management?.

3.8. Any other suggestions on what would make the *Efundja* management easier to you?.

SECTION D PROACTIVE RISK REDUCTION

4.1. How do you think the impacts of flooding in this communities can be effectively reduced?.

4.2. Whose responsibility will this be? (*If response unsatisfactory then probe*: Community members themselves, or headmen, or the local authorities or perhaps any other agencies not mentioned here).

4.3. Which other behaviors or practices do you think can help reduce the impacts of *Efundja* in this area?.

4.4. The Worldwide Disaster Risk Reduction frameworks are now advocating for nations to reduce the risk of disasters before they happen. How do you think the impacts of flooding event can be proactively reduced in your community?.

4.5. Mention and discuss various ways and strategies in which the impacts of flooding events in this area can be reduced? (Discuss each step by using the flip chart to visualize the stages as discussed by the respondents).

4.6. Is there anything else you would like to add to any of the issues we have discussed during the interview?.

Thank you for participating in our study. Be blessed!

Place _____

Date _____

Interview Duration:

END

Key Informant Interview (KII) – Local and national disaster risk management units

DEMOGRAPHIC INFORMATION

Note: The information you provide will be kept confidential. I will only look at correlations between demographic information and your views on Efundja risk issues. Information about individuals or households will not be released to anybody outside this study.

Name of the Institution you work for

_____

Please mention your position and how long you have been working in this position?

SECTION A OVERVIEW OF THE *EFUNDJA*-EVENTS

1.1. Ever since you have been working in this position, how many times did a flooding event occur in the Cuvelai basin?.

1.2. From your perspective, how do you see the risk of flooding in the Cuvelai being reduced effectively and efficiently?.

1.3. Do you think the community members themselves has potential to help reduce the risk of the hazard?

1.4. Who else do you think has a key role to play in this, (*Probe*: how?).

1.5. How do you see the affected communities collectively taking up measures to prevent or reduce the risk of *Efundja*?

1.6. In which ways do you suggest these communities can prevent or reduce the risk?

1.7. When you think of flooding event affecting households or the community at large, please evaluate the importance of the following actors [e.g Namibian Defence Force (NDF) to your ability to manage flooding].

	Very Important	Important	Not Important	Don't Know
Your Neighbors	1	2	3	0
Relative living in the same village	1	2	3	0
Friend living in the same village	1	2	3	0
Relative living a distance away	1	2	3	0
Friend living a distance away	1	2	3	0
Church	1	2	3	0
Headmen	1	2	3	0
Clinic	1	2	3	0
Local Councilor	1	2	3	0
Regional office	1	2	3	0
National government	1	2	3	0
Non-Governmental Organization	1	2	3	0
International donors e.g. Red Cross, USAID etc.	1	2	3	0

1.8. How do you think the key actors you mentioned above could help improve to *Efundja* management?

SECTION B *EFUNDJA* MANAGEMENT IN THE CUVELAI BASIN

Now, let's talk about *Efundja* management in the Cuvelai basin.

2.1. How does the *Efundja* management work in the *Efundja* affected area?

2.2. What is your role or function as a local disaster official in *Efundja* management of the affected region? (*Probe, what is the role of your institution*).

2.3. In your view, do you believe your or (institution) role is working in reducing the impacts of *Efundja* on the affected communities?

2.4. (***If*** *answer to 2.3 is negative, than* ***probe***) Do you feel there is a better way in which your (institution) role can effectively address the hazard?

SECTION D PROACTIVE RISK REDUCTION

3.1. How do you think the impacts of the flooding event in the affected communities can be effectively reduced?

3.2. Whose responsibility will this be? (*Probe: Community members themselves, or headmen, or the local authorities or perhaps any other agencies not mentioned here?*)

3.3. The Worldwide Disaster Risk Reduction frameworks are now advocating for nations to reduce the risk of disasters before they happen. How do you think the impacts of *Efundja* can be reduced before they happen?

3.4. Mention and discuss various ways and strategies in which the impacts of *Efundja* in the area can be reduced? (By identifying the key role players and their respective responsibilities).

3.5. In your views, what will be your step by step approach that will work in reducing the impacts of *Efundja* in this area?

3.6. Do you know of any national frameworks on disasters? If yes please discuss in detail.

3.7. (**If** answer to 3.6 is yes, then **probe**) Do you think these frameworks are working in reducing the impacts of *Efundja*?

(*If answer is No, then ask*) What do you think needs to be done in order to improve the effect of these frameworks?

3.8. Is there anything else you would like to add to any of the issues we have discussed during the interview?

Thank you for your time and have a pleasant day!

Date _____

Place _____

Interview Duration:

END

APPENDIX E: THE 2018 INITIAL PERMISSION LETTER FROM OMUSATI REGIONAL COUNCIL

REPUBLIC OF NAMIBIA

OMUSATI REGIONAL COUNCIL
OFFICE OF THE CHIEF REGIONAL OFFICER

Tel: (065) 251019
Fax: (065) 251078
REF: S.4/3/1
Enquiries: HN Mungandjela

P/ Bag 523
OUTAPI

01 November 2018

Ms. Victoria L Shaamhula
Head of Department: Military History & Military law
School of Military Science
University of Namibia
WINDHOEK

Dear Ms. Shaamhula

RE: PERMISSION TO CONDUCT DOCTORAL RESEARCH WORK

1. We acknowledge receipt of your letter dated 2nd October 2018 with regard to the above mentioned subject.

2. You are kindly requested to clearly indicate in writing the focused Constituencies in which you wish to conduct your research in order to enable the Regional Council to make proper coordination.

3. It is trusted that you will provide the required information at the earliest convenience.

Yours Sincerely,

.....
A P Andowa
CHIEF REGIONAL OFFICER

OMUSATI REGIONAL COUNCIL
Private Bag 523 Outapi
2018 -11- 01
No. 2
Tel: 065-251019
Fax: 065-251078

All official correspondences must be addressed to the Chief Regional Officer

APPENDIX F: OMUSATI REGIONAL PERMISSION LETTER (COPIED TO OTHER CONSTITUENCIES) 2019

REPUBLIC OF NAMIBIA

OMUSATI REGIONAL COUNCIL

OFFICE OF THE CHIEF REGIONAL OFFICER

Tel: +264 65 251019
Fax: +264 65 251078 / 088639090
E-mail: info@omusatirc.gov.na
Website: www.omusatirc.gov.na
Our Ref: 9/2/2
Enquiries: Jacobina T Aipanda

Erf 1080 Namaungu Street
Private Bag 523
OUTAPI

21 August 2019

Ms Loide V Shaamhula
Head of Department: Military Science
School of Military Science
Private Bag 13301
WINDHOEK

Dear Ms Shaamhula

PERMISSION TO CONDUCT DOCTORAL RESEARCH WORK

1. Your Letter dated 12 August 2019 regarding the above mentioned subject hereby refers.
2. Thus, it is pleasing to inform you that the Council has granted permission for you to go ahead with the Doctoral research work. However, you are advised to report yourself at the Constituency Offices before you embark the work in the Constituencies.
3. In addition, you are requested to provide a copy of your findings to the Regional Council.
4. We hope you will find all in order and wishing you all the best in your study.

Sincerely,

21/08/2019

Gervasius Kashindi
ACTING CHIEF REGIONAL OFFICER

OMUSATI REGIONAL COUNCIL
Private Bag 523 Outapi
2019 -08- 21
No. 4
Tel: 065-251019
Fax: 065-251078

Cc: Hon. Laurentius Iipinge, Regional Councillor: Okalongo Constituency
Hon. Werner Kalipi, Regional Councillor: Anamulenge Constituency
Hon. Elisa Johannes, Regional Councillor: Etayi Constituency
Hon. Modestus Amutse, Regional Councillor: Oshikuku Constituency
Hon. Wilhelm Iiyambo, Regional Councillor: Ogongo Constituency
Hon. Gerhard Shiimi, Regional Councillor: Elim Constituency
Hon. Junias Amunkete, Regional Councillor: Tsandi Constituency
Hon. Fillemon Shikwambi, Regional Councillor: Outapi Constituency

All official correspondences must be addressed to the Chief Regional Officer

APPENDIX G: PERMISSION LETTER FROM OUTAPI CONSTITUENCY COUNCIL

REPUBLIC OF NAMIMBIA

OMUSATI REGIONAL COUNCIL

OUTAPI CONSTITUENCY

Tel: (065) 251019
Fax (065)251692
E-mail outapiconst@gmail.com
Enquiries: Hon. F. Shikwambi

P/Bag 523
Outapi
30 October 2018

Subject: Doctoral Research

Permission is granted to Ms. Victoria Loide Shaamhula to conduct the Doctoral Research Work in Outapi Constituency as from March 2019, you are welcome.

Your Sincerely

Outapi Constituency Office
2018 -10- 31
Private Bag 523
Outapi
Omusati Region

Fillemon Shikwambi
Regional Councilor: Outapi Constituency

APPENDIX H: PERMISSION LETTER FROM OKATANA CONSTITUENCY COUNCIL

REPUBLIC OF NAMIBIA
OSHANA REGION
OKATANA CONSTITUENCY

Private Bag 5543
Oshakati,
Namibia

Tel: 065-225447
Fax: 065-224431

09th September 2019

TO WHOM IT MAY CONCERN

SUBJECT: PERMISSION TO CONDUCT DOCTORAL RESEARCH WORK IN OKATANA CONSTITUENCY, OSHANA REGION

This letter serves to inform you that permission is hereby granted to **Ms Loide Shaamhulu** from the **University of Namibia**, to carry out field study on the topic titled: A Proactive Disaster Risk Reduction framework for recurring floods in the Cuvelai Etosha Basin, Northern Namibia.

The Villages to be visited are as follows:

1. Omayanga village – Matilde Mwiila Growth Centre
2. Ombwelefuma village – Uukwangula Growth Centre
3. Onankwaya village – Okambuga Growth Centre

Against this background, the office of the Regional Councilor of Okatana Constituency is hereby requesting you to render her the assistance she may need.

Attached hereto, kindly please find the authorization letter from Oshana Regional Council.

Yours Faithfully

OKATANA CONSTITUENCY OFFICE
09 SEP 2019
P.O. BOX 11661

Hon. Rosalia Shilenga (MP)
Regional Councilor: Okatana Constituency

APPENDIX I: CONSENT FORM TO PARTICIPATE IN THE RESEARCH STUDY

UNIVERSITEIT•STELLENBOSCH•UNIVERSITY
jou kennisvennoot • your knowledge partner

STELLENBOSCH UNIVERSITY

CONSENT TO PARTICIPATE IN RESEARCH

Dear Sir/Maddam

My name is Loide Victoria Shaamhula and I am a researcher, I would like to invite you to participate in a research project entitled: *A Proactive Disaster Risk Reduction Framework for Recurring Efundja in the Rural Cuvelai Etosha Basin, Northern Namibia*.

Please take some time to read the information presented here, which will explain the details of this project and contact me if you require further explanation or clarification of any aspect of the study. Also, your participation is **entirely voluntary** and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you do agree to take part.

I would like to draw your attention to a few regarding the study:

- The study will be conducted in the Cuvelai Basin, which is a low lying floodplain area in northern Namibia. This study is strictly only conducted in rural villages of the Cuvelai basin.
- The study aims to understand how the rural communities of the Cuvelai-basin proactively prepare for the recurring *Efundja* in their region. The study will ask questions on what activities and strategies you undertake as a head of household and also a collective community to prepare yourself for *Efundja*.
- The procedure to be followed is as follow: Permission will be asked from the Village headmen and he informs his village of the intention of the study. The headmen then invite 6-9 head of households for a focus group discussion the following day at 10H00. The headmen will be interviewed separately as he is a key informant making up the KII, while 6-9 community members will be interviewed as a focus group.
- In this study, your responsibility will be to answer questions posed to you and hence you will not experience any harm or any sort of discomfort in any way whatsoever.
- In this study, there will be no personal individual benefits, however as a collectively community you will benefit once a collective solution is attained for this devastating recurring *Efundja*.
- You will not be paid for participating in this study. You will only be provided with a few refreshments such as water and cool drinks after the interview.

- The information collected during the interviews will strictly be used only for research purposes only. It will be analysed, evaluated examine to deduce meaning for the final report. Hence the information collected will not be shared with any other person for any reasons whatsoever.
- During the interviews, I would like to use a voice recorder to record all your responses, however I would not use the voice recorder without your consent. Kindly indicate so, if you are voting against the use of voice recorder.
- In this discussion, I will not ask your names and I will use code letters to identify each person. This is to ensure complete anonymity and your privacy.
- Lastly, I would like to remind you that your participation in this study is strictly voluntary, and you are welcome to withdraw from the discussion any time you wish to. Your withdrawal will not have any negative consequences or any harm to you.
- You are also welcome not to answer certain questions and still remain in the study.

If you have any questions or concerns about the research, please feel free to contact:

Ms. L. V. Shaamhula at +264 81 2068838 or Dr. (Cdr) HAP Smit at +267 22 702 3110

RIGHTS OF RESEARCH PARTICIPANTS: You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research participant, contact Ms Maléne Fouché [mfouche@sun.ac.za; 021 808 4622] at the Division for Research Development.

You have right to receive a copy of the Information and Consent form.

If you are willing to participate in this study please sign the attached Declaration of Consent and *(hand it to one of us or place it in the box available)*

DECLARATION BY PARTICIPANT

By signing below, I ……..……. agree to take part in a research study entitled: *A Proactive Disaster Risk Reduction Framework for Recurring Efundja in the Rural Cuvelai Etosha Basin, Northern Namibia*. **……** and conducted by (Ms. Loide Victoria Shaamhula)

I declare that:

- I have read the attached information leaflet and it is written in a language with which I am fluent and comfortable.
- I have had a chance to ask questions and all my questions have been adequately answered.
- I understand that taking part in this study is **voluntary** and I have not been pressurised to take part.
- I may choose to leave the study at any time and will not be penalised or prejudiced in any way.

- I may be asked to leave the study before it has finished, if the researcher feels it is in my best interests, or if I do not follow the study plan, as agreed to.
- All issues related to privacy and the confidentiality and use of the information I provide have been explained to my satisfaction.

Signed on

……...…….....

Signature of participant

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to _____ [*name of the participant] [H*e/she] was encouraged and given ample time to ask me any questions. This conversation was conducted in [*Oshiwambo*] and [*no translator was used*].

_____ _____

Signature of Investigator ***Date***

APPENDIX J: CODEBOOK FROM *ATLAS.TI*

Code	Code
Positive Collective community preventative/reduction measures	Difficulties mourning
Positive consideration of permanently relocating (and reasons)	Disaster Risk Reduction (DRR)
Positive Possible preparation measure (done by other communities)	Do nothing
Positive Preparation	DRM need to be prepared
Positive traditionally taken measures to prepare for *Efundja*	Early warning & Monitoring
Advice headmen	Economical
Allocate Plots	Encourage communities to be dependent and not wait for external help
Announce warnings and awareness in the radio	Encourage people to improve their way of building
Announce warnings in the radio platforms	Encourage residents to take caution
Appoint councillors from the same area where they will work	Encourage residents to work hard to have enough food
Authority Response_Act normal because they are used to *Efundja*	Encourage sustainability
Authority Response_Conduct needs assessments	Encourage unity among people
Authority Response_Decide to close down schools	Enhance Resilience (comm based intiatives)
Aauthority Response_Declare national state of emergency	Environmental Damage
Authority Response_Develop contigency plans	Equipments and resources needed to deal with the *Efundja* are scarce
Authority Response_Give warnings	Equipt councillors offices with emergency equipments
Authority Response_Monitor dam levels	Eroded streams
Authority Response_Organise and encourage reloaction camps	Find ways to encourage attendance
Authority Response_Weather bureau warns	*Efundja* Advantage
ARE YOU BETTER PREPARED NOW	*Efundja* water covers homes, farms and entire surface
Are you satisfied with present living condition	*Efundja* water fills the iishana to the bream
Arrange clearing off floodplains	*Efundja* water flows from Angola in Feb/March
ASS_ASSUMPTIONS	*Efundja* water flows with great pressure and fish
Ass_Country getting drier	*Efundja* water has dust on top
Ass_*Efundja* coming to an end	*Efundja* are liken to spiritual professies
Ass_Food aid relief is making people lazy	*Efundja* covers the western part of the Cuvelai
Ass_Risk seen as councillors campaigning angle	*Efundja* differs from year to year
Assess the effectiveness of the framework implementation	*Efundja* follows the patterns of low-lying Iishana
Assist those who are relocating	*Efundja* is enhanced by lack of bridges or dams

Assist those who came to ask	*Efundja* of the Cuvelai are man-made
Attitudes of Authorities at National level	*Efundja* water DO NOT follow any specific step-by-step approach
AUTHORITY RESPONSE TO *EFUNDJA*	Food relief distribution
Avoid settling in prone areas	Frequency of *Efundja*
Awareness training	Friends & Relatives also play a role
Being a backbone of the community	Fulfil every aspect of the policy
Biodiversity	Give awareness to comm members
Biodiversity: Emerging new bugs	Give warnings and precautions
Biodiversity: Emerging new vegetation types	Give water its way to flow
Biodiversity: Increase in bird types	Government
Biodiversity: Loss of Vegetation	Government is able to assist
Biodiversity: More snakes appearing	Halted Livelihood
Bridge construction	Headmen is first key person
Bridge constructions	Health Access Hampered
Business related	Health Deterioration
Carrying out meetings, and giving awareness	Heavy *Efundja* are not consecative
CDRMC monitors residents status	Heavy rain in Angola
CDRMC_Mobilize assistance	Heavy Rainfall in Namibia
Chair consituency DRMC	Host community meetings
Challenges faced by disaster experts	Host community meetings and give infor
Changing the attitudes of communities & leaders	Host meetings in communities
Choosing to be vulnerable	Household preparation of clearing water ways
Climate Change	Human Deaths
Collect grass and place inside rooms	Human Hazard
Combi_ *Efundja* and storm water	I do not respond in any way every resident know what to do
Communicate with regional coordinator	I do very little as a way of response
Communication channel	Ignoring *Efundja* preparedness aspect
Communities to use weather data as preparation tool	IMPACTS
Comparison of *Efundja*	Impacts_Household level
Compensation	Impacts_Movement/Trasportation related
Conduct_Vulnerability Assessmenet	Impacts_Schools
Conflicts in homes	Impacts_society
Connect the hazard to science	Inappropriate land surveying
Constituency_DRMC	Increased responsibilities
Construct *Efundja* houses just for this purpose	Justification for choosing few interviews in Oshikoto
Consult with village people	Lack of understanding
Consult experts in risk reduction	Learn to co-exist
Consult the councillor	Length of stay
Consultations	Less surface infiltration
Consulting and benchmarking	Let DDRM employ relevant qualified personnel

Contact point between villages & central government	Let Donors donate Mahangu for this purpose
Contact the councillor	Let not New Developments enhance new risks
Contributing Factors to *Efundja*	Let stakeholders give speedy response
Coordinate *Efundja* related incidents	Liasing with the councillor
Coping Capacity Decreases	Limited Mobility (Limited Access to Services Providers)
Councillor key role player	Livelihood_Affected
Councillors not active	Livestock relocation
Councillors should be monitored and assessed	Livestock_Deaths
Create awareness	Livestock_Diseases suspectability
Create awareness on the significance	Look out for those who are struggling and assist
Create green scheem to enhance food security	Low-lying Terrain
Criminal activities	Major difference between recent & past *Efundja*
Cry for help	Major *Efundja* people relocate
Cultural beliefs/Traditions	Major *Efundja* affects a lot of people
Cultural differences	Major *Efundja*are not frequent
Cuvelai is a floodplain	Major *Efundja* prohibits movements in homes
Dam Construction	Major *Efundja* washes away crops
Damage to Sanitation services	Major *Efundja* water only dry up by september
Deepens the Iishanas	Major *Efundja* water will be found by the next rainy season
Major *Efundja*_Fish everywhere	Major *Efundja*_exarbated by construction of bridges
Major *Efundja*_Rainer years	Recent *Efundja* impacts more on human life than vegetation
Major *Efundja*_water in our homes, farms & properties	Redirect water back to Iishanas using trenches
Mantain emergencies budget	Reduced grazing land
Master plan on water bodies management in Namibia	Reduced Harvest
Medical facilities	Relocation
MET office give warning on possible *Efundja*	Remind the responsibilities
Minor *Efundja* do not affect a lot of people	Rep_Seek grazing land in far places
Minor *Efundja* water remain in the Iishanas	Residents reports via cellphones
Misconceptions	Resp_Adapt to changing envrionment
Mis-use of Equipments	Resp_Carry learners on our backs to get them to school
MM_Arrange with business people for transportation	Resp_caution children not to play with water
MM_Buy groceries in bulk	Resp_Collect heaps of sand
MM_Change Mahangu storage facility type	Resp_Cook on top containers
MM_Change material used for construction	Resp_Delay harvest season
MM_Community saving projects (Money or Mahangu)	Resp_Dig trenches
MM_Digg trenches paving the water away	Resp_Do nothing cos we dont know what to do

MM_Educate and create awareness	Resp_Elevate our rooms for the follwing year
MM_Lifting valuable goods higher	Resp_Elevate our silos
MM_Offer Mahangu Grain	Resp_Help neighbours relocate
MM_Okupalela the rooms or homes	Resp_Move our elderly to relatives whose houses are safe
MM_Prepare meals on top of containers	Resp_Move vehicles upland
MM_Pump water out of homes using a small machine	Resp_No fixed response_everything is done adhoc
MM_Reconstruct/Renovate roads	Resp_Okupalela
MM_Stock up emergencieis equipments	Resp_Open farms to pedestrians
MM_Taking learners to friends & family out of flooding zone	Resp_Permanently relocate
MM_Temporary Relocation	Resp_place landmarks in the river
MM_Travel in groups	Resp_Place our valuable goods higher
Monitor & Assess the communities	Resp_Pump water out
Monitor the status of residents	Resp_Recomm learners to camp
Monitor the status of the residents	Resp_Recomm to close schools
Move away from reaction to proactive	Resp_Relocate livestock to higher grounds
Move Learners to friends and families out of flood zone	Resp_Relocate livestock to relatives
Multi-Sectorial	Resp_Relocate within own farm
Nation known for good policies but lacks at implementation	Resp_Relocation camps
National DRR frameworks (Are you aware of any)	Resp_Remain home
Needs Improvements	Resp_Renovate our homes
Neglecting Recovery Process	Resp_report to councillor
No	Resp_Report to headmen
No actual *Efundja* management strategy	Resp_Sell some of our livestock
No definsed way of preparation	Resp_Take learners to relatives who are closer to schools
No means of preparation	Resp_Travel in groups
Not sure how it can be improved	Resp_Use common sense and Logic
Not sure where we are going wrong	Risk Assessments
Nothing has changed	Road Construction
Offer counselling services to relocated and affected people	Roads Construction
Offer feedback to communities	Roads Damage
Offer Gas stoves	Role_DDRM_Collaboration with Agriculture
Offer Psychological services to the affected people	Role_DDRM_Coordinate
Offer solutions to community problems	Role_DDRM_Create awareness
Offered food relief aid	Role_DDRM_Early warning, Forecasting and Monitoring
Organise residents to fix the roads	Role_DDRM_Risk Assessements
Past *Efundja* only flow in Iishana	Room for improvement (not sure what needs to be improved)

Past *Efundja* water is still unlike recent *Efundja* with high pressure	Same difference
Past *Efundja* comes later in the year	Seen as an emergency at all times
Past *Efundja* had enormous water	shifted rainfall season
Past *Efundja* killed most of biodiversity	Social Distancing
Past *Efundja* represented good years	soil erosion
Past *Efundja* were normal and less distractive	Spin off effect
Past *Efundja* were not diverse	Statistics of impacts
Past *Efundja* were too distractive	Strategy to reduce the impacts of *Efundja*
Permanent Relocation	Take all the village problems upon my sholders
Place heaps of sand on the sides of communities	Teach communities how to handle *Efundja*
Policies	Teach communities various preparation options available
Poten_NO	Teach people to swim
Poten_YES	Transference of knowledge
Poverty Enhancement/Vulnerability	Transport them at a minimal fee
Preparation measures	Transportation mechanism to permit movements
Prepare household rooms & silos	Unknown code
Prepare my own vehicle	Unpredictable rainfall partners
Prevention needs to be added	Use humus to decrease surface run-offs
Procurement comes after Vulnerability Assessment	Various Stakeholders
Property Damage	-ve Collective community preventative/reduction measures
Psychological	-ve consideration of permanently relocating (and reasons)
Purposively settling in floodplains	-ve possible preparation measure (done by other communties)
Rec_Clean the floodplains	-ve Preparation
Rec_improve community consultation for future developments	-ve traditionally taken measures to prepare for *Efundja*
Rec_improve headmen preparation measure	Village emergency staple food fund
Rec_need for comm_capacity building	Village headship
Rec_Need to shift from reactive to proactive	Warning systems
Receive reports about *Efundja* issues in the villages	We are even worse off
Recent Developments	We are too dependent on government
Recent developments of Roads & Bridges has helped us a lot	We become more aware & conscious
Recent *Efundja* water is dirty	We have experienced it before
Recent *Efundja* water is enormous	We have taken measures to prepare ourselves
Recent *Efundja* (too dangerous) makes the ground salty	work hard to have enough food for difficult times
Recent *Efundja* are man-made	Work harder and have enough food to share with those who may need
Recent *Efundja* are more distractive	worst *Efundja* year

Recent *Efundja* are reliefing a little	
Recent *Efundja* cause displacement	
Recent *Efundja* comes too early in the year	

APPENDIX K: STELLENBOSCH UNIVERSITY ETHICS COMMITTEE FINAL APPROVAL

UNIVERSITEIT
STELLENBOSCH
UNIVERSITY

NOTICE OF APPROVAL

REC: Social, Behavioural and Education Research (SBER) - Initial Application Form

7 May 2020

Project number: 10414

Project Title: A Proactive Disaster Risk Reduction Framework for Recurring Floods in the Rural Cuvelai Etosha Basin, Northern Namibia.

Dear Miss Victoria Shaamhula
Co-investigators:

Your REC: Social, Behavioural and Education Research (SBER) - Initial Application Form submitted on 6 May 2020 was reviewed and approved by the REC: Social, Behavioural and Education Research (REC: SBE).

Please note below expiration date of this approved submission:

Ethics approval period:

Protocol approval date (Humanities)	Protocol expiration date (Humanities)
7 May 2020	6 May 2023

GENERAL COMMENTS:

1) There is currently a **postponement of all research activities at Stellenbosch University,** apart from research that can be conducted remotely/online and requires no human contact, and research in those areas specifically acknowledged as essential services by the South African government under the presidential regulations related to COVID-19 (e.g. clinical studies).

2) Remote (desktop-based/online) research activities, online analyses of existing data, and the writing up of research results are strongly encouraged in all SU research environments.

Please take note of the General Investigator Responsibilities attached to this letter. You may commence with your research after complying fully with these guidelines.

Document Type	File Name	Date	Version
Investigator CV (PI)	Shaamhula_Short CV template_REC application	27/05/2019	1
Data collection tool	Key Informant Interview_Disaster Expert_Feedback_v2	27/05/2019	1

Data collection tool	Key Informant Interview_Traditional Authority_Feedback_v2	27/05/2019	1
Proof of permission	Response_Outapi_Permission Letter	28/05/2019	1

If the researcher deviates in any way from the proposal approved by the REC: SBE, the researcher must notify the REC of these changes.

Please use your SU project number (10414) on any documents or correspondence with the REC concerning your project.

Please note that the REC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

FOR CONTINUATION OF PROJECTS AFTER REC APPROVAL PERIOD

You are required to submit a progress report to the REC: SBE before the approval period has expired if a continuation of ethics approval is required. The Committee will then consider the continuation of the project for a further year (if necessary).

Once you have completed your research, you are required to submit a final report to the REC: SBE for review.

Included Documents:

Proof of permission	Permission Letter_Response_Omusati_Response2	28/05/2019	1
Research Protocol/Proposal	Proposal_Loide_Ethical_FINAL_II_2020	17/02/2020	2
Informed Consent Form	Consent template_Disaster_Expert_2020	17/02/2020	2
Informed Consent Form	Consent template_Headmen_2020	17/02/2020	2
Budget	Proposal_Loide_Ethical_FINAL_II_28022020	28/02/2020	3
Informed Consent Form	Consent_Community_Members_Oshiwambo_27022020	28/02/2020	3
Data collection tool	Final FGD_Instruments_12Aug19_CLEAN	28/02/2020	3
Default	2020 Shaamhula DESC review report	28/02/2020	1
Default	Feedback ethics application-Ref MIL-2019-10414_Shaamhula	05/05/2020	

If you have any questions or need further help, please contact the REC office at cgraham@sun.ac.za.

Sincerely,

Clarissa Graham

REC Coordinator: Research Ethics Committee: Social, Behavioral and Education Research

National Health Research Ethics Committee (NHREC) registration number: REC-050411-032.

The Research Ethics Committee: Social, Behavioural and Education Research complies with the SA National Health Act No.61 2003 as it pertains to health research. In addition, this committee abides by the ethical norms and principles for research established by the Declaration of Helsinki (2013) and the Department of Health Guidelines for Ethical Research: Principles Structures and Processes (2nd Ed.) 2015. Annually a number of projects may be selected randomly for an external audit.

Principal Investigator Responsibilities

Protection of Human Research Participants

As soon as Research Ethics Committee approval is confirmed by the REC, the principal investigator (PI) is responsible for the following:

Conducting the Research: The PI is responsible for making sure that the research is conducted according to the REC-approved research protocol. The PI is jointly responsible for the conduct of co-investigators and any research staff involved with this research. The PI must ensure that the research is conducted according to the recognised standards of their research field/discipline and according to the principles and standards of ethical research and responsible research conduct.

Participant Enrolment: The PI may not recruit or enrol participants unless the protocol for recruitment is approved by the REC. Recruitment and data collection activities must cease after the expiration date of REC approval. All recruitment materials must be approved by the REC prior to their use.

Informed Consent: The PI is responsible for obtaining and documenting affirmative informed consent using **only** the REC-approved consent documents/process, and for ensuring that no participants are involved in research prior to obtaining their affirmative informed consent. The PI must give all participants copies of the signed informed consent documents, where required. The PI must keep the originals in a secured, REC-approved location for at least five (5) years after the research is complete.

Continuing Review: The REC must review and approve all REC-approved research proposals at intervals appropriate to the degree of risk but not less than once per year. There is **no grace period.** Prior to the date on which the REC approval of the research expires, **it is the PI's responsibility to submit the progress report in a timely fashion to ensure a lapse in REC approval does not occur.** Once REC approval of your research lapses, all research activities must cease, and contact must be made with the REC immediately.

Amendments and Changes: Any planned changes to any aspect of the research (such as research design, procedures, participant population, informed consent document, instruments, surveys or recruiting material, etc.), must be submitted to the REC for review and approval before implementation. Amendments may not be initiated without first obtaining written REC approval. The

only exception is when it is necessary to eliminate apparent immediate hazards to participants and the REC should be immediately informed of this necessity.

Adverse or Unanticipated Events: Any serious adverse events, participant complaints, and all unanticipated problems that involve risks to participants or others, as well as any research-related injuries, occurring at this institution or at other performance sites must be reported to the REC within **five (5) days** of discovery of the incident. The PI must also report any instances of serious or continuing problems, or non-compliance with the RECs requirements for protecting human research participants.

Research Record Keeping: The PI must keep the following research-related records, at a minimum, in a secure location for a minimum of five years: the REC approved research proposal and all amendments; all informed consent documents; recruiting materials; continuing review reports; adverse or unanticipated events; and all correspondence and approvals from the REC.

Provision of Counselling or emergency support: When a dedicated counsellor or a psychologist provides support to a participant without prior REC review and approval, to the extent permitted by law, such activities will not be recognised as research nor the data used in support of research. Such cases should be indicated in the progress report or final report.

Final reports: When the research is completed (no further participant enrolment, interactions or interventions), the PI must submit a Final Report to the REC to close the study.

On-Site Evaluations, Inspections, or Audits: If the researcher is notified that the research will be reviewed or audited by the sponsor or any other external agency or any internal group, the PI must inform the REC immediately of the impending audit/evaluation.