The Idiom of Development versus Disasters at Play in Zimbabwe:

Reflections on the 2014/15 Tokwe-Mukosi Flooding Disaster

TSUNGAI MUKWASHI

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ISBN 978-1-77934-217-1
EAN 9781779342171

Published by the Zimbabwe Ezekiel Guti University (ZEGU) Press
Stand No. 1901 Barrassie Rd,
Off Shamva Road
P.O. Box 350
Bindura, Zimbabwe

SUBSCRIPTION AND RATES
Zimbabwe Ezekiel Guti University Press Office
Stand No. 1901 Barrassie Rd,
Off Shamva Road
P.O. Box 350
Bindura, Zimbabwe
Telephone: ++263 8 677 006 136 | +263 779 279 912
E-mail: zegupress@zegu.ac.zw
http://www.zegu.ac.zw/press

Dedication and Acknowledgements

To the resilient communities of Tokwe-Mukosi, whose perseverance and courage in the face of adversity serves as a reminder of the strength of the human spirit. To the Chingwizi community whose lives changed in 'the blink of an eye" but nevertheless demonstrated their capacity for compassion and hospitality. May your circumstances improve and may your knowledge and insights help us in our efforts to build a brighter future, for you, our offspring, and ourselves. This book is dedicated to all those affected by the 2014/15 flooding disaster and to the tireless efforts of those who continue to advocate for sustainable development in the wake of catastrophe. May your stories inspire future generations to find balance between progress and protection.

I would like to express my deepest gratitude to Professor Innocent Chirisa for his invaluable guidance and supervision throughout the development of this book. His insightful feedback, unwavering support, and dedication to my growth as a scholar and researcher have been indispensable to this project.

To my beloved husband, Ren, your steadfast support, love, and encouragement have sustained me through every challenge. Thank you for believing in me and for being my rock during this journey. This book would not have been possible without you.

Book Synopsis

This book examines the intersection of development projects and disaster vulnerability through the lens of the 2014/15 Tokwe-Mukosi flooding disaster in Zimbabwe. Set against the backdrop of a large-scale dam construction project, the book critically analyses how development initiatives, while intended to promote economic growth and modernization, can also increase risks for communities when disaster preparedness and planning are inadequate.

The Tokwe-Mukosi Dam, a key infrastructure project in Zimbabwe, was intended to enhance water storage, improve irrigation for agriculture, and contribute to regional development. However, in early 2014, heavy rains overwhelmed the dam's capacity, leading to its partial collapse and severe flooding downstream. The resulting disaster displaced thousands of people destroyed homes and livelihoods and revealed the systemic weaknesses in Zimbabwe's disaster preparedness and response mechanisms.

The book brings out four themes, development versus disaster, impact of disasters on vulnerable communities, government and authority preparedness, and lessons for future development projects. It explores the conflict between development goals and disaster risk management arguing that poorly planned development projects, especially those involving large-scale infrastructure like dams, can exacerbate the vulnerability of already fragile communities if disaster risks are not properly assessed and mitigated. Through case study and testimonies from affected individuals, the book illustrates the profound social, economic, and psychological impacts of the flooding on local communities. It highlights the long-term consequences of displacement, loss of livelihoods, and inadequate resettlement efforts.

The book critically assesses the Zimbabwe government's preparedness and response to the disaster. It discusses the failures in early warning

systems, emergency response, and coordination among various stakeholders. Reflecting on the disaster, the book offers lessons for future development planning, emphasizing the need for a holistic approach that integrates disaster risk reduction into the design and implementation of major projects. It advocates for better infrastructure maintenance, community involvement, and stronger governance frameworks to prevent similar tragedies.

The book provides a nuanced reflection on the 2014/15 Tokwe-Mukosi flooding disaster, drawing attention to the delicate balance between pursuing development and ensuring the safety and well-being of communities. It calls for a more integrated and inclusive approach to development, where disaster risk is a key consideration in policy and planning decisions. The book ultimately serves as a case study in the importance of sustainable development that prioritizes human security alongside economic progress.

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List of Abbreviations

AUD	Australian Dollars
BBC	British Broadcasting Corporation
CARE	Cooperative for Assistance and Relief Everywhere
CPU	Civil Protection Unit
DA	District Administrator
DFID	Department for International Development
DRR	Disaster Risk Reduction
DSD	Department of Social Development
ECHO	European Civil Protection and Humanitarian Aid Operations
EIA	Environmental Impact Assessment
FAO	Food and Agriculture Organization
FEMA	Federal Emergency Management Agency
FGD	Focus Group Discussion
FPL	Food Poverty Datum Line
FRA	Fund-Raising Act
GIS	Geographic Information system
GMB	Grain Marketing Board
HDI	Human Development Index
HFA	Hyogo Framework for Action
IDBZ	International Development Bank of Zimbabwe
IDP	Integrated Development Planning
IDP	Integrated Development Plans
IFRC	International Federation of Red Cross and Red Crescent
IOL	Independent Online
IRIN	Integrated Regional Information Network
IRMSA	Institute of Risk Management South Africa
IRMSA	Institute of Risk Management South Africa
KPA	Key Performance Areas
MDMC	Municipal Disaster Management Centres

MW	Mega Watt
NDMC	National Disaster Management Centre
NDMF	National Disaster Management Framework
NGO	Non-Governmental Organisation
NSGIC	National State Geographic Information Systems
NSGIC	National State Geographic Information Systems
OCHA	Office for the Coordination of Humanitarian Affairs
OXFAM	Oxford Committee for Famine Relief
PAR model	Pressure and Release model
PMDC	Provincial Disaster Management Centres
PSIP	Public Sector Investment Programme
RDC	Rural District Council
RDP	Reconstruction and Development Programme
SADC	Southern African Development Community
SF	Sendai Framework
SPSS	Statistical Products and Services Solutions
UNCT	United Nations Country Team
UNDP	United National Development Programme
UNEP	United Nation Environment Programme
UNGS	United States Geological Survey
UN-HC	United Nations High Commissioner
UNICEF	United Nations International Children's Fund
UNISDR	United Nations International Strategy for Disaster Risk Reduction
US$	United States Dollar
USA	United States of America
USAID	United States Agency for International Development
VOA	Voice of America
WASH	Water, Sanitation and Hygiene
WFP	World Food Program
ZINWA	Zimbabwe National Water Authority

Definition of Key Terms

Coping capacity: Strategies or resources that a community has ranging from the environment itself to institutional capacities that are available in the community, to assist in dealing with the impact of a hazard.

Disaster management: The planning, actions taken, organisation and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies. This involves and includes prevention, preparedness, response and recovery to avoid risk and lessen the impact of disasters.

Disaster: Any event (happening with or without warning), natural or human made, causing or threatening death, injury or disease, damage to property, infrastructure or the environment, which exceeds the ability of the affected society to cope using only its own resources.

Floods: An overflow of a large amount of water beyond its normal limits, especially over what is normally dry land.

Hazards: Threats to life, well-being, material goods and the environment. Hazards may be caused by extreme natural processes or technology. When the impact of a hazard results in great suffering or collapse of a community in a way, in which that community cannot cope, it is then termed a disaster.

Resilience: The process of adapting well in the face of adversity, trauma, tragedy, threats or significant sources of stress such as the impact of a hazard.

Risk: The expected damage or loss caused by any hazard. Risk may depend on the type of hazard that exists within a particular area, severity and frequency of the hazard, vulnerability of communities

that are exposed to the hazard as well as the coping capacity of the exposed community.

Vulnerability: The degree to which an individual, family, community or region is at risk of experiencing misfortune following extreme events such as floods, earthquakes, tsunamis or any other extreme event.

Chapter One: Development and Disaster Nexus

Development and disaster frequently share a nuanced and complex relationship. Although development aims to improve living standards, stimulate economic growth, and promote societal well-being, the pursuit of these objectives can unintentionally heighten vulnerability to disasters. The over-exploitation of natural resources, environmental degradation, and inadequate infrastructure can elevate risk exposure, despite their intended purpose of promoting human prosperity. This chapter examines the paradox in which development, in this case dam construction, can worsen or instigate disaster risks rather than alleviate them. On the other hand, disasters, despite their destructive nature, frequently generate opportunities for rethinking developmental objectives and policies, potentially resulting in more resilient and sustainable futures. This chapter explores the complex interplay between development and disaster while looking int the Tokwe-Mukosi flood disaster, examples of flooding disasters and theoretical insights, analysing their relationship. This chapter seeks to emphasise the significance of proactive, inclusive strategies that harmonise growth with resilience, ensuring that development initiatives mitigate, rather than exacerbate, disaster risks for at-risk communities.

The endeavour to foster development often coincides with the challenge of disasters, leading to a complex paradox. Infrastructure development projects, such as the construction of roads and dams bring about spatial changes that have an impact on people's lives. Large-scale infrastructure construction projects implemented to stimulate development have in certain instances resulted in casualties, negative changes to people's livelihoods, and setbacks to the local economy. The United Nations in 2015 agreed upon Sustainable

Development Goals that are meant to enhance livelihoods (United Nations, 2024) suggesting that sustainable development must be viewed as a pathway to combat poverty and inequality and promote social justice. However, if development is not sustainable and properly planned, it may encounter challenges in effectively addressing these issues.

Development is essential as it contributes to the overall progress and well-being of societies, but while essential for progress, it sometimes triggers or adds to disasters when not properly managed. While floods are typically perceived as natural occurrences, development and various other factors, such as deforestation, poor farming practices, dam construction, urbanisation, and other human activities can be regarded as factors that contribute to the frequency and severity of floods. Globally, floods have resulted in many fatalities, devastated livelihoods, displaced individuals from their living spaces, and caused significant economic setbacks (Merz et al., 2021). Because of the negative impacts of these floods both physical and non-physical measures have been implemented to reduce their impacts. Structural mitigation measures encompass the erection of dams, dykes, levees, and other man-made structures that can aid in reducing the risk of flooding, while non-structural measures include various strategies, such as spatial planning, legislation, early warnings, zoning, with Heidari (2009) asserting that detention dams and flood diversion represent the most effective flood mitigation strategies, while also reinforcing the flood control objectives of upstream multipurpose reservoirs.

Discussions on topics like 'development versus disasters' indicate that individuals are examining and contemplating the delicate balance between development activities and the potential hazards they may bring. During the 1950s and 1960s, substantial hydropower initiatives, including the Kariba, Akosombo, and Inga dams, were intended to

rapidly modernise impoverished African nations. Consequently, numerous indigenous communities continued to lack electricity. Due to public pressure, the World Bank and other financiers basically stopped funding large dams in the mid-1990s (Bosshard, 2013). With no funding, the African Development Bank highlighted that little has been done in water security for Africa (Bank, 2023), emphasising the urgent requirement for dam construction as a means of development. Due to the rising expenses associated with constructing new water infrastructure and the increased costs of operating and maintaining existing infrastructure, securing funding for necessary investments in the sector has become challenging. There is a need for the construction of dams for water provision, however, the available funds are limited. This could result in projects that are inadequately funded and poorly organised. This can have devastating impacts on communities when such projects end up causing more harm than good. To address the conflict between development and the harmful effects it may have on communities, a comprehensive approach is necessary. This approach should aim to strike a balance between economic goals, and sustainability. By recognising the distinct challenges faced by communities potentially impacted by planned developments and employing well thought out and customised strategies in disaster prevention, management, and mitigation, it is possible to achieve a harmonious equilibrium between economic progress and sustainable development.

Development is a must, due to its significant role in advancing and enhancing the overall progress and well-being of societies. It allows access to services such as education, healthcare, potable water, housing, stimulates economic expansion through job creation and innovation (iMFdirect, 2016). This then helps in tackling societal issues such as poverty and inequality, allowing marginalised groups access to resources and opportunities to enhance their economic circumstances. Sustainable development combines economic

advancement with environmental conservation, safeguarding ecosystems and resources for future generations while at the same time 'fighting' climate change. The explosive escalation of human economic development has severely impacted the environment and the planet's natural resources. The involvement in social action to rectify this situation has been severely limited (Korten, 1998). Recent studies have drawn attention to the influence of the human element on sustainable development and resource conservation. As emphasis on social responsibility and sustainable performance intensifies, organisations have established objectives beyond mere financial profit, including commitments to social and environmental outcomes (Chams and García-Blandón, 2019). Effective sustainable development can bolster a community's ability to withstand disasters by enhancing infrastructure, early warning systems, and disaster preparedness, thereby decreasing susceptibility to natural hazards. With development, the capabilities of communities are increased as they become equipped with necessary knowledge, resources, and opportunities to make well-informed decisions regarding their future.

Recognising the benefits of development, the idea to boost the economy of Masvingo Province by increasing agricultural production, particularly in the sugar cane sector, is highly commendable. The Zimbabwean government initiated a project to construct the Tokwe-Mukosi Dam (ZINWA, 2015). Planning for the construction of the Dam was initiated as early as 1955 (Mazara, 2015). The construction of the dam then faced numerous obstacles, beginning with economic difficulties caused by the Rhodesian unilateral declaration of independence in the 1960s, followed by the liberation war in the 1970s. Post-independence, developmental priorities in the 1980s and the high construction costs resulting from the depreciation of the Zimbabwean dollar against major currencies in 1998 further delayed the commencement of the dam's construction until 2011 (Gumindoga, 2014).

Development, although crucial for advancement, can occasionally provoke or intensify disasters if not adequately controlled. The Tokwe-Mukosi catchment area experienced an unexpected and unusually high amount of heavy rainfall between January and March 2014. Before the flood, Matonho (2014) reported that approximately 20,000 people residing upstream and around 40,000 people residing downstream the Tokwe (Tugwi) River were in danger of flooding caused by water levels that had reached hazardous levels. This event then happened. The continual torrential downpours caused a rise in the reservoir water level, putting strain on the dam wall. The sluice gates could not be opened due to the ongoing construction of the dam. A breach occurred in the dam, resulting in the discharge of a significant amount of water downstream. Upstream, floods occurred because of the increasing water levels in the reservoir, while the floods downstream, were caused by the dam wall being breached, impacting numerous households, with families losing crops, livestock, homes, and livelihood (Mudzingwa,2015). Both national and local governments sought resources to relocate flood victims from affected areas after, rather than before the flood (Matonho,2014), which was not very effective suggesting that being prepared for a disaster is more effective than responding to it. This absence of readiness and inadequate ability to handle the flood resulted in numerous households experiencing losses from which they have been unable to or have yet to recover.

Cutter *et al.* (2003) link vulnerability to development. They consider the built environment in which communities are living in as a contributing factor to vulnerability, with Zahran et al. (2008) maintaining that the built environment and especially dams are hazards themselves. This suggests that the need for improving the social standing of a community through development can in some instances increase the vulnerability of the very same communities that governments, NGOs and other stakeholders may be trying to improve. There was a need to

improve the semi-arid area of Chivi as irrigation would begin after the construction of the inland Tokwe-Mukosi Dam but was development through the construction of the dam prioritised over the increase of the vulnerability of the Tokwe-Mukosi villagers?

The Tokwe-Mukosi Dam is situated at the point where the Tokwe (Tugwi) and Mukosi Rivers meet. This is in Chivi District, Masvingo Province, Zimbabwe. The dam is located 75 kilometres to the south (Figure 6-1).

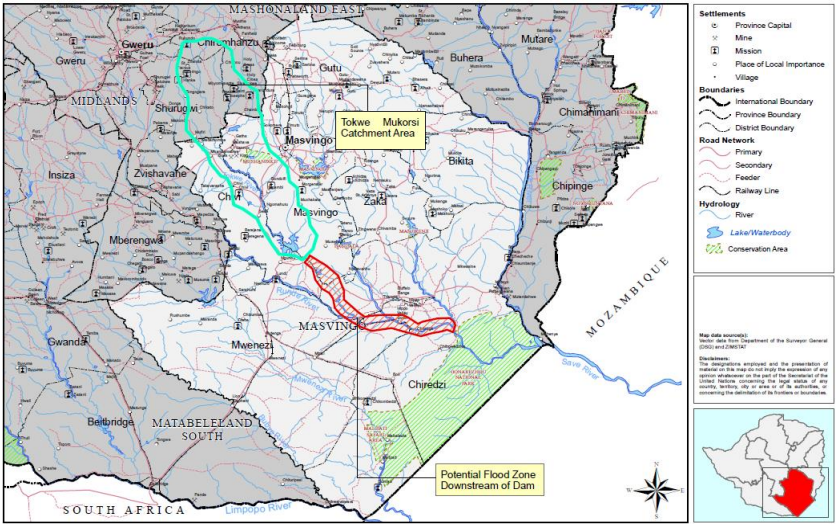

Figure 6-1: Masvingo Province Map – Showing Tokwe-Mukosi Dam Catchment and Flood Risk Area Source: http://reliefweb.int/map/

Zimbabwe is categorised into five distinct agro-ecological regions, which are determined by factors such as rainfall patterns, soil characteristics, and the types of vegetation that are most common in each region. Tokwe-Mukosi Dam is in region 5, encompassing low-lying areas below an elevation of 900 meters above sea level. Rainfall in this area is unpredictable and scarce. Region 5 receives less

than 500mm of rainfall per year (Mugandami *et al.*, 2012). Chivi District typically experiences an annual average rainfall of approximately 400mm (Chikodzi *et al.*, 2014) but between February and March 2014, the region experienced rainfall that exceeded the average amount, reaching up to 850mm (Gumindoga, 2014), that contributed to the increase in the water dam levels. The Tokwe-Mukosi flood had a significant impact on numerous individuals in an area where meteorological drought, rather than floods, is the most encountered natural hazard (Chineka, 2016).

The Zimbabwean government advocated for the Tokwe-Mukosi Dam as a water source for the region, that has the potential to stimulate economic activities and generate hydroelectric power. The primary objective of the dam is to facilitate the irrigation of approximately 25,000 hectares of land in the Lowveld region, specifically for the cultivation of sugar cane. ZINWA (2015) contends that approximately 50% of the accessible water was acquired by current commercial estates to expand sugar cane and citrus cultivation. The remaining 50% was allocated to new projects in communal and resettled areas. ZINWA plans to install a hydro-electric power generating plant with a capacity of 15MW on the dam. According to Gumindoga (2014), the idea to construct the dam which holds 8 million cubic meters of water, was to provide irrigation for more than 20,000 hectares of land, and supply water to Masvingo town.

The plan of constructing the Tokwe-Mukosi Dam was initially discussed in 1955, but actual construction did not commence until 1998. An Italian company, Salini Impregilo, was awarded the project construction tender. The construction project lasted approximately one year before it came to a halt due to insufficient financial resources. From 1998 to 2011, the project experienced a "stop-start process" as described by ZINWA (2015), where construction occurred only when there was funding and stopped when there was none. Salini Impregilo (2016) reported that construction began in May 2011 and was

scheduled to finish in November 2013. The commencement of impoundment was scheduled for November 2013, with the initial provision of irrigation water planned for 2014. Due to additional excavations on the foundations and financial constraints, the project was delayed and Salini Impregilo was given an extension to finish the project by August 2014. Figure 6-2 displays the chronological sequence of events related to the construction of the Tokwe-Mukosi Dam leading up to the flood in 2014.

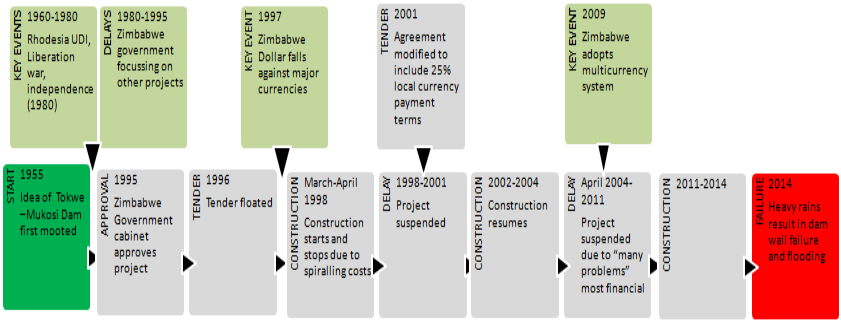

Figure 6-2: Key Events in Tokwe-Mukosi Dam Construction TimeLine. Compiled by Author from Article (Mazara, 2015)

Dam construction can be regarded as a risky business as there are technical and environmental problems that investors can face (International Rivers, 2017). It becomes important to state who and when the Tokwe-Mukosi dam was built to have confidence that the dam was built with all building standards in place. Finance can be said to be 'the weakest link" in many dam projects as whoever is the investor may decide which projects go forward and the standards that must be met. The Tokwe-Mukosi Dam according to the main contractors' report (Salini-Impregilo, 2016) was mainly funded by the Government of Zimbabwe.

With Salini-Impregilo as the contractor and most funding from the Government of Zimbabwe, it is important to know the history of the company Salini-Impregilo to determine their capability and

competence in dam construction. A brief analysis of some projects completed by Salini-Impregilo and the outcomes of their work sheds light on the reputation of the company in dam construction. Table 6.1 shows some dam constructions done by Salini-Impregilo Company. The company shows international experience, having built dams in Brazil and Argentina among other countries. The largest dam they built was the Ponte de Pedra in Brazil. The completed dams have not had any reported catastrophic failures. This may suggest that the company has or had the capacity, experience and technical knowhow to construct the Tokwe-Mukosi Dam.

Table 6.1: Some Dam Projects Completed by Salini-Impregilo Company (*Figures compiled from Salini-Impregilo website, 2016)*

Country	Brazil	Argentina-Paraguay	Argentina	Zimbabwe	Zimbabwe
Project	Ponte de Pedra	Yacycreta hydroelectric	Piedra del Aguila	Tokwe-Mukosi	Osborne
Surface excavation: Million cubic metres	4.5	32.2	1.9	1.0	0.6
Surface rock excavation: Million cubic metres	0.8	4.4	2.7		0.02
Dam embankment: Million cubic metres	1.2	65.4	0.7	0.7	5.7
Concrete: Thousand cubic metres	77	3,599	3,519	95	18
Dam water volume: Billion cubic metres	508	21	2.7	1.8	0.4

The total cost of the dam from construction in 1998 to its completion has not been fully revealed as public media gives estimates or only state the donations or contributions that have been made by different organisations. In Marawanyika and Latham (2017) Robert Malunga, a project manager at ZINWA stated that the Infrastructure Development Bank of Zimbabwe spent $290 million on the dam when construction resumed in 2011. These resources have been through the Public Sector Investment Program as well allocations from the National Budget. Salini-Impregilo shows on its website (2016) that initiation of the project from 2011 was to be Euro 107 million for the completion of the project.

Reports of funding from the government itself, banks and private companies such as Tongaat Hullet have been reported in the media. In September 2015 the "Minister of Finance and Economic Development Mr. Patrick Chinamasa, together with his Environment, Water and Climate counterpart, Mr. Saviour Kasukuwere, toured the project, whereupon a request for $30 million was made to Tongaat Hullet" (Mazara, 2015). Tongaat Hullett according to media reports (Mazara, 2016) was to benefit from the Tokwe-Mukosi project through irrigation water supply, therefore the request from the government to assist in the funding of the project. Chitagu (2015) reports of the Government of Zimbabwe seeking help from the Government of China to fund the project. The then Minister of Psychomotor, Josaya Hungwe was quoted as saying that he would travel to engage the Chinese Government concerning the Tokwe-Mukosi project but did not give finer details. Construction Review (2016) argues that Tongaat Hullet released a total of US$6.6 million to Salini-Impreglio JV, so that they may resume construction works on the dam. Officials at the Ministry of Finance and Economic Development confirmed that the Italian firm had agreed to be paid in United States Dollars (Kadzere,2016). In terms of the contract, Salini-Impreglio was supposed to be paid in Euros but due to foreign currency shortages, the Zimbabwe Government could not raise the money. The government had failed to pay over US$80 million owed to Salini-Impregilo and the company moved from the construction site and shipped its earthmoving equipment to other projects in Africa

(Chitagu, 2015). Since 2001, the Zimbabwe Government spent US$262 million on the dam with an additional US$13 million having been set aside in the 2015 National Budget (Development Bank of Zimbabwe, 2015).

Tongaat banking partners, Barclays Bank of Zimbabwe and the Infrastructure Development Bank of Zimbabwe released funds to the contractors for the outstanding arrears (Construction Review, 2016). The contractor was granted an extension to complete the project by August 2014 mainly because there were additional excavations on the foundations and financial constraints. All the media reports can be summarized through the ZINWA Information Memorandum (2015) in which the department discussed with the International Development Bank of Zimbabwe (IDBZ) on what funds were needed to complete the project. Although the cost figures were not independently verified by IDBZ, they however shed light on the cost and financing of the Tokwe-Mukosi project (ZINWA, 2015). In the memorandum, ZINWA argues that the Zimbabwean Government has been funding the construction of the Tokwe-Mukosi Dam from its own resources through the Public Sector Investment Programme (PSIP) which had allocations from the National Budget. The Schedule of Payments to Contractors is listed in Table 6.2.

Table 6.2: Summary of Payments Made to Contractors (*ZINWA, 2015)*

YEAR	AMOUNT PAID TO CONTRACTORS US$
2011	45,361,059
2012	47,288,977
2013	63,288,439
2014	46,830,307
TOTAL	202,768,783

On February 9, 2014, the Zimbabwe Government officially recognised the Tokwe-Mukosi flood as a national disaster and requested $20 million in humanitarian aid and relocation support for those impacted (The Human Rights Watch, 2015). In 2015, the Zimbabwe National Army and Civil Protection Unit (CPU) moved more than 20,000 people (approximately 3,300 households) from the flooded Tokwe-Mukosi Dam area to Chingwizi Camp on Nuanetsi Ranch in Masvingo's Mwenezi District (The Human Rights Watch, 2015). Figure 6.3 shows

the geographical positioning of Tokwe-Mukosi Dam in relation to Chingwizi and Nuanetsi Ranch.

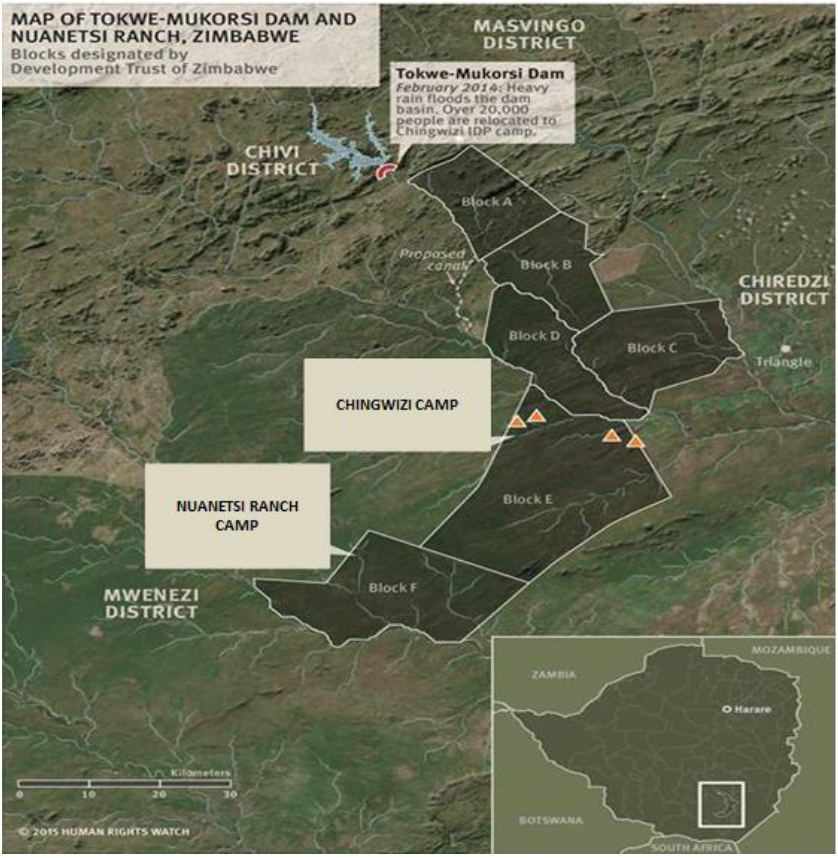

Figure 6.3: Tokwe-Mukosi Dam in Relation to Chingwizi and Nuanetsi Ranch Camps (*Human Rights Watch, 2015)*

The well-being of the residents of Tokwe-Mukosi has significantly declined following their displacement from their land. The community, whose primary source of income relied heavily on growing crops for their own consumption, has been restricted to living in camps that prevent them from engaging in their usual activities to

sustain their livelihoods (Human Rights Watch, 2015). The sudden and rapid occurrence of the flood may have not allowed enough time to carefully strategize and execute a well-organised relocation of the community, causing people to lose their possessions, livestock, and means of income, thereby making them susceptible to harm (International Confederation of the Red Cross, 2017). In 2015, the Human Rights Watch characterised the residents of Chingwizi Camp as "homeless, landless, and destitute" due to the significant loss of their possessions. This indicates a rise in poverty rates because of the loss of means of subsistence. The community experienced a swift and chaotic eviction, resulting in them becoming "permanent residents" in temporary camps as they were relocated to Chingwizi Camp. The purpose of this facility was to serve as a temporary camp for over 3,000 families, who would later be relocated to “better” areas (International Confederation of the Red Cross in 2017). The Government of Zimbabwe's response to the Tokwe-Mukosi disaster has received criticism from various human rights organisations. The Human Rights Watch (2015) claimed that households affected by the Tokwe-Mukosi flood faced economic vulnerabilities as their means of making a living had been disrupted. Their limited ability to access and manage productive capital has resulted in a long-lasting and irreversible decrease in living standards, impacting the ability of households to secure enough food and leading to malnutrition among the sick, elderly, and young (UNICEF, 2014).

Mhofu (2016), documented a significant incidence of child mortality and morbidity rates, as well as the spreading of various diseases in the holding camps. The Government of Japan provided a financial contribution of US$1 million to UNICEF. The purpose of this funding was to mitigate the prevalence of malnutrition, diarrhoeal diseases, and sexual abuse among children and women residing in the Chingwizi Camp. The Humanitarian Charter, as outlined in The Sphere (2018), stipulates that individuals must have access to clean water, sanitation and hygiene, food security and nutrition, as well as

shelter and settlement as a basic requirement. This implies that relocating individuals affected by disasters involves more than just offering them a place to stay, it should involve ensuring their safety, providing access to essential amenities like schools, and offering opportunities for sustainable livelihoods. A makeshift school was established in the camp with a sole instructor, Elphias Mapanje. By March of the same year, the school had an estimated enrolment of around 2,000 students. In Sachiti's (2014) study, it was found that the temporary school lacked proper classrooms to protect the children from weather conditions, as well as furniture and textbooks. The 2014 Situation Report on the Chingwizi Camp by UNICEF highlights the absence of adequate health and educational resources, as well as the issue of overcrowding.

While development is essential for progress and improving livelihoods, it must be pursued in a way that avoids creating new disasters. Poorly planned development projects can lead to environmental degradation, displacement, and catastrophic outcomes, as seen in events like the Tokwe-Mukosi flooding disaster of 2014/15 in Zimbabwe. Therefore, a balanced approach is crucial, where development efforts prioritize sustainable practices, disaster risk management, and the well-being of affected communities. Responsible development should enhance resilience, not compromise it.

Chapter Two: The Concept of Flooding

Flooding is a common and devastating natural hazard, impacting millions globally each year. Flooding occurs when water submerges land that is ordinarily arid, usually due to excessive rainfall, river overflow, storm surges, or the failure of dams and levees. Certain regions are inherently susceptible to flooding due to their geographical characteristics; however, human activities such as urbanisation, deforestation, and climate change have intensified both the frequency and severity of floods. This chapter discusses the concept of flooding, examining its diverse types, causes, and mechanisms. Floods are both natural occurrences and socio-environmental events that can be affected by human development patterns, infrastructure, and land use choices. Comprehending the complex relationships among these factors is crucial for alleviating the effects of floods on communities. The consequences of flooding are extensive, influencing lives, livelihoods, infrastructure, and ecosystems. Besides the immediate fatalities and property destruction, floods can result in prolonged displacement, economic disturbances, and public health emergencies. At-risk communities, particularly those residing in flood-prone regions lacking sufficient infrastructure or early warning systems, encounter increased hazards.

This chapter will analyse the social, economic, and environmental ramifications of flooding, emphasising its role in intensifying existing disparities and disproportionately impacting the marginalised. It will also tackle the challenges of managing flood risks in rural and urban settings, emphasising the necessity for integrated disaster risk reduction strategies. The chapter attempts to clarify the effects of flooding and the significance of resilience in alleviating its destructive consequences.

In the past decades changes in climate have been witnessed, suggesting that there must be changes in the way people deal with different types of disasters in the different regions they are in. Zimbabwe is classified as a country that is more susceptible to droughts rather than floods. In Chivi for instance Musiiwa (2016) asserts that he had prior knowledge of the drought situation in the Chivi area and cites an old Shona adage that tells the story of an elderly woman from Chivi who resorted to boiling stones and consuming the resulting "soup" when she had no more food left. This provides an image of a region that experiences significant food scarcity and is highly susceptible to drought, while flooding was or is unheard of. Devastating incidents that had been previously documented in Zimbabwe were primarily a regional occurrence, Southern Africa, rather than a hazard specific to Zimbabwe. In February 2000, Cyclone Eline caused heavy rainfall in Southern Africa, leading to the overflow of several rivers like the Zambezi. Mozambique experienced the highest number of casualties, with approximately 700 people killed. In Zimbabwe, around 250,000 individuals were displaced and became homeless. Approximately 90,000 individuals in Botswana experienced the consequences of flooding, which resulted in an estimated 10,000 homes being submerged (UNICEF, 2000). The flood's magnitude qualifies it as a regional crisis (Tsiko, 2015), that was not caused by any infrastructural development but was caused by a cyclone, natural phenomenon, whose intensity may be attributed to climate change.

In several places around the world, floodings are disasters that are difficult to “bounce back’ from, but in some they are just events that derail the normal functioning of a community for a short while. Storms Desmond and Eva caused flooding in December 2015, affecting 16,000 homes in England. According to the BBC (2016), the government protected more than 20,000 homes by erecting flood defences and mobilising the army to assist. Financial aid was provided in “record

time" and plans were in place to improve the flood defences. With climate change, preparation for flooding in areas that were previously not prone to flooding is becoming more and more essential.

A flood can be defined as an overflow of large quantities of water onto normally dry land. Flooding happens in many ways due to overflow of streams, rivers, lakes, oceans or because of excessive rain or ice melts (Madaan, 2017). Floods are a natural phenomenon, but human activities have affected and influenced flood intervals, size and area of extent. While some floods can occur suddenly and recede quickly, others take days or even weeks to build and discharge (State of Queensland, 2016). Rainfall is the most prevalent cause of flooding in many areas, with Nelson (2015) maintaining that precipitation, infiltration and interception are the most important variables that determine runoff and eventual discharge into streams. Runoff into streams and/or rivers is determined by the amount of precipitation at a given time and location, infiltration, interception and evaporation. This can be illustrated in an equation, simplified and modified from Tarboton (2017).

Runoff = Precipitation - Infiltration - Interception - Evaporation

Storms, such as hurricanes and/or tsunamis, cause water to surge or flow inland which may cause flooding. These severe weather conditions drive up the water level creating a storm surge. On the 8th of November 2013, Typhoon Haiyan caused flooding in the coastal areas of the Philippines. The Chinese Meteorological Administration estimated that Typhoon Haiyan had maximum wind speeds of 280km/h, strong enough to carry a lot of water inland onto the dry coastal lands giving rise to flooding (Earth Observatory, 2013). In urban areas heavy rainfall may introduce more water than the existing drainage system is designed for. In July 2016 some parts of KwaZulu Natal (South Africa) received rainfall amounts that exceeded 100mm in

24 hours, causing runoffs that exceeded the design capacity of the drains, causing flooding in many parts of the province (Figure 7.1).

Figure 7.1: Flooding in Durban July 2016 *(Mngoma et al., 2016)*

Dam failures have also been known to cause devastating floods. Dams are man-made structures, built across flowing water such as rivers to obstruct, direct or slow down the flow of water downstream (Madaan, 2017). This results in the creation of a lake, dam or impoundments that have many uses such as electricity generation, irrigation and general water supply. However, dam walls may fail due to various reasons which may cause extensive flooding downstream. A dam is designed and built for a specific water holding capacity. Changes in land use patterns such as urbanisation in an existing river catchment area previously used for agriculture may increase runoff into rivers. This increases the water levels of any dam on the river course which may exert pressure on the dam wall. Dam failures have also been caused by outdated designs of existing dam structures (Howard, 2015), but there has been an improvement of dam designs in the past century. Lack of maintenance of some dams has led to dam wall failures that resulted in flooding. Roads and other infrastructure in most countries have a regular tax such as tolls that keep roads well maintained. In many countries dams do not have a specific source of funding therefore maintenance is at times neglected. Old dams that cannot be repaired are left standing with no particular use and unmaintained, leaving

them susceptible to failure if any extra pressure is exerted on the wall (Howard, 2015), leading to wall failure and flooding. Some countries, due to lack of funding, have not been able to replace old dams with new designs, for instance in 2006 the old Barrage Dam located outside Gusau in Nigeria, collapsed following more than 24 hours of heavy rain washing away more than 500 houses (IRIN, 2016), Figure 7.2.

Figure 7.2: Flood Damage after the Barrage Dam Collapse in Nigeria. *(IRIN, 2016)*

Snowmelt is an important part of the water cycle as it contributes to many reservoirs and dams (United States Geological Survey, 2016) but it becomes a problem when it melts suddenly, causing a huge amount of water to flow at one time. In January 1996 heavy snowfall followed by a sudden thaw combined with heavy rain caused floods along rivers from New York through Pennsylvania to Virginia, "*producing water levels not seen since a major Hurricane Agnes, hit the area in June 1972*" (Leathers, 1998). Major rivers in Pennsylvania and the Potomac River were affected as the water (melted snow) sometimes jammed with ice caused an overflow of the rivers causing about 30 deaths and 1.5 billion dollars' worth of damage (Figure 7.3).

Figure 7.3: 1996 Flooding in Pennsylvania. (*USA National Weather Service, 1996)*

When rivers and/or streams hold more water upstream than usual they can overflow their banks. This may cause a sudden discharge of water into low lying areas flooding the floodplains ((Merz et al., 2021). With large rivers, the process is relatively slow. Precipitation enters rivers directly as the rain falls, through runoff as the soil becomes saturated or through a spring from underground water. When the river channel becomes completely full, any additional water inflow may result in an overflow causing a flood. Increased rainfall in the Mississippi River catchment area in 2011 caused an overflow of the riverbank between April and May 2011 on a scale not seen "since the floods of 1927 and 1937". Mississippi tributaries such as Big Black River, Red River, White River, Arkansas River, Tennessee River, Platte River and Ohio Rivers kept on adding inflows causing it to overflow (Pallardy, 2016). Thousands of hectares of agricultural and residential land were submerged by flood waters.

There are three main types of floods; fluvial (river) floods, pluvial (surface) floods and surge floods that mainly occur along coastal lines. Fluvial, or river flooding, occurs when excessive rainfall or heavy snow melts causing a river to exceed its capacity. Damages from river floods are usually felt downstream as the excessive water may cause dams or dykes to break, and in turn causing water to flow downstream (Kundzewicz & Pińskwar, 2022). For fluvial flooding there is overbank flooding and flash floods. When water rises, thereby overflowing its banks, it is termed overbank flooding. This is the most common type of fluvial flooding, and it can occur in any channel size. Llash flooding is characterised by an intense, high velocity torrent of water that occurs in an existing river channel with little to no notice (Maddox, 2014). Flash floods are dangerous and destructive not only because of the force of the water, but also the hurtling debris that is often swept up in the flow. In November 2016 torrential rains in Johannesburg (South Africa) caused flash floods along the N1 and N3 Highways, submerging the Freeway and other roads causing widespread traffic gridlock (Figure 7.4).

Figure 7.4: Flash Floods on the Johannesburg N1 Highway. (*Times Live, 2016)*

Surface or pluvial flooding is flooding that is independent of a water body such as a river or stream that may overflow. Surface flooding mostly occurs in urban areas where heavy rainfall may exceed the existing drainage system. Built-up or urban areas have few open spaces with exposed soil to absorb water, so in most cases runoff is channelled to surface storages such as dams or disposed of through the sewerage system. When an area lacks the capacity to dispose of the water, flooding may occur (Kundzewicz & Pińskwar, 2022). Surface or fluvial flooding may also occur on areas that are on hillsides especially where recent veld or forest fires have occurred. Sufficient vegetation cover promotes the percolation of rainfall which reduces runoff. Forest or veld fires leave the ground charred, barren, and unable to absorb water, creating conditions conducive for flash flooding and mudflows (Federal Emergency Management Agency, 2016). In July 2007, the British Broadcasting Cooperation (BBC, 2007) reported that some parts of England (Hull and Tewkesbury) received rainfall of up to 140mm which is more than double the June average of that area causing a strain on the drainage system thus resulting in surface flooding (BBC, 2007), Figure 7.5.

Figure 7.5: Flooded Shops in Tewkesbury. *(BBC, 2007)*

Coastal floods occur in areas along shorelines of oceans, or any large body of open water (Woodruff et al., 2013). Coastal floods usually occur after extreme weather events such as hurricanes or other storms with strong winds which can push water onshore. Coastal flooding can be minor, where a slight amount of beach erosion would occur, but no significant damage is observed. Coastal flooding can also be major where there are serious threats to life and property.

Floods have social, economic, and environmental consequences to individuals and communities. The impact can either be positive or negative depending on the flood location, extent of the flood, duration, depth, speed of the water, and vulnerabilities of communities in which the floods have occurred. There can be direct losses from floods such as the destruction of buildings, infrastructure such as roads and bridges, livestock, crops and other aspects that in turn would have an impact on the economy of impacted communities and countries. Indirect loses due to floods can be disruption to transport services which may affect people going to work thus affecting production. Damage to public infrastructure can have significant impacts on regional and national economies. In 2022 after a storm surge in KwaZulu Natal, the Durban Port that is the largest in South Africa and is also used by the Southern African region closed because of flooding (Cele & Naidoo, 2022). This not only affects the economy of one country but that of the region.

Flooding has both a negative indirect and direct impact on agriculture. It can lead to widespread damage to crops, agricultural equipment and loss of livestock. Flood waters can lead to the delay in planting or a delay in harvesting as the soils may be water locked. This is further exacerbated by transport problems due to flooded roads and damaged infrastructure. Reduced agricultural yield does not just end with the farmer having less to sell but may also result in price increases due to supply shortages. Rice farmers in Louisiana in August 2016 were about

to harvest their crops when the area received more than average rain for that season, causing a severe flood which led to mandatory evacuation orders, road closures and left the headed rice under water. Rice in such a condition may quickly sprout and/or rot, thereby decreasing the quality of the harvest (Bennett, 2016). The flow-on effects of such reduced agricultural production often affect the economy due to shortages and increases in food prices.

Flood events in some cases may result in long-term benefits to agricultural production, as flooding can recharge water sources and increase the fertility of the soil in some areas by spreading sediments and nutrients. Regular flooding in the Barotse Plains in the Zambezi River Basin has provided vital water for irrigation and replenished soil fertility in the area, thereby increasing agricultural production (GRID-Arendal, 2013). Flood waters recharge "groundwater systems, replenish wetlands, increase connectivity between aquatic habitats, and move sediments and nutrients around the landscape, and into the marine environment" (Science Clarified, 2017). For many species, floods trigger breeding events, migration, and dispersal. Fish and other marine life depend on the nutrients supplied from the land during floods; however, there can be a negative impact as the flood waters bring in pollutants and other toxins from land. This may affect marine life and may sometimes change the entire ecosystem into a completely different one (UNEP, 2015). Whatever the impact of the flood may be at a particular place and moment in time, it is important to know its causes, impacts and how preparedness is of importance to mitigate any negative impacts.

Floods have social impacts on both individuals and communities as it may lead to loss of life, damage to property, destruction of livelihoods and disruptions to supply of clean water, electricity, transport, communication, education, and health care (State of the Queensland, 2016). All these losses, according to Stanke (2012), have a deep impact

on the victims of floods that may result in long lasting psychological impacts. Several months after Hurricane Katrina in 2004, there were widespread mental health issues in New Orleans as people tried to grasp what had happened, while depression and suicide cases increased after the Hurricane (Harmon, 2011). Mental health issues can be a result of trauma experienced as some people witness their loved ones die and their lives significantly disrupted and changed.

Human activities have made the impact of floods more severe than if flooding was occurring in an environment that is "untouched by human hands" as floods, according to the State of Queensland (2016), tend to further cause destruction to already degraded systems. Floods are natural disasters that occur when excessive water overflows onto normally dry land, typically due to heavy rainfall, river overflow, storm surges, or dam failures. While floods are a natural part of the environment's hydrological cycle, they can have devastating impacts on vulnerable communities. These communities often have limited resources, inadequate infrastructure, and reside in flood-prone areas, making them highly susceptible to the effects of flooding. They can destroy homes, displace populations, and damage critical infrastructure such as roads, bridges, and utilities, disrupting livelihoods, and access to essential services. Vulnerable communities also face increased risks of waterborne diseases, food insecurity, and long-term poverty. Addressing these impacts requires effective flood management strategies, disaster preparedness, and resilience-building efforts to protect the most at-risk populations.

Chapter Three: Disaster Risk Reduction, Vulnerability and Resilience

Disaster Risk Reduction (DRR) is a strategic approach aimed at reducing the vulnerabilities and risks associated with disasters while enhancing the capacity of individuals, communities, and institutions to cope with and recover from them. Vulnerability, in the context of disasters, refers to the susceptibility of people, assets, and systems to harm, which is shaped by a variety of factors such as poverty, location, social inequality, and environmental degradation (Hyogo Framework for Action, 2005-2015), while resilience is the ability to anticipate, resist, absorb, and recover from hazardous events in a timely and efficient manner.

This chapter introduces the key concepts of DRR, vulnerability, and resilience, using theoretical frameworks such as the DFID Sustainable Livelihoods Framework, the Pressure and Release (PAR) "Crunch" Model, and the Progression of Vulnerability model. These models provide valuable insights into how disaster risks emerge and can be mitigated through a better understanding of livelihoods and social vulnerability. This chapter will explore how vulnerability comes into being and how building resilience requires a comprehensive approach that includes economic development, social protection, inclusive governance, and sustainability. By integrating these models, the chapter will highlight how DRR can be effectively embedded into development planning to enhance livelihoods and strengthen the ability of communities to withstand and recover from disasters. It will address the importance of fostering sustainable livelihoods, reducing pressures that exacerbate vulnerability, and building resilience to ensure that communities are better equipped to cope with disaster risks. This integrated approach emphasizes that disaster risk reduction,

vulnerability reduction, and resilience-building are interconnected processes that must work hand in hand for effective long-term solutions.

Chaudhary and Piracha (2021) describe a hazard as a threat to life, wellbeing, material goods and the environment caused by extreme natural processes or technology. In general, a hazard is any source of potential damage, harm or adverse health effects on people, while Bimal (2011) defines natural hazards (geological, climatic and environmental) as hazards due to changes or shifts in nature. Human induced hazards are caused by human action. Hazard classification assists in the identification of the type and causes of disasters within communities. Disasters may be experienced due to "an act of nature", or it can be an anthropogenic hazard or a combination of both. Floods are a natural hazard but their impact, intensity and sometimes frequency, may be influenced by the 'human hand' from construction of dams to the global aspect of climate change. Because of these hazards it is important for communities to build resilience to "Bounce Back Better" from disasters. Globally, there has been a gradual rise in the occurrence of natural disasters. This has resulted in a rise in fatalities, damage to properties infrastructure, and adverse effects on the environment (UNISDR, 2006). There is therefore a need to investigate disaster theories, community vulnerabilities and thus be able to prepare for and mitigate disaster. For instance, Osuret *et al.* (2016) performed a qualitative investigation in the Mt. Elgon region of eastern Uganda. The objective of the study was to comprehend the coping mechanisms and fundamental factors contributing to susceptibility to landslides and floods in the area. Osuret *et al.* (2016) determined that poverty and population pressure were the primary factors contributing to vulnerability. These factors compelled individuals to relocate to hazardous regions, such as the slopes of Mt Elgon. In such cases it is important to consider the United Nations

Disaster Risk Reduction, a "*concept and practice of reducing disaster risks through systematic efforts to analyse and reduce the causal factors of disasters*". Activities that may be undertaken in DRR include mitigating exposure to hazards, diminishing the vulnerability of individuals and assets, prudent management of land and the environment, and enhancing preparedness and early warning for detrimental events (United Nations, 2015). DRR must be the focal point in managing disasters so that disaster management is proactive rather than reactive.

The negative effects of disasters may remain if response and recovery outrank risk reduction and prevention. Responding to disasters has been a major part of disaster management as it took more of a humanitarian relief angle rather than reducing the disaster risks that exist in communities. A risk reduction success story came after Cyclone Phailin in India in October 2013. A total of 12 million people were in the path of the cyclone. 1 million people were able to be evacuated and after the storm there were 27 casualties. Cyclone Phailin could have claimed many more lives but proper planning and risk reduction activities by the government ensured the casualty figures remained low (Oxfam, 2013). Prepresses must outrank response.

The development of the post-2015 development framework which succeeded the Hyogo Framework for Action calls for risk reduction in all countries, and if followed, development and disasters can remain in a positive relationship (Oxfam 2013). Disaster risk reduction was considered seriously in the Rio20 Document. It called on countries to address the issue of disasters with great urgency. They called upon disaster risk reduction to be included and integrated into policies, plans, programmes and budgets of national, provincial and local levels since sustainable and significant reduction of disaster risk can only be achieved by working across policy frameworks (Zimmerman, 2012). Mankind has been plagued by natural hazards as far back as the

people's memories can remember. Most, if not all, natural disasters cannot be controlled; therefore, there is the need to reduce the risk if there is to be any hazard impact. The need for risk reduction has forced people to turn to preparedness, prevention and mitigation of disasters to reduce or avoid fatalities, injuries and infrastructure destruction. Disaster Risk Reduction according to Shah *et al.* (2019) through local institutions, precautionary and proactive actions such as preparedness, prevention, response and recovery is necessary to ensure required assistance reaches affected people at the right time thus minimising human and other losses. In the quest of risk reduction, a Disaster Preparedness Framework as illustrated in Table 8.1 is needed.

Table 8.1: Disaster Preparedness Framework (*Kent, 1994)*

Vulnerability Assessment	Planning	Institutional Framework
Information Systems	Resource Base	Warning Systems
Response Mechanisms	Public Education and Training	Rehearsals

In the past, disasters were seen as once-off events that governments and relief agencies would respond to as they give relief to victims, without consideration of how and why the disaster had occurred (International Federation of Red Cross, 2000). Research has shown that the rise in disasters and their impact on communities is linked to people's vulnerability and if this is eradicated, communities would be less susceptible to disasters. Vulnerability assessment involves the collection of data geared towards identifying potential threats faced by communities, the needs of the community and the available resources at their disposal in the event of a hazard (Wisner *et al.*, 2003). With vulnerability assessments, disasters are no longer seen as natural hazard impacts that occur on their own but are now seen as a combination of the hazard and unresolved problems of development (Yodmani, 2001). This transition of dealing with disasters from response and recovery to preparedness, prevention and mitigation has begun to influence the way disaster managers are planning and

financing management programs. Disaster preparedness planning as part of DRR, takes into consideration the resources available, allocation of roles and responsibilities of different organisations and the development of policies and procedures on how disaster management activities are to be carried out. During pre or post disaster, the plans on paper are then carried out on the ground to reach specific goals (International Federation of Red Cross, 2000). Institutional framework, according to Kent (1994), centres on efforts of disaster management working in established structures instead of the creating new ones. Floods are the most frequent and devastating natural disasters in Asia but the region no longer responds to disasters, instead they manage disaster risks through institutional frameworks that involve the government, the community, NGOs and all other stakeholders in planning and coordination (Label, 2006). The capacity of these institutions to manage floods lies in their ability to define roles and responsibilities so that each organ knows what to do and when.

For disaster risk activities to be efficient and effective there must be efficient communication and information management. This includes the collection of disaster activity related information, analysis of the information and development of a database and dissemination of the information (Pimentel, 2013). Label (2006) argues that forecasting and early warning systems are often the weakest element in flood risk reduction. This may be because of the technical challenges of obtaining critical information and sharing it in a timely fashion, or it may be because of organisational and individual behaviours that undermine otherwise sound information-sharing arrangements. The availability or lack of resources is critical in DRR. The International Red Cross and Red Crescent in its training manual (2000) looks at resource base as asking the following questions. What resources are already available and in what quantities? What staff and volunteers do we have and in emergencies where can they be shifted to? What resources will be

needed that we don't have? Where will the resources that we don't have be sourced from? According to the World Meteorological Organisation (2013), to reduce the risk of flooding the areas at risk must first be identified. This may involve mapping and the use of Geographic Information Systems, Geographic Positioning Systems and other equipment necessary for mapping. The National State Geographic Information Systems (NSGIC) (2017) state that when conducting GIS in any area, staff schedules should be allocated and included in the cost analysis for general support tasks that are additional and complementary to the cost of using specific GIS applications. Such ongoing costs include GIS management and coordination itself, database administration, general enterprise system support, and ongoing staff education. All these require financial resources as there is use of equipment, manpower and time.

The disaster theory formulated by Blackie *et al.* (1994), the Pressure and Release (PAR) model (also known as the Crunch Model) (Figure 8.1) maintains that a disaster does not only occur because of the presence of a hazard but because of vulnerability. The presence of a hazard, as in the case of the flood in the Chivi area, according to the theory, could not be the only issue that led to the disaster in Tokwe-Mukosi. There must be some form of vulnerability within the area. Wisner *et al.* (2004) proposes the progression of vulnerability which combines unsafe conditions such as being unable to afford safe housing and having to engage in dangerous livelihoods with dynamic pressures such as lack of education, rapid urbanisation and in some cases a decline in soil fertility and productivity. The unsafe conditions and dynamic pressures are linked to root causes. The root causes are historical causes that are imbedded in a society, and these include limited access to power, society structures and resources, and ideologies of political and economic systems.

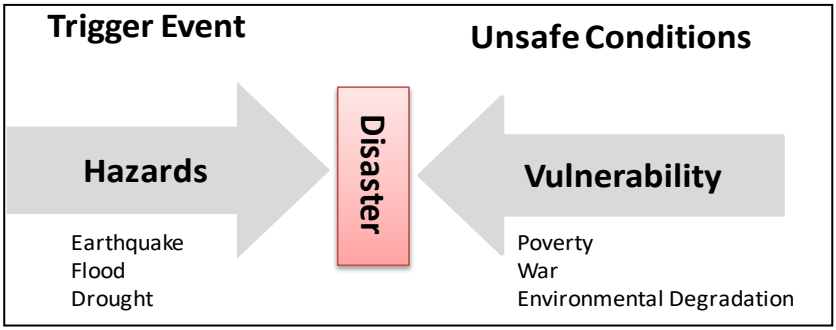

Figure 8.1: The Crunch Model. *(Smyth, 2012)*

Sarewitze *et al.* (2003) considers the root causes of disasters as systems that go beyond human control, calling it "the physical aspect of an event". Rainfall and weather patterns are aspects that are beyond human control and, in some instances, trying to mitigate their impact may increase vulnerability. Bimal (2011) argues that the physical, social and economic variables combined with the adaptive capacity of communities, contributes to vulnerability that in turn may lead to the occurrence of disasters. Dam failure can be due to physical events that are beyond people's control, or it could be due to other factors that can be controlled or a combination of both. A disaster, according to Wisner *et al.* (2003), does not occur because of the presence or impact of a hazard in any location, but the disaster occurs when a hazard impacts vulnerable people. A natural event, such as the 6.1 magnitude earthquake which occurred in January 2016 in the Mediterranean Sea off the Spanish coast, did not become a disaster because there was no human loss or human impact (Minder, 2016). A 7.0 magnitude earthquake like the 2010 Haiti earthquake (Disasters Emergency Committee, 2023) became a disaster because it affected many people who had to seek international assistance because they could not cope. The Crunch Model argues that a hazard (the trigger event) becomes a disaster when it meets with the vulnerability of people, which according to Wisner et al (2003) progresses in three stages (Figure 8.2).

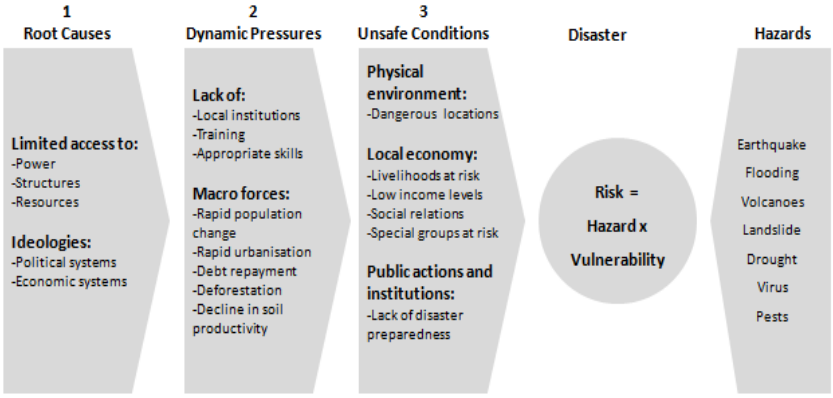

Figure 8.2: The Progression of Vulnerability. *(Wisner et al., 2003)*

The progression of the three stages of vulnerability, namely, root causes, dynamic pressures and unsafe conditions, introduce the 'human factor' into disaster management (Smyth, 2012). Wisner *et al.* (2003:52) argue that of the three stages, the most distant are the root causes as they are 'invisible and taken for granted'. Root causes include political and economic systems and limited access to information and resources. Dynamic pressures are processes and/or actions that turn root causes into unsafe conditions. Dynamic pressures include rapid population growth, rapid urbanisation and others that may lead to unsafe conditions such as unprotected buildings and infrastructure. The Progression of Vulnerability Model helps in explaining why communities are affected differently by hazards, drawing down to people's vulnerability.

In the three stages of the progression of vulnerability, Wisner *et al.* (2003) explains that disasters are not only due to the natural environment, but the social, economic and political environment that may exist in any community or country. These contribute to the occurrence of disasters. The existence of a hazard within a community together with the root causes, dynamic pressures, and unsafe conditions exert pressure that may initiate or increase the presence of

vulnerability within a community, leading to the occurrence of a disaster. Managing and controlling the root causes, dynamic pressures and the unsafe conditions that exist within a community may help reduce the impact of disasters, especially natural disasters arising when and if "mother nature" decides. According to the progression of vulnerability it is safe to say that with the presence of the hazard (flood) in the Tokwe-Mukosi area together with the pressures exerted by the root causes, the dynamic pressures and the unsafe conditions caused the flood disaster to occur.

Bolin and Stanford (1998) consider vulnerability to be a complex issue which combines the social, economic and political circumstances communities find themselves in. The situations communities find themselves in, mould, people's opinions and choices in coping with environmental hazards.

> "The most vulnerable are typically those with the fewest choices, those whose lives are constrained, for example by discrimination, political powerlessness, physical disability, lack of education and employment, illness, the absence of legal rights and other historically grounded practices of domination and marginalisation" (Bolin & Stanford,1999).

Blackie *et al.* (1994) define vulnerability as the characteristics or ability of a person or group in terms of their capacity to anticipate, cope with, resist and/or recover from the impact of a natural hazard. They chose to put vulnerability in consideration of mainly the human aspect. The impact of a hazard considers damage to property, infrastructure, loss of economic livelihoods, destruction and disruption of ecosystems, human death, injury or illness. Scholars such as Cutter (2003) maintain that risk alone is of no concern. It becomes of concern when it combines with the social aspects of a community. The concept of vulnerability argues that risk is not converted into disasters, but disasters occur when there is vulnerability which is linked to the social systems in which communities live in (Bimal, 2011). In the same vein Pimentel (2013) regards vulnerability as those characteristics that limit

an individual, household, country or region's capacity to anticipate, manage, resist or recover from the impact of a hazard or any other threat. Disasters occur where hazards and vulnerability meet.

Pimentel (2013) argues that response to flooding should be proactive rather than reactive so that lives can be saved. A proactive approach focuses on eliminating problems before they have a chance to appear, and a reactive approach is based on responding to events after they have occurred. In the Defence and Security Alert Issue, Bakshi (2017) compared the 9.0 magnitude Japanese earthquake and Tsunami of 2013 that caused 28,000 casualties, with the Jammu and Kashmir earthquake in India that measured 7.6 on the Richter scale and caused the deaths of more than 80,000 people. Bakshi (2017) argues that the difference observed in casualties may indicate which disaster management approach has a life-saving factor. He attributes the fewer casualties in the Japanese earthquake to the initial warnings that were given to communities and the design and construction of the Japanese's buildings which withstood the 9.0 magnitude earthquake. The proactive approach by the Japanese which took the form of 'prevention, preparedness and mitigation' rather than the reactive approach in India saved lives.

Importance has been placed on proactive management rather than reactive management, but it may also be important to highlight that reaction may be needed at some point in disaster management. It may be vital that governments, NGOs and the community itself know how to react when there is an impact of a hazard. Rehearsals are given as part of the UNDP Preparedness Framework (1994) as they test whether documented plans work on the ground. Rehearsals theoretically should include the government, national and local agencies and NGOs who would be involved in the response to an emergency or situation. This would then be followed with the revision and modification of the plan (International Federation of Red Cross, 2000). Table-top exercises

can be done by the disaster management committee, different ministries including the ministry of agriculture, heads of NGOs and other stakeholders to test the national and their own organisation's disaster and crisis management plans and may assist companies, the government and different NGOs function in the same capacity that they would have done in a real situation (Moulder, 2010). These exercises show the gaps that may exist in terms of resources to cope with a particular type of disaster. Tabletop exercises are however only possible with the management and do not involve the whole community, which is not helpful for community disaster response.

Successful prevention and disaster mitigation activities may be realised if there is cooperation and coordination between communities, the government and other agencies in disaster risk reduction. Disasters do not occur only because of the presence of poverty but also because people do not know "how to get out of harm's way or take preventative or protective measures" (Pimentel, 2013). For people to know how to get out of harm's way it is imperative that training and education against hazards be introduced in communities. Training may be introduced as part of the school curriculum or through special training of volunteers and staff in disaster management through accredited and/or non-accredited courses. The Federal Management Emergency Agency (FEMA) (2007) identified the need of public education in flooding and produced guidelines for communities on what a flood warning is and the appropriate response during and after a flood. Appropriate educational programmes may increase risk awareness which may assist communities in disaster prevention.

The Disaster Preparedness Framework may be used in conjunction with the Disaster Management Continuum and/or the Disaster Management Spiral. The Disaster Management Continuum has arranged disaster management activities into phases from preparedness to recovery and reconstruction. The Disaster

Management Spiral has the same stages but unlike the Disaster Management Continuum which indicates the disaster cycle as a 'spinning wheel' that continues to go round and round following the same stages, Figure 8-3. The Disaster Management Spiral is being encouraged as it incorporated DRR and calls for the 'Bounce Back Better' concept in which, after a disaster, reconstruction should not only get a community to its pre-disaster status but through experience and expertise, a community should rebuild in a way that makes it more resilient to any hazards surrounding it. After the 2014 flood disaster, the Tokwe-Mukosi community should have been rehabilitated and reconstructed. However, has the community reconstructed in the 'Bounce Back Better' concept or are they continuing to cope with matters as they currently exist that returns the community back to flood disaster vulnerability? Risk reduction in communities should take the 'Bounce Better' concept if they are to reduce risks within their communities and build resilience rather than stay in the same state they were before a disaster.

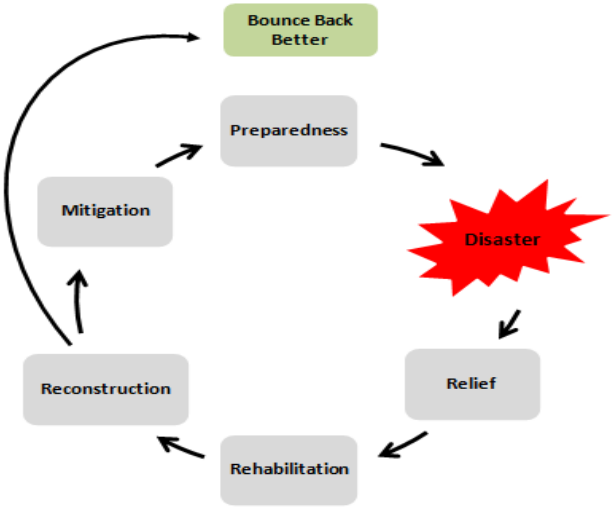

Figure 8-3: The Disaster Management Spiral. *(Pimentel, 2013)*

For a community to adequately prepare, prevent or mitigate disasters, the stages on the spiral are not acted upon in isolation but are interwoven for an effective buffer to disaster impacts. Acting upon the activities in the continuum at the right times may lead to disaster prevention and mitigation and assist in disaster preparedness. The Slow Onset Disaster Management Continuum has the same phases as the Rapid Onset Continuum, but they are different in framework and the time in which certain phases must be acted upon, for example the early warning phase. DRR has become proactive towards disasters rather than reactive, Figure 8.4.

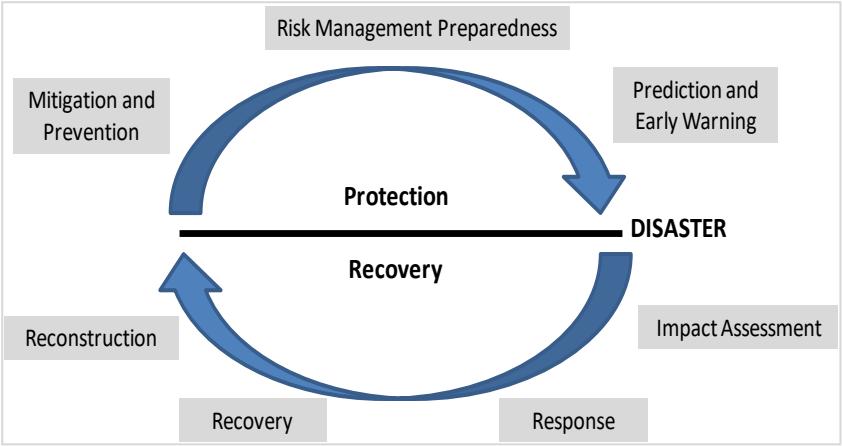

Figure 8.4: Proactive Approach to Disaster Management. *(UN Food and Agricultural Organisation (FAO), 2004)*

The proactive approach to disaster management involves disaster risk reduction and prevention rather than reacting to the impact of a hazard. Mitigation and prevention and flood prediction and early warnings are important aspects of DRR if disasters are to be avoided in the Tokwe-Mukosi area. There is therefore a change from responding and/or reacting to floods or any other hazard when it impacts a

community, to acting on the warnings given so that a disaster may be prevented.

In the Hyogo Framework of Action (UNISDR, 2005:5) resilience is described as the capacity of communities that are exposed to any kind of hazard to adapt, through resisting the hazard, or by changing their society so that they may reach or remain at an acceptable level of functioning and structure. New Orleans is a city that is trying to be resilient to floods. In 2005 Hurricane Katrina caused extensive devastation, killing over 1,400 people and displaced many others. The devastation was exacerbated by the failure of storm levees resulting in widespread flooding. With forecasts predicting that the average intensity of hurricanes will increase, it is critical for systems and infrastructure to be in place to be better prepared. New Orleans has adapted the "Bounce Back Better" approach, building 275km of levees after hurricane Katrina. The levees have been raised, a massive new surge barrier built, and new pumping stations installed. US$14.5 billion has been allocated to the Greater New Orleans Hurricane and Storm Damage Risk Reduction System to set flood resilience infrastructure and response systems. The Federal Emergency Management Agency (FEMA) has certified the upgrades as adequately protecting New Orleans to at least the "100-year" level, meaning that there is less than a 1 percent chance of flooding occurring (Salerno *et al.*, 2024).

Resilience has been associated with what affected communities have, that would enable them to reduce their vulnerability and build a 'hedge' of resilience. To better understand what communities, have that make them less vulnerable and more resilient; the livelihood model, encourages an understanding on priorities and realities that face poor communities. The model looks at what marginalised communities do for a living and centres on the assets that communities have in their reach, to face the different obstacles that they may have. In other words, what do communities have that will enable then to resist the impact of a hazard and if there is an impact how well, and within what period is the community able to 'bounce back' to its normal functioning? The model does not indicate the main issues that affect the livelihoods of people as a linear pattern or sequence that

moves logically from one stage to the other, but points out issues that affect livelihoods and how these issues interact with each other (DFID, 2000) (Figure 8-5). The DFID vulnerability analysis model is a way of understanding how households get to do what they are doing for a living as they use their capabilities and assets that, when available in the right "quantities" may assist in building resilience. The framework tries to define the different types of assets that each household has access to. The vulnerability analysis model considers the micro and macro environment and all actors and institutions that link up or combine in shaping the livelihood security of different households.

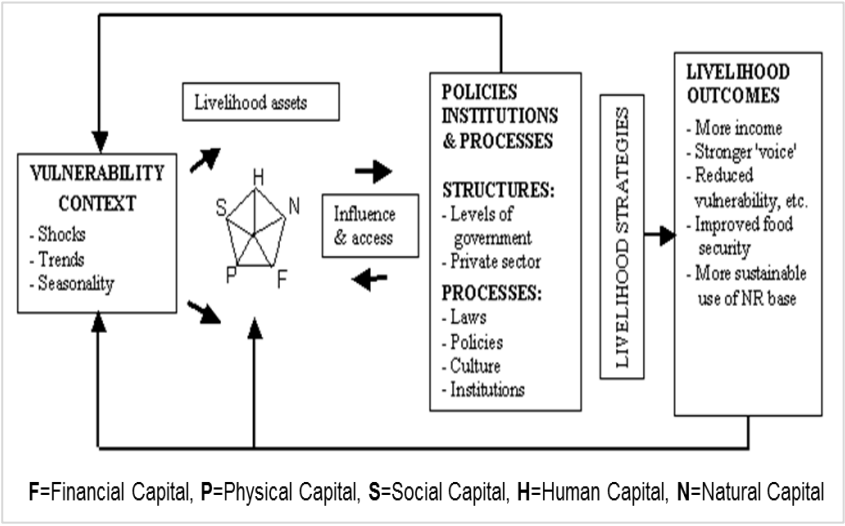

Figure 8-5: DFID Vulnerability Framework. *(DFID, 2000)*

Vulnerability in the Framework is the line between exposure of communities to physical threats, their wellbeing and the coping capacity of the community to deal with or cope with these threats. Consideration is given to the risks, shocks and stresses and concurrently the ability of a community to cope with the shocks or stresses to avoid or reduce losses is also determined. The insecurities may be in the form of shocks (rapid or slow onset), long-term trends and seasonal cycles. These conditions (shocks, trends, seasonality) are conditions that "lie furthest" from people and are beyond their control

(DFID, 2000) Floods can be a shock to a farming community that is ready to plant crops but because of the flooded fields are not able to. The delayed planting may lead to a cascade of negative events, and this may lead to reduced or delayed yields that may have a financial impact on the farmer. These events started by a flood may lead to a disaster if the farmers are not able cope with the cascading episodes.

The "asset pentagon" in the Framework shows how households in different communities have access to both tangible and intangible assets. The different assets help people to meet their needs (United Nations, 2017). The asset pentagon shows that there is a possibility of zero access to assets (in the middle of the pentagon where the lines meet), to maximum access to assets in the outer area of the pentagon. It is important to note when assessing the assets in a community, that a single asset can generate other assets. Land, for example, can be bought using financial assets. Each community has a different pentagon, depending on the assets that are available in that community. The more capitals and the diversity of the capitals that a community has, the less vulnerable they are and the more resilient they become. Capitals in any community may be taken to be indicators of resilience.

Financial capital in the framework includes cash and other liquid resources such as pensions and/or savings that may sustain and/or assist individuals in achieving their livelihood objectives (FAO. 2009). According to the United Nations (2017) livelihood guide, financial capital is the most versatile of the five assets in the model. This is because it allows other types of capital to be traded and/or owned. It can easily be converted into other types of assets, for example, the natural asset of land can be bought by anyone who has the financial capital, or a livelihood outcome of food security can be achieved by anyone who has the financial capital to buy food. Natural capital are those assets from natural resources, renewable and non-renewable, such as land, water and/or other environmental resources that can be the basis of production and life itself (Knight, 2023). Financial capital becomes important in insurance of the goods that one might have lost in the floods. Having insurance as a 'cushion' may make an individual

less vulnerable to the flood, as they are able in some way, to recover the goods that they may have lost.

Human capital is the skills, knowledge, good health and the ability of a person to work to achieve their livelihood goals. The livelihood model considers all people in each of the households who can work. Labour is an important tool in achieving positive livelihood outcomes. If a person does not work, be it due to ill health, lack of education and training or other any other reason, their livelihood is affected. Social capital involves and includes all institutions that assist in the development and maintenance of human capital as it partners with different institutions. Social capital includes family, the community itself, trade unions, schools and other voluntary networks that may exist within the community. The quantity and/or quality of social resources such as networking and connectedness, group membership and other social relations that involve trust, reciprocity and exchanges that individuals may be involved in are the social capital that one might enjoy (FAO, 2009). The existence of certain capitals may reduce vulnerability and thereby increase community resilience, while the lack of certain capitals in the community may result in vulnerability and no 'wall' of resilience.

Structures are organisations that implement policy and legislation. They deliver services that set up policies in trade and purchasing and/or perform many functions that relate to and/or affect people's livelihoods. Structures are from both the public and private sectors. The public sector includes political/legislative bodies, executive agencies, the judiciary and parastatals. The private sector includes commercial enterprises, civil society and Non-Governmental Organisations (NGOs). Structures are the "hardware" in policy and legislation setting, while processes are said to be the "software". Processes deal with policies (regulatory and other), legislations (international and domestic agreements), institutions (markets), and culture and power relations (age, gender, class). These determine the way structures work (FAO, 2009). Processes determine the link between structures and people or households. The structures and organisations that make policies in communities may help build or tear down resilience depending on the type of policies they are in place.

Are the policies in support of reducing disaster risk or they are in support of development 'against all odds? It is important to assess the source of the communities' strengths or what is in the background that is making them more vulnerable to disasters.

Livelihood strategies are activities that households or individuals engage in to generate an income. This may be in agriculture production, formal or informal employment or a combination of different income generating activities. Livelihood strategies consider options of jobs that households must pursue to produce an income. If there is a wide choice of livelihood strategies, communities become resilient to the shocks, trends and seasonality concerns and the success of one's pursuit of a livelihood strategy can be measured by the livelihood outcome. This begs the question; are the strategies that have been followed meeting the needs of the people who perused them? If the answer is "no" then the strategy has not been successful. If there is increased income, increased wellbeing, improved food security, physical safety, social network participation and reduced vulnerability, then the livelihood outcomes are a success. Success indicators are difficult to pinpoint on what or where the success is but a general improvement in a community's standard of living may be a general measure of success. Livelihood strategies in vulnerable communities should be reviewed to determine if the community can withstand and become "resilient to the shocks, trends and seasonality" of hazards that they may face. Having livelihood strategies that bring in a lot of income may mean some form of resilience while pursuit of livelihood strategies which produce barely much to survive on, leaves communities vulnerable and less resistant to hazards.

The United Nations argues that approximately 4.4 billion people have been affected by some form of natural hazard or another in the past two decades. In the same period about 1.3 million people lost their lives and US$2 trillion in economic losses was incurred (Oxfam, 2013). Disasters are considered as "agents of destruction" while developments are usually seen as a positive thing. Both the development and the disaster sectors have been viewed in some studies as having both a positive and a negative sector which are woven together, as in some instances a disaster or development can be

positive while in some instances development or disasters can be negative, Figure 8.6.

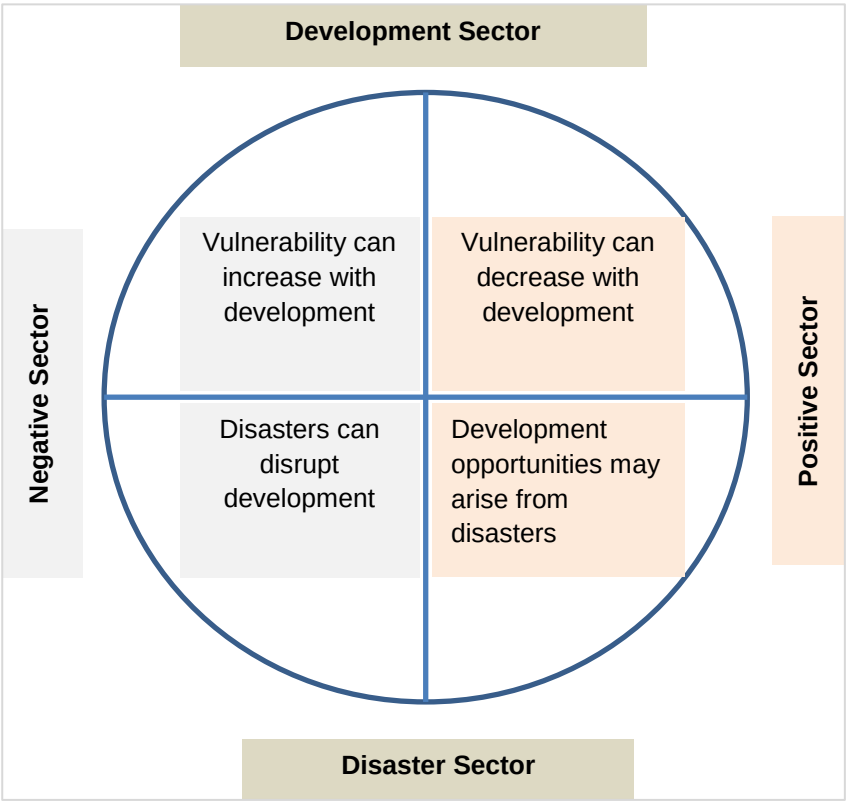

Figure 8.6: Disaster and Development. *(Pimentet, 2013)*

The positive sector indicates that development can reduce vulnerability. Development programmes can be designed in such a way that a community becomes less vulnerable to disasters and moves towards a goal of resilience. Istanbul is a city located at the confluence of 3 tectonic plates and is most likely to experience major earthquakes in future. In 2009, using new seismic building technology, Istanbul built the Sabina Gokcen International airport which now stands as the

world's largest earthquake proof building, designed to withstand an 8.0 magnitude earthquake. The design ensures that the airport remains fully functional after an earthquake (Mara, 2010). This is a positive aspect as development has vulnerability reduction in mind.

Disasters can provide development opportunities. Jha (2010) studied disaster history and concluded that "*great natural disasters are often a catalyst for huge positive change*" as he looked at the 1966 great fire of London which led to a better, cleaner and safer new city. When communities face disasters, developmental gaps may become visible. However, development in some instances can increase vulnerability. According to Pelling (2003), "*urbanisation affects disasters just as profoundly as disasters affect urbanisation*". Economic developments in the City of Johannesburg have attracted migrants from rural South Africa and from neighbouring countries such as Zimbabwe as people seek economic prosperity. Most of the migrants cannot afford proper housing and are forced to build shacks and settle on "unsafe" areas such as in Alexandra Township in Johannesburg where shacks are built along the Jukskei River which floods frequently (State of the Environment, 2016). Urbanisation and the drive for economic growth exposes people to more risks. In past decades, Asia and Central America have built new hotels, dams and roads in tourism promotion on the coastal areas that have fragile ecological systems and can experience storm surges (Oxfam, 2013) increasing the risk of flooding.

Some developmental projects that are not well thought out may have a negative impact on the environment. A plan for the construction of dams in the Amazon in Brazil would contribute to deforestation which increases vulnerability, to floods, landslides and other environmental damages on the communities living in the deforested areas (Butler, 2012). Pimentel (2013) argues that a project design may require a trade-off between disasters and development and people must choose between the "lesser of the two evils". This is because disasters can set

back a country or community in its development standing when infrastructure is destroyed. Oxfam estimates the 2010 earthquake in Haiti to have cost US$14 billion which is equivalent to 160 percent of Haiti's GDP (Hillier *et al.*, 2013). Disasters can decrease a country's resources as available resources would be channelled to rebuilding instead of other investments. Disasters sometimes interrupt developmental programmes resulting in people who want to invest in certain countries that are prone to disasters shunning them due to fear of losing their investments. Disasters are not inevitable, while development is a necessary facet of society. The link between the two has led the United Nations to steer countries into sustainable development. This led to the Agenda 21 documents in 1992 followed by the Johannesburg Summit in 2002. Sustainable development centres on reducing the causal factors of disasters such as poverty, rapid population growth, rapid urbanisation, environmental degradation and others. Close linkages between disaster management and sustainable development are not an option but a necessity. Sustainable development ensures that disaster or no disaster there will be resources left for the present and future generations.

Under the International Humanitarian Law dams are listed as "*installations containing dangerous forces*" due to the massive amounts of water they hold (Dinstein, 2016). Dammed water has the potential of causing massive damage to infrastructure, environment and causing human losses. Himsley (2011) maintains that there are risks from dams that can affect people in a way that is "greater than that of a Tsunami". The 1975 Banquiao and Shimantan dam failure in China is considered as one of the worst dam failures in history. Extreme rainfall exceeded the dam's capacity causing a failure which resulted in flooding downstream causing the death of 171, 000 people (Fish, 2013). Construction of dams is important, but knowing the flood risks they come with is equally important as authorities can put risk reduction measures in place.

Pottinger (2009) puts forward the notion that most rural African communities are directly dependent on surface water, from rivers, wetlands, springs and lakes. Earle *et al.* (2005) state that as the climate changes free-flowing, healthy rivers would become an even more valued resource, and this would be made worse by the construction of dams as it will affect the water quality and quantity for millions of downstream users. Dams also lead to riverbed deepening for tens or even hundreds of kilometres below the reservoir. Riverbed deepening can lower the groundwater along a river, threatening vegetation and local wells in the floodplain and requiring crop irrigation in places where there was previously no need (Pottinger, 2009). Dam construction in some instances has meant the "construction of hazards" that has a lot of destructive potential in them.

Dam construction can be a mitigation measure against floods as there can be the control of the amount of water that flows downstream but can also have a negative impact on ecosystems. The Tana River flood plain in Kenya has seen its forests dying as the flood plain has lost its ability to regenerate because of the reduction in high floods that have been caused by a series of dams upstream, while the Lower Zambezi has lost much of its rich floodplain and wetlands due to upstream dams (Pottinger, 2009). The destruction of ecosystems and the impact of the dams on agricultural land as in the Zambezi may suggest that dams may increase the vulnerability of communities living in the river basins, up or downstream.

Mosul dam, formally known as Saddam Dam, on the Tigris River near the City of Mosul was constructed in 1984 for the generation of hydroelectricity and for irrigation, is the largest dam in Iraq. Engineers have warned of the collapse of the dam partly because of the ongoing war as many maintenance workers have not returned there since August of 2014, when ISIS fighters briefly took control. But the main issue, according to Leslie 2016, is that, like many such dams, the project

shouldn't exist in the first place. The dam was built on unstable gypsum bedrock, requiring grout to be constantly injected into the foundation to prevent the dam's collapse. That work has ceased. In 2006, long before the war the U.S. Army Corps of Engineers had rated Mosul Dam "the most dangerous dam in the world" (Leslie, 2016). Doctor Azzam Alwash a hydraulic engineer who has served as an advisor on the Mosul Dam maintains that if the foundations of the dam get weak, it may crack and fail, and 11 billion cubic meters of water may flow downstream. This could be catastrophic for millions of people living along the Tigris River causing an "inland Tsunami" (Tremonti, 2017). Construction of a dam on unstable land was a creation of a hazard on its own, but the need for electricity and irrigation more than the thought of the "creation of a disaster" made the country choose the "lesser of the two evils" for them it was development over disaster.

The Sustainable Development Goals (SDGs), also referred to as the Global Goals, were officially approved by the United Nations in 2015 as a worldwide initiative to eradicate poverty, safeguard the environment, and guarantee that all individuals experience peace and prosperity by the year 2030 (UNDP, 2015). The objective of Sustainable Development Goal (SDG) 11 is to achieve inclusivity, safety, resilience, and sustainability in cities and human settlements, as stated by the United Nations in 2023, (Figure 8.7). One of the primary objectives of Sustainable Development Goal 11 is to substantially reduce deaths and financial damages resulting from disasters, specifically those related to water such as flooding. Dams are commonly regarded as crucial infrastructure that can facilitate the attainment of these objectives by regulating water flow, mitigating floods, and enhancing resistance to severe weather phenomena. The construction of dams in sustainable development should not only focus on economic growth, but also on preventing flooding as a means of disaster risk reduction.

Figure 8.7: SDG11. *(United Nations (n.d.)*

Dams are essential for flood management as they control the flow of water, store surplus water, and release it gradually, thus preventing abrupt flooding downstream (Boulange *et al.*, 2021). Dams play a crucial role in reducing the likelihood of flooding, thereby safeguarding cities, towns, and rural areas situated close to rivers and floodplains. This contributes to the achievement of Sustainable Development Goal 11, which aims to enhance the safety and resilience of human settlements. Although dams can effectively mitigate flooding, they also pose challenges that need to be resolved to align with the sustainability objectives of SDG 11. The construction of large dams frequently necessitates the relocation of communities (Mcdonald-Wilmsen & Webber, 2010), which can have adverse effects on the social cohesion and economic prosperity of these populations. SDG 11 prioritises inclusivity, thus it is crucial to guarantee proper resettlement and compensation for displaced communities. Inadequately maintained dams or flawed design can result in dam failure, potentially resulting in

catastrophic flooding. SDG 11 emphasises the importance of durable infrastructure, thus necessitating continuous monitoring, maintenance, and enhancement of dams.

To ensure that dams make a sustainable contribution to the attainment of SDG 11, it is advisable to employ various strategies that involve local communities in the planning and decision-making process. This approach guarantees that the needs and concerns of these communities, especially in relation to displacement and access to resources, are adequately addressed. Constructing dams to mitigate flooding has the capacity to facilitate the attainment of Sustainable Development Goal 11 by bolstering the security and adaptability of human settlements. Nevertheless, to fully actualise this capacity, dam projects must be undertaken with careful strategizing, good administration, and community involvement are crucial in guaranteeing that dam projects contribute to sustainable and resilient development.

DRR focuses on minimizing the damage caused by natural hazards, such as floods, earthquakes, and storms, through proactive measures like early warning systems, resilient infrastructure, and community preparedness. Vulnerability refers to the degree to which a population, system, or asset is susceptible to the damaging effects of a hazard. Vulnerable groups, often due to poverty, lack of resources, or geographic location, face greater risks and longer recovery times after disasters. Resilience, on the other hand, is the ability of individuals, communities, and systems to withstand, adapt, and recover from disasters. Building resilience involves enhancing the capacity of vulnerable populations to anticipate, cope with, and recover from hazardous events, ensuring that development efforts do not exacerbate vulnerabilities but instead strengthen the long-term safety and sustainability of communities. DRR, vulnerability reduction, and resilience-building are key components of sustainable development and disaster preparedness.

Chapter Four: Study Design and Methodology

The research philosophy and study paradigm, as well as the research design and research methods are explained in this chapter. The population is identified and as it was not possible to engage with the whole population under study, sampling was done. The sampling procedure, methods used in data collection, reliability and validity of the research instruments are discussed. Ethical considerations as well as limitations to the study are also addressed.

A mixed method approach was used in the research. This was done to provide a thorough analysis of the relationship between development projects and the risks associated with disasters, focussing on the Tokwe-Mukosi flooding disaster and the lived experiences of the Tokwe-Mukosi community. The aim is to comprehend how development initiatives can both contribute to and alleviate the effects of disasters, with the objective of informing future policies and practices to ensure that development efforts are durable and resistant to natural hazards. Using the mixed method the study examined the fundamental factors that contributed to the 2014/15 Tokwe-Mukosi flooding tragedy, including the impact of development activities such as the construction of dams. An evaluation of societal, financial, and ecological impacts of the flooding disaster on the impacted communities, encompassing displacement and loss of livelihood is investigated. This study examines the potential impact of the Tokwe-Mukosi Dam's construction on the occurrence of the disaster and discusses whether the risks associated with this project was sufficiently assessed and controlled. The study offers a comprehensive account of the initial reaction to the disaster by governmental organisations, non-governmental organisations (NGOs), and local communities, as well as the subsequent long-term recovery endeavours and their efficacy.

The study examines the Tokwe-Mukosi disaster and extracts important insights regarding disaster risk management, development planning, and policy implementation. It provides recommendations for future

development projects in Zimbabwe and similar situations, adding to the discussion on sustainable development by addressing the connection between development and disaster risk. The study contributes to academic and policy conversations on how to balance development objectives with the imperative to safeguard communities from potential disasters, thus both qualitative and quantitative methods were used in the research.

A mixed methods approach incorporating both positivism and interpretive research philosophies was used in the study. The concept or idea of positivism is associated with the concept of objectivity. In this philosophical approach, scientists can give their views in the evaluation of the social world using objectivity instead of being subjective (Cooper & Schindler, 2006). The positivism approach according to Saunders (2007) is usually linked to observations and experiments. Objectivity rather than subjectivity was used in the Tokwe-Mukosi flood study. The researcher was able to give their view as they evaluate the social environment of the Chingwizi Camp community. Interpretive research can be referred to as "social construction". This approach allows researchers to project the importance of their beliefs and values as they justify their research problem. Interpretive research seeks to focus on and highlight the real facts and figures which are in line with the research problem. Interpretive research seeks to find out facts which are in line with the problem.

The research made use of both a qualitative and quantitative approach. Qualitative research is regarded by Snap Survey (2010) as primarily exploratory research. It is used to gain an understanding of underlying reasons, opinions, and motivations. It provides insights into the problem and/or helps to develop ideas or hypotheses for potential quantitative research. A qualitative approach involves collection and capture of data and information that is not numerical in nature. Information that was captured from interviews recorded or written was qualitative information. Open ended questions are used in qualitative research and so are observations.

Quantitative research is objective and may use statistics to generalize a finding. Qualitative research can be used to quantify attitudes, opinions, behaviours, and other defined variables. Collection of data in a quantitative study involves a more structured approach than in a qualitative study. Quantitative data collection methods include different surveys, interviews and other structured methods (Creswell & Plano Clark, 2011). The research had a quantitative approach as close-ended questionnaires were used. The close-ended questionnaires enabled the researcher to quantify data and generalize results from a sample to the population of interest, collect data from a large sample and collect numerical data for data representation and analysis.

A study design, according to De Vaus (2001), is the overall strategy that a researcher chooses to integrate the different components of his/her study in a "*coherent and logical way as they ensure that they effectively address the research problem*". It may be regarded as a plan or structure for an investigation or a list of specifications and procedure for conducting and controlling a study project. Kombrabail (2009) argues that a study design should bring out specific methods and procedures for acquiring information that is needed in the study. It is therefore a 'master plan' or a framework that stipulates the information to be collected, the sources to obtain the information, how the data was analysed and the procedures to be undertaken. The research design chosen for this study is both descriptive and exploratory and takes a case study approach (Case of Tokwe-Mukosi Community). Saunders *et al.* (2003) define the descriptive survey method as "one which looks with intense accuracy at the phenomena of the moment and then describes precisely what the researcher sees" as the researcher describes the characteristics of the problem. Descriptive research designs, according to Anastas (1999) assist in providing answers to the questions of who, what, when, where and how, associated with a particular research problem. Questionnaires

and interviews are the two methods used to elicit information in descriptive research. A descriptive research design allowed in-depth analysis of variables and elements of the Tokwe-Mukosi population in the study.

An exploratory design is conducted about a study problem when there are few or no earlier studies to refer to or rely upon to predict an outcome, in a particular area or study field (Cuthill, 2002). Exploratory research designs allow insights for later investigation and understand how best to proceed in studying an issue. The use of exploratory research in the study produced familiarity with basic details, settings and concerns of the study. The exploratory research gave a well-grounded picture of the situation being developed, generation of new ideas and assumptions in the Tokwe-Mukosi area. The use of exploratory research enables issues to get refined for a more systematic investigation and formulation of new research questions, while direction for future research and techniques get developed (Cuthill, 2002).

A population signifies the units or people that one is interested in studying. A population in research is referred to by Polit and Hungler (1999) as the totality of all the objects, subjects or members that conform to a set of specifications. In this study the population was all people, male and females of all ages that were living in the Tokwe-Mukosi area and were affected by the 2014 floods. Obtaining data from the entire population requires vast amounts of money and time which are not available at the time of the research. Sampling was therefore used. A sample refers to a representative sub-group of the population. LoBiondo-Wood and Haber (1998) refer to sampling as the process of selecting a portion of the population to represent the entire population. There are two categories of sampling techniques, probability and non- probability sampling. Sampling procedures

include random, judgmental, stratified and systematic sampling. For this research, judgmental and convenient non-probability sampling techniques were used. If a study is performed with a wrong sample or one that is inaccurately designed, misleading results may be obtained.

The chosen sample comprises of randomly selected households that are still living in the Chingwizi Camp. About 3,125 households were moved to Chingwizi Camp. Efforts to decongest the camp by moving people to a permanent site have met resistance from the community. Only 376 families had relocated to the permanent site by 15 May 2014 as most of them state that they are waiting for compensation (OCHA, 2014). An estimated 2,749 households are living in Chingwizi Camp. Fielding (2007) maintains that a sample size must be at least 30% of the total population under research, but for the purpose of the study the researcher tolerated a margin of error of 10% and a confidence level of 95%. With a 10% margin of error and 95% confidence level, the sample size was 93 households. Calculations of the sample size were done using Rao soft (2004), an internet-based sample size calculator. It is impractical, and in most cases impossible, to attempt to study or survey every unit of a population. Studying a sample of the population affected by the 2014 floods is a more attainable goal due to time and cost constraints. In the Tokwe-Mukosi area, the researcher selected participants viewed as the best source of information, or participants viewed as most likely to bring out the required data which is specific to the research problem. To achieve this, a judgmental sampling technique was used. Judgmental sampling has been referred to as sampling that works in a situation whereby the researcher selects respondents who they judge to be representative of the population (Reference.com, 2017). This is a non-probability sampling technique based on judgment.

Considering that Chingwizi Camp was created solely for the 2014 flood victims, it most likely that all the residents of the camp were

affected by the flood and are likely to give specific information relevant to the research. The use of judgmental sampling ensured optimisation of time and resources. This is because the interviews could be done quicker and faster with those people with information and knowledge about the issues and area under study. Convenience non-probability sampling was used to locate households for interviews. Convenience sampling is a non-probability sampling technique where subjects are selected because of their convenient accessibility and proximity to the researcher (Tajik & Noor, 2022). During data collection, households in the camp were visited and those available at that time were interviewed. Randomly sampling respondents from a food beneficiary register or registration of flood victims could have been an alternative. This would however be a mammoth task as the Chingwizi Camp villagers were said to be there temporarily, so they do not have specific physical addresses. Convenience sampling made data collection easier as any villager available had a chance of being interviewed. This method of sampling has been criticised for its lack of being scientific and its bias on not being representative of the entire population. Explorable.com (2008) is of the view that convenience sampling is not representative of the entire population therefore the results cannot speak for the entire population. The study did not use convenience sampling in isolation but combined it with judgmental sampling. The two-stage sampling design sought to ensure that the sample was representative of the population and that no bias or errors were incurred.

Questionnaires were used for the survey. A questionnaire is defined as a formalized list of questions that are used to solicit information from respondents (Whelan, 2007). Questionnaires are designed to collect appropriate data, enable data comparison, minimise bias in question formulation and to make the questions varied and engaging. In this research, the researcher made use of both structured and unstructured

questions to gather data. The structured or closed questions are meant to save both the researchers and respondents' time. Definite answers may be obtained from structured questions. Unstructured questions or open-ended questions are meant to ensure that relevant information is not left out and that respondents' feelings are not disregarded. Unstructured questions allowed further explorations and explanations which are not possible in closed questions. The questionnaires were delivered in person. Households that were available when the interviewer visited Chingwizi Camp were interviewed. The questionnaires were delivered after the consent of the Government of Zimbabwe to enter the Chingwizi Camp and after the respondents themselves indicated willingness to respond. Saunders *et al.* (2003) maintains that a reasonable and moderately high response rate of about 30 to 50% is guaranteed when questionnaires are self-administered, hand delivered and/or collected. Uniformity and lack of bias is achieved in questionnaires as the respondents respond to the same questions. Self-administered questionnaires sometimes ensure that the questionnaires returned are all completed, unlike those that are sent by mail.

According to Dessler (2017), an interview is a procedure designed to obtain information from a person's oral response to oral inquiries. Interviews were used because they allow a certain amount of probing of questions and answers that may require clarification. Dialogue allows a person to explain themselves if they think they are being misunderstood. The interview gave the researcher more control over the person being interviewed compared to some questionnaires which give room for respondents to give someone else to answer questions for them. The interviews of the project managers at Tokwe-Mukosi gave clarity on some technical terms. Face to face interviews gave room for informal discussions that brought out some important information for the research.

Observation is a systematic data collection approach (Robert Wood Johnson Foundation, 2008). Observations were used to get a picture or images of the impact of the flood. Observation was used in the assessment of how communities are living now. Geographic Information Systems (GIS) is a system designed to capture, store, manipulate, analyse, manage, and present spatial or geographic data (Esri, 2017). Spatial data including aerial photographs and images were used in the study. GIS with mapping capabilities, assisted in visualizing, questioning and interpreting data to understand patterns and trends in flooding and vulnerability in the Tokwe-Mukosi area.

A focus group discussion (FGD) involves gathering people from similar backgrounds or experiences to discuss a specific topic of interest (Shaping Policy for Development, 2017) the FGD brought the flood victims together to discuss their experiences about the flood. The group was guided by a moderator who, guided by the objective of the study and the key questions that have been developed had an agenda to give the discussion guidance. A detailed report including observations by a moderator was written immediately after the discussion. The focus group discussion assisted in bringing meaning to survey findings that cannot be explained statistically.

Validity refers to how well a test measures what it is supposed to measure. Phelan and Wren 2005) state that "while reliability is necessary, alone, it is not sufficient". For a test to be reliable, it also needs to be valid. Construct Validity is used to ensure that the measure is measuring what it is intended to measure (i.e. the construct), and no other variables. Formative Validity, when applied to outcomes assessment, is used to assess how well a measure can provide information to help improve the program under study. To ensure validity of the study, the researcher ensured that the goals and

objectives of the study are well defined. The assessment measures were then matched to the goals and objectives. An expert reviewed the questionnaires for troublesome words that might be misunderstood and any other difficulties that may be in the tools. The tools may also be compared to other data that may be available. Phelan and Wren (2005) define the reliability as the degree to which an assessment tool produces stable and consistent results. If an assessment tool is reliable then it is less likely to make errors. Parallel forms of reliability were applied in ensuring that data obtained was accurate. More than one data collection instrument was used to eliminate weaknesses inherent in each instrument.

Data organisation ensured the integrity and accessibility of data files during the data collection process. Multiple individuals edited and analysed the data hence the need for data organisation to ensure that research data was not lost or misplaced. To avoid data access confusion during research and data analysis, all project data was filed and organised according to the following protocol.

Directory structure: For ease of access and reference, different aspects of the project were filed separately. The following was the general directory structure.

Project Title Directory\Aspect Directory\Sub-Aspect Directory

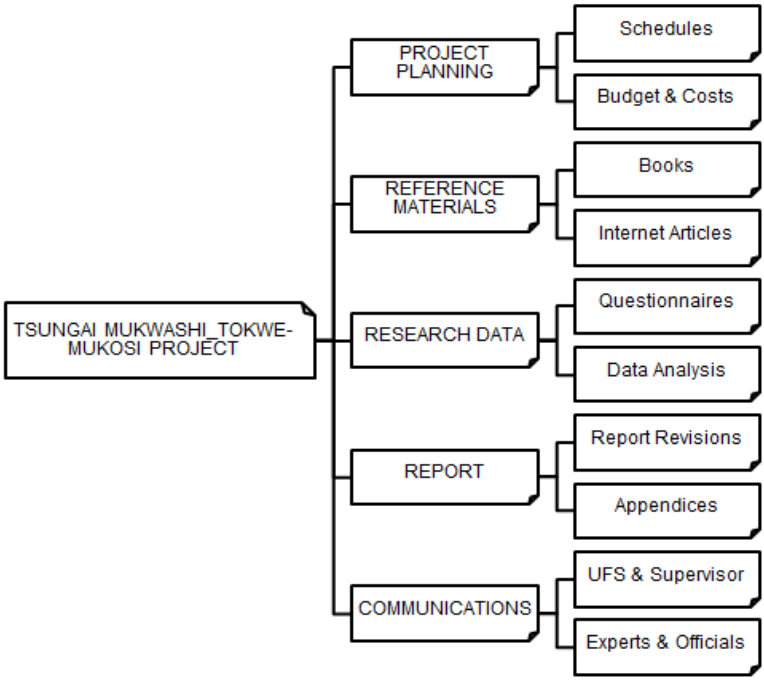

Figure 9-1: Schematic of the Directory Structure

File naming: All files were named according to the following convention.

Researcher Name_ Project Title_Date_Version

File version: For clear file version control, each file had a postfix of date and version number as follows:

Date_Version number

Below is an example of the root to an individual file.

Project Title Directory\Aspect Directory\Sub-Aspect Directory\Researcher Name_ Project Title_Date_Version number

Tsungai Mukwashi_Tokwe-Mukosi Project\Report\Report Revisions\ Tsungai Mukwashi_Tokwe-Mukosi Project_28032017_Version 1

After data collection and information generation, the results must be presented in a way that conclusions can be drawn from the findings (Reference.com, 2017). Data collected from both primary and secondary sources was processed, analysed and presented as useful information. Content analysis and comparison techniques were used in analysing secondary data. Content analysis is a qualitative research technique that has three distinct approaches: conventional, directed and summative. All three approaches are used to interpret the research findings so that there may be adherence to the paradigm guiding the study (Shannon, 2005). Collation and interpretations were used for responses on open ended questions in the questionnaire. Care was taken to avoid incorrect grouping of data, that data was not incorrectly added, there are no missing data forms and that no double counting was done.

Quantitative data generated through questionnaires was analysed using an electronic data analysis package called SPSS (Statistical Products & Services Solutions) and Microsoft Excel. There are a variety of ways of presenting data which includes pie charts, graphs (bar graphs, line graphs) and tables. The presentation of data must be clear and appropriate ways of presentation must be used. The researcher analysed the data and decided on the appropriate ways of presenting the data.

In seeking knowledge, truth and solutions to the flood problem in Tokwe-Mukosi, care was taken to respect the cultural values and dignity of the people in Chingwizi Camp. The community of Chingwizi camp are victims of a flood and most have lost homes and livelihoods. Some of the people are living in, as stated by the Human Rights Watch (2015) 'inhuman' conditions. The dignity of the community was respected as they were people who have suffered a misfortune but still people. Data obtained in research becomes

information from which people may learn from past mistakes or from how other communities have overcome disasters and/or any other obstacles.

All literature reviewed was referenced as a way of acknowledging the use of work done by others. The limitations of the study have been coined as follows, potential challenges during data collection, allaying fears of respondents that questionnaire responses are not anonymous, scheduling meetings with government officials, access to information considered confidential and classified by authorities. To gain community trust, the researcher started with a meeting with local administrators and community leaders to explain the purpose of the research before engaging with community members. Where face to face meetings with officials were not possible, telephonic interviews were conducted.

Chapter Five: Policies, Laws and Standards Governing Disasters

Effective disaster risk management requires a solid foundation of policies, laws, and standards that govern how countries and communities prepare for, respond to, and recover from disasters. Over the years, global frameworks such as the Yokohama Strategy for a Safer World (1994), the Hyogo Framework for Action (2005–2015), and the Sendai Framework for Disaster Risk Reduction (2015–2030) have shaped international efforts to reduce disaster risk and promote resilience. These frameworks provide guidelines and principles for integrating disaster risk reduction (DRR) into national policies, encouraging proactive, inclusive approaches to managing disaster risks.

This chapter will explore the evolution of global disaster management frameworks, focusing on their goals and principles. In addition to global frameworks, this chapter will also review the national laws and policies governing disaster management in Zimbabwe, a country highly vulnerable to natural disasters such as floods, droughts, and cyclones. Zimbabwe has developed a range of legal instruments and policy frameworks aimed at disaster risk management, including the Civil Protection Act (1989), which provides the legal basis for disaster preparedness, response and recovery in the country and the National Contingency Plan will also be discussed in the context of their role in strengthening national disaster preparedness and response capacity. The Chapter also looks into South Africa's DRR laws to give a regional perspective in DRR. The chapter highlights the importance of aligning national legislation with international standards and the need for continuous improvement in policy implementation to reduce disaster risks and enhance resilience, particularly in vulnerable countries like Zimbabwe.

Climate change, changing technology, socio-economic conditions, changing demography, urbanisation and development in high-risk zones, have increased disaster losses around the world (UNISDR, 2015). This has pointed to a future where the world's population and

economies will be greatly affected by disasters. The idea of sustainable development is being encouraged and all countries interested in disaster risk reduction must embrace this concept if disaster risk reduction is to become a reality for all (Prevention web, 2017). Since risk reduction is becoming a global concern, standardising the approach actions to be taken in risk reduction is important. The concept of having standard policies and processes in addressing disaster risks may help in reducing global disaster risks. The recognition of the importance of promoting disaster risk reduction internationally and at local levels has led to several key frameworks and declarations, such as the Yokohama Strategy, Hyogo Framework of action and the Sendai Framework for Immediate Action.

The Yokohama World Conference on Natural Disasters held in 1994, was the first world conference on natural disasters. The Yokohama Strategy for a Safer World, Guidelines for Natural Disaster Prevention was adopted and was endorsed by the UN General Assembly in the same year (United Nations, 1994). The Yokohama Strategy centred on preparedness and mitigation guided by ten principles:

1. Application of risk assessment in all disaster reduction policies and measures.
2. Disaster relief and response to be reduced with the implementation of disaster prevention and preparedness.
3. All developmental policies and planning (national, regional, bilateral, multilateral and international levels) should take into consideration disaster prevention and preparedness.
4. Follow-up should be enabled by development and strengthening of capacities to prevent, reduce and mitigate disasters.
5. Early warnings and information dissemination should be an integral part of disaster prevention.
6. Participation at all levels; from the local community to national governments to be part of disaster prevention.
7. Through education, proper development plans and designs, vulnerability should be reduced.
8. Sharing of necessary technology to prevent, reduce and mitigate disasters.

9. Environmental protection through sustainable development, together with poverty alleviation to be included in prevention and mitigation of natural disasters.
10. The primary responsibility for protecting its people, infrastructure, and other national assets from the impact of natural disasters, rests on individual countries. The international community would support individual countries develop strong political determination through the mobilisation of adequate and efficient use of existing resources (financial, scientific and technological) in natural disaster reduction. The needs of developing countries, particularly the least developed countries would be taken into consideration (UNISDR, 1994).

These guidelines would help individual countries to create safer environments for their communities and therefore a safer world.

The Hyogo Framework for Action (2005-2015) centres on developing the resilience of different countries and communities to disasters. The Hyogo Framework seeks to promote strategic and systematic approaches to both vulnerability and risk reduction. The Hyogo Framework was identified as the framework of action as it considered different ways (actions) of building community resilience. Building Resilience of Nations and Communities to Disasters (HFA) was the first disaster risk reduction initiative to outline, explain and describe in detail, the actions and work that would be done by different sectors in Disaster Risk Reduction (DRR) such as governments, international agencies, disaster experts and many others sectors relevant to DRR. The 168 countries attending the conference adopted The Hyogo Framework for Action (2005-2015) that was then endorsed by the UN General Assembly in resolution 60/195. Countries such as the United States of America, the Netherlands, Namibia, South Africa, Zimbabwe and other UN affiliated countries attended the conference (Prevention Web, 2017).

The Framework offers guidelines and practical steps that can be taken to achieve disaster resilience, where five priorities of action are outlined (HFA, 2020).

1. Priority 1 is to ensure that disaster risk reduction is a national and local priority with a strong institutional basis for implementation. This would be achieved through development of national policies, legislative and institutional frameworks. The different countries would then track progress and have measurable outcomes.
2. Priority Action 2 identifies, assesses and monitors disaster risks, while at the same time enhancing early warning systems. Monitoring and assessing disaster risk means that local and national governments can give early warnings which will be important in disaster prevention.
3. Priority Action 3 uses knowledge, innovation and education to build a culture of safety and resilience at all levels. Collection, compilation, dissemination of relevant knowledge and information on hazards, vulnerabilities and capacities, means that people know the kind of hazard they are dealing with, and move towards reducing exposure and ultimately reducing risk.
4. Priority Action 4 aims to reduce the underlying risk factors. Planning was proposed as a sector which may assist in the reduction of underlying risks. With changing social, economic, environmental conditions, and the impact of hazards associated with geological events, weather, and climate change, sector development planning and programmes become important in pre- and post-disaster situations.
5. Priority Action 5 strengthens disaster preparedness for effective response at all levels. Authorities, individuals and communities in hazard-prone areas can be well prepared and ready to act if they have knowledge about the hazard and what to do in case of a hazard impact. Coping capacities of communities are important and can be achieved by equipping communities with the right resources in case of a hazard impact.

The HFA lasted for a decade. In 2013 the UNISDR hosted global meetings and facilitated the process of developing a post-2015 framework for disaster risk reduction. This process culminated in the adoption of the Sendai Framework (SF) for disaster risk reduction 2015-2030 at the third United Nations world conference on disaster risk reduction (DRR).

The Sendai Framework for Disaster Risk Reduction 2015-2030 for disaster risk reduction is for the period 2015 to 2030. It was, adapted at the third UN World Conference in March 2015 at Sendai, Japan. The SF stresses the need to enhance disaster preparedness and a post disaster period that takes a 'Build Back Better' or a 'Bounce Back Better' recovery, rehabilitation and reconstruction stance (Sendai Framework for Disaster Reduction, 2015-2030). Movement from the HFA to the SF ensured that countries would be able to renew their commitments to reduce the risk of disasters locally and internationally. The SF included goals of reducing mortality, minimising economic and infrastructure losses and getting the countries which were already using the HFA, and others who would consider risk reduction in their countries to commit to disaster risk reduction strategies.

Three themes were central to the Sendai Framework for Disaster Reduction, building resilience, promoting local solutions and fostering inclusion. The SF went beyond reducing disaster risk to building resilience. This would be done by investigating the causal factors of disasters, one of which was vulnerability caused by poverty. Reducing disaster risk was not enough, but communities had to have the capacity to recover from shocks that they may face (USAID, 2017). The preoccupation with mega-disasters, such as tsunamis and earthquakes were set aside in the SF and focus was on dealing with 'chronic shocks and stresses, like from frequent floods and droughts to rapid urbanisation and chronic food insecurity, that keeps communities locked in a cycle of crises (Staal, 2015).

Disaster risk reduction in communities that are themselves not involved in disaster reduction activities are bound to fail. Locally driven solutions, according to Staal (2017) are crucial for lessening disaster risks. Humanitarian agencies and civil society organisations

who work first hand with communities were present at Sendai. They shared how communities have been affected by disasters and how these same communities can be or are part of the solution to disaster preparedness and resilience at a local level (Staal, 2017). The program, *Resilience in the Sahel* by *USAID* is to assist in reducing the impacts of drought. USAID works with local women to diversify their livelihoods, so that they are not solely reliant on one source of income when disaster strikes (USAID, 2017). Humanitarian agencies and civil societies continue to work and partner with local communities and civil society to advance the goal of local solutions in DRR.

The Sendai Framework (2015-2030) recognised that in DRR and emergencies, women, youth, the elderly and people with disabilities have different needs and are more affected by hazard and disasters than others. The Sendai Framework has the goal of including all people in DRR. Investment in disaster risk reduction should ensure that no community is left behind, as every unique need of individuals must be addressed.

The targets of the Sendai Framework can be summarized as follows:

1. Substantially reduce global disaster mortality by 2030. The aim is to lower the average per 100, 000 global mortalities between 2020 and 2030 compared to the 2005-2015 period.
2. Substantially reduce the number of affected people globally by 2030. The aim is to lower the average global figure per 100,000 between 2020 and 2030 compared to the 2005-2015 period.
3. Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030.
4. Substantially reduce disaster damage to critical infrastructure, and reduced disruption of basic services such as health and education facilities. Reduction will be done through development and strengthening resilience by 2030.
5. By 2020 the number of countries with national and local disaster risk reduction strategies should increase.
6. Assisting and cooperating with developing countries in their actions to implement the SF by 2030.

7. Access to multi-hazard early warning systems and disaster risk information and assessments should easily be accessed by communities by 2030.

The Sendai Framework calls on countries to undertake the following as part of the implementation of the Framework:

1. Appointment of national focal points which can be the same as those in the HFA but be increased to be in line with that of the SF.
2. The importance of the establishment of an open-ended intergovernmental working group for the development of a set of possible indicators to measure global progress in the implementation of this framework. The group would comprise of experts nominated by member states.
3. The SF expanded the scope of hazards and risks that need to be considered. Biological and man-made hazards were included in the definition of hazards.
4. Implementation of national and local disaster risk reduction strategies for preventing the creation of risk, reduction of existing risk and strengthening of economic, social, health and environmental resilience must be done by 2020.
5. Public accounting and disaggregated information to better understand risks had to be done through the identification of baselines and the dissemination of results of the assessments.
6. National governments to revise and revisit legislation to be in line with the SF for DRR to be prioritised in their countries.
7. Access to plans and reports to be open to the public. This was to be done immediately.
8. Development and updating of regional strategies to be in line with national strategies and the strategies of the SF.
9. Peer reviews among countries. SADC, for example, can have peer reviews among member countries.
10. Local platforms in addition to national platforms on DRR to be developed by member states.

The focus of the SF is on disaster risks, while the HFA focused on disaster losses. Valasquez (2015) argues that the Sendai Framework focuses more on "the how" while the HFA focused more on "the what".

The HFA expected outcome according to the HFA (2002) was to achieve substantial reduction of disaster losses, human, social, economic and environmental in communities. The target outcome of the SF is to achieve a reduction in both disaster risks and losses in lives, livelihoods, health, economic, physical, social, cultural and environmental assets of people and businesses. The focus in disaster losses, in the HFA, meant minimising the impacts of disasters, while reduction in disaster risks which was adapted by the SF meant more effort was put in reducing the magnitude of the same disasters.

The SF and the HFA are not two completely different frameworks with parallel policies. The Sendai Framework was guided by the actions proposed by the HFA, as according to Valasquez (2015) about a quarter to half of the priorities for actions are similar. The HFA focussed on actions to be done in DRR while the Sendai Framework puts more emphasis on the means of implementation. Both the Sendai framework and the HFA highlight the importance of sustainable developed in disaster risk. The HFA and the Sendai Framework emphasises the need for and importance of multi-stakeholder, local and international approach so that all sectors may be involved in DRR. HFA adopts a more "proactive approach," while the Sendai Framework has a "people centred approach" (UNISDR, 2015). The duration for the HFA to achieve its objective was set at 10 years while that of the Sendai Framework is 15 years. The Sendai Framework, according to Valasquez (2015) requests for more accountability from member states than that in the HFA.

One of the indicators of success in DRR proposed by both frameworks is the reduction of losses from disasters. The HFA notes that 2 billion people have been affected by disasters over a ten-year period. In comparison, the Sendai Framework estimates more than 1.5 billion people who have and will be affected by disasters in 10 years. This gives a 25% reduction in the number of people affected by disasters in the same time. The world population increased by more than 1 billion people, but the disaster losses have decreased (HFA, 2015).

The following summarises changes in focus priorities between the HFA and SF:

1. Priorities for Action Section 2 and Section 3, in the HFA are Priority 1 in the Sendai Framework. This includes sharing of risk information in different sectors and encouraging collaboration of people at a local level. "The idea is to foster partnership with scientific, technological, academia and private sector to share good practices, and the call to support global and regional campaigns for public awareness and education" (Valasquez, 2015). The new elements introduced in the SF include developing country access to finance, innovation, knowledge and information sharing, support to thematic platforms to share knowhow, innovation and research, and a call for inclusion of DRR into bilateral and multilateral assistance. The SF considers public education and awareness to be very important and should be included in national and international level policies.
2. The HFA Priority 4 became SF Priority 3. In Priority 3, the SF included new elements such as special focus on people with chronic diseases, livestock and animals, workplaces, sites of historical, cultural heritage and religious interest (Sendai Framework, 2015). The historical and cultural areas were included in Priority 3 as the SF incorporated tourism into DRR.
3. HFA Priority 5 became Priority 4 in the Sendai Framework. In Priority 4 new elements such as 'critical infrastructure safety, public awareness and stockpiling for relief, capacity of workforce and volunteers on response, business continuity management, response and recovery exercises, evacuation drills, cooperation by stakeholders for reconstruction, and guidance on reconstruction (Sendai Framework, 2005). Focus was also added onto the relocation of public facilities outside of the risk range, building of local authority capacity for evacuation, and development of laws to support international cooperation and procedures on relief and recovery.
4. The Sendai Framework adds man-made hazards, and biological hazards, and increases the scope of action in recovery, rehabilitation and reconstruction, as compared to the HFA. It thus reflects a holistic and multi-hazard approach to disaster risk management and the relationship, between them which can have a significant impact on social, economic,

cultural and environmental systems (Valasquez, 2015). The SF (2015) focuses on enhancing disaster preparedness for effective response, and to "Build Back Better" in recovery, rehabilitation and reconstruction. The Sendai Framework thus significantly increases the scope of action in recovery, rehabilitation and reconstruction.

Legal frameworks in disaster management stipulate the rules and regulations of actions and operations in disaster management, for instance Chapter 4 of the Constitution of Zimbabwe includes laws, some of which are relevant to disaster risk reduction, disaster relief, rehabilitation and reconstruction. "Juristic persons and natural persons are entitled to the rights and freedoms set out in this Chapter to the extent that those rights and freedoms can appropriately be extended to them" (Constitution of Zimbabwe, 2013). A constitution is a set of fundamental principles, established precedents or processes according to which a state or other organisation is governed (University College London, 2017). Countries have constitutions detailing rules and regulations which create, empower, and limit the institutions that govern society. The Bill of Rights in disaster management becomes important in ensuring that pre and post disaster, the rights of individuals are not infringed upon.

Some of the rights defined in the Constitution of Zimbabwe which are key to disaster management include:

1. Everyone has a right to life.
2. Everyone has a right to human dignity.
3. Everyone has a right to access information.
4. Everyone has the right to movement and residence.
5. Everyone has a right to education, health care, food and water.

According to Betera (2011), the Government of Zimbabwe's commitment to disaster management is demonstrated by the existence of legal enabling statutes that create a conducive environment for disaster risk reduction initiatives. The broad policy statement of the National Policy for Civil Protection argues that "Every Citizen of

Zimbabwe should assist where possible to avert or limit the effects of a disaster". The need to reduce disaster risks in Zimbabwe led to the amending of the Draft Bill of the Civil Protection Act (1989) and a Draft Bill to mainstream disaster risk reduction into development planning was also developed. The Draft Bills are in line with both the Yokohama (1994) and the Hyogo Framework (2005). The Bills seek to:

1. Ensure that disaster risk reduction is a national and local priority with a strong institutional basis for implementation.
2. Identify, assess and monitor disaster risks and enhance early warning for disaster risk reduction.
3. Use knowledge, innovation and education to build a culture of safety and resilience at all levels.
4. Reduce underlying risk factors and strengthen disaster preparedness for effective response at all levels of action (HFA, 2005).

The current disaster legislation in Zimbabwe is the Civil Protection Act of 1989 that was amended in 2001. The Civil Protection Act of 2001 defines disaster as consisting of "any (a) natural disaster, major accident or other event howsoever caused; or (b) destruction, pollution or scarcity of essential supplies; or (c) disruption of essential services; or (d) influx of refugees; or (e) plague or epidemic or disease; that threatens the life or well-being of the community" (The Civil Protection Act 2001; Part I, Section 2). This legislation resulted in the creation of the Department of Civil Protection. The Act provides for;

1. Special powers designed to establish, coordinate and direct the activities of both public and private emergency services,
2. Guidelines for action and maximum use of resources in disaster mitigation,
3. The establishment of a National Civil Protection Fund which is applied to the development and promotion of civil protection activities throughout the country,

4. Sourcing and allocation of resources for the purpose of mitigating a disaster,
5. Declaration of a State of Disaster by the president of Zimbabwe (Betera, 2011).

The Minister responsible for Local Government Rural and Urban Development is mandated with the coordinative role as empowered by the Civil Protection Act No. 5 of 1989. The Act stipulates that the Ministry should direct all functions relating to disaster risk reduction, mitigation of disasters, rehabilitation and reconstruction. Some of the disaster alleviation functions of the Ministry of Local Government Rural and Urban Development include:

1. Establishment of a regulatory and management system in emergency and disaster management as provided for in the Civil Protection Act and coordinating disaster intervention and mitigation programmes during (duration of a declared state of disaster).
2. Collation of relevant data and compilation of disaster reports as well as communication and partnership development with international disaster management and disaster relief organisations.
3. Sourcing financial and material aid from within and outside Zimbabwe for disaster management promotion and mobilisation of resources, before, during and after disasters/emergency.
4. Ensuring coordination and cooperation various subcommittees and related structures. Planning and execution of the plan in major emergencies/disasters.
5. Promoting research into matters relating to emergency/disaster management, liaison with related sectors on research to enhance civil protection policy and practice.

6. Dissemination of information on matters relating to emergency/disaster management.
7. Developing appropriate training programmes on civil protection issues, promoting and organising training for critical services such as hospitals, airports and local authorities on civil protection issues and developing public awareness programmes on emergency preparedness and disaster prevention.

By 2003, plans were in place to change the name of the Department of Civil Protection to the Department of Emergency Preparedness and Disaster Management under the newly proposed Emergency Preparedness and Disaster Management Act (Bongo, 2013). The Government of Zimbabwe in 2007 produced its first draft of the National Disaster Risk Management Policy. After consultations, the draft was revised in 2011. The 2011 edition of the Policy was being circulated to key stakeholders in 2012 for their input, before finally being revised and adopted. There has yet to be an outcome of the policy revisions of 2012.

In the United Nations Preparedness Framework, institutional capacity is noted as one of the aspects that are necessary for communities or society at large to be prepared for hazard impacts. Kent (1994) is of the view that disaster management preparedness and response should function within already established structures instead of creating new ones. The objectives of disaster management can only be achieved if there are relevant institutions in place. The success of disaster management sometimes depends on the government or the traditional structures of governance that exists in an area (Pimentel, 2013). With clearly defined institutional arrangements and policies, all stakeholders in disaster management from the government,

humanitarian agencies to the heads of different households, disaster risks may be reduced.

There should be different institutions in place for prevention of disasters to disaster relief and recovery. According to the Disaster Management Act 57 of 2002, an Intergovernmental Committee on Disaster Management must be established by the President. The committee would consist of cabinet members involved in disaster management or involved in national legislation dealing with an occurrence defined as a disaster. The committee members may hold portfolios in sectors such as agriculture, defence, education, environmental affairs, treasury, international affairs, health, public works, water affairs, safety and security or any other sector that is relevant to disaster management. The committee then gives advice and makes recommendations to cabinet on any issues relating to disaster management (Western Cape Government, 2017).

Key Performance Area 1 in the NDMF (2005) focuses towards establishing the necessary institutional arrangements for implementing disaster risk management within the national, provincial and municipal spheres of government. Cooperative governance for the purpose of disaster risk management is applied. It also emphasises the involvement of all stakeholders in strengthening the capabilities of national, provincial and municipal organs of state to reduce the likelihood and severity of disasters. KPA 1 describes processes and mechanisms for establishing co-operative arrangements with international role players and countries within southern Africa (NDMF, 2005). The institutional arrangement as stipulated in the NDMF (2005) is shown in Figure 10-1.

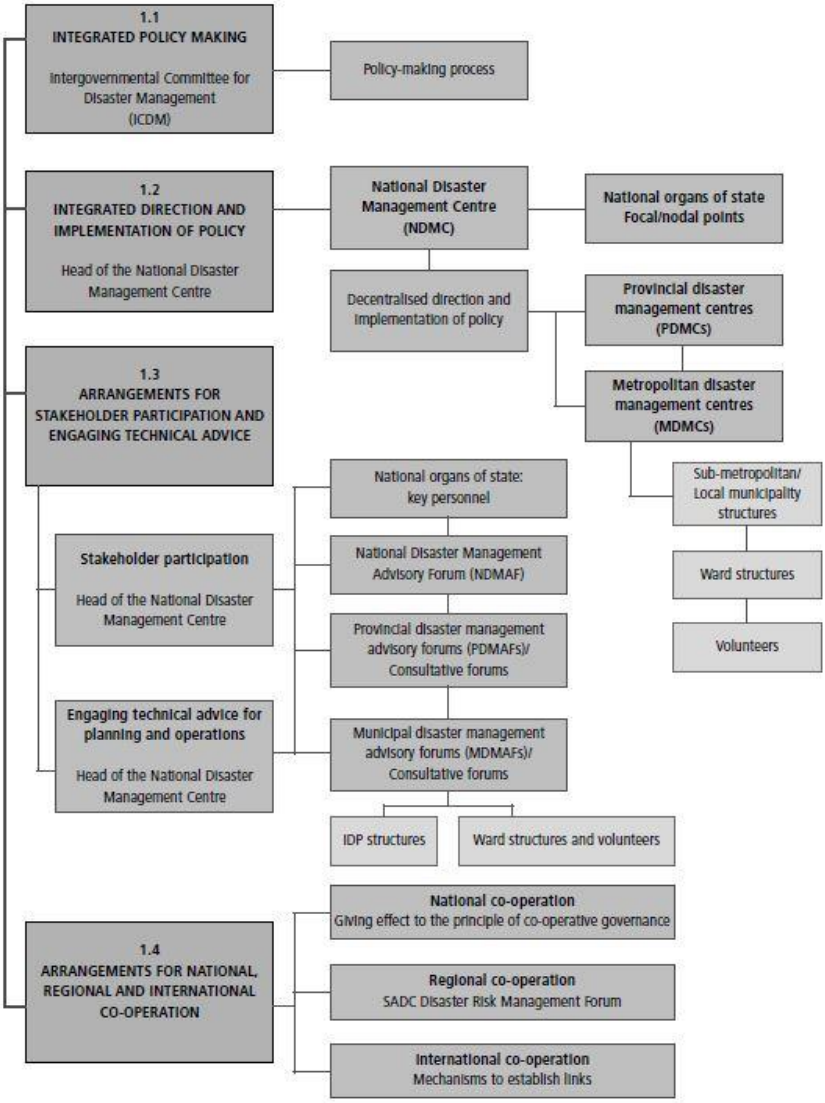

***Figure 10-1*:** Institutional Arrangement. *(NDMF, 2005)*

Act 57 of 2002 calls for national organs of state to appoint a Disaster Management Focal Point. This will be an individual who represents

their department and facilitates and/or coordinates the department's disaster management arrangements, planning for risk reduction, response and recovery.

As stipulated by both the Act and the Framework there has been the establishment of a National Disaster Management Centre (NDMC), Provincial and Municipal Disaster Management Centres (PMDC and MDMC). In all the three centres there should be establishment and maintenance of institutional arrangements that will enable implementation of the provisions of the Disaster Management Act. The Disaster Management Centres are facilities that have been created to provide efficient communication lines, risk assessments, development and implementing prevention and mitigation strategies and response and recovery plans (Pimentel, 2013).

The MDMC, PDMC and the NDMC must initiate and co-ordinate disaster risk management capacity building, education, training and research within the area that they operate in placing particular emphasis on the development of community awareness programmes and promoting the incorporation of such programmes into school curricula (Western Cape Government, 2017). Capacity should be built so that municipalities and/or provinces can be able to deal with emergencies and/or disasters. The municipality first deals with emergencies and/or disasters in their local area, with the resources available to them. If they are not able to cope with the impact of a hazard they appeal to the Provincial Disaster Management Centre for assistance. If the PDMC is not able to handle the emergency it then appeals to the NDMC that is in the offices of the presidency, were a disaster can be declared. If a disaster is declared the national government, as stipulated by the Act must assist.

Enabler 3 in the NDMF stipulates that there must be funding arrangements for disaster risk management sufficient to support an integrated institutional capacity. Though there has been decentralisation of disaster management activities, the state provides social security during times of crises, and these relief measures are known as social relief (Madubula, 2013). According to Myburgh (2005:180), government provides community relief during community-wide disaster situations, such as flooding, that have caused excessive damage to both personal property and livelihood. The funding for the social relief is through general government funds collected through taxation and fund-raising activities in terms of the *Fund-Raising Act 107 of 1978* (FRA). To serve as additional sources of funding, the Disaster Relief Fund, South African Defence Force Fund, Refugee Relief Fund, State President's Fund and the Social Relief Fund have been set-up in terms of Section 16 of the FRA (Myburgh, 2005:181).

The Disaster Relief Fund renders assistance to any person who has suffered damages or loss caused by disaster. A Board appointed by the Minister is responsible for managing the fund and for ensuring that assistance is rendered where deemed necessary (Myburgh, 2005:181). The Department of Social Development (DSD) administers the Disaster Relief Fund. Although a Board is in place to manage the fund, its current functioning is problematic, as the board may take time to meet and approve the funds while the disaster victims have no assistance (Madubula, 2013).

Institutional arrangements in disaster management in South Africa have many role players from the government itself, to non-governmental organisations. The problems that exist in the capacity to fight disasters are that the declaration of disasters is made through the National Government only. This hinders municipalities

from declaring disasters in their own areas and as such help to the victims is delayed. More synergy is needed in the institutional arrangements in disaster management if DRR is to be a success.

Central Government initiates disaster preparedness programmes through the relevant sector ministries with local administration taking the responsibilities for implementing and maintaining its effectiveness. The institutional and technical capacity exists to reduce the risk and impact of disasters. Each sector and department have a role to play in DRR, for instance, the Zimbabwe National Water Authority's (ZINWA) monitors river flows and the state of hydrology, as a flood watch while the Meteorological Services Department forecasts and predicts weather conditions that are useful in both drought and flood warnings. The Civil Protection Committees coordinates disaster preparedness and response, mainly at the national level. Partners including UN agencies and NGOs have continuously played a key role in providing financial, material and logistical support to assist in preparing for and responding to disasters (Zimbabwe Contingency Plan, 2012).

There are cluster and sector heads in government who are responsible for disaster management activities which includes fund mobilisation. The Zimbabwe Contingency Plan (2012) argues that the relevant government ministry or department in partnership with UN or NGO leads, coordinates and manages emergency preparedness and response activities before, during and after the emergency including early recovery activities. Each Cluster and Sector is then responsible for ensuring that emergency preparedness and response cascades through all structures, that is, from central level administration to provincial and district levels. Assessing and monitoring of impeding hazard are done through the cluster and sector heads. Figure 10.2 shows levels of emergency planning (Betera, 2011).

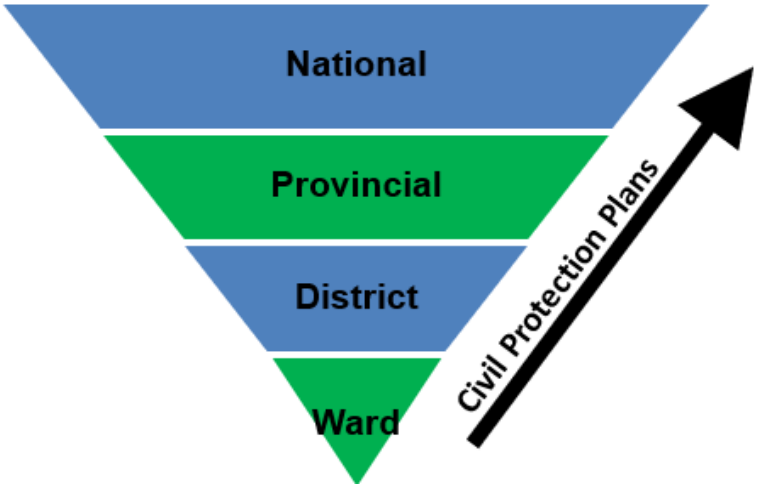

Figure 10.2: Levels of Emergency Planning. ***(Betera, 2011)***

The current legal framework stipulates the establishment of a National Civil Protection Fund. The fund receives money from taxes and uses the money for the development and promotion of civil protection activities throughout the country (Bongo, 2013). When a disaster exceeds national capacity to respond, national authorities can request for international assistance. The United Nations and partner NGOs can then request to utilise existing response tools managed by UN Office for the Coordination of Humanitarian Affairs (OCHA) such as the Emergency Response Fund (ERF) or the Central Emergency Response Fund (CERF). The ERF is mainly for small grants not exceeding US$250,000 for projects implemented in six months or less. Locally based, national and international NGOs, Red Cross and UN agencies can apply for funding. (Zimbabwe National Contingency plan, 2012). Some of the institutions that are available in disaster management in Zimbabwe include:

1. The United Nations High Commissioner (UN-HC) is responsible for coordinating UN emergency and/or disaster preparedness and response in line with the Government plan.

The United Nations Country Team (UNCT) under the watch of the UN-HC is responsible for effective and efficient implementation of Inter-Agency disaster risk management activities (Humanitarian Response, 2017).The Humanitarian Country Team (HCT) is the highest-level coordination body for humanitarian non-governmental community in Zimbabwe. Its responsibility is to set out common objectives and priorities for humanitarian action in the country. The humanitarian body supports with financial aid, volunteers, material support and manpower. OCHA acts as the secretariat of the HCT and supports the Humanitarian Coordinator (HC) in all aspects related to HCT issues (Humanitarian Response Info, 2017).

2. Four active clusters (Health, WASH, Food and Protection) operate in Zimbabwe and meet monthly to discuss cross cutting issues. The Zimbabwe Contingency Plan (2012) argues that the Agriculture, Education, Early Recovery and Nutrition Clusters have been deactivated and activities previously carried out under these clusters will take place within other relevant national coordination mechanisms.
3. The NGO Heads of Agencies Forum meet monthly to discuss and share challenges in humanitarian and developmental activities in Zimbabwe. The Forum comprises of heads of participating NGOs (NGO Report Project, 2010).

Climate change is affecting water resources, agriculture, forestry, coastal ecology, biodiversity and human and animal health. According to the Environmental Protection Agency (2016), these are definite indications that climate change would increase the frequency and intensity of natural disasters like floods and droughts in the coming years. To meet future disaster challenges and the challenges that communities are facing now, it is important to have synergies in the global approach and strategies in disaster risk reduction.

The thrust of the international policies in disaster management is to mainstream disaster risk reduction into countries development initiatives. This is contained in the Yokohama Strategy and Plan of Action for a Safer World (1994), the Hyogo Framework of Action 2005—2015 and the Sendai Framework for Immediate Action (2015-2030). The Frameworks centre on resilience building as a way of reducing disaster risks. The frameworks give guidance on what actions should be taken by the different member states; however, development of frameworks and policies should be guided by the nature of disasters occurring in specific countries. No global policy can work for every single country, as disaster risks that they face are different. The Frameworks should act as a guideline as member states create Acts and frameworks that fit into their development agendas.

Prevention, relief and/or rehabilitation before and after a disaster cannot be successfully managed if the activities are undertaken in an inconsistent, inharmonious, reactive and uncoordinated manner. This can happen if there is no unified policy framework. In view of the experiences gained and lessons learnt during and after the flooding of the Cape Flats in South Africa, the Government of South Africa formulated a National Disaster Management Act which later resulted in the NDMF. This was to emphasize proactive and preventive strategies in addressing disaster situations (National Disaster Management Framework, 2005). The Act and the Framework seek to establish guiding principles and architecture for disaster management in South Africa by presenting the institutional structures, roles, responsibilities, authorities and key processes required to achieve a coordinated, coherent and consistent approach to disaster management.

The institutional arrangements in the region (case of South Africa) and the local government (Zimbabwe) have a legislation that stipulates that disasters are declared by the president (Zimbabwe) or in South Africa

by the NDMC which is in the Office of the Presidency. The South African Framework has decentralised disaster management by creating municipal and provincial disaster management centres, but they are not able to declare disasters in their areas. This creates a weakness in the institutional capacity as the centres will have little and no planning as they rely on the Central Government. International laws on disaster prevention, relief and rehabilitation, as stipulated by the Sendai Framework, include education and training of communities who are at risk. This can be done through educating the community itself about the hazard and reducing community vulnerability to mitigate the impact of the hazard. Legislation should empower communities so that they can participate in local DRR.

The Zimbabwe Civil Protection Act calls for disaster reduction across the country but one of its greatest weaknesses is inactive community participation in DRR. Disaster risk reduction without the community is bound to fail, as those who will or are directly affected by a disaster have no knowledge of the hazard that surrounds them.

Mavhura (2016) considers inadequate resources to be a weakness in DRR in Zimbabwe, as he argues that "the unavailability of dedicated and adequate resources to implement DRR programmes, centralisation of power and resources, and the focus on 'natural' hazards rather than on vulnerability and resilience is a weakness in the Act. As such, there is need for the Act to be revised to align it with international best practices in disaster legislations" (Mavhura, 2016). The Herald (2017) reports that the government is reviewing the Civil Protection Act with a view to plugging policy gaps that exist in the present legislation such as the centralisation of civil protection activities and lack of public awareness and education. The draft policy advocates for the setting up of a levy to boost the national emergency and disaster management fund proceeds which would also be given as grants to local authorities.

Low budgetary allocation for disaster management is a problem facing emergency management in Zimbabwe and other developing countries (Madamombe, 2004). The National Civil Protection Fund to finance the development and promotion of civil protection measures is available in Zimbabwe. The effectiveness of such a fund according to Chikoto (2012) depends on the government's fiscal budget. Policies and frameworks in the absence of financial commitment "are likely to be doomed". Frameworks and policies in disaster management must be backed up by funding of disaster management activities.

Legislation, policies and frameworks should enhance institutional capacities in emergency and/or disaster management. This, as stipulated in the Civil Protection Act of 1998 includes the training of directorate staff and training for critical services such as hospitals, airports and local authorities (Civil Protection Act, 1998). Critical emergency staff includes nurses, doctors, paramedics, defence and police forces. Policies to train and equip such staff members may be there, but it is crucial that there be sufficient people employed in these critical services. Deployment of the staff members to disaster areas should not leave the critical facilities in areas that are not affected by a disaster understaffed. Legislations and policies which do not specify persons solely responsible for disaster management, inhibits their efficient implementation.

Disaster Management Acts, policies and frameworks may also give opportunities for governments to boost DRR activities and emergency management systems. At a glance, the policies and frameworks that exist in different countries appear to have been guided by the global frameworks (Hyogo and Sendai) and are well thought-out and organised. The South African Disaster Management Framework and the Civil Protection Act of Zimbabwe show how responsibility for disaster mitigation and preparedness cascade from the national to the local levels of government, and to the private and NGOs. Disaster

management at a local level, through the set policies and Acts is guided by the National Government (Madamombe, 2004). With the support of the national government local communities can be in control of risk reduction and conduct search and rescue activities if need be (Madamombe, 2004).

Policies and frameworks guided by the Sendai Framework lean towards investing in volunteer training and support. Such policies may also help improve the transmission of early warnings and evacuation efforts both at the national and local levels. In the 1989 and 2001 Civil Protection Acts, the emergency management system is designed to cultivate volunteer engagement in emergency preparedness and response efforts. Volunteers will be educated in disaster management which may assist in increasing risk awareness among local communities.

Opportunities for DRR in communities may be found in disaster management legislations. The Hyogo Framework which guides the Zimbabwe and South Africa disaster management legislations calls for risk assessments to be conducted periodically. In this, the countries can strengthen risk assessment measures and early warning systems. The Meteorological Services Department in Zimbabwe and/or the Weather Services of South Africa monitors weather patterns to improve the ability to provide regular updates and warnings, as part of risk monitoring. Knowledge of the occurrence and magnitude of hazards may reduce disaster losses as early warnings give time for evacuations and/or some form of preparedness.

The Sendai Framework (2015-2030) discusses the willingness of international organisations to assist mostly developing countries in disaster prevention and mitigation. In disaster management policies and legislations developing countries need to capitalise on the international and non-governmental support from the international

community. With the assistance of the 'developed world', developing countries through legislation can be able to build an effective and self-sufficient emergency and/ or disaster management system, equipped with the necessary human expertise and financial resources. Between January 2004 and December 2009, the UNDP (2010) reported that the UNDP in partnership with the Ministry of Local Government, Rural and Urban Development, Food and Agriculture Organisation (FAO), United Nations Children Fund (UNICEF), World Health Organisation (WHO), United Nations World Food Program (WFP), OCHA, Zimbabwe Red Cross and the International Federation of the Red Cross initiated a project designed to improve the Government of Zimbabwe's capacity, at a national, regional and local level, to prepare and respond to disasters (UNDP, 2010). Local institutions are important as so are international stakeholders.

Chapter Six: Evidence: Vulnerability of The 2014 Tokwe-Mukosi Flood Victims - The Chingwizi Community

This chapter outlines the findings of the research carried out on the topic of Development versus Disasters, specifically focussing on the 2014/15 Tokwe-Mukosi Flooding Disaster in Zimbabwe. The results are structured based on the primary research enquiries and goals established earlier in the investigation. The chapter demonstrates that the convergence of hazards and vulnerabilities worsens the impact of disasters, compared to when the same hazard affects a less vulnerable community. This conclusion is drawn from the analysis of questionnaires, informant interviews, focus groups, and observations. These results establish the basis for the subsequent analysis in the same chapter, where the causes and effects of the disaster on the Tokwe-Mukosi community (now known as the Chingwizi community) will be examined.

The floods that occurred in February 2014 at Tokwe-Mukosi led to the evacuation of families residing both upstream and downstream (Kadzatsa, 2014). Approximately 4 500 villagers residing in the flood basin were evacuated from their homes and 2 500 households residing upstream of the dam wall were forced to relocate. The individuals affected by the flood were transferred to Chingwizi Transit Camp, as well as the Chisase and Masangula relocation sites, which are in Nuanetsi Ranch within the Mwenezi District. According to the International Confederation of the Red Cross (2017), the sites were intended to be temporary until they could be moved to permanent locations. The flood victims were assured reparation for their damages and relocation to alternative regions (Hove, 2016). The study focusses

on the firsthand experiences of families who were relocated to Chingwizi Camp and are currently residing there.

Demographics play a critical role in research as they help in understanding the varied impacts of disasters on different population groups. Demographics such as age, gender, income level, and occupation can help identify vulnerable populations. For example, elderly people, children, and low-income groups may have less capacity to respond and recover from a disaster. Distributing resources such as food, shelter, medical care, and financial aid becomes easier if the demographics of a population are known. Demographics goes beyond aid distribution but assist in answering some social problems and guiding policy formulation (Morgen and Lynch, 2006).

Demographic data is important for long-term recovery and rehabilitation planning. Recovery and assistance can be tailored to the needs of different population groups, ensuring all groups are included in the recovery processes and efforts as well as inclusive strategies for disaster preparedness and response. Literacy levels, and access to information channels vary among different groups. Knowing such information is important in planning. Demographics become essential when policymakers need to develop disaster management policies that are suitable for specific disasters in specific areas. In the context of the Tokwe-Mukosi Flooding Disaster, demographic insights would inform how to support displaced communities, rebuild infrastructure, and ensure that interventions consider the varied needs of those affected.

Of the 110 household representatives interviewed 49% were women, 18% of which were older than 50 years and 14% between 40 and 49 years old. 51% of the respondents were men most of whom are in the 40 to 19-year category (16%) followed by those older than 50 years that had 15% of all men interviewed. The highest percentage of the females

interviewed was in the 50 plus years' category that is at 18%. Figure 11.1 shows the age and gender of the respondents.

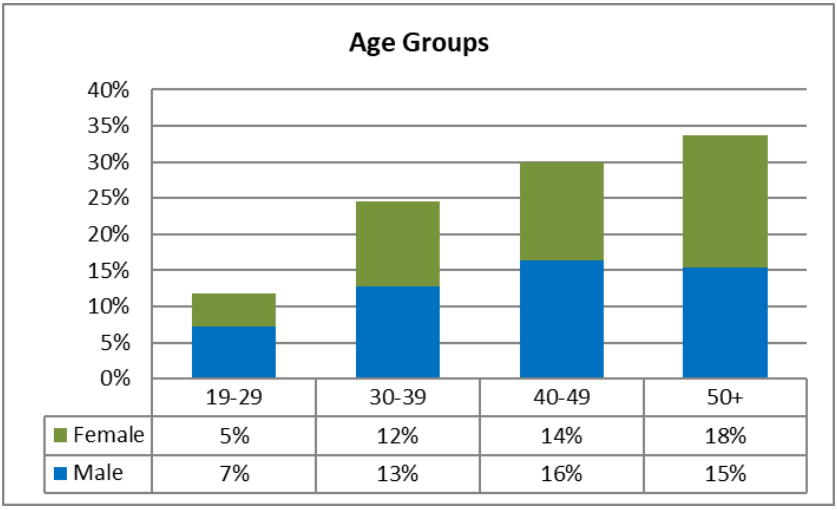

Figure 11.1: Age and Gender (Mukwashi, 2019)

Showing marital status by gender in a disaster context is important because it reveals how different groups may experience and cope with the disaster differently, for example how female headed household respond to disasters as compared to male headed households. This then creates a nuanced disaster response that address the diverse needs of different population groups, ensuring that relief efforts are more inclusive and equitable. Within the sampled households, the research revealed that the married category had more people affected by the flood. The widowed population is also a significant figure being 27% of the sample. 65% of the respondents indicated that they were married, 25% of which were women. 27% of the respondents were widowed with 16% of this category being women. Figure 11.2 shows the distribution of marital status of the respondents.

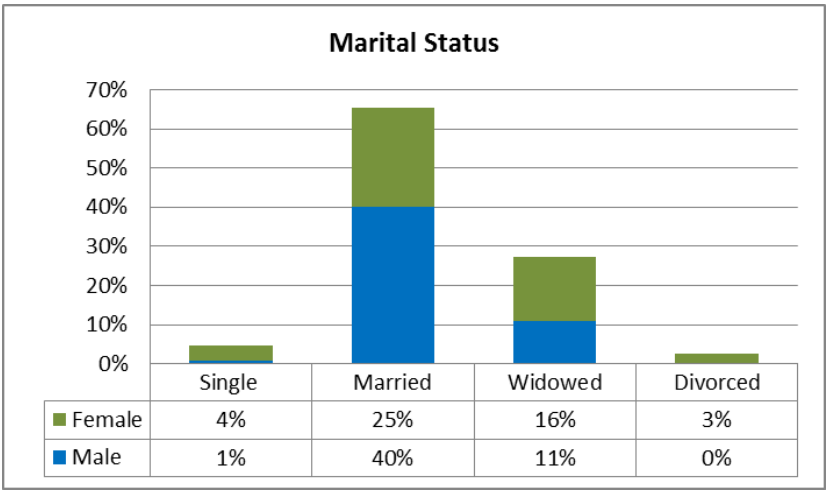

Figure 11.2: Marital Status of Respondents by Gender (Mukwashi 2019)

Knowing education levels in a community affected by a disaster is crucial as education levels influence how well individuals understand disaster warnings, preparedness measures, and recovery information. Chingwizi community members with higher education levels may have better access to and comprehension of emergency protocols, while those with lower education levels might require simplified communication strategies or additional awareness campaigns. Education has an impact on the time it may take for a family or individual to recover from a disaster. This is because education is closely linked to skills, employment opportunities (Verhaest and Omey, 2012), and access to resources. Higher education levels often correlate with better economic resilience and the ability to navigate post-disaster recovery processes. Information on education levels in Chingwizi camp may assist in creating more effective, targeted, and inclusive disaster responses, ultimately increasing the community's resilience. Most respondents (51%) indicated that they had secondary school education, 22% being women. Of the 39% that indicated that

they had primary school education 21% of them are women. Figure 11.3 shows the highest education level attained by gender.

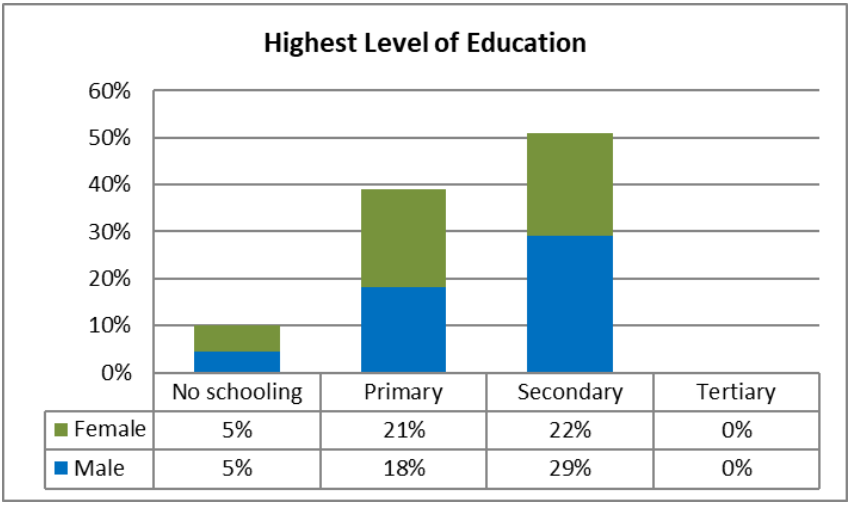

Figure 11.3: Highest Level of Education by Gender (Mukwashi, 2019)

Employment status directly influences a household's financial resilience (Yao and Zhang, 2023). Unemployed members of the Chingwizi community are more likely to struggle with immediate recovery costs such as temporary housing, medical bills, and food. Employment status helps relief organizations and governments design support programs that are tailored to the needs of different groups, for instance, unemployed individuals may need cash grants, job training, or employment opportunities, while employed individuals may require salary compensation. Knowing the employment status in a disaster-affected community is crucial for creating effective disaster response and recovery programs that address both immediate needs and long-term economic stability. Figure 11.4 shows the employment status of the respondents.

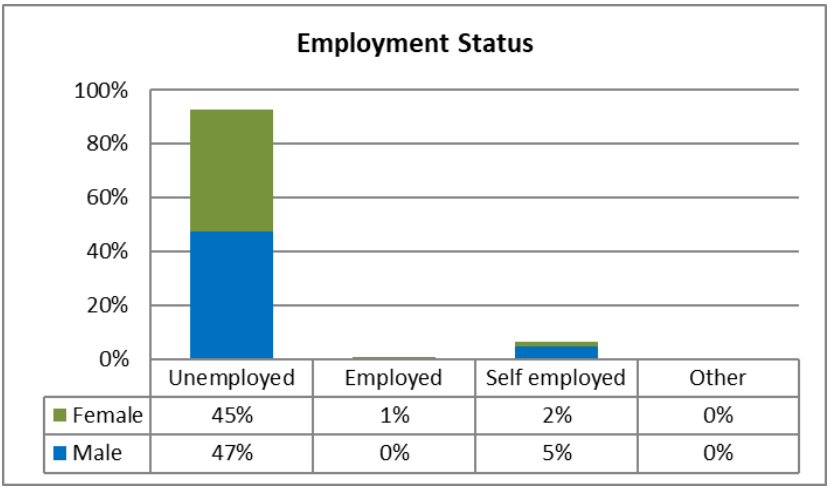

Figure 11.4: Employment Status (Mukwashi, 2019)

Knowing livelihoods and sources of income, such as employment in the Chingwizi community is important for creating a comprehensive disaster response and recovery program that addresses both immediate needs and long-term economic recovery and stability. Livelihood information provides insights into the types of skills available in the community. This information is crucial for post-disaster reconstruction efforts, as local labour can be mobilized to rebuild infrastructure, support relief operations, and revitalize businesses. The government can then create programs that are tailor-made for the Chingwizi community as recovery efforts are linked to available local skills. Livelihood and source of income data informs policymakers on the economic health of the community, enabling creation of policies that promote economic recovery. 53% of respondents had no source of income. Other respondents received financial support from relatives, earned a monthly salary and some indicated their source of income as "other" as shown in Figure 11.5.

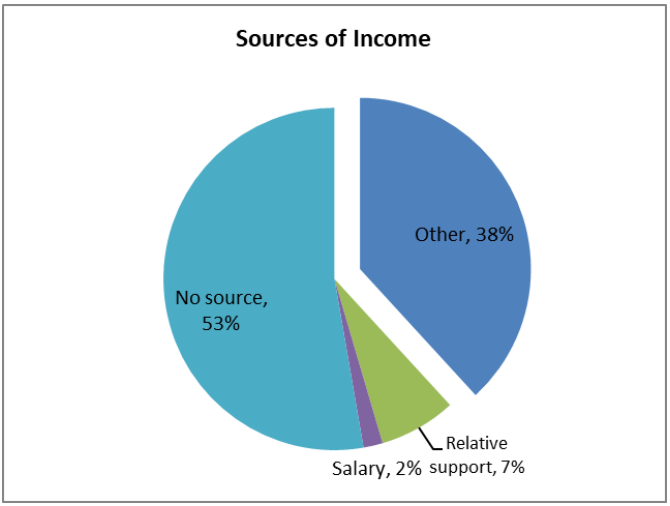

Figure 11.5: Sources of Income (Mukwashi, 2019)

The livelihoods that the respondents indicated as sources of income are shown in Figure 11-6. (Note: *Maricho* is a Shona word that refers to a daily contract for weeding and seeding on another person's plot).

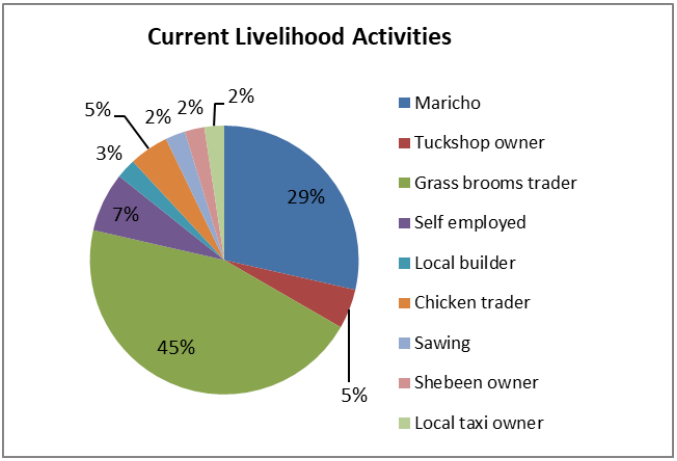

Figure 11-6: Current Livelihoods as Sources of Income (Mukwashi, 2019)

Family dynamics and family income are critical factors in disaster response and management because they influence a household's ability to cope with and recover from disasters. The structure of a family (e.g., single-parent households, multigenerational families, families with elderly or disabled members) can determine how well they manage during a disaster. Stevenson et al. (2020) employed a Social Identity framework, suggesting that family identification predicts enhanced social support and well-being, which in turn indicates more effective coping with financial difficulties. A single parent with no other family support may require more financial support or may face greater challenges in evacuating or accessing resources due to the burden of managing children alone. However, a larger family may require more resources such as food, shelter, and medical supplies, suggesting that each family unit has different needs that must be catered for. Figure 11-7 shows the number of people in relation to households. 50% of the households interviewed had seven or more people living in one household with 2% having one person in the household.

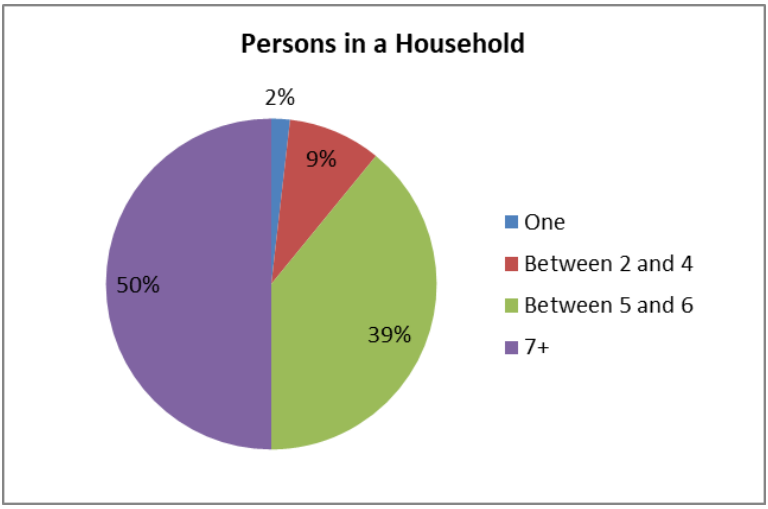

Figure 11-7: Number of People in a Household (Mukwashi, 2019)

Income levels affect access to basic needs like food, shelter, and healthcare. Low-income families may require immediate financial assistance, housing support, or subsidies for rebuilding. High-income families may still face significant losses but often have more robust coping mechanisms such as insurance or savings. Disaster management must consider these differences. 86% of the respondents indicated that no member of their household was employed and only 1% had up to three members working, Figure 11-8.

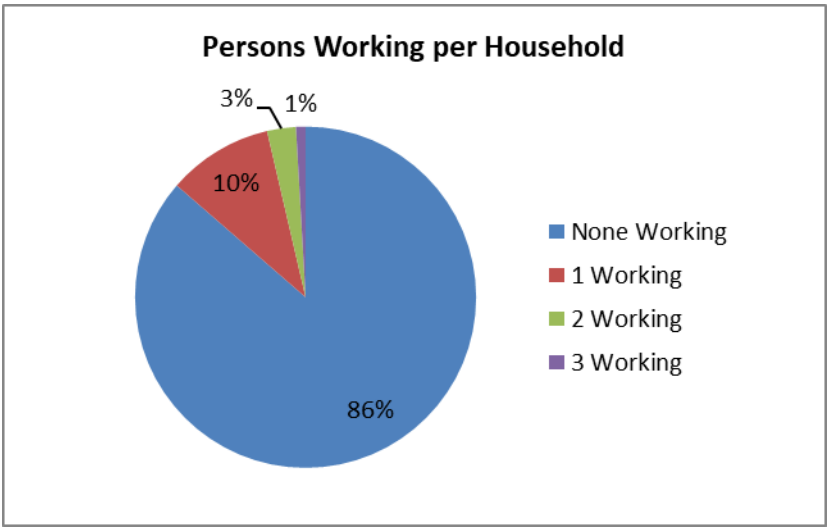

Figure 11-8: Number of People Working in Each Household (Mukwashi, 2019)

Monthly incomes are shown in Figure 11-9. 85% of households indicated that they did not have any monthly income, and no household earned above US$201 per month.

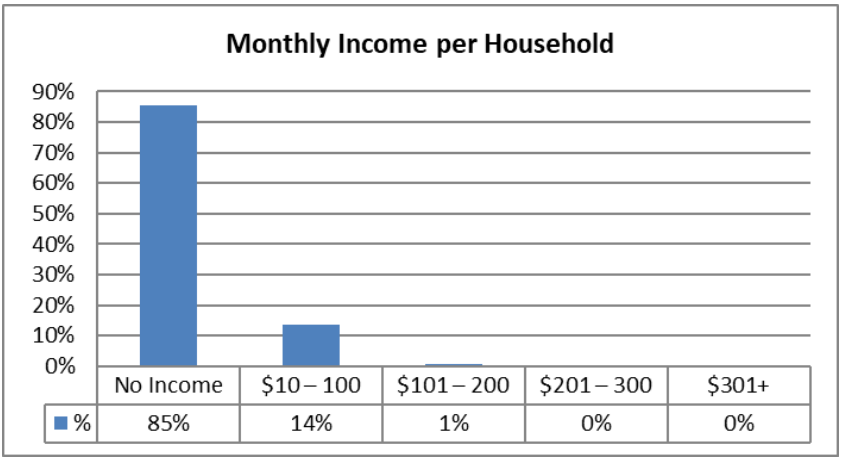

Figure 11-9: Household Income per Month (Mukwashi, 2019)

Understanding how long individuals or communities have stayed in an area can help in their knowledge and understanding of disasters that occur in that area. Understanding the length of stay in the Chingwizi camp which was said to be temporary would assist with planning and prioritizing aid distribution, such as shelter, food, and medical supplies. The longer people remain in a disaster area, the more likely they are to experience trauma or stress. Understanding the length of stay in a disaster area provides essential data for improving immediate relief efforts, long-term recovery, and preparedness planning. 74% of the respondents had stayed in the Tokwe-Mukosi area for more than 16 years with the others having stayed in the area for shorter periods as shown in Figure 11-10.

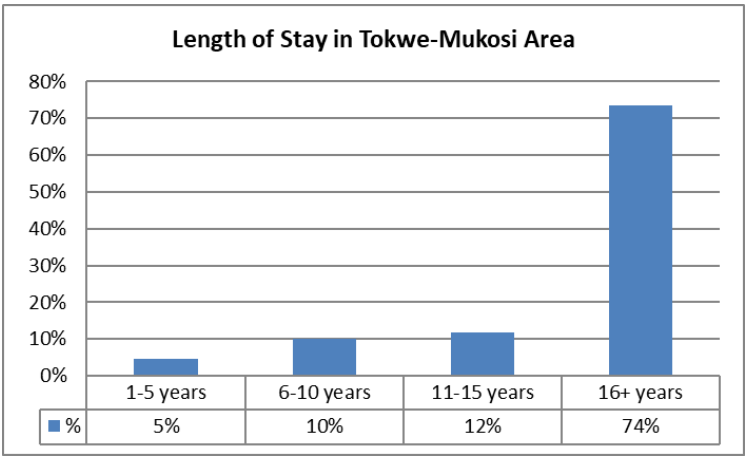

Figure 11-10: Length of Stay in Tokwe-Mukosi (Mukwashi, 2019)

97% of the respondents indicated that they had lived in Chingwizi for 3 to 4 years and that may suggest that what was meant as an evacuation from the floods immediately became a relocation. Figure 11-11 shows the length of time respondents had been staying in Chingwizi.

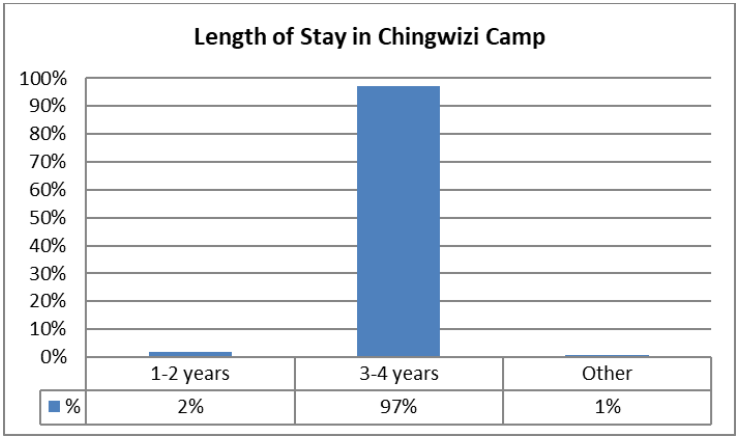

Figure 11-11: Length of Stay in Chingwizi Camp (Mukwashi, 2019)

Community flood perception is important as it influences how the Chingwizi community understood, responded to, and prepared for flood risks. Risk perception is essential for comprehending which risks individuals consider acceptable and which risk reduction programs are more likely to gain acceptance. Risk perception is shaped by many variables, including the nature of available information and its processing; the personality and emotional condition of the individual; their personal experiences and biases; and socio-economic influences (Agrawal, 2018). Perceptions shape how communities take preventive actions such as creation of evacuation plans or there is no action at all. Communities with accurate flood perceptions are more likely to engage with policymakers and authorities to protect themselves from disasters. Figure 11.12 **Error! Reference source not found.** shows the community perception of flood frequency in the area. The majority indicated that flooding was rare. The 1% that indicated flood frequency as being yearly may be due to a lack of understanding of the term 'flooding' and were referring to river water increases during annual rain seasons.

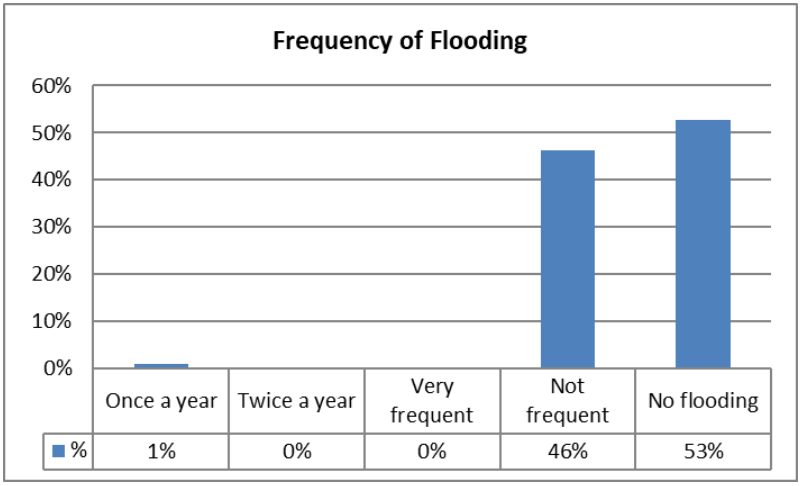

Figure 11.12: Community Knowledge of Flood Frequency (Mukwashi, 2019)

Flood awareness among those affected by a disaster is critical in minimizing damage and loss of lives and livelihoods. Risk awareness, an essential aspect of security, must integrate vulnerability assessment, information gathering, and knowledge management, which are vital for the risk identification and management process (Gibson, 2003). This definition of risk awareness necessitates the incorporation of risk awareness into DRR. Awareness involves ensuring that individuals and communities understand the risks, know how to prepare, and are equipped with information and resources to respond effectively to flood situations. 56% of respondents cited the existence of the Tokwe-Mukosi Dam as the cause of the flood, with others attributing the floods to heavy rains and overflowing river, Figure 11.13.

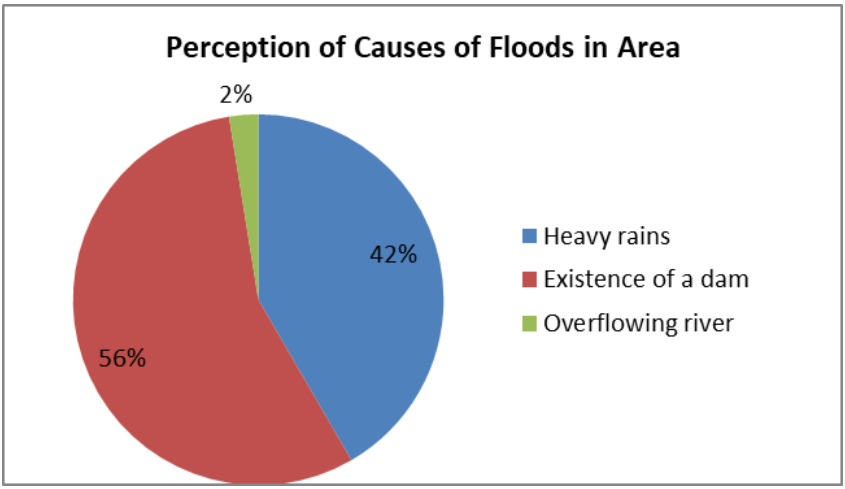

Figure 11.13: Perception on Cause of Flood (Mukwashi, 2019)

A total of 91% of respondents indicated that they knew about the construction of the dam through word of mouth and by seeing the builders at work. This awareness can significantly improve disaster preparedness and community resilience to future floods. The

community gained awareness of the dam construction through a variety of means as shown in Figure 11-14.

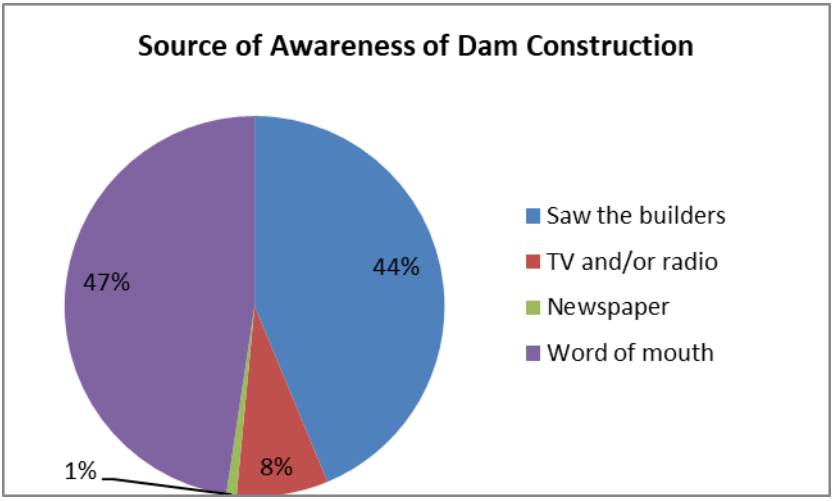

Figure 11-14: Source of Dam Construction Awareness (Mukwashi, 2019)

The Chingwizi community suffered both tangible and intangible losses because of the flooding disaster. The loss of livelihoods resulted in the destruction of crops and livestock. Additionally, there was also the loss of homes and family bonds, which cannot be quantified in economic terms. Loss of life and livelihoods in the Chingwizi community necessitates the development of a comprehensive disaster response and recovery program. This program should address both immediate needs and long-term economic and social recovery and stability. 88% of the respondents indicated that they had lost all possessions (house, crops, livestock, furniture and clothing). Figure 11-15 shows the losses suffered due to the flood.

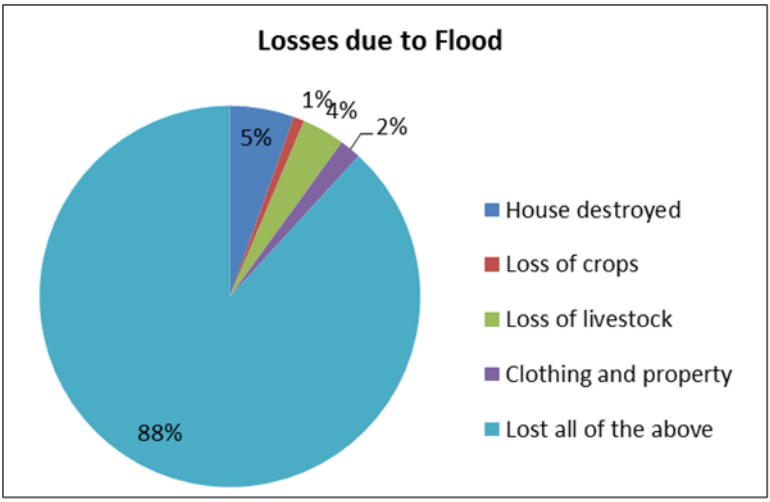

Figure 11-15: Losses Due to Floods (Mukwashi, 2019)

Loss in livelihood may be life changing. 95% of the respondents indicated that their livelihoods changed after the 2014 floods, with 5% stating that their livelihoods did not change, Figure 11.16.

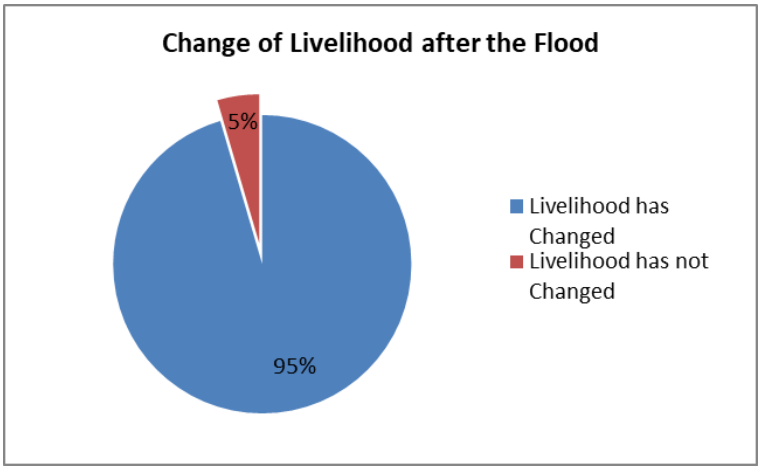

Figure 11.16: Change of Livelihood after the 2014 Flood (Mukwashi, 2019)

Figure 11-17 shows the livelihoods of the community before and after the 2014 floods. Before the flood, community livelihood was agriculturally based and after the flood there is no consistent livelihood occupation.

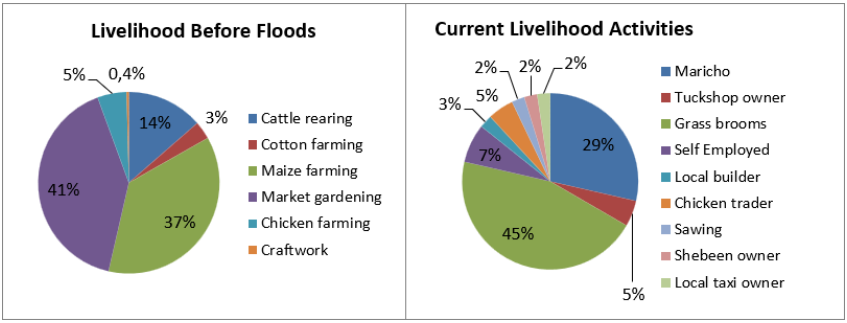

Figure 11-17: Livelihoods Before and After the Flood (Mukwashi, 2019)

97% of the respondents indicated that before the floods their homesteads comprised of both zinc roofed brick houses and grass thatched brick huts, Figure 11.18.

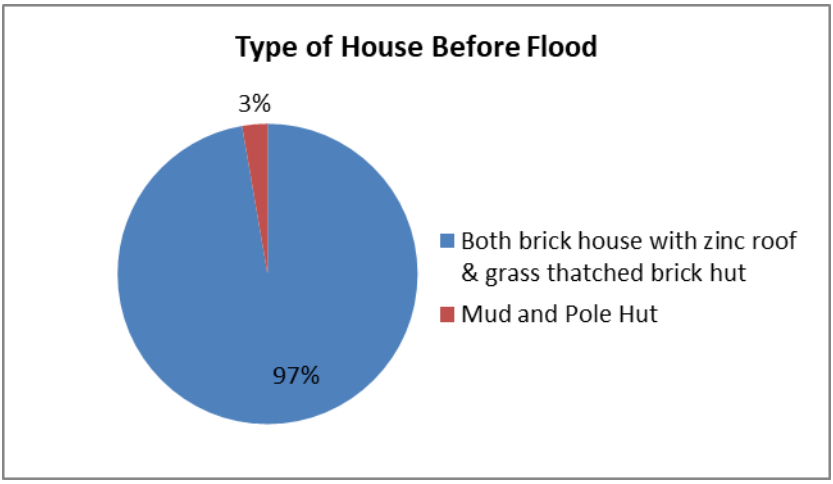

Figure 11.18: Dwelling Types before Floods (Mukwashi, 2019)

Figure 11.19 shows the dwelling types after the flood with mud and pole huts being the highest percentage at 83%. 17% of households indicated that they had both zinc roofed brick houses and grass thatched brick huts.

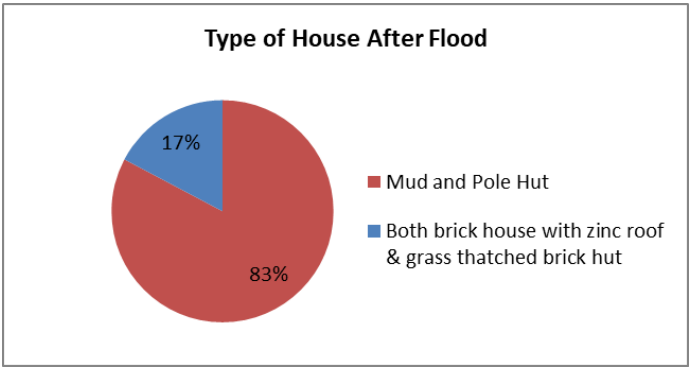

Figure 11.19: Type of Dwelling after Floods (Mukwashi, 2019)

Figure 11.20 shows the percentage of households that changed the quality of the material they used for house construction. The same respondents who had indicated that they no longer had brick homes indicated that they had changed the way and the materials in which they use to construct their houses.

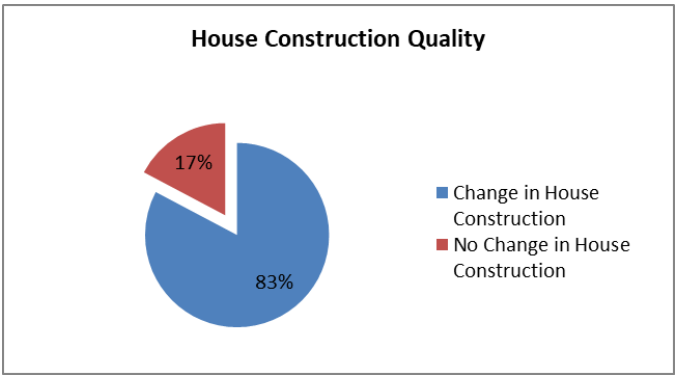

Figure 11.20: Change in House Construction Quality (Mukwashi, 2019)

The reasons for the changes in house construction are shown in Figure 11.21. More than 50% of respondents cited financial constraints as the main reason for changing the way they construct their houses. 24% cite a lack of grass for thatching and 20% cite insufficient water for brick making.

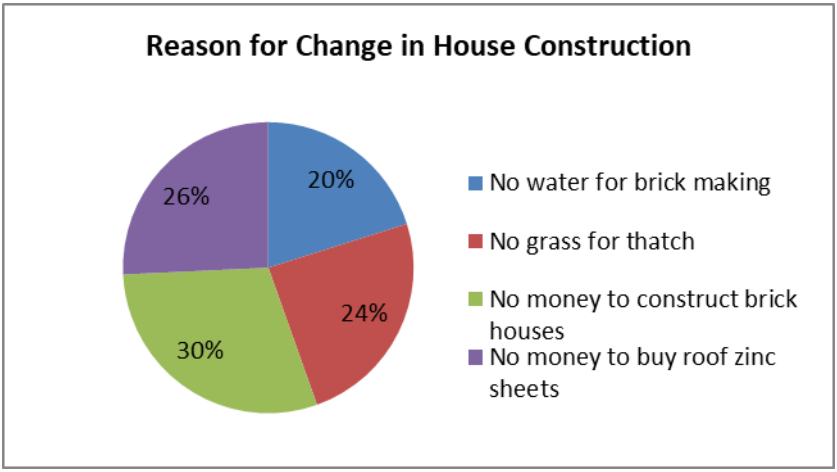

Figure 11.21: Reasons for Change in House Construction (Mukwashi, 2019)

During a flood, timely assistance ensures that people are evacuated from dangerous areas, reducing the risk of injury or death. After a flood, communities have no shelter and often face shortages of essential supplies like food, clean water, and medical care. Carver, (2013) asks if "there is a human right to shelter after a disaster" as he talks of scepticism in introducing human rights in disasters. Assistance whether under human rights or not, does help in meeting these urgent needs. Both short term and long assistance are important assist assists the Chingwizi community recover and rebuild. Effective assistance ensures a faster and more resilient recovery, helping communities "Bounce Back" from the devastating impacts of floods. Most respondents (84%) received assistance during the flood emergency as shown in Figure 11.22.

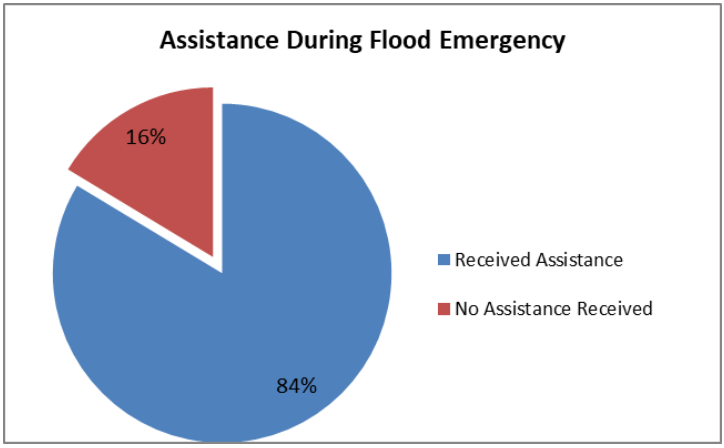

Figure 11.22: Assistance Received in Evacuation (Mukwashi, 2019)

The Government of Zimbabwe, NGOs and their neighbours aided during the flood emergency as shown in Figure 11.23.

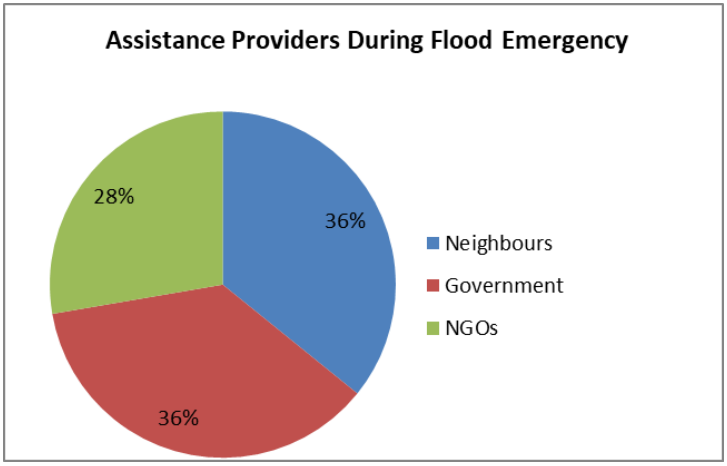

Figure 11.23: Assistance Providers in Evacuation (Mukwashi, 2019)

Table 11-1 shows the assistance that the respondents received during evacuation, this included transport from the flooded area to higher

ground (100%), assistance in removing property from the water (87%) and some financial compensation (4%).

Table 11-1: Assistance Given to Tokwe-Mukosi Community During Disaster

Assistance During Disaster	% Who Received Assistance
Evacuation transport (boats, helicopter, trucks)	100%
Clothes and blankets	69%
Monetary compensation	4%
Assistance from neighbours to retrieve property	87%
Food	96%

Table 11.2 shows the assistance that is being given to the Chingwizi community. All respondents (100%) indicated that they receive 50kg of maize per month and 14% indicated that there were scheduled to be taught carpentry skills.

Table 11.2: Assistance in Post-disaster Stage

Assistance After Disaster	% Who Received Assistance
50kg maize per month	100%
Sewing machine	1%
Rice (irregular periods)	84%
Carpentry skills	14%

Figure 11.24 shows the organisations that assisted the Chingwizi community.

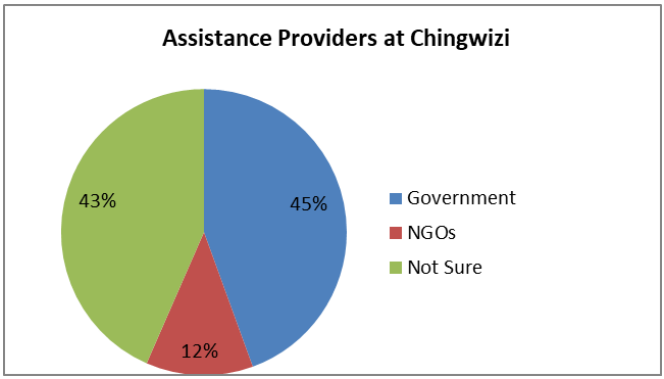

Figure 11.24: Assistance Providers in Chingwizi Camp (Mukwashi, 2019)

The community of expressed unwillingness to return to their original homes (Tokwe-Mukosi) as they were not prepared for another flood. Figure 11.25 shows the willingness and unwillingness of the Chingwizi Community to return to Chivi (Tokwe-Mukosi). Many respondents (79%) showed that they were not willing to return to their former community while 21% showed willingness to return.

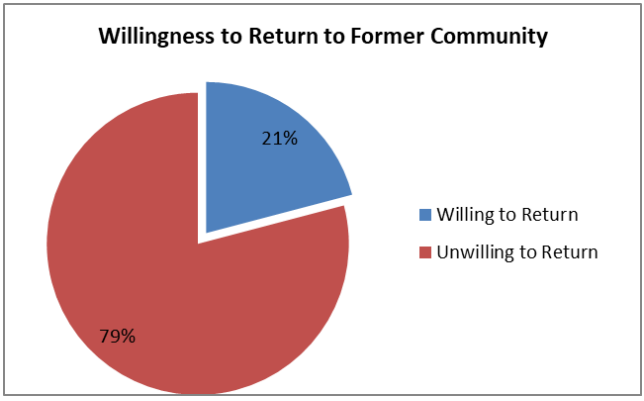

Figure 11.25: Willingness to Return to Tokwe-Mukosi Community (Mukwashi, 2019)

Table 11-3 shows the reasons that were given by the respondents on why they were not prepared to move back "home" and why they felt they were not prepared for another flood.

Table 11-3: Reasons for Unpreparedness for Another Flood

Reason for flood unpreparedness	%
No flood education	57%
Nowhere to go	4%
Will wait for government instructions	30%
Don't know	9%

Lack of preparedness for another flood was not the only reason the community was not willing to return "home". Table 11.4 summarises reasons for the respondent's willingness or unwillingness to return to the Tokwe-Mukosi area.

Table 11.4: Reason for Willingness or Unwillingness to Return to Tokwe-Mukosi Community

Willing to return	%	**Unwilling to return**	%
If given compensation.	8%	Flood risk in Tokwe-Mukosi area.	53%
Because area has fertile soils.	13%	Current location (Chingwizi) unsuitable for farming (ranch lands). Would like to leave but not to go to Tokwe-Mukosi.	14%
To benefit from fishing cooperatives.	37%	Allocated land (1Ha) is too small. Need 4-6Ha which can no longer be found in Tokwe-Mukosi area.	31%
To benefit from irrigation farming.	42%	Rumours that remaining people in Tokwe-Mukosi will be relocated to make way for hotels and game reserves.	3%

42% of those willing to return to Tokwe-Mukosi hoped to benefit from irrigation farming and 37% hoped to benefit from planned fishing cooperatives. Although some (13%) would return because the Tokwe-Mukosi area has fertile soils relative to Chingwizi, others (8%) indicated that they would only return if given compensation. These reasons suggest that most of the flood victims felt they were entitled to benefit from the dam as they had lost their land and all their possessions.

Some respondents indicated an unwillingness to return (53%) due to a fear the flood risk in the Tokwe-Mukosi area. Others indicated that the current location (Chingwizi) was unsuitable for farming, and they would prefer to leave but not go to Tokwe-Mukosi. Some respondents (31%) indicated that they would like to leave Chingwizi because the land they had was too small. They would want 4 to 6 hectares or more which they thought they would no longer get in Tokwe-Mukosi as some land was now 'under water'. A small percentage of respondents (3%) showed unwillingness to return to Tokwe-Mukosi as there were rumours that some remaining people in Tokwe-Mukosi would be relocated to make way for hotels and game reserves.

Unwillingness to return did not mean that the Chingwizi community had settled well in Chingwizi and would not like to move but the research indicated that the participants knew that where their original homes stood was now a dam and they could not return, Figure 11.26.

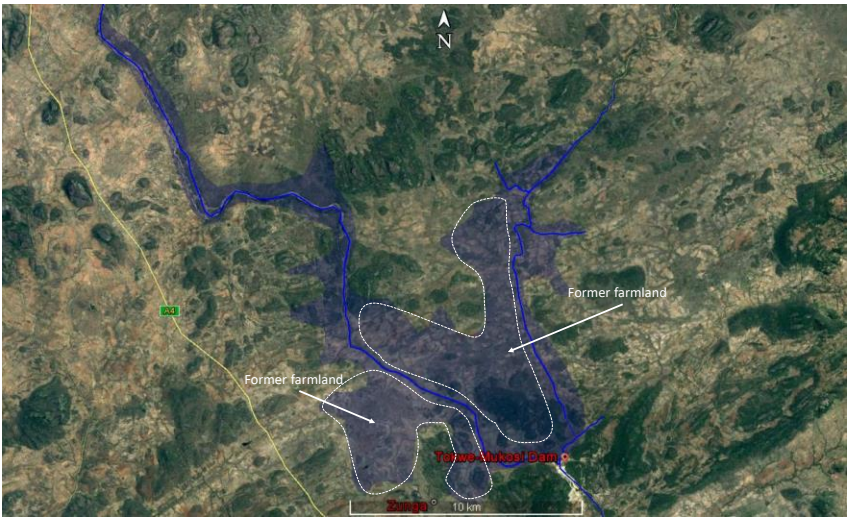

Figure 11.26: Image Showing Farmland Now Part of the Dam (*Modified from Google Earth)*

It is important to note that 31% wanted bigger pieces of land and they indicated that this could no longer be found in their former communities, so any large piece of land in other areas would be better than where they were. Return to their original community is ideal in all relocations as there is less "shock" for the victims regarding culture, the environment itself or getting used to new leadership.

Four (4) key informant interviews were supposed to be interviewed but only one (1) was conducted as others were not available. The one was a District Administrator (DA) who was closely involved in the Tokwe-Mukosi project. The questions and answers given are as follows,

1. Background On The Disaster

Can you describe the events leading up to the 2014/15 Tokwe-Mukosi flooding disaster?

DA: *It rained a lot for some days and there was a call that people's houses were being flooded. We then, we as government went in to help ad the army also assisted with helicopters to evacuate people.*

What were the primary causes of the disaster? Were they linked to development projects, natural factors, or a combination of both?

DA: *I think it was both because we had more than expected rainfall, and the dam was still not ready to receive so much water*

2. Impact on Communities

How did the flooding impact the local communities, particularly in terms of displacement, livelihoods, and access to basic services?

DA: *We had to move the people because they could not live in the houses anymore, so we had to relocate them to a safe place.*

What were the immediate and long-term effects on the agricultural sector and food security in the affected areas?

DA: *People cannot farm there now, because where they used to live there is water now*

3. Government Response and Policy

How would you assess the government's response to the flooding disaster? Were there any immediate relief measures, and were they adequate?

DA: *We moved the people to Chingwizi and gave people food and some who had been given compensation by the government were able to build again and buy their own food.*

How did government policies shape the outcomes of the Tokwe-Mukosi flooding disaster, particularly in terms of relocation and resettlement efforts?

DA: *The government did what it could with the help of NGOs*

4. Development Projects and Disaster Risk

How did the Tokwe-Mukosi Dam project contribute to the flooding, if at all?

DA*: The dam was not ready for rain therefore there was a flood.*

Do you believe the dam and other development projects in the region were planned with sufficient attention to potential disaster risks?
DA: *Yes, EIA was done therefore we believed that all was ok.*

5. Coordination and Stakeholder Involvement

How effective was the coordination between various stakeholders (government agencies, NGOs, local communities) during the response and recovery phases?
DA: *The government, NGOs and others all came together to assist the affected communities.*
Were the affected communities involved in the decision-making process related to resettlement and recovery efforts? If not, how did this affect the outcomes?
DA: *Government had to look for land that was free for resettlement and Chingwizi was the best place while we looked for other areas to resettle the community. Others chose to go and join family elsewhere.*

6. Long-Term Implications and Reflection

In hindsight, what were the key successes and failures in managing the Tokwe-Mukosi flooding disaster?
DA: *People should have been moved before the floods.*
What recommendations would you make to policymakers and development planners to prevent similar disasters in the future?
DA: *People must know about the risks and relocation or moving of the people has to be done before any flooding or any disaster happens.*

7. Broader Development vs. Disaster Nexus

How can development be pursued in a way that does not increase vulnerability to disasters?
DA: *We must let the people that may be affected by the development know of the risk and make them have a choice if they want to move. The government should then assist with the move.*

Focus groups serve as an invaluable addition to other data collection methods, offering comprehensive insights in a short timeframe (Gundumogula, 2020). Two focus groups were held in Chingwizi, one a women focus group which had 11 participants and a men's focus group which had 8 participants. A third focus group was held the following day at Zunga village in the Tokwe-Mukosi (Chivi area). The key discussion areas are shown in Figure 11.27.

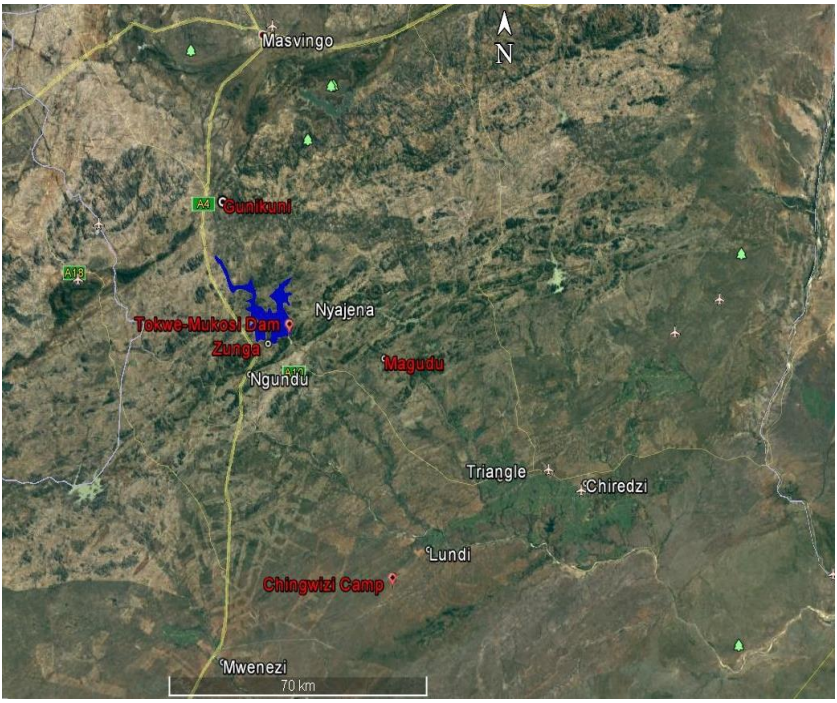

Figure 11.27: Location Map Showing Key Discussion Areas (Red Labels). *Modified from Google Earth*

The Chingwizi focus groups' recordings indicated that the discussions in both the men's and the women's focus group were similar. The discussions and the results from the two focus groups were combined.

Figure 11.28 shows the Chingwizi women's focus group, faces to be blurred as there was request for anonymity.

Figure 11.28: Women Focus Group in Chingwizi. *Photograph by researcher, April 2014*

The focus group discussion was designed to gather information from the participants concerning the following.

1. What they perceive as being the cause of the flood disaster.
2. Why they think the 2014 flood affected them in the way it did.
3. How participants perceive the government and other role players fared in meeting their needs in times of distress.
4. Gain an understanding of how the victims of the flood disaster would want future developments in their areas to be handled.
5. Chingwizi Camp Focus Group

All 19 participants agreed that the year 2014 had more rainfall than normal that led to the flood. 17 participants indicated that they believed the existence of the dam caused the flooding disaster without which water could have flowed downstream and not have flooded

homes which were upstream. One participant indicated that no one wanted the building of the dam including the ancestors. Fourteen (14) members agreed with him as they recalled that every morning the contractors would come and find their wheelbarrows and shovels missing. All participants agreed that the missing equipment gave credence to rumours that ancestors of the land did not want the dam to be built. "This dam is trouble" one of the participants is quoted as saying, "It was trouble from day one and it caused this flood".

Twelve participants believe that the flood affected them in the way it did because of the local councillor and politicians who gave them conflicting statements. The 12 concurred that the councillor informed them of the impending flood hazard and encouraged them to relocate their homes. However, they were not told where to move to. Politicians that visited the community informed them that they would be compensated for their houses before relocation to various farms around Masvingo. The group highlighted that some Human Rights organisations (unnamed) advised the community not to relocate before they were compensated. This was allegedly because the government was likely to renege on any compensation promises if they moved before being paid. All participants agreed that when the rains came, they did not think that their homes would flood so they remained in their homes waiting for government compensation and to be told where they would go. One of the group members said his home was not in danger of flooding but when the other homes were flooded soldiers came to his house and told him to remove his possessions and go with the flood victims as the water level was rising and would eventually flood his house. This was because the soldiers "did not want to come back for him when his house is flooded".

The general discussion and conclusion on why the flood affected the community as it did, may be because no one, including the government and contractors, expected the water to start filling up as

fast as it did, and no one had moved out of the basin as they waited for compensation and to be told where they would be relocated to. Torrential rains came at a time when there was no plan of where the community was to be relocated to and there were no funds to compensate affected households.

All (17) participants believed the government and other role players did not adequately meet their needs during their period of distress. All agreed that, when their homes were flooded, the neighbours were the first responders as they began helping each other to rescue children and salvage property. The Air Force rescue units announced from helicopters to the villagers to run to the tractors and or buses, and allegedly stated that they did not have time to check for whoever would be left behind. The rescued people were first evacuated to Gunikuni where they were given clothes and some food. One group member is quoted as saying;

> "The only help I received from the government is transport from Gunikuni to this isolated place (Chingwizi) were they left me at the side of the road".

One woman indicated that the only help she received was,

> "... this dress (pointing to what she was wearing) that I got from the government in 2014. Now they give me 50kg of maize per month and that is it, and only 1 hectare of land? How many crops do I get out from such a small piece of land? 4 maize cobs?"

All group members agreed that this was what they also receive from the government and NGOs. All focus groups' members indicated that assistance was not given just because you were a flood victim but one had to indicate to political party affiliation to be given the flood aid.

During a disaster it is important to note the importance of getting individuals to safety. This was achieved through the provision of transport. The aftermath of the disaster seems to be a problem, as after evacuation the community is not receiving adequate assistance. The participants indicated their need for clothing and blankets as they last

received these three years ago. The land in Chingwizi is small and they are not able to produce sufficient food for their families.

All focus group's members emphasised that the government had not given then compensation and paying high school fees was now a challenge. School fees were between $10 and $15 per month. Most of their children had dropped out of school and were turning to "indecent" means of livelihoods. On what kind of livelihoods, the focus group murmured and did not say what exactly the children's livelihoods were. The researcher assumes the "indecency" refers to prostitution.

With children not attending school and some turning to prostitution, a vulnerable society was being created. The children would be uneducated and the livelihoods they would pursue would not enable them to cope in disasters. The children might end up having children or getting sick leaving grandparents headed households. This may continue creating a web that is intertwined and woven in such a way that it would be difficult to address. Such living conditions may not only create a vulnerable community of this generation but future generations.

The focus group had a discussion on how they would want development in their areas to be handled. All (17) participants agreed that the government should be clear and transparent on any developments that they want to do in any community. In being transparent, the community would be fully appraised of projects in their community and what the future government developmental plans are, and how these impact them and their livelihoods. Transparency would mean that anyone affected by development would be aware and know where they would be relocated to. Public participation in the EIA could have given the community the information that they required on risks if they stayed in their

homesteads. Having information and knowledge about something gives individuals the capacity to make informed decisions. The community could have decided to move on their own, avoiding a disaster. Risk information and education reduces community vulnerability.

The group consensus was that they should have been compensated and consulted on where they would be relocated to. Other members expressed interest in being relocated to areas that are earmarked to benefit from irrigation schemes from the Tokwe-Mukosi Dam such as Magudu Ranch near Triangle, or the Chisasa area. Financial compensation and engaging the community in a consultative process to decide where they should be relocated to would strengthen community resilience. Financial compensation would enable the community to rebuild homes. The indication that they would also want to benefit from irrigation shows their desire to return to their livelihoods that depended on agriculture. Irrigation would then have made the community more resilient as their livelihoods would have improved. Currently, the community remains vulnerable and with the changed livelihoods they are now poorer and more vulnerable than they were in Tokwe-Mukosi.

Zunga village is near Tokwe-Mukosi Dam. The focus group participants are living in the vicinity of the dam close to where many of the Chingwizi camp inhabitants relocated from. The focus group included five men, three of which are aged between 40 and 49 years and two are older than 50 years. All participants witnessed the events of the 2014 Tokwe-Mukosi disaster. Their homes were not affected by the flooding but those of some of their relatives and friends were. A focus group discussion was held to identify whether they had been taught in Disaster Risk Reduction drawing lessons from the previous flood and whether they perceive themselves as being outside the flood risk area.

All (five) members indicated that there has not been any awareness or education programmes on reducing flood risk after the 2014 disaster. One participating member of the group said that most people living in the Zunga area (Chivi at large) knew that a dam would be constructed since 1960. Most however, thought it was idle talk, until they saw the builders. All (5) focus group members indicated that when the dam construction began, some families were paid for relocation, but others were not. Some families who were right at the edge of where the dam would be decided not to move in anticipation of benefits associated with the dam. This confirms the findings of the key informant interviews that there was no public participation in the EIA and no community ratification of the final EIA and recommendations. Lack of disaster risk information made the Tokwe-Mukosi community vulnerable to the 2014 floods.

All focus group members indicated that they were not at ease because rumours had started, and local councillors were giving conflicting messages on what would happen to them. Their concerns relate to rumours of a possible expansion of the dam, building of recreational facilities and establishment of game reserves that would force them to be relocated especially those in the Gwamajoma area that is rumoured to be earmarked for game parks. All focus group members agreed that if they are to be relocated the government would order them to move "*within a day as they do not want us to know about anything*". This may suggest that there are other planned developments earmarked for the Tokwe-Mukosi area and if any EIAs are being done, there is no public participation. The group expressed concerns about the rumours on planned developments that are like those that spread prior to the construction of the Tokwe-Mukosi Dam. Lack of awareness on these rumoured planned developments and their potential resultant risks causes community anxiety. The remaining Tokwe-Mukosi community, due to lack of disaster information remains vulnerable to hazard impacts.

The focus group stated that families who were living close to where the dam wall was to be built were compensated and land was found for them to settle back into the community, while some were moved to Magudu Ranch in the Nyajena area. These were supposedly given 4 to 6 hectares of land and have adapted well into the new communities. On the question of why the group indicated that they think they have adapted well, one member of the group suggested that Magudu and Muzhi where some of them had been resettled resembles "*the fertile soils and plenty of water from the river*" that they had in Tokwe-Mukosi area. Compensation and moving into areas where minimal changes will be experienced reduces individual or community vulnerability. Financial compensation builds resilience as families have the capacity to build good homes and have 'start-up' capital for different kinds of livelihoods. If all affected families had been compensated and moved to areas with fertile soils and irrigation, disaster could have been averted. The statement by one of the group members that "*the government was not prepared for this*" started a discussion in which all group members agreed that the lack of preparedness by the government caused the 2014 flood disaster.

> "If the government was prepared, they could have compensated all the people, moved them to wherever they had a plan to move them and there will be no talk of all this" (sic).

On resilience building through livelihood enhancement, the focus group was keenly expectant as the Ministry of Enterprises had instructed then to form fishing cooperatives. In April and May 2017, the Ministry promised to supply boats and nets for the cooperatives to start operating. The fish would be sold in nearby towns such as Masvingo and countrywide. Fishing cooperatives through increased income for families would enhance the resilience of the community.

Larkham (2018) states that observation alone in research is not enough, it must be observation with purpose. Observation must go hand in hand with the interviews and questionnaires to give validity to what is

being said. Photographs of the Chingwizi area and surroundings were taken to highlight the living conditions of the Tokwe-Mukosi 2014 flood victims. Figure 11.29 shows the newly built Chingwizi clinic, a joint venture between government, private sector and churches.

Figure 11.29: Chingwizi Health Centre

The health facility was clean and at the time the photograph was taken some Chingwizi residents were receiving treatment. The distance of the clinic from othere homesteads (20km) was a concern but communty members were happy to have the health facility.

Health and sanitation is a basic human right and Figure 48 shows a sign that indicates that there were latrines that were constructed through the funding of ECHO with technical support from the Government of Zimbabwe. However, all latrines observed in the area were comprised of a hole in the ground, where privacy was provided by sacks held by wooden poles, Figure 11.30.

Figure 11.30: Poster Indicating Latrines Built

As the government had indicated to the community of Chingwizi, relocation was a temporary solution, and the infrastructure that was erected was mostly non-permament tents. The high school comprised of tent classrooms and had no furniture for the pupils to use, Figure 11.31.

Figure 11.31: Chingwizi (Nyuni) High School

When the 2014 flood victims first settled in Chingwizi, organisastions such as UNICEF, provided tents so that the victims of the flood may have some form of shelter. With time, due to weather elements, the tents became worn out and the residents of the camp had to construct their own shelter. Tents that are not worn out are stilll in use. Most of the residents have built or started building semi-permanent and permanent structures as all indications are they are likely to be

permanently settled in Chingwizi. Due to financial constraints, lack of water to manufacture bricks and no proper grass for thatch most of the residents have built pole and dagga homes and business structures, Figure 11.32.

Figure 11.32: Pole-Dagga Homestead and Tuckshop

One household indicated that they had received compensation from the government and decided to build a more permanent structure like the ones they had at Tokwe-Mukosi, Figure 11.33.

Figure 11.33: Zinc Roofed Brick House and Grass Thatched Hut

During the time of the research, some families had harvested their crops, mostly maize and round nuts. According to the villagers, the good rains received in 2017 gave them the best harvest since they have been in Chingwizi. The researcher observed that the yield was too little

to last families to the next harvest. Figure 11.34 shows a maize harvest at a Chingwizi homestead.

Figure 11.34: Maize Harvest at Homestead

Results reveal that vulnerability of the Tokwe-Mukosi flood victims can be categorised in relation to:

- Vulnerability of individual households and the community to the 2014 flood.
- Ability to cope with the immediate effects of disasters.
- The ability to respond to disasters both on short- and long-term basis
- Cause of vulnerability

The collapse of the dam, and not the cause of the collapse of the dam, has been blamed for the catastrophe. It appears convenient for the authorities to focus on the dam collapse and avoid exploring the underlying causes. The results indicate that the 2014 disaster was due to not only heavy rains, but also a product of the social, political and economic environment that existed in the Tokwe-Mukosi area at that time. This environment caused the Tokwe-Mukosi community to lack the '*capacity to anticipate, cope, resist and recover from the impact of a*

hazard'. Disaster risk in Tokwe-Mukosi was due to the presence of the hazard, vulnerability of the community and the lack of community coping capacity.

The lack of access to information created a high degree of exposure to risk. With 47% of the respondents indicating that they knew about the Tokwe-Mukosi Dam construction through word of mouth and 44% indicating that they saw the builders working at the construction site may suggest that there was no communication from the government, ZINWA to be specific, that a dam was to be constructed in the area. With all (four) 4 key informants interviewed indicating that there was no public participation in the EIA, the community was not aware of the gravity of the flood risk that surrounded them. It does not appear there were any mechanisms for construction progress updates to be provided to the community. Without progress updates on the dam construction and subsequent increasing risk, the Tokwe-Mukosi community was oblivious to the impending disaster to proactively flee. Lack of access to information prevents people from getting out of harm's way, even for retrospectively "obvious" hazards.

The lack of efficient early warning systems increases vulnerability in communities as it reduces the ability of people to make decisions and to respond appropriately in emergencies. This was lacking in the Tokwe-Mukosi flood disaster. There was no early warning system in place so that people could avoid the flood. This was made worse as there were no established emergency response protocols for envisaged project risks such as flooding. The lack of early warning systems and emergency plans suggest inefficiencies in disaster management guidelines or policy enforcement. These inefficiencies cause communities to be vulnerable, as they become "sitting ducks" to hazards.

The Tokwe-Mukosi community is poor, dependent on peasant agriculture making the flood a huge shock from which they are struggling to recover. Due to poverty, the research revealed that the Chingwizi community is struggling with recovery and reconstruction in the aftermath of the 2014 flood. The poorer the community is the more sensitive or vulnerable households are to the impact of hazards. Poverty or being poor means that households have a low threshold for withstanding any or most shocks. They are therefore less able to respond, cope with and/or adapt to disaster.

In line with the Pressure and Release (PAR) model, the Tokwe-Mukosi flood impacted the vulnerable community resulting in a disaster. There was flooding in an area where 51% of the population had secondary education as the highest qualification and the rest primary (39%) and no schooling (10%). This together with the livelihoods that could be pursued in the community provided very little income. With low household incomes (85%, no income and 14% less than US$100 per month), the community was not able to deal with the impact of the flood. With 89% of households having five or more persons, sharing the household income it becomes very little. Through livelihoods pursued, living conditions and educational levels (using international benchmarking of poverty datum line) the study classified the Chingwizi community to be poor. Poverty according to (Bolin and Stanford, 1999) makes communities more vulnerable to hazards than in richer communities.

The 2014 flood disaster can be said to be a cause or source of poverty in Chingwizi as most households do not have the income or capacity to rebuild homes, replace lost assets and meet basic needs. The research revealed that disasters can induce and/or increase poverty, especially in communities marginally above or below the poverty datum line. This is because some households or the entire community may not be able to recover from losses incurred in disasters. Change of livelihoods

and the change of house construction materials (83% changed from brick and zinc to pole and dagga huts) reveal that the Chingwizi community are now living in worse conditions than before the flood. Without significant humanitarian intervention, the Chingwizi community may take many years to recover from the aftermath of the 2014 flood disaster.

The Chingwizi community were vulnerable to floods and are still vulnerable to the impact of hazards. The community has a low resilience to loss. This is because they have very low incomes and no surplus capacity to 'cushion' themselves from losses let alone recover. All (100%) are dependent of food handouts from humanitarian and government agencies. Disaster risk in Chingwizi is shaped by a range of social and economic factors that have erased their capacities to respond to disasters and thus create a more vulnerable community.

None of the respondents (100%) knew where they were going to be relocated. They would relocate, but to where and with what would they reconstruct their homes? Most (97%) of the respondents in Chingwizi did not receive compensation to be able rebuild elsewhere. By not comprehensively compensating the Tokwe-Mukosi community the government made the community worse off than they were before the dam.

Although the community's populace was exposed to the same stress factor, there are wide variances in how different inhabitants coped with the impact. The research indicated that households affected by the same flood cope differently depending on the resources each has. The respondents in Chingwizi who received some compensation from the Government had better houses (brick and zinc), one owned a taxi, another a tuck-shop and the other a shebeen (beerhall). All respondents (3%) that had received compensation fared better than those who had no compensation (ranging from US$2,000 to US$4,000). An orderly

evacuation and/or relocation with coping capacities (compensation) are an important factor in areas where people must be moved for development to take place. Without compensation for households, the government itself became a source of vulnerability in the community.

A lack of planning and unpreparedness on the part of the responsible government departments made the Chingwizi community vulnerable to the 2014 flood. The Tokwe-Mukosi community was informed that they would be relocated to various farms around the province of Masvingo, but this was not done. The fact that an evacuation ended up being a relocation to Chingwizi where there were no social amenities, shows that the government had not planned to relocate people to that area. Unpreparedness meant that when there was a flood the government had to take the people 'somewhere' and this 'somewhere' was not known or planned for. The study highlights that preparedness may be the most important phase in disaster management as the relief approach used by the Government of Zimbabwe seems not to have worked. Post-disaster relief is ineffective if there are no other measures taken to prepare for and mitigate the impact of a hazard.

The research revealed subtle political and administrative factors that may have contributed to the disaster of 2014. This may be inferred from the way resources, such as knowledge, information and food are distributed in the Chingwizi community. The fact that the recipients of aid do not know the source of donations and that one must assure the community headman, who distributes the food their political party affiliation, shows the discrimination that occurs in welfare allocation and potentially information sharing. The 2014 floods may have been a result of heavy rains, but the broader pattern shows that vulnerability is brought out when both the natural environment and the social environment comes together. Disaster mitigation may be difficult to reach if such a social environment continues to exist in Chingwizi.

The government's approach of focussing on relief provision in lieu of resilient building continues to create a vulnerable community dependent on hand-outs. Relief provision without plans to restore and build community resilience is ineffective. All the research respondents in Chingwizi community were not aware of any plans by the government to enhance their livelihoods. Three years after the disaster, there are no indications of resilience building but just relief provision that the community says is insufficient to meet their needs. The Government of Zimbabwe and donor partners are still treating the flood victims as if they are in the evacuation phase where they had to cope. They now need resilience building and adaptive capacity that are long-term solutions in disaster management.

The 2014 floods had an adverse impact on the Tokwe-Mukosi community, some of whom have moved to Chingwizi area, as evidenced by more than 80% of respondents who indicated that they had lost all their possessions in the flood. Disaster risk reduction revolves around public information and education; existence of efficient warning systems; disaster preparedness; mitigation and coping mechanisms. The lack of these fundamental disaster management concepts in Zimbabwe made the Tokwe-Mukosi community vulnerable to the 2014 floods.

There were restrictions on the areas for data collection and some community heads were sceptical towards the authenticity of the research authorisations granted by the relevant government officials. Emphatic anonymity assurances were frequently requested in adherence to the perceived government censorship of matters relating to the 2014 Tokwe-Mukosi flood disaster. Some respondents were thus reserved in their willingness to participate in the research.

There were time restrictions on the permissions granted for study in the Chingwizi area, and due to the sensitivity of area, the researcher

had limited opportunity for follow-up data collection engagements with community members.

The research highlights five contributing factors to the flooding disaster, heavy rains, dam failure, a vulnerable community, lack of public participation and a lack of preparedness from authorities. These events often interact in a cascading manner, worsening the impact on already vulnerable populations. Intense and prolonged rainfall can lead to severe flooding, especially in areas with poor water management systems (Amoako and Frimpong Boamah, 2014). In many cases, communities have no early warning systems, leaving them unprepared for the magnitude of the disaster. The failure of a dam, often due to inadequate maintenance, structural weaknesses, or overwhelming water pressure from the rains, can significantly amplify the extent of flooding (Evans *et al.*, 2000). In the Tokwe Mukosi scenario, before the collapse there was accumulation of water up stream flooding home. Then with the collapse released massive amounts of water downstream, inundating entire villages, destroying homes, and washing away farmlands.

Vulnerable communities, often characterized by poverty, inadequate infrastructure, and weak governance, are highly susceptible to natural disasters such as floods. The shows that these communities are disproportionately affected by disasters because they lack the resources, resilience, and institutional support to effectively cope with and recover from such events. The research found that most of the victims of the flood consisted of the elderly, who were more than 50 years old. The highest number of respondents was aged 50 years, and above which shows that the victims of the flood are mostly in this age group. May and Deyle (1998) maintain that extremes of age affect the movement and/or ability of an individual to move out of harm's way. The elderly "may have mobility constraints or concerns that increase the burden of care and lack of resilience". According to UNESCO

(2017) a person may be classified as poor if his or her income level falls below a minimum standard necessary to meet basics such as housing, food, clothing, education and health. This minimum level is usually called the 'poverty line'. The global poverty line was defined by the World Bank to be between US$1.25 and US$2 per day (using 2005 purchasing power). The poorest countries in the world (10 to 20 poorest countries) have an average poverty line of $1.25 a day (World Bank, 2017). This highlights the vulnerability of the then Tokwe-Mukosi community.

Prior to the disaster, the community may have been living in substandard housing, flooding risk as there may be " accidents from dams" (Lempérière, 2017) and limited access to information on disaster risk increased their vulnerability. The community though it was in a drought prone area relied on subsistence agriculture meaning that the loss of crops, livestock, or small businesses due to flooding has led to prolonged economic hardship and food insecurity.

The study points to a failure of local and national governments to adequately prepare for or respond to the flooding disasters. This as there is indication of the absence of early warning systems. Without proper weather forecasting and flood alerts, communities are caught off guard, unable to evacuate or protect their assets in time (Pappenberger *et al.*, 2011). Poorly coordinated emergency responses, including delays in deploying relief teams and supplies, often exacerbate the suffering of affected populations. The absence of pre-established evacuation plans, shelters, and healthcare facilities can make recovery more difficult.

The study brings out the fact that negative impacts of disasters may be due to systemic failures in governance, infrastructure planning, and disaster preparedness. In this case lack of funding can be highlighted as the building of the Tokwe-Mukosi was a 'start and stop" situation

which may have contributed to intensive rain coming when the dam was incomplete and was not ready for water that flowed into the dam. The failure of authorities to act proactively in the face of impending disasters reflects broader issues of governance, such mismanagement, or a lack of institutional capacity. The research finding stress the need for and importance of stronger government accountability and investment in disaster risk reduction. The research findings bring out the need to advocate for vulnerable communities' involvement in disaster preparedness and planning. This includes educating communities about flood risks, developing local early warning systems, and ensuring that disaster plans are inclusive and sensitive to the needs of the most vulnerable.

The success of an EIA can be measured by public participation, as the interested parties that may benefit from the project and any community that may be affected negatively must be given an opportunity to submit their comments on the impacts to the environment, social, cultural and historical aspects. Public participation enables developers to determine measures that can be taken to mitigate and/or totally avoid some impacts that their development may have on the community. By not providing the Tokwe-Mukosi community with the EIA documents, the project sponsors (ZINWA) did not give the community a chance to air their views on how the dam was going to affect them. This suggests that the project sponsors did not assess all alternatives and options to minimise negative impacts of the dam construction on the community. In Zimbabwe EIAs should be conducted as stipulated in the Environmental Management Act 13 of 2002, Amended by Act 5 of 2004. Chapter 20:27 Sub-section XI argues that EIA evaluations should be done before the commencement of any project that may have an impact on the environment, human health and/or the destruction or disruption of the social, historical and/or the cultural fabric of the people living in the area where development is "required"

(Government of Zimbabwe, 2004). EIAs are development strategies that must take into consideration the concerns of affected communities to avoid future legal lawsuits (Jeri, 2017).

The negative impact on the now Chingwizi community multi-faceted, affecting physical, economic, social, and psychological well-being. Flooding due to dam collapse and heavy rains displacement of entire communities, destruction of homes, schools, and health centres, and loss of agricultural land. Livelihoods, particularly in agrarian communities, are devastated, leading to long-term economic insecurity (Allaire, 2018). The destruction of homes often forces people into temporary shelters or resettlement camps, where conditions are frequently overcrowded, unsanitary, and lacking in basic services like water, sanitation, and healthcare as is the case in Chingwizi Camp. Resettlement plans were poorly executed, leaving families without permanent housing, as the mud houses observed. The socio-economic status of an individual and or community determines their ability to respond to and/or cope with the impacts of disasters. If one is not employed (formal or self-employed), then there is no income and usually no wealth. According to (Masozera *et al.*, 2006), wealth enables individuals and/or communities to absorb losses and /or recover from these losses quicker than the poor. The wealthy can use buffers such as insurances.

Chapter Seven: Improving Pre- and Post-Disaster Management in Zimbabwe and Beyond: Some Critical Considerations

Effective disaster management requires a balanced focus on both pre-disaster preparedness and post-disaster recovery to mitigate risks and enhance resilience. In Zimbabwe, as in many other countries, disaster management faces many challenges, including limited resources and insufficient early warning systems. This chapter explores important considerations for improving pre-disaster preparedness, such as strengthening community engagement, enhancing early warning systems, and integrating disaster risk reduction into development planning. It also addresses post-disaster recovery strategies, focusing on building back better, promoting resilience, and ensuring that recovery efforts prioritize the most vulnerable populations. With lessons learnt grom the Tokwe-Mukosi flood disaster, this chapter aims to highlight the importance of a proactive, inclusive, and integrated approach to disaster management that can improve outcomes both locally and globally.

The study explored that the intersection of heavy rains, dam collapses, and lack of preparedness that beings into light the importance of proactive, inclusive, and well-planned disaster management. Devastation brought about by the Tokwe-Mukosi flooding vulnerable households how lack of disaster risk reduction can amplify the suffering of vulnerable communities. The findings call for urgent sustainable development initiatives that involve the communities themselves to prevent future tragedies. Conclusions and recommendations come from lessons learnt in the aftermath of the Tokwe-Mukosi Dam failure, identifying factors which may have led to the flooding disaster in 2014, Why the community was vulnerable to

the 2014 flood and why the 2014 flood affected many households in such a manner that it is proving difficult for them to recover.

The 2014 Tokwe-Mukosi flood disaster was not due to a single cause but a complex mix of both the presence of a hazard and human action or inaction. Although dam constructions and dam failures are relatively common, disasters arise when these negatively impact are vulnerable communities as in the case of Tokwe-Mukosi. A combination of heavy rains, dam construction (development), and existing social and economic conditions made the Tokwe-Mukosi community vulnerable to the 2014 flood. Inadequate project funding for the dam construction and disregard for social considerations or responsibilities by responsible government officials resulted in the 2014 Tokwe-Mukosi disaster.

Poor disaster management planning by responsible government departments in terms of relocation modalities resulted in the community remaining in an otherwise evidently hazardous location. Regardless of financial constraints to compensate each affected household, it is evident that there was no plan on where to relocate this community. If the community had been empowered with the knowledge of their intended relocation site, some or most may have relocated at their own cost to flee the obvious impending danger, especially those who were located within the actual dam perimeter. Compounded by otherwise valid encouragement from human rights activists, not to relocate unless compensated, the community remained "sitting ducks" in the face of a retrospectively obvious hazard.

The decision or oversight of not engaging the Tokwe-Mukosi community in the full processes of EIA resulted in them not being aware of the risk they faced from the dam construction. From a pre-disaster viewpoint, the community was made vulnerable because of a lack of information on flood risks in the area. In the pre-disaster

period, where education on disaster risk reduction should have been the focus; the community was left to construe their own versions of risks and potential benefits, adding to their unwarranted exposure to the flood hazard. This resulted in them not attempting to relocate themselves to safer areas within or outside their community in the face of increasing risk as the dam construction advanced.

The absence of an early warning system and the community not having been informed of emergency plans highlights deficiencies in disaster management guidelines or policy enforcement that resulted in more households than necessary being impacted by the flood. The failure to give formal community updates on the dam construction progress increased the community vulnerability from the most encountered risk during a dam construction project, flooding.

According to international benchmarking, the Chingwizi community can be classified as poor hence, most likely to be affected by the impact of any hazard. With the highest level of education being secondary schooling, most in the community do not have formal skills and rely on communal farming which has not enabled them to build resilience. The material poverty and lack of higher education limited the community's awareness of their rights and recourse to effectively challenge shortcomings in project implementation in their area.

The pre-existing socio-economic conditions in Chivi played a major role in highlighting how vulnerable the community was. Living in poverty made the community vulnerable to the flood and they are now living in poverty in Chingwizi that renders them more vulnerable to various hazards including food shortages. The community was dependent on agriculture that means their livelihoods were destroyed. With negligibly low incomes and low educational levels, the community is not able to pursue other livelihoods to generate

sustainable income. The 2014 flood impacted a vulnerable community that was not able to cope using the limited resources they had.

In must however be said that government coordinated evacuation of the flood victims saved lives as the flood victims lacked the capacity for self-evacuation. The material and food relief provided after the flood increased the coping capacity of the victims. The study reveals that the evacuation of the Tokwe-Mukosi victims became an immediate relocation as the Government of Zimbabwe had not yet planned on where the community was to be moved. Chingwizi had no prior provisions of basic community amenities such as school, clinic or potable water sources. The coping capacity and the resilience of the community was reduced as the flood victims were relocated without any monetary compensation that would help them rebuilt their lives. Without monetary or material compensation for their lost homesteads, the enshrined right to shelter would not be achieved in the short to medium term. The livelihoods adopted at Chingwizi generate less income than livelihoods pursued before the flood and there are no evident programmes to enhance community livelihoods.

The Tokwe-Mukosi (now Chingwizi) community was rendered vulnerable by the social, economic and political environment that existed before, during and after the flood disaster. The flood victims are now living in a social, economic, political environment that makes them more vulnerable than they were in Tokwe-Mukosi. In the absence of a well-planned and well-implemented intervention to promote sustainable livelihoods, the vulnerability to hazards may become imbedded in the community such that it would not only affect the current generation but those to come.

Disaster risk reduction revolves around public information and education; existence of efficient warning systems; disaster preparedness; mitigation and coping mechanisms. The lack of or

failure to apply these fundamental disaster management concepts in Zimbabwe made the Tokwe-Mukosi community vulnerable to the 2014 floods. The Government of Zimbabwe was not adequately prepared for the Tokwe-Mukosi Dam project in terms of project financing, implementing legally prescribed community engagement and awareness through prescribed EIA processes.

Regarding the reflections on the 2014/15 Tokwe-Mukosi Flooding Disaster in Zimbabwe, it is possible to derive recommendations based on the knowledge gained during and after the disaster. These recommendations should aim to enhance development efforts while simultaneously mitigating the risks associated with future disasters.

1. Enhancing disaster preparedness and early warning systems: Allocate resources towards sophisticated meteorological and hydrological monitoring systems capable of promptly identifying potential flooding occurrences and promptly alerting vulnerable communities. Conduct continuous training initiatives for local communities regarding disaster preparedness, evacuation procedures, and response strategies.
2. Improving the durability and robustness of infrastructure: Prioritise the development of flood-resilient infrastructure in areas prone to flooding, including the construction of flood barriers, spillways, and drainage systems, to reduce the impact of similar disasters. Sustainable urban and rural planning involves incorporating disaster risk reduction strategies into development plans for both urban and rural areas. This includes designing settlements, especially those located in flood-prone areas, with a focus on resilience.
3. Improving community involvement and fostering collaboration with stakeholders: Implement participatory planning and decision-making by involving local communities, including marginalised groups, in the processes

of disaster planning and decision-making. This will ensure that their knowledge and needs are considered when developing strategies for development and disaster management. Enhance the efficacy of disaster response and recovery endeavours by fostering better coordination among government entities, non-governmental organisations (NGOs), local authorities, and international organisations through multi-stakeholder collaboration.

4. Enforcing policies and strengthening institutional capabilities: Evaluate and revise policies related to the management of potential disasters. It is important to ensure that national and regional policies concerning disaster management are in line with the most effective methods used worldwide and are regularly revised to incorporate new and emerging risks. Enhancing the capabilities of local institutions by offering training and resources to local disaster management institutions to improve their capacity to respond efficiently to disasters, including by enhancing resource allocation and coordination.
5. Rehabilitation and Adaptability after a Catastrophic Event Developing Programs for Restoring Livelihoods: Create specific livelihood restoration initiatives that prioritise the reconstruction and expansion of income streams for communities affected by the flooding, with a particular emphasis on those reliant on agriculture, which suffered significant damage. Ensure that individuals and families who have been displaced are provided with enduring assistance, including access to housing, education, healthcare, and employment prospects, to facilitate a sustainable recovery.
6. Adaptation to Climate Change: Incorporate climate change adaptation strategies into development plans, integrate climate change adaptation strategies into national and local development planning to tackle the growing occurrence and

severity of disasters such as flooding. Advocate for the adoption of sustainable land and water use practices to mitigate the susceptibility of communities to climate-induced disasters, particularly through the promotion of sustainable agricultural and water management techniques.

7. Financial Mechanisms for Mitigating the Impact of Disasters: Create provisions for establishing funds specifically designated for disaster contingencies. Establish dedicated funds at both the national and regional levels to guarantee prompt financial reactions to disasters, thereby minimising the economic consequences on affected communities.

The purpose of these recommendations is to tackle both the immediate response to disasters and the long-term planning for development to reduce the impact of future disasters. These recommendations are based on the knowledge gained from the Tokwe-Mukosi flooding disaster which is one case study which suggests that further research in several other areas is needed to increase our knowledge of development and disasters and thereby enhancing our resilience.

The study on the Tokwe-Mukosi flooding highlights the significant interplay of severe rainfall, dam failures, and insufficient preparedness, which worsens the vulnerability of marginalised communities. The destruction faced by these households shows the urgent need for proactive, inclusive, and properly planned disaster management strategies. In the absence of thorough disaster risk reduction strategies, at-risk populations continue bearing the consequences of such disasters. The results necessitate sustainable development initiatives that emphasise the participation of impacted communities in decision-making processes, thereby ensuring mitigation of future tragedies through a collaborative and informed approach. By addressing these shortcomings, we can strive to enhance resilience and protect livelihoods in disaster-prone regions.

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Synopsis

This book examines the intersection of development projects and disaster vulnerability through the lens of the 2014/15 Tokwe-Mukosi flooding disaster in Zimbabwe. Set against the backdrop of a large-scale dam construction project, the book critically analyses how development initiatives, while intended to promote economic growth and modernization, can also increase risks for communities when disaster preparedness and planning are inadequate.

The Tokwe-Mukosi Dam, a key infrastructure project in Zimbabwe, was intended to enhance water storage, improve irrigation for agriculture, and contribute to regional development. However, in early 2014, heavy rains overwhelmed the dam's capacity, leading to its partial collapse and severe flooding downstream. The resulting disaster displaced thousands of people destroyed homes and livelihoods and revealed the systemic weaknesses in Zimbabwe's disaster preparedness and response mechanisms.

The book brings out four themes, development versus disaster, impact of disasters on vulnerable communities, government and authority preparedness, and lessons for future development projects. It explores the conflict between development goals and disaster risk management arguing that poorly planned development projects, especially those involving large-scale infrastructure like dams, can exacerbate the vulnerability of already fragile communities if disaster risks are not properly assessed and mitigated. Through case study and testimonies from affected individuals, the book illustrates the profound social, economic, and psychological impacts of the flooding on local communities. It highlights the long-term consequences of displacement, loss of livelihoods, and inadequate resettlement efforts. It calls for a more integrated and inclusive approach to development, where disaster risk is a key consideration in policy and planning decisions.

About the Author

Tsungai Mukwashi is a seasoned researcher and practitioner with expertise in disaster management, community development, and just energy transitions. Currently pursuing a PhD in Regional and Urban Planning at the University of Johannesburg, her research examines power dynamics in the pursuit of clean energy and sustainable cities. She holds an MSc in Disaster Management from the University of the Free State and a BA from the University of Zimbabwe. Her work is grounded in advancing climate resilience and sustainable development, with a focus on vulnerable communities.

Tsungai has contributed significantly to understanding the intersection of development and disaster management. Her research includes studies on the Tokwe-Mukosi flooding disaster, which examine the social and environmental impacts of infrastructure projects in Zimbabwe. She is the founder and director of the Ndirimo Foundation, where she leads community-based initiatives aimed at risk management and climate change adaptation.