THE ROLE OF INSTITUTIONAL ARRANGEMENTS IN POST-FLOOD DISASTER MANAGEMENT IN SOUTH AFRICA, FOCUSING ON KWA-ZULU NATAL PROVINCE, MPHELA TOWNSHIP AND NCAKUBANA COMMUNITIES

by

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Thesis

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The Ethics Protocol number is H20/02/32

DECLARATION, PLAGIARISM

I, Sindisiwe Nyide, declare that this thesis, including data, diagrams, graphs, tables, and other information, is my work. Therefore, one has, where necessary, acknowledged the source of the material.

This thesis is primarily my writing, except for explicitly acknowledged material from other researchers. Information attributed to other quoted sources was paraphrased and referenced. Their writings were italicized, enclosed in quotation marks, and adequately referenced when their exact words were used.

This thesis is submitted to the Faculty of Science at the University of the Witwatersrand in Johannesburg, South Africa, for the Doctor of Philosophy degree award. The thesis was never submitted for examination or degree award at this or any other learning institution.

Signature of a candidate

24 October 2023

Date

DEDICATION

This thesis is dedicated to my living, future, and departed family members. You inspired me and gave me strength throughout this challenging yet rewarding journey. Thank you very much for everything. I love and appreciate you.

I also dedicate this thesis to all individuals who believe that everyone has the potential to achieve their goals and thus give them an opportunity or support when requested to assist.

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ABSTRACT

South African officials and communities grapple with various matters after flood disasters. This thesis used a combination of qualitative and quantitative data collection approaches to explore possible systematic and structural weaknesses in addressing post-flood disasters in South Africa. The study investigated whether post-disaster management in disaster-vulnerable urban and rural communities contributes towards disaster resilience and adaptive capacity to achieve sustainable development. The need stemmed from the Country's high frequency and magnitude of disasters, including floods, droughts, and fires. The Government implemented different policies and strategies after 1994 to address flood disasters. While acknowledging some success in managing these disasters with the current adaptive measures, the frequency and intensity of disasters have increased, causing significant loss of life, environmental damage, and properties, particularly among the vulnerable population. Since this was a national study, participants came from across South Africa. The random sampling selected 35 Ncakubana Village and Mphela Township community members. Other selected participants were seven and six focus group members, respectively. In contrast, purposive and snowball samples chose 34 disaster management officials. Moreover, the purposive sampling selected two ward councillors and six advisory forum members. There were open-ended and closed-ended questions in the interview schedules and questionnaire surveys. The researcher also used observation to gather information on variables of interest during transect walks in the study areas. The study conducted an intensive documentary analysis to obtain more information. Descriptive statistical techniques, Microsoft Excel, and Statistical Package for the Social Sciences were employed to examine the quantitative data. Thematic analysis was for qualitative data analysis to review data from open-ended questions and literature. The study employed Atlasti software for inductive content analysis to identify research codes and themes and the Word Cloud tool to visualise textual data.

For quantitative results, 33 disaster management officials responded that disaster-specific Acts and Policies are in place. According to 21 disaster management officials, or 62% of all participants, their organisations have vulnerable groups' specific policies. Multistakeholder complications were the most frequently mentioned challenge by participants. They mentioned them 23 times, 68% of the total participants. Challenges stated, among others, included funding and administrative matters. Most of the respondents, 75% identified funding as the biggest problem. Qualitatively, the thesis uncovered that disaster management is a multi-sectoral and multidisciplinary field. Although various institutional

arrangements exist, they do not seem appropriate for assisting vulnerable groups post-disaster. Floods appeared to be the most frequent natural disaster in South Africa. Floods severely affected vulnerable people, particularly women, the elderly, children, and people with physical disabilities. While officials have made some progress on implementing post-flood disaster projects, they appear inadequate to assist vulnerable groups in dealing with floods. Furthermore, regrettably, despite the level of success in addressing disasters, most measures have failed to achieve the intended results for various reasons. The participants identified multiple tangible and intangible opportunities. They subsequently proposed that Disaster Management Centres develop various noteworthy documents, intensify the dissemination of post-disaster information across numerous platforms, obtain post-disaster funding and adequate personnel, and establish or revitalise structures. The suggested consolidated long-term measures by the participants yielded a proposed South African Post-flood Disaster Checklist or Model, which was non-existent in South Africa. By implementing more effective and efficient post-disaster measures, the proposed tool can help policymakers and strategic partners standardise post-disaster resilience and adaptive capacity in various sectors' sustainability contexts. The aim is to have post-flood disaster resilient communities with adaptive capacity to achieve sustainable development.

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LIST OF ABBREVIATIONS AND ACRONYMS

%	Percent
BSU	Basic Sampling Unit
BRIC	Baseline Resilience Indicators for Communities
BBB	Build Back Better
CART	Communities Advancing Resilience Toolkit
CBO	Community-Based Organisation
CDRI	Community Disaster Resilience Index
CSIR	Council for Scientific and Industrial Research
DM Act	Disaster Management Act
DMC	Disaster Management Centre
DRR	Disaster Risk Reduction
DM	District Municipality
EPWP	Expanded Public Works Programme
HoC	Head of Centre
HGDM	Harry Gwala District Municipality
HGDMAF	Harry Gwala District Municipality Advisory Forum
HHs	Households
HFA	Hyogo Framework of Action
ICT	Information and Communication Technology
IDP	Integrated Development Plan
IPCC	Intergovernmental Panel for Climate Change
IFRC	International Federation of Red Cross and Red Crescent Societies
IDP	Integrated Development Plan
ISDR	International Strategy for Disaster Reduction
KPAs	Key Performance Areas
KZN	Kwa-Zulu Natal
LDRRMF	Local Disaster Risk Reduction and Management Fund
LM	Local Municipality
MS	Microsoft
MOU	Memorandum of Understanding

MDMCs	Municipal DMCs
NDMC	National Disaster Management Centre
NDMF	National Disaster Management Framework
NDMRC	National Disaster Management and Relief Committee
NADMO	National Disaster Management Organization
NDRF	National Disaster Response Framework
NEMA	National Emergency Management Agency
NERA	National Emergency Relief Agency
NGOs	Non-Government Organisations
NPO	Non-Profit Organisation
NQF	National Qualifications Framework
PD	Presidential Decree
PDMC	Provincial Disaster Management Centre
RDP	Reconstruction and Development Programme
RCI	Resilience Capacity Index
RSA	Republic of South Africa
RIM	Resilience Interference Measurement
SASSA	South African Social Security Agency
SDG	Sustainable Development Goal
SI	Sample Interval
SoVI	Social Vulnerability Index
SPSS	Statistical Package for Social Science
SOPs	Standard Operating Procedures
TV	Television
UNISDR	United Nations International Strategy for Disaster Reduction
USA	United States of America
WHO	World Health Organisation
Wi-FI	Wireless Fidelity

CHAPTER 1
FRAMES OF REFERENCE

1.1.Background to the study

The occurrence of disasters is one of the most concerning environmental difficulties and challenges that communities will continue to face globally (Wamsler, 2010; Nojavan et al., 2018). In Indonesia, there has been a dramatic increase in natural disasters in recent decades (Kamil et al., 2019). The Centre for Research on Epidemiology of Disasters Emergency Events Database supports this finding; for instance, in the 1970s, globally, there were fewer than 100 disasters annually; by the 2000s, there were approximately 400 disasters annually (Kurosaki, 2017). Besides Hurricane Katrina, there has been an increase in major catastrophic disasters globally (Burby, 2006). South Africa is predominantly semi-arid and experiences significant climate variability, including droughts, floods, and storms (Van Riet, 2012). According to Sha et al. (2019), floods are the most prevalent type of natural disaster, occurring more frequently than other disasters (Ringo et al., 2016; Olanrewaju et al., 2019). Floods account for a significant portion of natural hazards worldwide, with some estimates putting the figure as high as 90 percent (%) (Abaya et al., 2019). Floods are a severe and increasing phenomenon affecting developing and developed countries (Amakao, 2012). Hence, floods of varying frequency and intensity occur regularly in different parts of South Africa (Du Plesis et al., 1999), as seen in Figure 1.1.

The disaster consequences are significant and increasing. They have socio-economic implications for communities and individuals. There is a multi-dimension in disaster management impacts and redistributive effects; thus, it becomes unclear to determine the estimated value (Hallegatte, 2017). Relatedly, Owusu-Sekyere et al. (2021) revealed that disasters affect economic growth because of the disruption of the functioning of a community, material, economic, human, and environmental losses in critical infrastructure, transport, agriculture, and tourism, resulting in unemployment, loss of production and revenue. The loss caused by Hurricane Katrina was estimated to be $200 billion, considered the largest in US History (Burby, 2006). Similarly, Hallegatte (2017) states that large-scale disasters affect the poor and the rich. Specifically, floods are well known for causing crop destruction, property damage, loss of life and livelihood, and even deterioration of water resources.

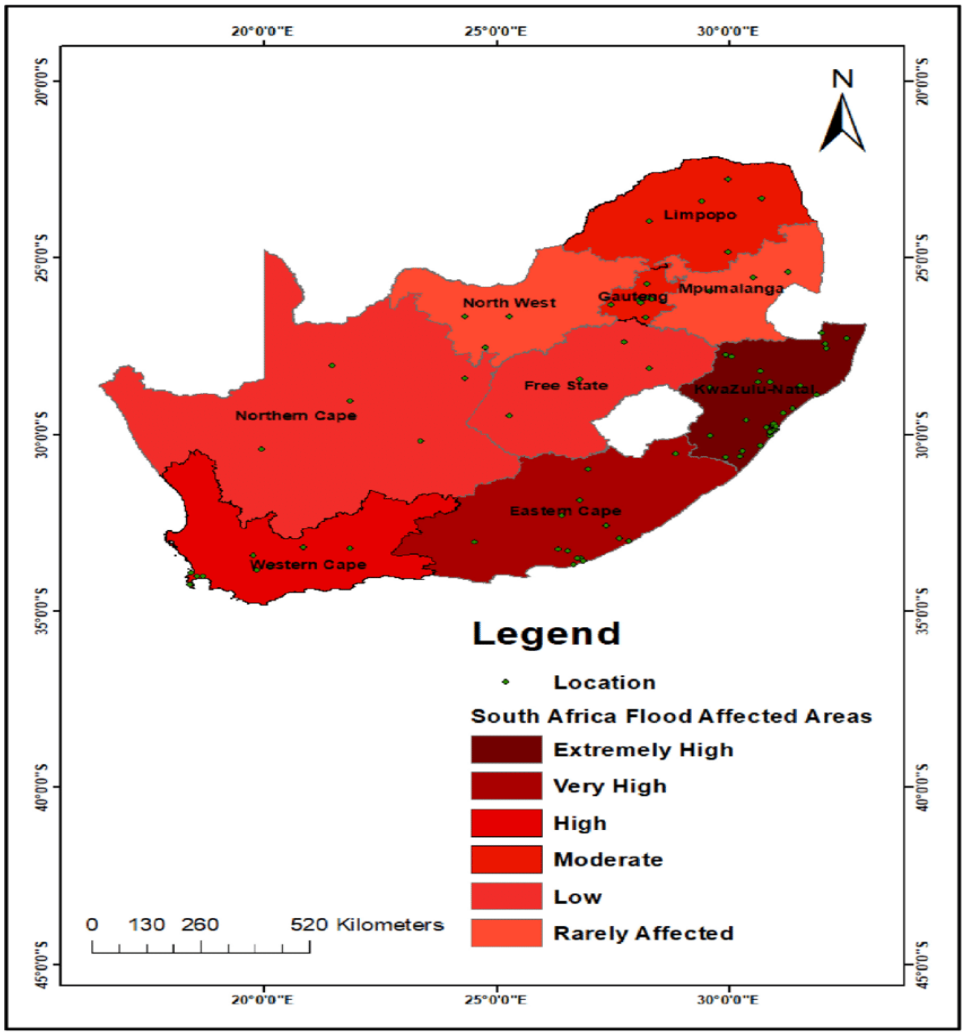

Figure 1.1: Flood effects on various provinces of South Africa (Busayo et al., 2023)

There are also secondary effects, such as psychological consequences and job losses. Nakileza (2007) focused on the personal aspects and indicated that disasters can cause the victims to be sick, widowed, orphaned, displaced, have post-traumatic stress disorder, or be disabled (Nakileza, 2007). These possible consequences mean that disasters increasingly threaten human security (Nakileza, 2007). Moreover, some impacts are long-term, while others are short-term, necessitating long-term and short-term strategies. Regrettably, this trend will likely continue (Gibson et al., 2018; Kwan, 2020). As stated, disasters, particularly floods, cannot always be avoided because some are natural occurrences.

Natural disasters are blamed on human-caused factors such as uncontrolled urbanisation, climate change, and deforestation (Ringo et al., 2016; Olanrewaju et al., 2019). Flood losses and damage are

expected to increase because of urbanisation, population growth, climate change, and economic development (Chakraborty et al., 2019). Other environmental encounters include desertification, rapid population growth, global warming, acid precipitation, and pollution. From another perspective, Deria et al. (2020) indicate that other human activities that exacerbate floods include river engineering, damaging natural protective systems, and building and residing in flood plains. The occupation of flood plains is thus expected to increase. In addition, Vitale et al. (2020) emphasise this viewpoint, stating that the global flood risk increase is because of floodplain occupancy and the impacts of climate change. Furthermore, poor planning and population growth exacerbate these problems (Lukamba, 2010). Notably, Katolonge (2019) stresses that destituteness, poor governance, and inadequate capacity to manage disaster impacts all contribute to disasters' continuous impact on Africa. Also, Ayers (2011) contends that inadequate infrastructure, limited resources, and weak and ineffective systems exacerbate Africa's vulnerability. These views support Prelog and Miller's (2013) and Ali et al. (2014) contention that vulnerable communities are more vulnerable to disasters because of high poverty rates, low income, inadequate infrastructure, insufficient resources, or political instability. As a result of the concerning conditions, Africa has low disaster resilience and adaptive capacity. These patterns and tendencies are common in post-colonial and middle-income countries and should not be ignored. However, these countries must implement appropriate measures.

Another global challenge is climate change (Amoah & Simatele, 2021). Some authors agree that the severity and frequency of severe weather and climatic events have intensified globally (Sam et al., 2019; Jasmed et al., 2020; Kwan, 2020). Scholars such as Guo (2010), Hewitt (2013), Rana and Routray (2018), and Chuang et al. (2020) contend that these disasters manifest as weather-related extreme events with increased frequency and intensity. Particularly, Katolonge (2019) and Jasmed et al. (2020) claim that climate change is another example of the root cause of disasters, as it exposes more vulnerable communities to hazards. Numerous scholars support this viewpoint and believe that society faces climate change-induced disasters and that millions of individuals are affected by climatic conditions each year (Hewitt, 2013; Hilhorst, 2013; Browne et al., 2018). Wen et al. (2023) point out that climate change exacerbates disaster risks and increases the frequency and impacts of disaster losses and damage. Furthermore, Faling et al. (2012) indicate that climate change-induced disasters will increase floods, tornadoes, hail, storms, heavy rains, wind, veld fires, snow, and drought in the southern African region. Climate change affects urban and rural areas and can increase floods and drought (Amoah &

Simatele, 2021). Climate-related disasters account for roughly two-thirds of all disasters (Wamsler, 2010). In agreement, according to Faling et al. (2012), climate change contributes to increased disasters. This background demonstrates that rising greenhouse gas emissions have resulted in a rise in global temperatures. The impacts of rising temperatures include rising sea levels, weather pattern changes, and increased severity and frequency of disasters. Furthermore, there is anticipation that this greenhouse gas emissions increase will continue.

The adverse effects of climate change affect families, communities, the environment, and the economy (Amoah & Simatele, 2021). Simatele et al. (2023) highlight that climate change directly and indirectly impacts the agricultural value chain. This climate variability can affect food security regarding access availability, utilisation, and stability (Simatele et al., 2023). According to Wen et al. (2023), climate change severely disrupts measures to achieve Sustainable Development Goals (SDGs). Amoah and Simatele (2021) also add mental health and well-being to the long list of climate change challenges, which may hinder their productive activities. Even though there is uncertainty in future climate projections, they indicate that future climate stress will undoubtedly exist. Various aspects of food security, including access, availability, and utilisation leading to socio-economic effects, are affected by climate variability (Simatele et al., 2023). The agricultural value chain is also affected (Simatele et al., 2023). Considering this reality, Gajanayake et al. (2018) believe that adaptation choices may differ depending on the affected community members, thus influencing their disaster resilience.

As a result of rainfall pattern variation and global warming, floods are becoming more common and catastrophic (Deria et al., 2020). In this context, Shah et al. (2018) emphasise that, due to climate change, floods are likely to be the most common, with severe consequences. In other words, there is a likelihood that floods and increased climate variability will result in more frequent and intense flooding in many areas (Mai et al., 2020). Many regions will experience floods more frequently than ever because of climate change. Due to socioeconomic challenges and stressors, Africa may be vulnerable to climate change (Filho et al., 2018). Kreibich et al. (2022) concurred that the recent floods in KwaZulu-Natal (KZN) Province in April 2022 caused over 400 casualties and damage to infrastructure worth $ 4 billion is a prime example of the negative impact of disasters in South Africa. Busayo et al. (2022) added that factors that exacerbated flood vulnerability are uncontrolled population growth, urbanisation, and

uncoordinated planning. Still, on this subject, there is a view that besides acknowledging climate as a scientific construct, it has to be localized, historical, and rooted in culture (Grab, 2023).

The Intergovernmental Panel on Climate Change (IPCC) Assessment Report 6 Cycle states that global warming is 1.5^0C above pre-industrial levels and related global greenhouse gas emission pathways (Djalane, 2019). The IPCC's fourth assessment report specifies that Africa is the most climate-change vulnerable continent (Borner et al., 2015). Elaborately, Bang (2013), Hewitt (2013), and Rech et al. (2017) assert that the reason is that Africa depends on climate-dependent economic sectors, poverty, high illiteracy rates, limited institutions for funding, poor infrastructure and technology, overuse of natural resources, weak institutional frameworks, and conflicts. It is undoubtedly essential to prioritise the continent regarding disasters and climate change. Global warming will likely reduce agricultural production, increasing poverty, food insecurity, and population displacement. The IPCC's prediction that Africa's temperatures will intensify faster than global temperatures is a concern for South Africa (Faling et al., 2012). There is also a climate change problem in South Africa since the global average has increased by 0.65^0C since around 1964, while the increase in South Africa has been more than double that, at 1.5^0C. (Ziervogel et al., 2014). In South Africa, there appears to be no concrete plan to deal with the inevitable climate change impacts, particularly disasters. Climate change impacts in South Africa could harm food security, infrastructure, water resources, ecosystems, health, and biodiversity (Ziervogel et al., 2014). For example, it could be devastating for areas like KZN, which has high biodiversity and poverty levels (Munien et al., 2015). The predicted impacts have already been observed in South African communities through different destructive disasters.

These disasters, many of which have been linked to environmental change, have massive ramifications for countries' socio-economic and welfare systems (Guo, 2010; Ali et al., 2014; Nojavan et al., 2018; Yu et al., 2018; Gomez-Cunya et al., 2019). The studies show the devastation caused by disasters to human and socioeconomic factors. There is a suggestion by Mashi et al. (2019) that anthropogenic-related or natural disasters are a barrier to achieving global sustainability. Furthermore, Tsai et al. (2019) contend that natural and anthropogenic-related disasters endanger people's lives and cause property damage. Another researcher, Wamsler (2010), believes that developing countries are mainly affected by lives lost and the proportion of Gross Domestic Product loss during disasters. Similarly, Filho et al. (2018) assert that most disaster-affected communities comprise poor people, particularly in Sub-

Saharan Africa, a developing Region. Disasters caused by climate change can exacerbate inadequacy in developing countries regarding access to essential services, health, and even food security. The IPCC's Fifth Assessment Report stipulates that despite causing gradual shifts, anthropogenic climate change increases the frequency, duration, and intensity of extreme temperature and rainfall (Menchler et al., 2014). Communities in developing countries are vulnerable due to a lack of institutional arrangements to cope with disasters, initial welfare levels close to poverty lines, and non-existent early warning systems (Kurosaki, 2017). The challenges will be significant if there are no attempts to ensure poverty alleviation, likely exacerbating the situation. Hence, it is critical to determine post-disaster interventions to have disaster-resilient and adaptive communities.

Disasters have varying effects on communities and groups (Cui & Sim, 2017). As a result, some communities or groups are more vulnerable than others. The mortality and losses of vulnerable groups may be higher than those of less vulnerable community members affected by the same flood. Importantly, Sheikhbardsiri et al. (2017) discovered that people experiencing poverty, particularly children, senior citizens, women, and those with physical disabilities, are the most disaster-vulnerable people who suffer as environmental and climatic changes reduce their adaptive capacity and resilience to any disaster. Additionally, Mitchell et al. (2008) and Muzenda-Mudavanhu (2016) specify that children in developing countries are more vulnerable to disasters than children in developed countries. On the other hand, Cui and Sim (2017) stipulate that senior citizens are vulnerable groups with limited disaster-resilient capacity and are more likely to face insufficient financial assets following disasters. Some vulnerable groups include poor older persons with limited access to political, social, economic, and environmental resources (Kwan, 2020). Countries such as Indonesia, Sri Lanka, India, the United States, and the Netherlands recognise people with disabilities as vulnerable; therefore, their protection during disaster evacuation is prioritised (Pertiwi et al., 2019). Literature shows that the specified vulnerable groups are children, senior citizens, women, and people with physical disabilities. A recent study by First National Bank in South Africa reveals a worrying picture, revealing that even the middle class is in trouble. The findings revealed that the middle class has only 20% of their salary on the fifth day after receiving a wage because of secured and unsecured credit (De Wet, 2022). These findings imply that more people are vulnerable than initially anticipated. Even those thought to have capacity and resilience are at risk. The constant load shedding and increasing interest rates in South Africa will likely result in more vulnerable people. Then, more people would require assistance post-disaster.

Aside from the discussions above, Jasmed et al., (2020) allude to the vulnerability of rural communities in developing countries to non-climate stressors, such as location-specific social, economic, physical, political, spatial, and natural factors. Accordingly, Ahmad and Ma (2020) believe that people living in rural areas rely on agriculture as their primary source of income, even though the sector can be severely affected because of low income and inadequate protection measures. In support of this notion, Jasmed et al. (2020) believe the vulnerability of rural communities is due to insufficient human development and poor infrastructure. As a result, they rely primarily on agriculture, and the government gives them little attention. In addition to the issues mentioned above regarding developing countries, rural households are vulnerable to climate change and variability because they rely on rainfed agriculture and spend two-thirds of their budget on food (Kubik & Maurel, 2016). Furthermore, Hosseini (2016) believes cultural factors are essential in rural areas, where the community relies more on agricultural capital than urban areas. However, according to Montoya and Masser (2005), due to elements such as population, buildings, and infrastructure, urban areas are more vulnerable to disasters. Most people in rural areas rely on agriculture. As a result, environmental challenges can reduce rural communities' adaptive capacity and resilience. Therefore, the communities become more vulnerable and severely affected during disasters.

There are ongoing efforts to comprehend the world's growing vulnerability to extreme weather patterns, including the 2004 Indian Ocean Tsunami, Hurricane Katrina in the United States in 2005, the 2010 Haiti earthquake, and the 2011 Tohoku Earthquake Tsunami (Manyema, 2013; Davies & Davies, 2018). Even in June 2023, there were floods in the Western Cape, South Africa, floods in the Ivory Coast, landslides in Abidjan, flooding in Haiti, floods in Samoa, and floods in Australia. The most recent ones are the devastating cyclone Freddie in Mozambique, Madagascar, and Malawi, and the floods in Australia and Pakistan in March 2023. Other recent topical disasters include an earthquake in Syria and Turkey in 2023, floods in South Africa, Zambia, and New Zealand in 2023, mudslides in Brazil in 2022, unprecedented floods in South Africa, KZN in April and May 2022, Tropical Storm Ana in Mozambique in 2022, and Cyclone Idai in Zimbabwe in 2019. These examples show that floods are a global phenomenon with severe impacts, a concerning trend. So, new thinking is necessary to tackle future disaster incidents (O'Brien et al., 2010). As a result, Wamsler (2010) asserts that it is inevitable to rethink current approaches to disaster management and associated poverty because of climate change. In support, Dube (2019) highlights that studies have shown that, as disasters' magnitude and subsequent

impact increase, the focus should be pre-disaster and post-disaster frameworks. It is significant to understand post-disaster trends because that will assist with adequate resource allocation and the design of appropriate, effective post-disaster policies. The country's institutions and policies to enhance adaptability and resilience among vulnerable groups will determine how climate change and resulting disasters impact them (Bang, 2013).

The thesis investigated the systems and structures regarding post-flood disaster management in South Africa. To emphasize this, Bang et al. (2019) explain that post-disaster management research has received insufficient attention. Post-disaster management measures can decrease vulnerability and, thus, the number of vulnerable people. Above all, Campos (2019) states that resilient people adapt to change and can face challenges. Importantly, Mohanty et al. (2020) acknowledge the need for capacity building to understand the problem and plan mitigation strategies. Supporting this view, Ali et al. (2014) suggest that local capacity building empowers vulnerable people to cope and adapt to shape social structures and contribute to policy. Therefore, Chuang et al. (2020) affirm that adaptive capacity is crucial in disaster management because it can assist in dealing with extreme weather events that are increasing in rate and frequency. As a result, it is critical to plan for post-disaster situations.

1.2. Thematic consideration

South Africa appears to be the Southern African region's economic engine (Patt et al., 2009) because of its status as an upper-middle-income economy. The country is committed to reducing poverty through government social grants and the Expanded Public Works Programme (EPWP). However, given the high cost of living, the interventions appear insufficient. There is concern about increased necessities like gasoline, paraffin, food, and electricity. External factors such as alleged government misappropriation of funds, wars in other countries, and the recent global COVID-19 pandemic exacerbate these increases. Moreover, besides the above concerns, like any other developing country, South Africa faces climate change challenges (Flato et al., 2016; National Disaster Management Centre (NDMC), 2018). South Africa has been declared one of the world's climate change hotspots (Hewitt, 2013). South Africa is semi-arid (Busayo et al., 2022). Specifically, the South African climate varies spatially and temporally (Grab and Knight, 2015). Also, Strydom and Savage (2018) concur that the rainfall and air temperature in South Africa vary, as illustrated in Figure 1.2. The rainy season is from November to March. In contrast, the dry season is from May to September.

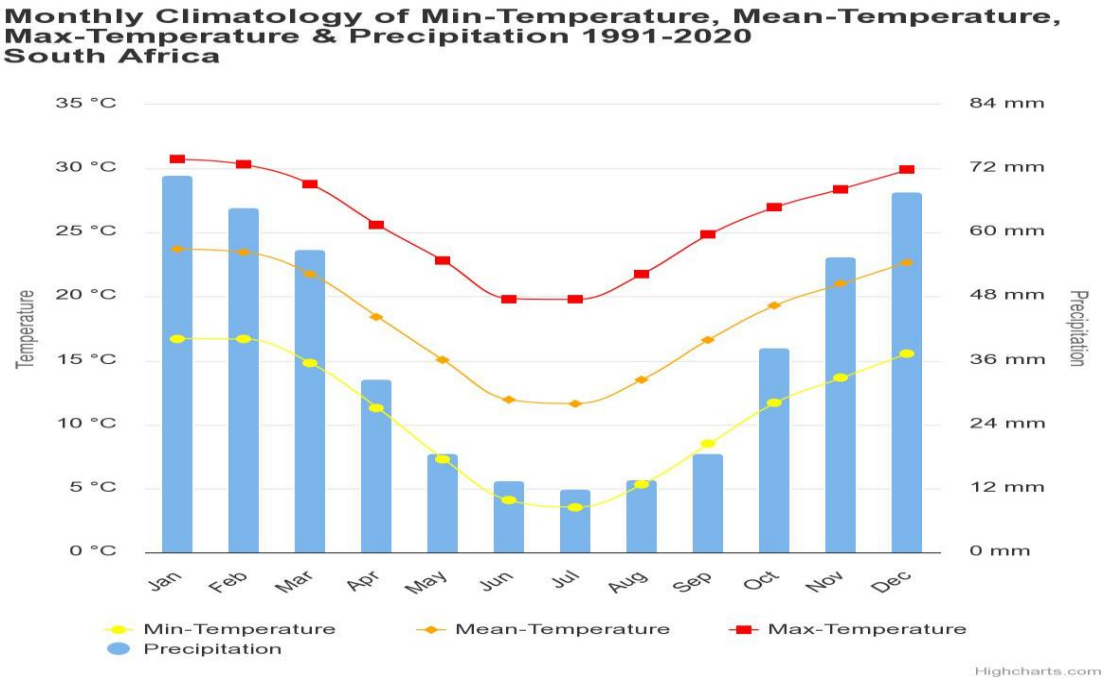

Figure 1.2: Mean weather conditions for South Africa from 1991 to 2020 (The World Bank, 2023)

Except for the South Western Cape, South Africa is in the summer rainfall zone (Grab & Knight, 2015), as shown in Figure 1.3. The KZN Province has a subtropical oceanic climate, with cool, dry winters and wet summers (Guastella et al., 2014; Strydom & Savage, 2018). The KZN Provincial Disaster Management Centre (PDMC) (2018) affirms that in KZN, usually, summer is the season for heavy rainfall, house fires, floods, lightning, drowning, and strong winds, while winter is predominantly the fire season. However, as seen in the recent past, winter rain sometimes results in flood disasters, and this trend is supposedly changing due to climate change. These disasters affect human and socio-economic development. For instance, during the 2017/18 financial year, KZN experienced 2953 disaster incidents, affecting 16678 households (KZN PDMC, 2018). There were 76072 people impacted, with 164 fatalities and 2280 injuries (KZN PDMC, 2018). One of the studies conducted in KZN found that one of the adverse climate change effects is the growing reliance on ecosystem services (Mugwedi et al., 2018). The KZN Midlands area is predominantly rural; the primary source of income is agriculture (Strydom & Savage, 2018). The province's growing reliance on ecosystem services can be a challenge. Thus, increasing disasters, ineffective post-disaster measures, policy, and recently identified development and maintenance shortcomings are all potential challenges in KZN. These matters need consideration when assessing the post-disaster phase.

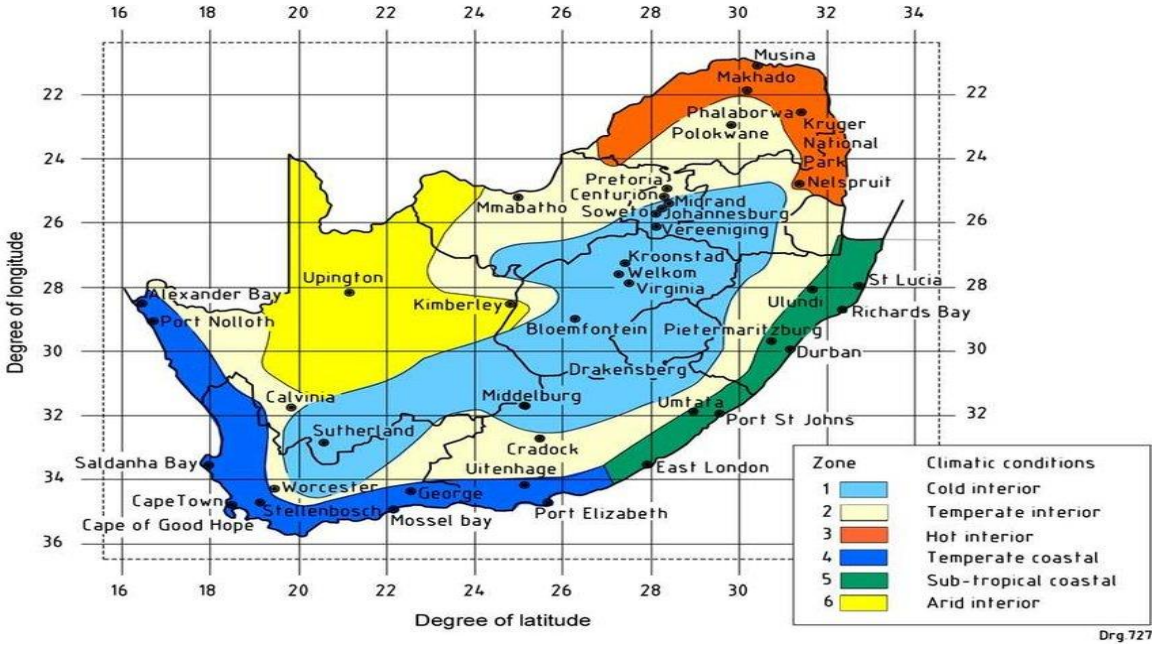

Figure 1.3.: Climatic zones of South Africa (Cu Conradie & Kumirai, 2012).

South Africa has experienced climate fluctuations and sea-level changes (Grab & Knight, 2015). Figure 1.4 shows the fluctuating rainfall in KZN between 1993 to 2022.

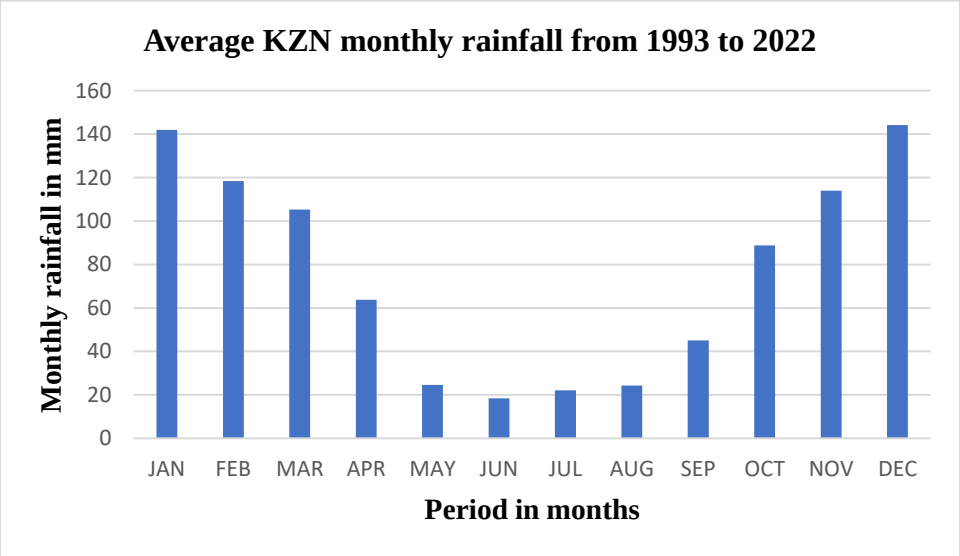

Figure 1.4: KwaZulu rainfall data from 1993 to 2022 (South African Weather Service, 2023)

According to Flato et al. (2016), there is a high projection that extreme flooding and drought will be more frequent in South Africa. As a result, the country will continue to face adverse and environmental challenges, such as increased drought, floods, and temperature extremes that could cause problems,

such as fires (Hewitt, 2013). Vermaak and Van Niekerk (2004) support this argument and point out that flooding, informal settlement fires, droughts, veld fires, and human-caused disasters, such as mining accidents and spills, have massive impacts in South Africa. Moreover, the NDMC (2018) report indicates rising costs for implementing post-disaster activities in the 2017/18 fiscal year. Wentink and van Niekerk (2017) attribute this to the absence of basic disaster management structures in some municipalities and obliviousness about disaster management principles in government departments, resulting in unfavourable disaster management in South Africa. As one of the hotspots for climate change, South Africa will continue to face adverse environmental challenges. The challenges result from various circumstances in communities, municipalities, and government departments.

The NDMC (2018) report further indicates that officials from transport, agriculture, forestry, environment, water and sanitation, education, and human settlements sectors must actively participate in disaster management prevention measures to prevent disasters and subsequent losses. Of concern is that Wentink and van Niekerk's (2017) findings show that officials split their attention between disaster management and unrelated duties because they work in other municipal departments. There are persistent challenges facing disaster management in South Africa due to the lack of disaster management focal points within many sector departments, programs that do not integrate disaster risk reduction into sector department programs, and insufficient capacity in provincial and municipal disaster management centres (NDMC, 2018). This negative trend is continuously observed in disaster events, including the most recent ones in KZN in April and May 2022, where the national government declared a provincial state of disaster. As recently as February 2023, floods affected the Eastern Cape, KwaZulu Natal, Gauteng, Limpopo, Northwest, the Northern Cape, and Mpumalanga Provinces, and subsequently, the Minister declared a national state of disaster. Unfortunately, based on the handling of recent disasters, there seemed to be inappropriate planning for post-disaster activities commencing after the disaster. In essence, Faling et al. (2012) believe that the preceding leads to inadequate post-disaster planning, monitoring, and management. Consequently, disaster management officials can only address the most pressing crises, restricting social learning and adapting flood-response systems (Culwick et al., 2017). While implementing post-disaster activities in South Africa, there is an occurrence of a slew of difficulties. Various stakeholders and role players seemingly face these challenges regularly, if not daily. As a result, there is insufficient planning, monitoring, and management of post-disaster activities.

While Harry Gwala District Municipality (HGDM) in KZN has managed to put measures such as institutional arrangements, disaster management volunteer units, disaster management frameworks, disaster management plans, and cross-border cooperation in place, this district is still affected by disasters (HGDM Integrated Development Plan (IDP), 2019). Thus, this District Municipality is not resilient during post-disasters and lacks adaptive capacity, as these disasters seem frequent. The reasons are the threats and weaknesses in the district, which entail the occurrence of disasters that exceed the district's state of readiness, a lack of disaster management understanding by other stakeholders, inadequate personnel, and a shortage of resources (HGDM 2017-2022 IDP, 2019). The common district disasters are fires, droughts, road accidents, storms, communicable diseases, floods, and snowfall (HGDM 2017-2022, 2019). Greater Kokstad and Ubuhlebezwe Local Municipalities (LMs) are the worst affected of the four district's LMs. The common disasters in those LMs are veld fires, flooding, and drought. The fire incidents in Greater Kokstad LM in the 2016/17 financial year were 236, and the 2017/18 financial year had 198 incidents. According to the Greater Kokstad 2019/20 IDP Review (2019), the municipality's critical challenges are a lack of disaster awareness and preparation. Disaster incidents in Ubuhlebezwe LM during the 2017/18 fiscal year included heavy rainfall, wind, and structural fires. There were 38 incidents caused by humans and 126 by natural causes (Ubuhlebezwe LM annual report: 2017/18, 2018). Compared to other districts in the country, it has experienced more disasters. According to this information, the post-disaster phase may be ineffective and inefficient.

Therefore, it is significant to establish an institutional framework for effective post-disaster management in South Africa, entailing the identification of various avenues that feed into strategies, which then lead to rebuilding vulnerable urban and rural communities' adaptation and resilience (Sheikhbardsiri et al., 2017). Apart from the nature of multi-sectoral and multidisciplinary disaster management, many challenges remain post-disaster. Given the above observations, the current study examines institutional and policy frameworks that facilitate long-term adaptation and resilience post-disaster. Without a Post-Flood Disaster Checklist or Model in South Africa, this thesis develops one. It examines institutional arrangements, measures in place, challenges, projects, common disasters and long-term actions that can contribute to developing a Post-Flood Disaster Checklist or Model. **The research explores whether post-flood disaster management in disaster-vulnerable urban and rural communities contributes towards disaster resilience and adaptive capacity to achieve sustainable development.**

1.3. Significance of the study

The purpose of this section is to clarify who will benefit from the research and the benefits thereof. As per Samu and Kentel (2018), flood disasters are unavoidable. It is concerning that Adalekan (2016) believes that developing countries have a low adaptive capacity to address climate change effects, even though they are under pressure to manage the ever-increasing flood risk. Proper management processes can help reduce socioeconomic and environmental losses caused by floods. Moreover, there seems to be no standardised mechanism to deal with floods post-disasters effectively and efficiently. In contrast, the available information is on short-term post-flood disaster measures. According to Adedeji et al. (2012), different approaches and actions are necessary to address community floods. The study's findings will assist in revealing the importance of existing institutional arrangements and current measures, as well as the strengthening mechanism for ensuring effective disaster management during the post-flood disaster phase in urban and rural areas in a disaster-prone country like South Africa. Post-flood disaster institutional frameworks should assist communities and disaster management officials. This research will assist in understanding better institutional arrangements to implement post-flood disaster activities.

Recent extreme flood occurrences worldwide indicate that post-flood management may need reconsideration and evolution (Van Ogtrop et al., 2005). As a result, while a flood management strategy will not prevent floods, it will ensure flood preparations, particularly during the post-disaster recovery period (Van Ogtrop et al., 2005). However, South Africa has inadequate information regarding flood management after a disaster. The knowledge inadequacy is evident in how recent flood disaster incidents, particularly major disasters, have been addressed. As a result, post-flood disaster management implementation has generally been unsatisfactory. In addition, the available information focuses on response and relief measures rather than other aspects of post-disaster activities. To break it down, Borowski and Stathopoulos (2019) explain how developing adaptive-oriented strategies assists decision-makers in improving the responsiveness and resilience of regulated systems to disruptions. On the other hand, Du Plesis et al. (1999) agree on the importance of monitoring the occurrence of floods. Knowledge of prevalent disasters will likely assist in ensuring appropriate measures are in place to deal with those disasters. In addition, Reham et al.'s (2019) opinions are that applying technical problem-solving approaches to flood disasters will not suffice because flood problems are also systematic. Therefore, this research could assist in a better understanding of the challenges encountered by disaster

management stakeholders and role players, including community members, in the post-disaster phase. Therefore, there is an opportunity to understand the disaster management officials' challenges when implementing disaster management legislation and policies. The research results of the thesis could thus be significant in assessing the common disasters and challenges encountered post-disaster. Thus, the focus was also on the prevalent disasters the officials responded to and their effects on the communities.

The upward trend in disasters is predicted to continue, similar to the severity of disasters. Hence, the study also sought to identify existing projects and opportunities to assist vulnerable groups in disaster-prone areas. Okada et al.'s (2018) research highlights that in most cases, hazards and physical infrastructure replacement post-disaster affect community safety and must be prioritised. Excluding vulnerable groups hampers recovery and community development (Okada et al., 2018). Researchers and academics have documented factors that promote or hinder the achievement of SDGs (Ozili, 2022). However, few studies indicate the global progress and challenges linked to sustainable development and sustainability (Seddiky et al., 2020). For instance, road sections need long-term recovery planning to achieve community and economic restoration post-disaster (Singh et al., 2023). The transport sector can play a huge role in achieving SDGs (Singh et al., 2023).

After the 11 September 2001 World Trade Centre attack, there was a need to anticipate movie disaster dramas as reality (Simon & Teperman, 2001). This attack highlighted that unthinkable events were becoming a reality worldwide (Simon & Teperman, 2001). Specifically, Sharifi (2016) found that current tools have revealed a shortage of understanding by local leaders and organisations in developing nations. As a result, Cutter et al. (2010) state that there is a criterion for ensuring the quality of variables for disaster resilience indicators. Similarly, Rezende et al. (2020) contend that the flood index requires various enhancements, focusing on other social vulnerability indicators. Accordingly, the researcher aimed to fill knowledge gaps and contribute to the discussion about institutional arrangements, challenges, and measures to assist vulnerable communities in post-disaster situations, primarily in South Africa. Post-disaster management measures are in place, but disasters continue to occur. The study will identify measures to address institutional arrangements and challenges and recommend ways to improve the situation by developing a Post-disaster Checklist. The proposed Checklist will assist officials and communities in standardising flood-related post-disaster activities in rural and urban disaster-vulnerable communities. Consequently, this research could assist decision-makers in

improving post-disaster regulated systems. For the international audience, the research will add value to the Sendai Framework for Disaster Risk Reduction (DRR) 2015- 2030 goal, which advocates for the active participation of all stakeholders and role players, including Non-Government Organisations (NGOs), communities, and government agencies (Seddiky et al., 2020). The Sendai Framework also aims to increase resilience to current and future disasters (Seddiky et al., 2020). The thesis will also contribute valuably towards sustainability and sustainable development literature that helps improve post-disaster strategies, reduce vulnerabilities, and enhance overall disaster resilience.

1.4.Research questions

Given the preceding considerations, the subsequent questions guided the research process:

i. Which institutions, policies, and legal frameworks in South Africa pursue effective post-flood disaster disaster management or governance, focusing on vulnerable groups?
ii. What are the most common disasters in South Africa, and measures to ensure efficient and effective post-flood disaster implementation?
iii. What are the prevalent post-flood disaster challenges and those encountered when implementing post-disaster legislation and processes in South Africa?
iv. What projects and opportunities exist in South Africa to develop systems and processes for effective post-flood disaster management?
v. What are long-term post-flood disaster measures and indicators to implement in South Africa to build disaster capacity and resilience among the most vulnerable urban and rural groups?

1.5.Research aim and objectives

The study pursued to explore possible systematic and structural measures in addressing post-flood disasters in South Africa to promote adaptive capacity and disaster-resilient urban and rural communities to achieve sustainable development.

Given the above research goal, the study's objectives were to:

i. Analyse existing institutional arrangements in South Africa to pursue effective disaster management or governance during the post-flood disaster phase.
ii. Investigate post-flood disaster measures in South Africa to address the identified most prevalent disasters, build disaster resilience, and ensure adaptive capacity.

iii. Ascertain the challenges and barriers to efficient and effective post-flood disaster management in South Africa.
iv. Create an inventory of implemented projects and identify opportunities for developing systems and processes for effective post-flood disaster management in South Africa.
v. Develop a Post-Flood Disaster Checklist to contribute to the body of knowledge on post-flood disaster institutional arrangements, challenges, and long-term measures to assist vulnerable groups, particularly in South Africa.

1.6. Theoretical considerations and literature review

This section discusses the study's theoretical considerations and literature review (De Vos, 1998; Mouton, 2006). Some scholars categorise disasters as natural and anthropogenic-related disasters (Simon & Teperman, 2001). Natural hazards, also called weather, include rain, snow, fog, wind, blizzards, tropical cyclones, and thunderstorms (Grab, 2023). Natural disasters include hurricanes, droughts, storms, heat waves, intense precipitation, thunderstorms, lighting, and cold spells (Hallegatte, 2017). Nakileza (2007) also include landslides and floods on the list of natural disasters. Similarly, other natural disasters are floods and drought (Wa Teresia, 2007). There is a belief that colonial and post-colonial anthropogenic disaster policies and practices can impact natural disaster consequences (Howitt et al., 2017). Additionally, Wa Teresia (2007) elaborates that it is difficult to plan for anthropogenic-related disasters since they are sporadic and random. In comparison, natural disasters are usually seasonal disasters, thus predictable (Wa Teresia, 2007). Therefore, it is easier to plan for them. Howitt et al. (2017) concur that governments are usually effective when mobilising natural disaster recovery. Natural disasters were previously linked to some divine act (Vogel, 1998).

On the contrary, other scholars, particularly Environmental Geographers, believe that the concept of natural disaster is non-existent (Smith, 2006). To add to this aspect, Blaike et al. (2004) suggest that disasters are not only natural events. They also result from social, economic, and environmental situations regarding the different groups. The human contribution that makes hazards unnatural is the interaction between hazard exposure and vulnerability (Menchler et al., 2014). The justification is that the disaster management cycle and the distinction between survivors and fatalities are somehow connected to social dynamics (Smith, 2006). Hurricane Katrina was an example of a disaster confirming this axiom (Hartman & Squires, 2006). However, this line acknowledges that natural events include

tsunamis, earthquakes, drought, blizzards, and hurricanes (Smith, 2006). Despite this acknowledgement, these scholars deny the naturalness of disasters (Hartman & Squires, 2006). Disasters also result from social, economic, and environmental situations regarding the different groups. Furthermore, Blaike et al. (2004) warn that treating disasters as peculiar events that need a special focus is dangerous. Another view is that the natural event becomes a disaster based on the location of the occurrence (Smith, 2006). Blaike et al. (2004) conclude that disasters combine natural and anthropogenic-related hazards. They also result from social, economic, and environmental situations regarding the different groups.

The 2004 Sphere Project stipulates that disaster victims are entitled to live with dignity and receive relief to reduce human suffering (Hosseini, 2016). To elaborate, Daly and Brassard (2011) state that international humanitarian relief standards, such as the SPHERE Charter, the International Federation of the Red Cross (IFRC), and the World Bank's 2010 comprehensive guide to post-disasters, call for affected disaster victims' involvement in rebuilding their affected societies and livelihoods. As a result, some academics argue that for all nations to adhere to international humanitarian relief standards, disaster victims must participate in post-disaster activities. Stakeholders and role-players in countries and communities must implement several post-disaster adaptation strategies. Thus, the post-disaster policy must address the identified gaps and ensure that the post-disaster phase is effective and efficient.

According to Saracoglu (2015), the United States of America (USA) has prioritised mitigation; hence, the Disaster Mitigation Act of 2000 prescribes the integration of mitigation planning into government plans and programs to identify natural hazards, risks, and vulnerabilities. Similarly, Horney et al. (2015) found improvements in the outreach and quality of disaster management in India. The plan was established following the 1996 Disaster Management National Policy and the Disaster Management National Capacity Building Project (Horney et al., 2015). Conversely, Gajendran and Oloruntoba (2017) outline several common post-disaster adaptation strategies, such as stockpiling fuel, food, and medical supplies, satellite communication, standby generators, and information sharing through community agencies. Interestingly, different countries have different priorities and strategies. It is a concern that Yi and Yang (2014) and Sheikhbardsiri et al. (2017) suggest that common institutional arrangements challenges, such as unqualified personnel, the absence of an overall plan, inappropriate decision-making processes, the poor performance of available resources, disregard for affected people,

insufficient stability, and inadequate information about the affected community, hinder adaptation strategies. Furthermore, Fan (2015) observes that part of the problem is that the government focuses on the technical approach to risks while hardly incorporating sociocultural aspects of vulnerability and sustainability, resulting in deficient laws. There seems to be a lack of a standardised mechanism to deal with post-disaster issues effectively and efficiently to have adaptive disaster capacity and disaster-resilient communities. Instead, most information is about short-term flood post-disaster measures, which have been ineffective for officials and affected communities.

From Africa's perspective, Cameroon's Emergency Response Plan activation may be at multiple administrative levels, depending on the natural hazard's nature, intensity, scale, and magnitude (Bang, 2013). However, the limitation on delegation of authority to lower organisational levels challenges the legislation (Bang, 2013). Meanwhile, Mashi et al. (2019) draw attention to Nigeria, where the National Emergency Relief Agency (NERA) Act replaced the National Emergency Act of 1999. The Act explains its mandate, measures to increase disaster management revenue in the country, establishing a governing council for the Agency, incumbency, and membership cessation (Mashi et al., 2019). In contrast, Adebimpe (2011) shows that when floods occur in Kwara State, Nigeria, affected people have few options for relocating to other houses or business premises. The costs of purchasing new properties and extensive search times exacerbated the situation (Adebimpe, 2011). Considering this, Gajanayake et al. (2018) believe that adaptation choices may differ depending on the affected community members, thus influencing their disaster resilience. In the study by Nyakundi et al. (2010) in Kenya, which interviewed flood-affected victims from 2002 to 2006, households constructed their homes on raised ground to prevent flooding and elevated walls and entrances as an adaptation strategy. Furthermore, the same study found that people planted trees, excavated trenches around their houses, and erected fences to break and mitigate floodwater flow to prevent erosion (Nyakundi et al., 2010). Yet, Ranjan and Abenayake (2014) point out that in Sri Lanka, officials need to comprehend the community's mindset and improve its capacity to shape the adaptation process, thereby assisting in closing the disparity between spatial planning and disaster resilience building. In conclusion, Edoun et al. (2015) indicate that this trend suggests insufficiencies in Africa's disaster management systems. Drought, floods, water-related epidemics, and cyclones are all hydrogeological disasters that threaten Africa. Some communities have developed disaster-resilient strategies, which unfortunately appear to be short-term,

unsustainable, and ineffective. Thus, to deal with post-flood effectively and efficiently, stakeholders and role players must thoroughly understand the difficulties encountered.

Due to urbanisation, more people in South Africa are forced to reside on unstable hillsides, floodplains, and sinkhole zones (Faling et al., 2012), making them more disaster vulnerable. The contributing factors to disasters are bound to change over time because of urbanisation, population growth, and development in flood-prone areas for economic reasons. Considering South African history, the land is inadequate because of the previous regime's laws, which resulted in the marginalisation of many people. Subsequently, most people do not have suitable land on which to live. Meanwhile, Van Niekerk (2005) argues that before 1994, South Africa lacked a comprehensive approach to disasters and disaster risks because disasters were considered "acts of God" that were unpredictable or unpreventable. However, the South African government's traditional approach to disasters has shifted and is now consistent with international best practices in disaster management (NDMC & Reid, 2008). The concern that Saja et al. (2019) identify in South Africa is that disaster victims' speed and delay of recovery differ due to socioeconomic status, the extent of relief provided, past disaster experiences, and the type and severity of disasters experienced. During the Garden Route Region of the Southern Cape floods from December 2004 to January 2005, the absence of capacity supported this position, adequate early warning systems, local institutions, a comprehensive understanding of the area's disaster risk profile, and inadequate infrastructure maintenance (Tempelhoff et al., 2009). Similarly, a recent study in Ekurhuleni found that municipal officials have limited financial and human resources to address disasters (Culwick & Patel, 2017). The projections emphasize the likelihood of future floods, which effective post-disaster measures can prevent or mitigate. Predictably, disaster management implementation must be effective and efficient post-disaster to assist vulnerable groups.

Rural recovery implementation differs from urban recovery implementation (Hosseini, 2016). For instance, Stephens (2016) demonstrates that following the 2010 earthquake in China, the government provided well-known nomadic resettlement programs and new rural development strategies. On the other hand, according to Yilma et al. (2014), household coping strategies in rural Ethiopia include saving, reducing food consumption, selling assets, borrowing, receiving assistance, and labour-based techniques. The reason may be that rural areas are disadvantaged due to inadequate infrastructure, disaster information, and social inequality (Peng et al., 2013). Conversely, the self-reliance

characteristic of rural regions with a strong sense of community engagement, knowledge of natural resource links, and strong social networks can boost resilience. In contrast, according to Nolet (2016), the response to flood risks by communities in Fiji was perceived to be inappropriate in both urban and rural communities because they were unprepared and overly reliant on government assistance following disasters. There is a sentiment that, while both urban and rural areas have social inequalities, heterogeneousness in urban areas assists in promoting disaster resilience, as opposed to rural economic dependence on a single sector (Cutter et al., 2016). The characteristics listed are less common in rural areas than urban areas (Cutter et al., 2016). Therefore, recovery implementation in rural areas differs from that in urban areas. The advantage of the rural regions is that they might have an astute sense of community engagement and be self-sufficient. Therefore, the approach during the post-disaster period may differ when dealing with urban and rural areas.

Drought, floods, water-related epidemics, and cyclones threaten the African continent, reducing opportunities and wreaking havoc on communities (Tall et al., 2013; Borner et al., 2015). According to Tall et al. (2013), the impact of these disasters causes development hindrances with extensive social ramifications, thereby affecting Africa's achievement of the Millennium Development Goals. Specifically, Katongole (2020) states that in 2019, floods, landscapes, drought, and cyclones resulted in about 33 million people experiencing emergency food insecurity. On the other hand, in some instances, post-disaster social upheaval can provide an opportunity to advance the community's impoverished and most vulnerable members (Arnall et al., 2013). As Ranjan and Abenayake (2014) argued, post-disaster community attributes should include physical resilience, economic and organisational diversion, and environmental resilience. In the same vein, Sharifi and Yamagata (2016) support this argument by highlighting that resilient communities should be capable of preparation and planning, absorption, recovery, and adaptation. However, despite the existence of guidelines, challenges appear to persist. As a result, there is a need for more focus to ensure an effective and efficient post-flood disaster phase to assist vulnerable groups to be disaster resilient and have adaptive capacity.

1.7.Methodological considerations

The research content entailed data collection on a broader scale. This study adopted a mixed-method approach, thus simultaneously collecting and analysing qualitative and quantitative data (Wagner et al., 2012). The mixed-methods approach assisted in comprehending the participants' detailed views.

Therefore, data focused on institutional arrangements, prevalent disasters, existing measures, post-disaster challenges, current projects, identified opportunities, and recommendations to ensure community disaster resilience and adaptive capacity. During the ten-year review period, the researcher sought information from disaster-affected communities or individuals who participated in post-disaster management activities. Participants in the study included disaster management officials from the National Department, Municipal and PDMCs across the country, members of the HGDM Advisory Forum, Ward Councilors from Ncakubana and Mphela Township, and community members. Ncakubana and Mphela Township are rural and urban areas, respectively. Mphela Township is in Greater Kokstad LM, while Ncakubana is in Ubuhlebezwe LM, both in HGDM, KZN Province, South Africa. The 10-year trend analysis results from NDMC annual reports indicated that the two study areas were more vulnerable to disasters than others, making them the chosen study areas. Moreover, trend analysis results indicated that floods were the most prevalent disasters in South Africa and were prevalent in these areas.

Since it was impossible to study the entire population, the research employed random and non-random sampling techniques. Systematic random sampling was utilised to select community members. It was a non-random sample for Disaster Management Centre (DMC) officials and HGDM Advisory Forum members. The researcher mainly selected participants using purposive sampling due to their disaster management expertise. The initial sample size was small, so the study used a snowball technique to select more DMC officials. In addition, the study implemented primary and secondary research methods to investigate ways to assist vulnerable groups in building capacity and resilience post-disaster to promote sustainable community development. The research methods entailed phone and e-mail interviews and structured interviews with key participants. The interview schedules for disaster management officials and Focus Group members included open-ended and closed-ended questions.

Furthermore, the researcher administered personal and telephonic questionnaires to community members. The questionnaires also entailed open-ended and closed-ended questions. The researcher liaised with disaster management officials in Greater Kokstad LM to assist in arranging the venue and organising the participants for the Mphela Focus Group. The researcher, disaster management officials, and community leaders in the study areas conducted a transect walk in the study areas to supplement the collected data. The researcher assessed Disaster Management policy documents, International

Disaster Management policies and reports, peer-reviewed journals, textbooks, theses, and newspaper articles. The researcher acquired existing research documents from the Internet, the University of the Witwatersrand Libraries in Johannesburg, and the uMsunduzi LM Library in Pietermaritzburg (PMB). The Call Recorder Application recorded telephone interviews to capture all conversations. The researcher preserved the captured data on a private, password-protected laptop that only the researcher could access. For backup purposes, the external hard drive was used and kept safe. The researcher transcribed interviews and presented them in various formats for analysis, as in the Okada et al. (2018) study. Moreover, the researcher processed the notes collected during fieldwork to produce additional results. Data analysis followed data collection and included using Word Cloud, Atlasti, Statistical Package for Social Science (SPSS), and Microsoft (MS) Excel to determine the essential qualities and understand collected data. The Word Cloud tool made it possible to visualise textual data. The researcher applied Atlasti to acquire qualitative analysis codes, categories, and themes. The SPSS identified frequencies and correlations as part of the descriptive statistics. MS Excel also analysed quantitative data. The data were presented in various formats using graphs, tables, and images. The collected data were expected to respond to the research questions. Chapter 3 elaborates on the implemented methodology and the justification for choosing the mixed research method.

1.9.Scope of the study

Even though the world is prone to disasters, as the reports show an upward trend in intensifying frequency, the study was confined to South Africa. The researcher gathered information from various Disaster Management officials across the country. Since it was impossible to study the whole community population, the research focused on specific community study areas. Thus, the emphasis was on KZN and HGDM. The community study participants were Ward 1 Greater Kokstad and Ward 5 Ubuhlebezwe, Mphela Township, and Ncakubana, respectively. The 10-year trend analysis of NDMC disaster management annual reports from 2007/08 to the 2017/18 financial years revealed that these areas are disaster-prone and vulnerable. As a result, disasters, particularly floods, have repeatedly affected the selected community areas. As disasters have a diverse impact on individuals, a further focus was on vulnerable groups such as widows, children, elderly individuals, individuals with disabilities, and women.

The study acknowledges that there are pre- and post-disaster management activities. The pre-disaster phase entails prevention, mitigation, and preparedness. In comparison, the post-disaster phase includes response, relief, reconstruction, recovery, and rehabilitation. The study was restricted to the post-disaster phase. In addressing the research questions, it focused on how institutional arrangements shape the post-disaster phase. It is how institutions work to understand and assist communities in fostering disaster resilience and adaptive capacity. The study determined the legal frameworks or instruments used in South Africa post-disaster and identified challenges encountered when implementing post-disaster processes by investigating the preceding. There are both positive and negative consequences when a disaster happens. As a result, identifying opportunities after disasters was critical, as it helped understand the positive effects of disasters. Therefore, the research focused on opportunities rather than disasters' negative socio-economic and environmental effects.

1.10. Ethical consideration

In research, there are ethical guidelines for how to treat humans and animals (Boynton, 2005). Accordingly, Creswell (2009) stipulates that because research involves human subjects, ethical approval is a requirement. The researcher submitted the study's information sheets, consent forms, survey questionnaires, and interview schedules for various participants to the University of Witwatersrand's Ethics Committee for approval. Subsequently, the researcher acquired the ethics clearance certificate on 18 August 2020 from the University of the Witwatersrand's Ethics Committee and shared it with the study participants. The protocol number for the Ethics Certificate is H20/02/32, as shown in Annexure A. Moreover, the researcher sought permission from the Ubuhlebezwe and Greater Kokstad LMs Municipal Managers to conduct the study in Ncakubana and Mphela Township, respectively. The Municipal Managers of both municipalities granted the researcher written authorisation to conduct research in their respective cities. The participants who received the interview documents via e-mail were disaster management officials and were literate. Literacy was not a concern for community members who were asked questions over the phone, as the researcher noted the responses and spoke to them in the languages they understood and were comfortable with.

Mainly due to the nationally declared COVID-19 disaster, another data collection technique in this study involved online interaction via e-mails, which was more convenient, safe, and low-cost. Telephonic interviews recorded the conversations and were another cost-saving data collection method.

However, the participants could perceive the recording of interviews as intrusive. People might have felt uneasy about being recorded and, as a result, changed their honest views. Consequently, the researcher addressed potential privacy apprehensions in the study. The study interviewed 34 disaster management officials and two ward councillors with the appropriate knowledge to answer the research questions. There was also an administration of six HGDM Advisory Forum members' questionnaires via e-mail and telephone. Additionally, 35 households responded to questionnaires. The study also administered focus group interview schedules in Ncakubana and Mphela Township.

The researcher put several measures in place to address the anticipated concerns. First, the researcher addressed the concerns by adhering to the University of Witwatersrand's ethical guidelines, minimising participant discomfort and scepticism. Firstly, Participant Information Sheets comprise the research's background information, the study's intention, and how the results would be used (Annexures B-F). The information sheet also elucidated the nature of the PhD study to the participants. Furthermore, the researcher clarified that the research findings would be reported as a PhD study and that the research would be accessible. The wired space platform at the University of the Witwatersrand Library will provide access to the final thesis. Secondly, the researcher obtained informed consent from the respondents, as Creswell (2009) recommends that participants fill out and sign a consent form before even commencing with the research. Accordingly, while disseminating research instruments, the researcher requested that participants fill out consent forms (Annexures G-K) before responding to the research questions (Annexures L-P). For telephone interviews, participants gave verbal consent before the discussion could begin. For e-mail data collection, participants returned either an interview schedule or questionnaire with the consent form, as with a one-on-one interview. The participants who received the interview documents via e-mails were disaster management officials and thus assumed to be literate. Literacy was not a concern for community members who were asked questions over the phone, as the Researcher noted the responses and spoke to them in the languages they understood and were comfortable with.

Thirdly, the research participants' anonymity was protected, particularly during physical data collection. According to Punch (2004), common ethical issues throughout the research include data rights, anonymity, and confidentiality. The researcher explained that anonymity could not be guaranteed in the Focus Group due to the involvement of several participants. Moreover, privacy was not guaranteed in

other cases because some data were collected via e-mail. Nevertheless, the researcher ensured that the e-mails and submitted information were confidential. In addition, the researcher then assured the participants that their identifiers, such as names, addresses, and contact information, would not be used to link them to the results or publications. Therefore, the researcher referred to the respondents by gender, age, alphabet, and numbers. Fourthly, the data collected were only used for the research study and will be deleted and destroyed five years after the finalisation of the research. The Participants Information Sheet assisted the researcher in explaining to participants who would access data, how data would be stored, and how study findings would be published. Fifthly, the researcher informed all research participants that they may withdraw from the study should they feel uncomfortable continuing as participants. Sixthly, due to the declared national COVID-19 disaster, the study participants' health was always protected. During the data collection phase, all the participants followed the COVID-19 guidelines and regulations, such as social distancing, wearing a mask, and sanitising. A high degree of certainty exists that the response came from the selected participants since the researcher personally selected them and administered the data collection tools.

1.11. Layout schedule of the study

The doctoral thesis is a monograph comprising six (6) chapters. **Chapter 1** entails frames of reference. The topics covered in Chapter 1 included the study's background, thematic considerations, research questions, the research aims and objectives, and the study's significance (Mouton, 2006 & Hofstee, 2006). In addition, brief theoretical considerations and a literature review are presented in Chapter 1. Chapter 1 also included methodological considerations, the scope of the study, ethical considerations, and the layout of the study**. Chapter 2** discusses theoretical considerations, and the literature review highlights the theories and models relevant to the investigated problem, historical background, and trend analysis. The Chapter deals with defining critical concepts and terms, the conceptual and theoretical framework in Disaster Management, promoting disaster adaptive capacity and resilience, a summary, and identifying the gaps in knowledge. **Chapter 3** describes comprehensive methodological considerations guiding the research, organising, and information analysis. The section considers the research design, description of the research sites, study population, and sampling procedure. In addition, the section details data collection tools, data management, data analysis, validity, reliability, and methodological reflections. **Chapter 4** presents empirical evidence regarding institutional arrangements, common disasters, measures in place, challenges during post-disasters, projects, a post-

disaster opportunity inventory, and proposed long-term measures. MS Word, Excel, SPSS, Atlasti, and Word Cloud assisted in analysing the data. The results are presented in tables, graphs, and pictures. **Chapter 5** is about research analysis and collected data discussions. Secondary data, which are existing data, were considered to establish a link between previous studies and the research study results. This chapter also presents the researcher's perspectives on the findings. **Chapter 6** contains a synopsis of all research findings and a conclusion. The Chapter also makes recommendations for promoting disaster adaptive capacity and resilience. Finally, there are recommendations for future studies that this study could not investigate. The study concludes with a proposed South African Floods Post-Disaster Checklist that the researcher developed.

1.12. Conclusion

Chapter 1 presented the study's background, the investigated issue, the thematic consideration, research questions, aim, and objectives. The study's focus areas were institutional arrangements and policies, measures in place to address disasters, challenges, existing projects, identifying opportunities, and long-term efforts. Moreover, the chapter justified the study's importance. In addition, the chapter briefly described the methodological considerations used to attain the study's objectives. Finally, Chapter 1 explored the research scope and ethical considerations. The Chapter concluded with an overview of Chapters 1–6.

CHAPTER 2
THEORETICAL CONSIDERATIONS AND LITERATURE REVIEW

2.1. Introduction

This section discusses the study's theoretical considerations and the literature on post-disaster management. A literature review either demonstrates the uniqueness of the data or compares it to a current research study (Rossouw, 2003). It also compares existing research studies. During the literature review, notes are taken to document the information (Yin, 2011). The information documents for this study's literature review include information about the institutional framework to govern disasters, prevalent disasters, common existing challenges in the post-disaster phase, and measures and indicators to assist in rebuilding the disaster capacity and resilience of vulnerable groups post-disaster. At the end of the research, there was a literature review to compare the findings to previous studies, particularly when patterns or categories were identified (Creswell & Creswell, 2018). First, it is necessary to review the study's key concepts and terms.

2.2. Definition of key concepts and terms

Before delving into the relevant literature discussions, defining certain concepts and terms used throughout the research study is essential. The researcher explains the crucial subsequent terms conceptually and operationally in the context of this study to avoid misunderstanding their meaning.

a) Adaptive capacity

Adaptive capacity, as defined by Borowski and Stathopoulos (2019), is the capability of people to respond to changing conditions. It is the capacity of the system and its components to deal with or recover from hazardous disaster incidents' consequences (Sam et al., 2019). In this study, adaptive capacity refers to people's and businesses' ability to use available resources to deal with disasters (Ahrens & Rudolph, 2006). Job opportunities result in multiple sources of income, government and NGOs collaborating with communities to assist them, access to information and credit facilities, and adaptive capacity improvement (Shah et al., 2018). Collaboration contributes to reducing overall vulnerability (Sam et al., 2019). According to Shah et al. (2018), the non-existence of early warning systems' infrastructure, knowledge about mitigation options, and financial and resource constraints hamper adaptive capacity. The greater the community's or an individual's capacity to deal with disasters

and the environment, the less severe the impact (Khan & Khan, 2008). Adaptability is a critical component of resilience (Borowski & Stathopoulos, 2019). Assertedly, adaptive capacity is the system's, institution's, or community's ability to respond to disasters, use opportunities presented by them, or adapt to their effects.

b) COVID-19

According to the World Health Organisation (WHO), COVID-19, the Novel coronavirus (2019-nCon), was a respiratory disease caused by the SARS-COV-2 virus that emerged in China in December 2019. Considering the magnitude and the severity of COVID-19, the outbreak was declared a Global Pandemic by the WHO on 11 March 2020 (Guner et al., 2020). There was contact tracing and monitoring once the laboratory testing confirmed COVID-19 infection. WHO suggested that there should be isolation or quarantine to prevent further spread (Guner et al., 2020). In South Africa, the COVID-19 pandemic was classified as a national disaster on 15 March 2020 per Section 23(1)(b) of the National DM Act by the Honourable Minister of Cooperative Governance and Traditional Affairs (CoGTA), as designated under Chapter 3 of Disaster Management Act (DM Act), 2002, as amended in 2015, Section 27(1) and (2), Subsections (a), (b), (c), (d), and (e) (DM Act, 2002). Subsequently, the Minister of CoGTA, after consultation with responsible Cabinet members, developed and gazetted regulations in response to the COVID-19 outbreak as prescribed by Section 27(a) (b) of the DM Act (DM Act, 2002). Through the media briefing on 23 April 2020, the honourable President announced that the country was moving towards a graded alert level system to determine how strict the country's lockdown restrictions would be to battle the COVID-19 pandemic while reigniting the economy. The Government adopted a risk-adjusted strategy of five levels to determine the risk and infection rate nationally and in each Province, Metropolitan, District, and Local area. The levels which denoted the level of action were as follows:

- Level 5- Drastic measures are required
- Level 4- Some activities can be allowed, subject to extreme requirements
- Level 3- Further easing of restrictions on work and social activities
- Level 2- Further easing of restrictions, but the maintenance of social distancing
- Level 1: Most normal activities can resume with caution, and health guidelines followed

Most of the fieldwork in the research was done during Alert Level 1 when most restrictions were lifted, and activities were allowed.

c) Disaster

The name ‘disaster’ is derived from the French word "desastre," which means "bad or evil star" (Khan & Khan, 2008). A disaster combines danger and vulnerability (Hossain, 2013). Hallegatte (2017) put it well by indicating that a disaster does not have a single definition. The study adopts the disaster definition provided in the South African DM Act (2002), as amended, which stipulates that a disaster occurs when affected individuals cannot cope using their resources and require external assistance. Thus, a disaster occurs when a hazard, vulnerability, and insufficient capability to mitigate the risk exist (Khan & Khan, 2008). On the other hand, Vogel (1998) defines risk as the potential for death or property loss. Specifically, Tingsanchali (2012) stipulates that risk = hazard X vulnerability. Similarly, Vogel (1998) concludes that disasters result from inadequate risk management. Natural disasters and anthropogenic-related disasters are distinct. Earthquakes, floods, storms, and epidemics are natural disasters, whereas nuclear or chemical explosions are examples of anthropogenic-related disasters (Yu, 2020). Some disasters are immediate, while others develop gradually (Louw & van Wyk, 2011). According to Ahrens and Rudolph (2006), disaster categories can be single, sequential, or mixed. Consequently, disasters are severe disruptions in the community that result in enormous human, material, economic, and environmental losses (Khan & Khan, 2008; Becker, 2009; Louw & van Wyk, 2011; Sheikhbardsiri et al., 2017; Salehim et al., 2020). Additionally, Karunasena and Amaratunga (2015) highlight the effects of disasters, such as death, injury, and displacement. In agreement, Davies and Davies (2018) state that disasters damage assets, injure people, and disrupt services. Infrastructure and crop destruction also devastate the environment and have psychological consequences (Karunasena & Amaratunga, 2015). Some disasters occur suddenly, while others develop gradually, causing significant disruption. The number of fatalities, injuries, property destruction, and economic losses determines the impact of the disaster.

d) Disaster management

Various disciplines such as public health, medicine, planning, social development, project management, engineering, environmental, and health impact assessment are involved in managing disasters (MacFarlane et al., 2006). Disaster management encompasses more than relief efforts; it integrates emergency response with disaster risk reduction strategies (Ahrens & Rudolph, 2006). The South African DM Act (2002); Louw and van Wyk (2011) define disaster management as a continuous,

integrated, multisectoral, multidisciplinary process of planning and implementing measures with the goal of:

i. Disaster prevention or risk reduction

ii. Reducing the severity or impact of disasters

iii. Emergency preparedness

iv. Rapid and effective disaster response

v. Post-disaster recovery and rehabilitation

The research adopted the above definition. Therefore, disaster management entails various activities.

e) Disaster management cycle

The disaster management cycle deals with disaster management, which involves addressing vulnerabilities in stages (Hossain, 2013). Furthermore, Salehim et al. (2020) elaborate that it is an ongoing process of mitigating risks and exposure to hazards and planning and preparing for the impact response. Conversely, Khan and Khan (2008) define the disaster management cycle as all disaster-related activities, programs, and measures performed before, during, and after a disaster. Through clean-up and reconstruction, the actions minimise the effects of disaster and restore the environment (Salehim et al., 2020). Numerous disaster management cycles have been proposed (Coetze & van Niekerk, 2012). Researchers' proposed phases include rehabilitation, emergency relief, and development, according to Petrudi et al. (2019). Likewise, Sheikhbardsiri et al. (2017) indicate that they are preparedness, response, rehabilitation, prevention, and mitigation. Some propose recovery, response, and preparedness (Petrudi et al., 2019). For Vermaak and van Niekerk (2004), the disaster management cycle has two phases: A, which includes pre-disaster reduction, and B, which entails post-disaster recovery. Phase A concerns readiness, early warning, and mitigation, while Phase B includes relief, recovery, and prevention (Vermaak and van Niekerk, 2004). Nevertheless, Sheikhbardsiri et al. (2017) hold a different view and believe that disaster management phases are response, rehabilitation, prevention and mitigation, and preparedness. In the same vein, Hossain (2013) lists phases as response, recovery, prevention, and preparedness.

The study follows the disaster management cycle, as shown in Figure 2.1, which encompasses prevention, mitigation, readiness, reaction, relief, rehabilitation, and reconstruction (Khan & Khan, 2008). The phases, however, do overlap (Kwan, 2020). The cycle addresses disasters in stages,

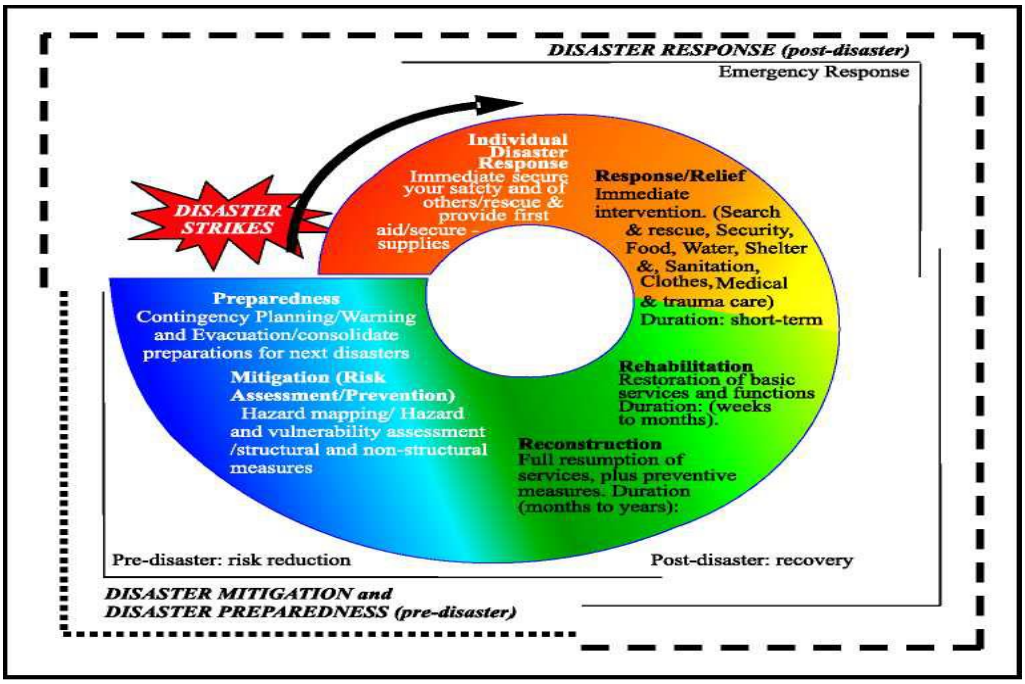

Figure 2.1: Disaster Management Cycle (Khan & Khan, 2008)

considering vulnerability. Emergency relief, rehabilitation, and development are among the phases researchers propose. Others define phases as mitigating disaster effects and restoring the environment through clean-up and reconstruction. The disaster management phases depict the continuous process by which various stakeholders and role players prevent and mitigate disaster effects. Moreover, they respond to disasters and put recovery measures in place. Therefore, it is vital to ensure the implementation of these activities effectively and efficiently. The observation is that some phases begin while others are still in place.

f) Floods

Foods are hydrological disasters (Deria et al., 2020). Heavy rainfall is typically the cause of floods. According to Samu and Kentel (2018), floods occur when they overflow with enormous volumes of water more significantly than average, particularly on normally dry land, destroying belongings, houses, and land of displaced people. Consistent with Olanrewaju et al. (2019) and Gimenez-Maranges et al. (2020), a flood is an episode in which water overflows in areas that are not usually submerged. In support, Samu and Kentel (2018) elaborate that flooding occurs when large water amounts are unexpectedly released from storage, such as dams, snowpacks, or extreme precipitation. Additionally, Gimenez-Maranges et al. (2020) underscore this by pointing out that in urban areas, floods are

frequently caused by overflowing watercourses and the resulting stormwater during flash floods. Floods result from both natural and human factors (Tingsanchali, 2012). Anthropogenic-related factors can exacerbate natural factors. For instance, floods can result from unrestricted urban growth, dysfunctional sanitation systems, and a lack of stormwater drainage systems (Schaer & Hahonou, 2017). Similarly, Oladukun and Proverbs (2016) suggest that Nigeria's flood challenges result from population growth, rapid urbanisation, and extreme weather events. Flooding is most common in developing and tropical regions (Abaya et al., 2019). According to Ahadzie et al. (2016), weak socioeconomic indicators frequently make developing countries vulnerable to floods. Regarding flooding damage and deaths, Africa ranks second only to Asia (Amakao, 2012). Overall, Amakao (2012) emphasises that Africa has had the highest flood incidents since 1995, as illustrated in Figure 2.2. According to research, there are indications that floods are more dangerous in developed and developing countries due to poor socioeconomic indicators.

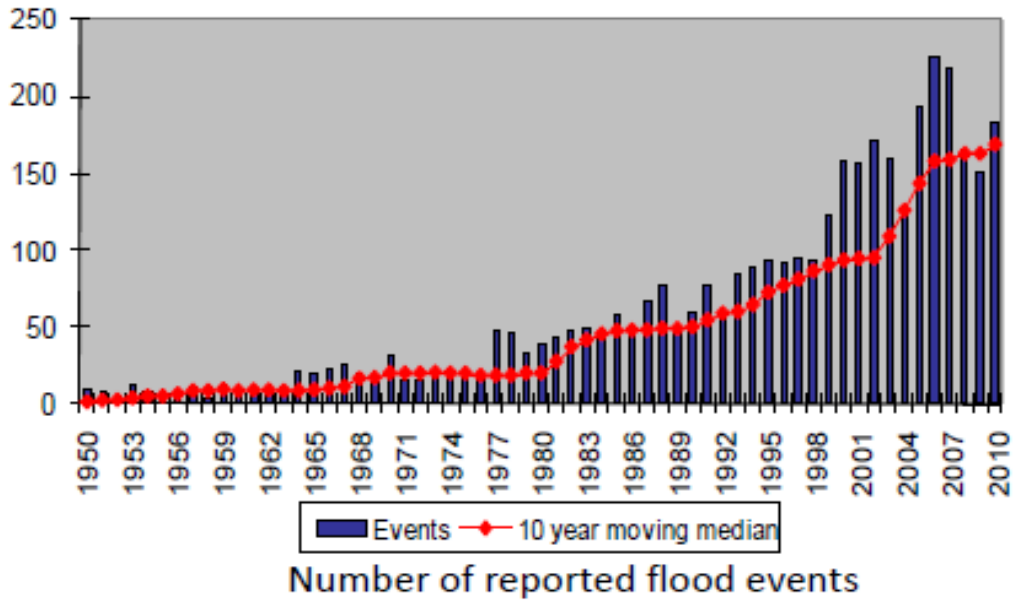

Figure 2.2: Globally recorded flood cases: 1950- 2010 (Amakao, 2012)

g) Evacuation

Typically, disasters force communities to evacuate their homes and neighbourhoods. It is sometimes safer to leave the building than to stay inside. A variety of factors prompted the individual's decision to evacuate or not. Evacuation, as defined in the study, is the movement of individuals away from a potential or actual hazard for safety reasons (Riveria, 2019). Evacuation is another effective way to prevent fatalities (Takabatake et al., 2020). The presence of children and the elderly and personal and

family characteristics such as family members' health status also influence the evacuation decision (Kubisch et al., 2020). Moreover, risk awareness, perception, previous disaster evacuation experiences, and demographic characteristics influence people's evacuation decisions (Riveria, 2019). The conclusion could be that evacuation means getting away from the hazard immediately. Agreeably, Kubisch et al. (2020) suggest that affected individuals must be able to evacuate themselves without assistance from officials. Some evacuations are voluntary, while others are mandatory, as the primary goal is to save as many lives as possible.

h) Institutional arrangements

Examples of institutional arrangements are rules introducing perspectives and evaluative and obligatory pressures (Raven et al., 2019). In this study, institutional arrangements are rules that determine who is eligible to make decisions and what actions are permitted or prohibited (Jaspers, 2003). Noncompliance with the regulations may result in legal ramifications (Raven et al., 2019). The Institutional or administrative disaster management structure is critical for achieving programmatic objectives (Rivera et al., 2020). Disasters elicit reactions from the community, bureaucrats, politicians, and disaster managers (Hilhorst, 2013). Thus, there must be links with the government, NGOs, international organisations, and the community in the post-disaster phase (Arain, 2015). Disaster Management Advisory Forums assist participants in understanding one another's challenges, limitations, and strengths, resulting in solid relationships (Wiggil, 2013). Flood management should involve stakeholders such as urban planners, civil and water resource engineers, disaster management officials, health and social service providers, and others (Tingsanchali, 2012). Institutional arrangements address existing organisational structures, resources, and permissible rules. Practically, having engagements such as Workshops can help role players and stakeholders work together and find solutions for effective post-disaster measures.

i) Post-disaster

The typical consecutive post-disaster phases are emergency response and relief, recovery and reconstruction, preparedness, and mitigation (Sridarran et al., 2018). The post-disaster phase usually involves decision-making to speed up implementation procedures (Lizarralde, 2012). Unfortunately, this is not the case in South Africa; the post-disaster phase is still ineffective and inefficient, hence the focus of the study. Anilkumar and Banerji (2021) suggest that limited human resources, lack of

transparency and accountability, inexperienced implementing agencies, corruption, delays in establishing institutional support for land purchase, and escalation of prices can exacerbate post-disaster failure. The study focuses on the post-disaster or reconstruction period. According to Lopez-Carresi et al. (2014) and Arain (2015), vulnerable members of the affected community and the stress and pressures related to the effects, hopes, hardships, and future opportunities complicate the post-disaster period. Resilience, adequate capacity, and timely and accurate information to make informed decisions are required for a successful post-disaster phase (Arain, 2015); this study adopts this perspective.

j) Reconstruction phase

The reconstruction phase is the project implementation phase, and it involves the replacement of physically damaged structures. This phase includes the construction of new structures to avoid future disaster impacts. Some projects entail renovating public buildings, repairing damaged homes, and restoring the water supply. The disaster-affected community's physical reconstruction and socioeconomic recovery are among the post-disaster reconstruction efforts. Inadequate post-disaster reconstruction efforts lead to insecurity, vulnerability, poverty, or a combination of the three (Yi & Yang, 2014). Project administration must be suitable for resources to be distributed or supplied fairly for reconstruction projects. It means tangible and intangible factors can prompt satisfaction or dissatisfaction during reconstruction.

k) Recovery

Specifically, Kwan (2020) stipulates that after the response phase, there is a recovery process that can be either short-term or long-term. The recovery process is dynamic (Kurosaki, 2017), making it complex. As a result, the recovery efforts of the study address various institutional, cultural, social, and economic aspects in the disaster-affected area and surrounding population to rebuild the community (Okada et al., 2018). Among the recovery activities are the restoration and improvement of infrastructure and livelihoods (Kwan, 2020). Recovery entails restoring and improving disaster-stricken communities' livelihoods, facilities, and living environments and reducing disaster risk factors (Edgington, 2017). The objective is to reestablish normalcy in the affected community (Kwan, 2020). Based on Bang et al.'s (2019) findings, emerging countries are more reactive than proactive, rendering response and recovery management ineffective. Recovering from a disaster can take years, if not decades. During recovery, officials ensure the stability and restoration of vital community services.

Hence, essential services such as food, water, utilities, transportation, and health care are prioritised. Sometimes, many disaster victims do not receive assistance during recovery until many years after the disaster. It can even take years without recovery.

l) Resilience

There is no universally accepted disaster resilience definition (Yoon & Keng, 2013). The International Strategy for Disaster Reduction (ISDR) describes resilience as a community's ability and capacity to attain an acceptable level of functioning (Shah et al., 2018). Similarly, Dube (2019) defines resilience as the ability of a community, system, or society to resist, accommodate, absorb, transform, adapt to, and recover in a timely and efficient manner from the effects of a disaster. The study adopted this definition. Moreover, Keating and Hanger-Kopp (2020) expand this definition and state that households, communities, and countries can achieve change by preserving or transforming living conditions during disaster incidents without jeopardising long-term prospects. Traditionally, Shah et al. (2018) state that resilience's four components are social, physical, economic, and institutional. The ability to cope with and adapt to pressures caused by social, political, and environmental change, as well as to use community resources to mitigate the effects and capitalise on opportunities created by such changes, is a critical aspect of resilience (Manyema, 2006; Shah et al., 2018; Uddin et al., 2020). Disaster resilience entails restoring and preserving essential functions or structures through risk management (Dube, 2019). High resilience and low vulnerability levels are ideal situations (Shah et al., 2018) that all communities should strive for. Thus, Yoon and Keng (2013) conclude that resilient communities are less vulnerable to disasters and can cope better than less resilient communities. Specifically, Yoon and Keng (2013) explain resilience better in the following equation: Degree of disaster resilience = Degree of Capacity/ Vulnerability. Resilient communities are better prepared and can thus withstand and recover quickly from disasters such as floods, droughts, and fires. The study focuses on the capability to mitigate, cope with, recover quickly, and prevent disasters. The resilient community is better at disaster prediction and planning, which results in reduced disaster losses. The concern is that building resilience is complicated and costly, though essential. An individual's psychological capability to overcome extreme vulnerability is also a component of disaster resilience (Korstanje, 2019). This ability helps the individual to think quickly and make decisions in times of crisis. It also allows them to stay motivated in adversity and encourages them to seek help when needed.

m) Response

In essence, Kwan's (2020) study explains that the response is implemented instantly after a disaster and entails search and rescue operations and the distribution of relief materials. In this context, Bang et al. (2019) report that typical response activities include crisis incident management, emergency treatment, casualty tracking, sick people evacuation, search and rescue, disaster victim identification, and removing the dead from incidents or disaster scenes. For the study, disaster response refers to the assistance provided to disaster-affected communities in resuming normalcy (Riveria, 2019). The response occurs after the disaster and can be either short-term or long-term. Thus, disaster management officials oversee coordinating resources such as personnel, supplies, equipment, and funding. This coordination assists in restoring personnel, community, and environmental safety, thereby minimising the risk of further property damage. Various stakeholders and role players have raised concerns regarding the slow pace of response. The delay can be attributed to the lack of political buy-in, inadequate resources, and disaster management and climate change matters prioritisation service delivery by the political leaders and communities themselves to a certain extent.

n) Vulnerability

Physical and socioeconomic vulnerability are the two categories of vulnerability (Khan & Khan, 2008). Socioeconomic vulnerability refers to the socioeconomic conditions of the community, whereas physical vulnerability refers to who or what hazard can harm (Khan & Khan, 2008). Furthermore, Tingsanchali (2012) says that the causes of vulnerability are economic, social, physical, and environmental factors that make a community more vulnerable to hazards. Vulnerability is when a system is susceptible and unable to cope with the impacts of climate change and weather extremes (Odufunwa et al., 2012; Hossain, 2013; Muysoki et al., 2015; Sam et al., 2019). On the other hand, Shah et al. (2018) define vulnerability as the potential threat to humans and societies from catastrophic hazards and the ability to cope and adapt to mitigate the hazard's adverse effects. The study's comprehensive definition is by Chakraborty et al. (2019) and Straub et al. (2020), who define vulnerability as an individual's or group's traits, as well as their circumstances that impact their ability to anticipate, adapt, resist, and recover from disaster impacts. A disaster occurs when there is a vulnerability and a hazard; thus, Vulnerability + Hazard = Disaster (Vogel, 1998). Vulnerability is the incapacity to withstand a hazard or appropriately respond when a disaster strikes. The assets that are the source of the vulnerability include economic, cultural, institutional, social, political, and

psychological aspects. Disaster vulnerability is determined by geographical location, seasonality, population and infrastructure exposure, natural resource capital, gender, political and institutional mechanisms, economic and social conditions, equity in resource distribution, coping, and adaptive capacity (Mirza, 2003; Adebimpe, 2011). Similarly, Hilhorst (2013) contends that social processes make others vulnerable to disasters. The more vulnerable a person is, the more they are affected and thus suffer more significant physical, economic, and emotional losses (Vogel, 1998). Impoverished communities are typically in the most dangerous and unhealthy urban environments (Douglas et al., 2008). Unemployment, poverty, and inequality are vulnerability amplifiers in South Africa (NDMC, 2018). Regardless of the location, people vulnerable to the disaster have a high chance of being affected by a disaster (Vogel, 1998). Letsie and Grab (2015) elaborate on the scope by indicating that vulnerable groups in Lesotho are orphans, child-headed households, and people 65 years or older. The higher the vulnerability, the higher the economic, emotional, and physical costs of a disaster (Vogel, 1998). Certain vulnerability amplifiers can cause challenges if there are no preventative measures. While some indices measure vulnerability, the study focuses on disaster resilience and adaptive capacity.

2.3. Theoretical and conceptual framework in disaster management

The theoretical framework explains other researchers' theories and models. The theoretical framework serves as the foundation for conceptual theory. Although several topics may be connected to the research topic, the theoretical framework will evaluate, compare, select, and present the most relevant ideas. As a result, it serves as the research component that introduces and discusses the existing theory or theories that underpin the research problem. This section is critical for laying the groundwork for analysis, interpretation, and generalisation. The research focuses on capitals, resilient indices, and Build Back Better (BBB) theories.

2.3.1. Background of each theory

The section discusses the background of the study's selected theories: capitals, resilient indices, and BBB. Firstly, assets are a collection of various capitals that can generate livelihoods directly or indirectly (Elasha et al., 2005). The literature depicts different livelihood assets or capitals (Elasha et al., 2005; Melore & Nel, 2020). Explicitly, Gwimbi (2009) defines five livelihood assets as natural, socio-political, human, physical, and financial capital. Mai et al. (2020) state that livelihood capital includes physical, natural, economic, human, and social capitals and measures the community's

resilience. Secondly, the index can be calculated using a bottom-up or top-down approach, quantitative or qualitative data, and secondary or primary field data (Parsons et al., 2016). In summary, researchers agree that resilience is a multidisciplinary concept encompassing social, economic, institutional, infrastructure, ecological, and community necessities (Cutter et al., 2010). Likewise, Ziyath et al. (2013) concur, stating that the five thematic resilient areas are infrastructural, ecological, institutional, economic, and social. Similarly, Marzi et al. (2019) state that resilient classification focuses on social, ecological, organisational, infrastructure, economic, and community competence pillars. According to Sharifi (2016), the standard resilience dimensions are economic, social, built environment and infrastructure, environmental, and institutional. Evidently, there are various types of resilience indices. Thirdly, the United Nations developed the Build Back Better (BBB) disaster recovery strategy in 2004, primarily in response to the devastating 2004 Indian Ocean Tsunami (Dube, 2019). Additionally, Hamann (2020) elaborates that in the 2004 Indian Ocean Tsunami, BBB gained momentum among policymakers, relief workers, and academics. Build Back Better is concerned with effectively and efficiently implementing recovery activities to minimise delays and ensure proper implementation of BBB-based approaches (Mannakkara & Wilkinson, 2015). The phrase mainly refers to rebuilding better communities and infrastructure (Hamann, 2020). The meaning includes better recovery planning and implementation, with the humanitarian response as a permanent developmental objective (Hamann, 2020). This could entail housing, public infrastructure, and economic development initiatives.

2.3.2. Development of each theory

It is significant to understand the evolution of each theory. Concerning assets, Gwimbi (2009) believes that the more livelihood the community has, the more sustainable that livelihood is. Occasionally, assets are accumulated, resulting in a surplus (Elisha et al., 2005). Interestingly, Renschler et al. (2010) developed a framework for defining and measuring community disaster resilience at different scales. Regarding disaster resilience, Renschler et al. (2010), for example, identified the following dynamics: population and demographics, environmental and ecosystem, organised governmental services, physical infrastructure, lifestyle and community competence, economic development, and social-cultural (PEOPLES) capital. On the other hand, Renschler et al. (2010) concentrated on more dimensions than those mentioned above. The framework incorporated both capital and resilience indices. The framework was created when there were no clear procedures for quantifying resilience regarding multiple hazards and comparing community resilience to one another (Renschler et al., 2010).

Just as important, Orencio and Fujii (2013) developed an index assessing coastal communities' disaster resilience. Orencio and Fujii (2013) identified sustainable livelihoods, human health and well-being, physical measures, framework instruments, social protection, environmental and national resource management, and planning regimes as resilience components. Some of the features are not the primary focus of the study, which focuses on assisting vulnerable groups in developing disaster resilience and adaptive capacity. A second disparity was that the study areas were not along a coast, though in a coastal province; as a result, the study did not adopt any frameworks.

The World Risk Index is about theoretical concepts and comprehending natural hazards and the disaster risk community (De Almedia et al., 2020). The World Risk Index is used globally (Parsons et al., 2016). On the other hand, Rezende et al. (2020) and Parsons et al. (2016) mention the Australian Natural Disaster Resilience Index. This index employs a top-down approach, as Parsons et al. (2009) explain, and the indicators are drawn from nationwide secondary data. In addition, Marzi et al. (2019) contributed by stating that the most commonly used resilience indices are the Community Disaster Resilience Index (CDRI), Disaster Resilience of Place, Baseline Resilience Indicators for Communities (BRIC), and Foster's Resilience Capacity Index (RCI). Moreover, Cai et al. (2018) elaborate that BRIC encompasses six capitals: housing and infrastructure, economic, institutional, social, community, and environment. Interestingly, Yoon and Keng (2013), for example, agree that the CDRI indicators include human, social, economic, environmental, and physical aspects. Moreover, Marzi et al. (2019) explain that CDRI concerns financial resources, housing conditions, services, cohesion, education, environmental status, and institutions. BRIC, which measures countries' intent resilience, is a developed indicator in the USA (Cai et al., 2018). However, Cai et al. (2018) also show no validation with external data for the BRIC index in their study. According to Bakkensen et al. (2017), the five key disaster indices are:

a) BRIC by Cutter and Emrick,
b) CDRI by Peacock et al.,
c) Social Vulnerability Index by Flanagan,
d) Social Vulnerability Index (SoVI) by Cutter, Boruff, and Shirley,
e) Community Resilience Capacity Index by Foster, as applied to metropolitan areas by Network on Building Resilient Regions.

After analysing indices, Bakkensen et al. (2017) conclude that the RCI, SoVI, and CDRI indices are best suited for dealing with damages and fatalities after analysing indices. SoVI performs better when assessing damage and disaster declarations (Bakkensen et al., 2017). The conclusion is that each Index serves a specific purpose, and thus, indexes are used for various purposes. Other resilient assessment tools that Parsons et al. (2016) mention include the Resilience Scorecard Approach, the Communities Advancing Resilience Toolkit (CART), and the Capacities Approach. Moreover, Parsons et al. (2016) point out that the Resilience Scorecard Approach and CART employ bottom-up data collection methods. The resilience scorecard intends to measure local resilience (Parsons et al., 2016).

In contrast, Yoon and Keng (2013) disagree, claiming that the most used indicators in disaster management are the Disaster Risk Reduction Index, SoVI, and Earthquake Disaster Risk Index. They are effective management and planning tools for developing policies and allocating resources (Yoon & Keng, 2013). In expansion, Parsons et al. (2016) elaborate that SoVI assesses vulnerability to environmental hazards in US countries. Therefore, SoVI is a specific national index. Deciding thematic areas with indicators to evaluate resilience (Ziyath et al., 2013) is critical. Another example of a resilient measurement is the Resilience Interference Measurement (RIM) model (Cai et al., 2018). Additionally, Cai et al. (2018) stipulate that RIM uses a quantitative approach and empirical evidence; thus, RIM is both quantitatively and empirically validated. Furthermore, Rezende et al. (2020) underscore that the index indicator concept considers the physical vulnerability of people whom floods may severely impact. According to Chakraborty et al. (2019), flood social vulnerability indicators are associated with the social root causes of people's vulnerability, such as their ability to cope, access to resources, racial groups, ethnicity, household, set-up, and physical structures. The Disaster Risk Indicator in Brazil Index measures hazard exposure, coping skills, community susceptibility, and adaptive capabilities (De Almedia et al., 2020). Once again, most of the above index's information is unsuitable for this study. However, some aspects are relevant, particularly when identifying the indicators that need prioritisation.

Build Back Better is a rebuilding and recovery process model that results in sustainable, resilient, and efficient recovery solutions for disaster victims (Mannakkara et al., 2014). When it comes to reconstruction, Rahmayati (2016) indicates that the BBB means that buildings constructed post-disaster must be better than pre-disaster buildings. The buildings and the homes should have better living conditions for survivors (Rahmayati, 2016). Build Back Better aims to create more substantial and

resilient communities post-disaster (Mannakkara et al., 2014). Accordingly, Hamann (2020) agrees with BBB's call for progress rather than reverting to pre-disaster levels. The study aims to improve disaster resilience and adaptive capacity in disaster-prone communities, which is more than the presented BBB theory; hence, it will be considered with other theories.

2.3.3. Usefulness of the Theories

The theories presented above appear to help understand the post-disaster management problem. The indices, for example, address economic capital, human and social capital, infrastructure, and institutional organisations. As elaborated below, they also apply during disaster management phases such as preparedness, absorption, recovery, and adaptation (Bakkensen et al., 2017).

i. *Natural capital* is about natural resources and ecosystem services that support human life and generate other outputs (Melore & Nel, 2020). Moreover, Melore and Nel (2020) define natural capital as biological and ecological resources. Thus, it deals with water, land, and biological resources, including pasture, trees, and biodiversity (Elisha et al., 2005). Specifically, Gwimbi (2009), for example, reveals that natural resources are most valuable in rural communities.

ii. *Financial capital* is also called economic capital (Melore & Nel, 2020). It involves financial and disposable assets such as livestock (Elisha et al., 2005). Moreover, it deals with financial resources for capacity building, business establishment, civic and social entrepreneurship, and wealth generation (Melore & Nel, 2020). It also entails income, credit access variations, financial savings, and debt levels (Elisha et al., 2005). This capital enables communities and households to prevent, respond to, and recover after disasters (Melore & Nel, 2020).

iii. *Physical capital* are results from income-generating activities (Elisha et al., 2005). It concerns the community's infrastructure (Melore & Nel, 2020). Roads, irrigation schemes, electricity, reticulated equipment, and shelter are all part of it (Elisha et al., 2005). Other types of infrastructure include communication, transportation, housing, and other structures (Melore & Nel, 2020). Physical capital availability impacts a community's adaptive capacity and resilience (Melore & Nel, 2020).

iv. *Human capital* is the ability to work productively (Melore & Nel, 2020). It contains the quality and quantity of available labour (Elisha et al., 2005). Skills, health, educational level, and leadership availability determine work quality (Melore & Nel, 2020). Thus, human capital can be evaluated using access to services, education, health, population growth, demographic traits,

housing type, population density, and various dependents (Melore & Nel, 2020). It also depends on household members' education, skills, and health status (Elisha et al., 2005). In addition, Malak et al. (2020) indicate that human assets include skills, knowledge, and participation in decision-making.

v. *Social capital* includes assets with group members' rights (Elisha et al., 2005). To explain, Melore and Nel (2020) state these as relatives, channels, community-based voluntary organisations, trade unions, schools, and social norms. Melore and Nel (2020) elaborate that people rely on formal and informal organisational measures to achieve a common vision. It is more about relying on others in need (Elasha et al., 2005). As a result, networks help people cope with disasters and solve collective problems (Melore & Nel, 2020). To put it another way, Wiguna and Ketut (2019) believe disaster management needs synergy and integration regarding the government's and social capital's roles throughout the disaster management phases. Trust and synergy give poor people safety nets (Melore & Nel, 2020). Trust, norms, and networks are the three primary characteristics of social capital (Wiguna & Ketut, 2019). Finally, Wiguna and Ketut (2019) conclude that social capital and the government's role in disaster recovery are both beneficial and significant.

vi. *Institutional capital* pertains to rules, policies, programs, social rules, and governance structures that can assist and support community resilience (Melore & Nel, 2020). Such resilience is contingent on established collaboration and coordination among the private sector, government, and civil society organisations (Melore & Nel, 2020).

For assessing resilience and vulnerability, an index or composite indicator quantifies resilience and vulnerability (Bakkensen et al., 2017). Notably, Parsons et al. (2016) propose seven common elements when designing disaster resilience assessments. They are evaluation purpose, evaluation scale, conceptual framework, indicator selection, structural design, index computation, reporting, data analysis, and interpretation (Parsons et al., 2016). The application and measurement of resilience vary and are frequently associated with theoretical frameworks indirectly (Quinian et al., 2016). Previous studies have developed a resilience assessment model that differs in terms of examples, scope and definition, and community assessment (Ziyath et al., 2013). People's daily community interactions impact disaster recovery (Okada et al., 2018). In the same vein, Riveria (2019) believes that poverty influences recovery at the community and individual levels. Neighbours in Bangladesh assisted one

older adult in moving to a nearby primary school after their house was damaged and they lost their belongings (Malak et al., 2020). According to the study, the effects on younger adults were not severe, as those households with only older adults lost their source of income due to a lack of cultivation (Malak et al., 2020). Moreover, Malak et al. (2020) state that the elderly use asset-based strategies to reduce vulnerability. Conversely, Marzi et al. (2019) explain that, despite Italy's vulnerability to hazards, few studies have examined resilience. For example, Sudmeier et al. (2013) researched to develop locally relevant landslide indicators for self-monitoring resilience. Thus, in Middle East Nepal, resilience is associated with natural, economic, social, human, and physical assets (Sudmeier et al., 2013). During community consultations, the indicators were validated and scored according to Kafle's recommendations (Sudmeier et al., 2013).

The post-disaster period presents an opportunity to address and correct community vulnerability; hence, BBB is advised (Mannakkara et al., 2014). As a result, the BBB Framework focuses on community recovery, disaster risk reduction, and effective implementation (Dube, 2019). Build Back Better is described by Ultramari (2016) as an opportunity to improve the community's situation. It includes improving social, physical, environmental, and economic conditions, resulting in more resilient communities (Mannakkara et al., 2014; Mannakkara & Wilkinson, 2015). Therefore, post-disaster structures should be more disaster resilient.

2.3.4. Compare and contrast strengths and weaknesses

Despite increased disasters, seemingly post-disaster measures have remained ineffective and poorly managed. First and foremost, despite great strides, Bakkensen et al. (2016) concede that significant work remains to quantify resilience and vulnerability and, thus, must be improved (Mannakkara et al., 2014). Understanding disaster vulnerability and resilience is essential globally because it is a policy priority (Bakkensen et al., 2017). Accordingly, Parsons et al. (2009) advise that using an index to assess disaster resilience is critical in natural hazard management and planning. Accurate resilience measurement and tracking ensure that disaster-resilient policies and programs support appropriate actions and reach the target population (Jones & Tanner, 2017). Composite indicators are essential for policymaking and public communication because they contain data relevant to performance indicators (Cutter et al., 2010). The problem is that existing approaches are generally incapable of providing policy support (Jones & Tanner, 2016). It is unusual to use indices, as index developers commonly indicate

frameworks or baseline assessments for their products (Bakkensen et al., 2016). One of the well-known criticisms of indices is that, even though many indices use comparable metrics, their outcomes differ (Bakkensen et al., 2017). Additionally, Orencio and Fujii (2013) affirm this viewpoint, pointing out that standardising resilient assessments is still challenging. The Orencio and Fujii (2013) model's weakness was its reliance on assumptions. Moreover, Bakkensen et al. (2017) are concerned about the inadequacy of index validation, the final step in index creation. Furthermore, the limitation of metrics entails policy relevance even when there is a defined objective and empirical validation (Bakkensen et al., 2017). The limit is that it is unclear which metrics need increased resilience. Another drawback of resilience indices is that they rely on literature and theoretical justifications in a meta-analysis, unlike empirical validation (Bakkensen et al., 2017). The combined level of validation does not address this gap.

Build Back Better needs legislation for compliance and facilitation, essential for post-disaster (Mannakkana & Wilkinson, 2015). Dube (2019) confirms that better post-disaster recovery building results in better houses, stronger infrastructure, better livelihoods, and better systems and services. The changes also focus on sustainability principles and best environmental management practices (Davidsson, 2020). Build-Back-Better has more advantages than disadvantages (Dube, 2019). Community-driven reconstruction is flexible, fosters social cohesion and capacity building, and improves a sense of ownership (Danquah et al., 2014). Affected communities must build back better during reconstruction (Dube, 2019). Implementing BBB means post-disaster infrastructure projects and implementation are better than before the disaster (Hamann, 2020). A sustainable reconstruction approach will reduce vulnerability while conserving resources for future generations (Davidsson, 2020). The benefit is that the recovery phase channels investigations toward more inclusive, resilient, and environmentally friendly outcomes (Hamann, 2020), raising the bar for future preparation.

The BBB also contributes on a social and political level. It was the case during the 2004 tsunami post-disaster activities on Thailand's Andaman Coast, where donors improved the lives of the locals (Hamann, 2020). Aceh, Indonesia, is an excellent example of a conflict where the BBB principle helped rebuild and end the war (Hamann, 2020). However, the lack of proper measures to implement the BBB principle is one of the challenges to implementing BBB-based recovery (Mannakkana & Wilkinson, 2015). On the other hand, resilient communities necessitate measures to help disaster victims be resilient and adaptable to future disasters. Another disadvantage of BBB is that it can take a long time to finalise

the implemented projects (Hamann, 2020). Furthermore, one of the BBB concept's detractors claims it is poorly framed (Rahmayati, 2016). The challenge with the BBB phrases is that people have different perspectives on terms such as 'build' and 'better', clearly not stating what and how to build (Hamann, 2020). One more concern of BBB was ignoring vulnerable groups' needs, interests, and perspectives (Hamann, 2020). Rahmayati (2016) elaborates on this viewpoint, suggesting the concept of enhancement to consider post-disaster victims' cultural, individual, and communal desires and wants.

2.3.5. Adopted conceptual framework

The study agrees with Wiguna and Ketut (2019) that the emphasis should be on individuals with weaker socioeconomic status. Hence, the study focused on individual vulnerable groups, vulnerable communities, and subsequently, measures to assist vulnerable groups. In the post-disaster phase, figure 2.3 illustrates how the conceptual research framework influences capitals, indices, and BBB principles to result in disaster resilience and adaptive capacity.

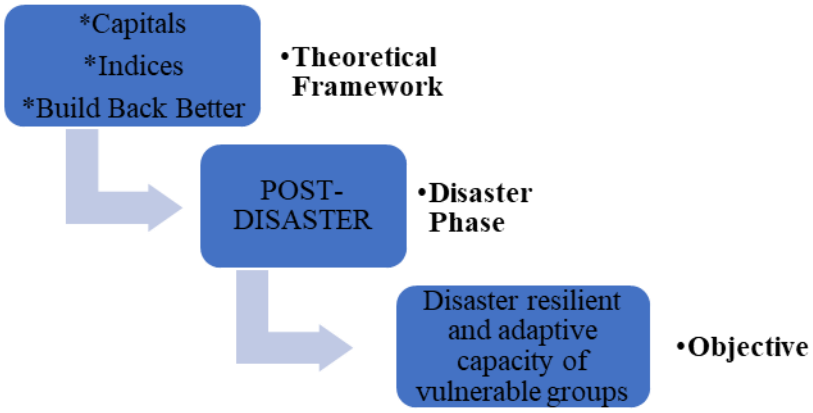

Figure 2.3: Developed Conceptual Framework

Source: Researcher's notes

There are various capitals; the study focused on multiple capitals rather than just social capitals, as other studies have done. The indices examined are primarily concerned with resilience rather than adaptive capacity. The study did not analyse the indices individually but focused on resilience indices in general. Furthermore, some indices looked at economic recovery, whereas the study focused on the post-disaster period. Another concern with the indexes is that they do not compare situations in rural and urban areas. The study also compared various circumstances in urban and rural areas. As a result, the study proposed

a prioritisation of measures based on the recommendations of the research participants. In the same vein, Yoon and Keng (2013) argue that the concepts must be measurable to apply disaster resilience. Previously, post-disaster reconstruction focused on reporting and repairing the physical damage caused by the disaster. This approach has challenges because it does not address vulnerability; thus, when a disaster occurs, the same community will be affected again. Therefore, Ahmad and Ma (2020) recommend integrating the post-disaster phase into the overall long-term development of disaster-affected communities because it is an opportunity to build back better. The BBB Principles must be applied in rural and urban areas. Build-Back-Better does not address the measurement of the identified factors. However, it is helpful in the research because it will allow the participants to make recommendations for vulnerable people to be more resilient and have an adaptive capacity post-disaster. The research examined the institutional structure, challenges, occurrences of disasters, existing projects and identified opportunities. The study also allows various stakeholders and role players to make recommendations to help ensure adaptive capacity and resilient communities. As a result, this research aims to contribute to the existing literature on the current disaster-resilient indicators by using the information gathered to develop a flood-specific checklist for South Africa, which is nonexistent.

2.4. Promoting disaster adaptive capacity and resilience

There is an expectation that climate change will increase the frequency and severity of extreme weather events (Mirza, 2003; Samu & Kentel, 2018; Olanrewaju et al., 2019). On the other hand, Chagutah (2009) expresses concern that climate change models predict that 'wet' events, including cyclones and floods, will become more common in Southern Africa as the climate changes. According to the United Nations ISDR (UNISDR), climate change exacerbates disasters more frequently and severely (Manyema, 2016). The projections show that the number of people exposed to the deadliest disasters will have more than doubled by 2050 (Shah et al., 2018). This prediction is evidence that disaster occurrences and intensity will continue to rise. Africa is vulnerable to various natural hazards, particularly hydrometeorological hazards (Lukamba, 2010). In addition, Ahadzie and Proverbs (2011) indicate that floods disproportionately affect African countries due to a lack of appropriate mitigation measures. The reason for severely experiencing the disaster impacts in Africa was that the Continent is more vulnerable to disasters. Man-made disasters frequently affect South Africa, like other developing countries (Bean et al., 2011; Skinner et al., 2014). Climate change-related disasters such as floods, heavy snowfall, hailstorms, and gale-force winds have repeatedly affected South Africa (Chagutah, 2009).

Since the early 90s, South Africa has been affected by floods and droughts (Vogel, 1998). Other disasters include toxic spills, fires, hailstorms, and tornadoes (Vogel, 1998).

In addition, Chagutah (2009) puts it in context by stating that 946 disasters occurred between 1800 and 1995, with 59% of them being wet incidents such as snow, heavy rain, cloudbursts, hailstorms, floods, and torrential rain. To make matters worse, Ahrens and Rudolph (2006) discovered that the number of people affected by disasters tripled between the 1970s and the 1990s. Moreover, the economic impact was five times higher (Ahrens & Rudolph, 2006). The predictions indicate that Southern Africa will be more vulnerable to disasters. The past disaster incidents prove that South Africa is vulnerable to different disasters. Unequivocally, Zuma et al. (2012) state that there were 77 recorded flood disasters in South Africa between 1980 and 2010, with 1068 fatalities. Specifically, Zuma et al. (2012) suggest that the most disaster-vulnerable provinces are the Eastern Cape, KZN, Northwest, and Limpopo. It means that in South Africa, some provinces are more vulnerable to disasters than others. KZN already had a flood disaster declaration in 2008 (Chagutah, 2009).

Disaster occurrences suggest a lack of adequate post-disaster policies because, in some instances, secondary disasters occur while dealing with the initial disasters. The view of Katongole (2020) suggests that Africa is prone to weak governance, chronic poverty, and insufficient disaster preparedness. Subsequently, African countries take longer to recover from disasters. They lack adequate measures to recover from the disaster's effects and return to normalcy. Additionally, according to Louw and van Wyk (2011), determining the effects of disasters and putting measures in place to reduce vulnerability to future impacts during the post-disaster period is critical. Explicitly, Louw and van Wyk (2011) opine that disasters damage a community's lives, infrastructure, environment, property, and economic and social activities. Natural disasters in Africa jeopardise poor people's economic survival by causing disruption and financial loss, limiting their recovery ability (Lukamba, 2010). The effects of mortality and failure to meet basic needs can have psychological consequences, as affected individuals feel helpless and unable to help themselves. Moreover, Ahadzie and Proverbs (2011) emphasize that the most concerning factor in Africa is the increased mortality risk since developing countries account for 96% of flood-related deaths. Disasters have socioeconomic consequences for the communities they affect. The inability to deal with disasters means that developing countries will continue to suffer and that living conditions will not improve. With the predicted increase in disaster frequency and magnitude

affecting developing countries, it is necessary to review legislation and policies. The legislation and policies will not prevent climate change or disasters but may help vulnerable communities cope with future disasters.

2.4.1. Disaster Management Act

First, Huck et al. (2019) stipulate that New Zealand had reputable disaster risk management legislation before the Hyogo Framework of Action (HFA), 2005- 2015. The Civil Defence and Emergency Management Act of 2002 prescribes non-specific objectives and delegates significant decision-making authority to local governments (Huck et al., 2019). In addition, the Act mandates that lifeline utilities, which provide emergency services and critical infrastructure, implement their responsibilities to the greatest extent possible (Huck et al., 2019). On the contrary, Islam et al. (2020) state that Bangladesh passed several DM Acts, distributed policies, activated agencies, and formed additional policies in a related disposition. As a result, the government is sincerely committed to addressing climate change's consequences (Islam et al., 2020). Conversely, Japan's updated Disaster Countermeasures Basic Act entails the prefecture, designated public corporations, municipalities, the state, and residents (Kato & Endo, 2019). The Act also specifies appropriate actions to be taken before, during, and after a disaster (Kato & Endo, 2019). Furthermore, Malla et al. (2020) indicate that Nepal has the Disaster Risk Reduction (DRR) and Management Act of 2017. Several international countries appear to have DM Acts in place. The approach to the Acts' contents and implementation are seemingly not standardised.

In Africa, the Gambia National DM Act focuses on the HFA concepts in its disaster response efforts, which are about institutions and policy frameworks focusing on disaster response (Rivera et al., 2020). Olowu (2010) advises that in Nigeria, the main aim of the National Emergency Management Agency (NEMA) is to coordinate various agencies, including NGOs. In contrast, Adedeji et al. (2012) elaborate that the Nigeria NEMA deals with disaster-related matters by developing concrete structures and measures, such as education, to raise community awareness and mitigate disaster impacts in Nigeria. The NEMA was established by Act 12, as amended by Act 50 of 1999, to manage disaster incidents in Nigeria (Adedeji et al., 2012; Olanrewaju et al., 2019). Furthermore, Olowu (2010) advises that in Nigeria, the main aim of NEMA is to coordinate various agencies, including NGOs. It seems some countries continue to base their Acts on obsolete international strategies. Despite the current Sendai Framework, many countries continue to use the HFA as the basis of their DM Acts. Countries that rely

on outdated strategies may encounter difficulties implementing old post-disaster management strategies. This means they will employ outdated methods even when modern techniques are available and required. Working with other countries would also be challenging because they would not be on the same page regarding priority strategies and approaches to post-disaster management. Therefore, governments must benchmark with other countries to improve their practices. In South Africa, the NDMC amended the Disaster Management Act 57 of 2002 in 2015. It focuses on the three spheres of government. The Acts should not be a box-ticking exercise but a tool for ensuring effective and efficient post-disaster activities based on practical rather than theoretical solutions. Another factor to consider is the availability of resources, as Chapter 6 of the Act suggests that the primary focus should be on funding (DM Act, 2002). Furthermore, the focus is on declared disasters, whereas other major disasters are sometimes not declared. Besides the challenge of post-disaster management activities lacking funding, there are concerns with the declaration process, which requires urgent funding.

2.4.2. Disaster management laws and policies

Some countries do not have DM Acts, but law decrees are prompted by disaster occurrences. Standing orders during disasters also improve the functionality of mechanisms (Islam et al., 2020). According to Pertiwi et al. (2019), the disaster management legislation in Indonesia is Law 24 of 2007, which came into effect on April 26, 2007. It was in response to the 2004 Aceh Boxing Day Tsunami (Pertiwi et al., 2019). Another example is that Britton (2006) advises that the Philippines still uses Presidential Decree 1566 (PD1566), stipulating that a National Disaster Coordinating Council is the uppermost policymaking structure on disaster management-related matters, to advise the president. The government enacted Law Number 24 of 2007 in Indonesia to address disaster impacts. The law standardises the processes and roles of stakeholders participating in disaster management (Wiguna & Ketut, 2019). The law also advocates for communities to actively participate in pre-, during, and post-disaster activities (Wiguna & Ketut, 2019). In addition, Ndille and Belle (2014) report that it took a Lake Nyos gas emission disaster in Cameroon in 1986, which killed 1785 people, for the government to act. Law No. 86 of December 6, 1986, was passed to restructure civil protection in Cameroon, followed by Decree No. 96/054 of March 12, 1996, which deals with the composition and duties of the National Council for Civil Protection (Ndille & Belle, 2014). Furthermore, Ndille and Belle (2014) reveal that Decree No. 98-31, issued on March 9, 1988, governed the organisation of emergency and relief plans. On the other hand, Khalid and Shafiai (2015) state that the National Security Council

Directive No. 2 and Fixed Operating Regulations are the prescripts dealing with disaster management in Malaysia. They describe the policy's objectives and the disaster and relief management mechanisms (Khalid & Shafiai, 2015). In conclusion, Khalid and Shafiai (2015) add that the directive specifies the scope of responsibilities and how different stakeholders should participate in disaster management. Determining whether these laws were legally binding in the respective countries was tricky. The law's clauses must be binding and not suggestive, making them ambiguous and thus unimplementable. Moreover, most laws are reactive and enacted in response to a specific disaster. Mechanisms must be in place to ensure that enthusiasm does not wane following the disaster. South Africa does not use such laws but has legislation and policies.

India constantly develops inadequate flood policy guidelines, and lately, there has been some success (Mohanty et al., 2020). On the other hand, Reham et al. (2019) indicate that Pakistan also signed the previously applicable HFA (2005-2015) and the framework for disaster management institutions. However, due to the discovery of significant gaps during the 2010 disaster, the study recommends that disaster risk reduction policies be updated and executed adequately (Reham et al., 2019). In 2008, Bangladesh adopted a draft National Disaster Management Policy (Hossain, 2013). Countries have policies in place; however, some policy frameworks date back over a decade. Regardless of whether a framework exists in a country, the identified challenges result in inefficient implementation. Some experts have said there is a need to improve the policies in their countries. Thus, policies may need to be updated to address the constant disasters. Furthermore, policies must align with the higher sphere of government legislation. As a result, the updated policy must be in sync with the relevant legislation by addressing all gaps.

In Africa, Kenya published a new Disaster Management Policy in 2009, after which a new Constitution followed in 2010 (Van Niekerk, 2015). This approach is the most notable and one-of-a-kind good practice (Van Niekerk, 2015). Conversely, Nigeria established the National Disaster Management Framework in 2010 (Olanrewaju et al., 2019). Understanding disaster management and operational guidelines benefits government officials, emergency management officials, organisations, civil society, the private sector, and leaders. The eight sections include disaster response, disaster prevention, disaster recovery, facilities and enablers, institutional capacity, disaster risk assessment, preparedness and mitigation, disaster risk reduction, and coordination (Olanrewaju et al., 2019). The Framework's

shortcomings include focusing on response compared to prevention and reducing financial, accommodation, equipment, and mobility constraints. Put another way, Ulasi and Ulasi (2016) claim that Nigeria has several environmental policies, but they are ineffective. As a result, Nigeria must strengthen existing national emergency and disaster policies to implement effective disaster preparedness and response (Odufunwa et al., 2012). In another study, Schaer et al. (2018) explain that following the 2005 disastrous floods, Nigeria developed a Housing Construction 2005- 2008 Policy. The Policy was designed to compensate flood victims by building 4,000 housing units on a new site where floods had significantly impacted the community (Schaer et al., 2018). As a result, residents of Pikine's high-risk areas were permanently relocated (Schaer et al., 2018). Disaster response policies must assist with post-disaster operations. The policies present ideal principles, strategic priority areas, and measures rather than practical strategies or actions. Another observation is that policies are constantly changing. Policy changes may result in non-stabilisation, as there will be constant variations. Moreover, there may be no opportunity to determine what works and what does not. The country may then fall into the trap of following the latest trends without considering its actual needs, which are unique to it.

2.4.3. Disaster Management Plans

The Disaster Management Plan is another critical and valuable document for disaster management. Besides the Disaster Management Policy, Bangladesh established a 2010-2015 Disaster Management National Plan. The Plan prioritised capacity development and livelihood promotion in disaster-prone areas (Hossain, 2013). Bangladesh's National Plan for Disaster Management details measures to achieve systematic and institutional DRR and response management mechanisms (Islam et al., 2020). On the other hand, India's 2005 National DM Act prescribed that states and localities must develop Disaster Management Plans to better prepare for earthquakes and floods (Weinstein et al., 2019). In addition, Weinstein et al. (2019) stipulate that in India, the Municipal Corporation of Greater Mumbai released the revised City’s Development Plan in April 2018. The plan details the identified priorities and regulatory frameworks to improve the development of the City and Region until 2034. While the plan addresses flooding concerns, Weinstein et al. (2019) argue that its primary focus is development-driven economic growth. Although the India Plan mentions floods, it is not primarily concerned with floods. In most cases, Disaster Management Plans do not guarantee effective and efficient implementation post-disaster. These Plans do not appear to focus on post-disaster activities in greater detail. Certain Disaster

Management Plans do not even include post-disaster information. Another identified weakness regarding the Plans is that one plan focuses on various disasters and is thus not hazard specific.

Then, focusing on the African continent, Rivera et al. (2020) show the development of the 2018-2021 National Development Plan in the Gambia following a regime change in 2018. Disaster Risk Management is one of the seven "critical enablers" listed in the country's Plan under Environmental, Natural Resources, and Climate Change Land Use Planning Enabler (Rivera et al., 2020). On the other hand, Swaziland enacted the Disaster Management Act in 2006 and the National DRR Action Plan (Van Niekerk, 2015). Similarly, in Mozambique, the Master Plan for Disaster Prevention and Mitigation has been regularly updated since 2006, and national planning is responsive to DRR integration in the country's 5-year Government Plan (Van Niekerk, 2015). Plans were developed but not implemented in Senegal after 2008; however, a new ten-year Flood Management Program was launched and implemented to assist flood victims in 2012 (Schaer et al., 2018). Moreover, Schaer et al. (2018) add that Senegal has a National Relief Coordination Plan, which is the direct responsibility of the government. Nigeria also has a National Action Plan (Van Niekerk, 2015). Undesirably, some Disaster Management Plans are not updated. Among the above countries, only Gambia has a current plan, though it is not specifically a Disaster Management Plan because disaster management is part of the Master National Development Plan. Senegal, for example, has action plans but not disaster management plans. Despite the challenges, it is encouraging to see that even developing countries, particularly in Africa, have Disaster Management Plans, albeit with flaws. Countries that do not have plans should be encouraged to develop them because they make disaster management activities easier to implement when a disaster strikes. It would be much easier than planning post-disaster management activities from scratch. Without a doubt, plans should effectively and efficiently assist disaster-prone areas after a flood.

2.4.4. Disaster management structures: roles and responsibilities

The Act requires Local governments to form disaster management committees (Malla et al., 2020). Concerning disaster management structures, Mohanty et al. (2020) report that some of India's disaster management strategies include the formation of committees, task forces, working groups, and development policies concerning water resources, including flood management. The Civil Protection and Disaster Relief System is another structure that oversees disaster prevention, rescue, preparedness, protection, and assistance with basic life necessities (Malesic, 2020). In Bangladesh, however, the

Ministry of Disaster Management and Relief manages and implements DRR policies and actions (Islam et al., 2020). In contrast, disaster management authority in Indonesia is decentralised, owing to the credibility of Disaster Management Agencies in provinces and districts (Pertiwi et al., 2019). As a result, Indonesian law encourages stakeholder participation in disaster management efforts, allowing private and public sectors to participate (Pertiwi et al., 2019). Indonesia advocates for a multi-stakeholder approach. According to the information on disaster management structures, officials and communities can form various structures. Some are temporary, while others are permanent. Moreover, some structures are formal, and others are informal. The structures may ensure that everyone's roles and responsibilities are clear. As a result, it is critical to establish structures properly. There should even be Terms of Reference, especially regarding formal structures. Given the importance of various disaster management structures, ensuring that the existing structures have the necessary resources is critical. When establishing structures, it is also essential to involve community members. Community participation ensures that no decisions are taken for them without their input. However, having community members represented by community leaders in all structures can be difficult, even if the mandate is from the communities.

In an African situation, Adedeji et al. (2012) argue that disaster management in Nigeria is still in its infancy, although disaster management efforts started in 1906, when the Police Fire Brigade, now known as the Federal Fire Services, was established. There is a suggestion for the Nigerian state government to develop separate emergency management agencies to supplement the federal agency's role in their respective states (Adedeji et al., 2012). In a separate study, Kahalid and Shafiai (2015) explain that in response to flood impacts, the Malaysian government instituted the National Disaster Management and Relief Committee (NDMRC) in 1972 to coordinate flood relief at the national, state, and district levels. The committee anticipated reducing flood damage and avoiding fatalities (Kahalid & Shafiai, 2015). This will save lives and livelihoods while reducing disaster vulnerability (Odufunwa et al., 2012). Establishing disaster management structures depends on the country's needs and progress in implementing post-disaster management activities. The structures also address the reporting line and the hierarchy. The National Disaster Management Organisation (NADMO) oversees disaster management in Ghana (Ahadzie & Proverbs, 2011). Another study conducted in Ghana by Ahadzie et al. (2016) shows that the NADMO, the government agency, focuses mainly on providing limited relief items to affected individuals. The organisation's role is to manage the activities of different individuals

involved in disaster management, including floods (Proverbs, 2011). In contrast, the NADMO in the Gambia reports to the Vice President's Office (Rivera et al., 2020). In Cameroon, Decree No. 2005/104 prescribed establishing the Department of Disaster and Emergency Services and organising and coordinating civil protection activities during natural or man-made disasters (Ndille & Belle, 2014). Different structures implement disaster management at various levels in specific counties. Noticeably, there is no standardisation in the placement of disaster management offices across different countries. Some are placed correctly, while others are compromised at lower levels. It seems as if the closer the DMC is to the highest decision-makers, the better since the decision-makers can easily listen to their views. The ones at the lower level cannot carry out their activities due to their placement. Thus, the structures in place and the placement of disaster management offices may need to be relooked at.

Additionally, in 1996, South Africa established the National Disaster Management Committee (Vogel, 1998). This Structure emanated from the 1995 ad-hoc Structure established by the Cabinet due to the threat of an El Nino from 1997 to 1998 (Vogel, 1998). Subsequently, in 1997, an Inter-ministerial Committee for Disaster Management was formed to develop disaster management legislation for South Africa (Van Niekerk, 2006). Furthermore, according to Van Niekerk (2006), the disaster management sector in South Africa is a multidisciplinary function that necessitates the involvement of various sectors and disciplines. Disaster management involves government departments, relief organisations, Non-Profit Organisations (NPOs), research institutions, and the public and private sectors (Bean et al., 2011). Stakeholders thus include representatives from all three spheres of government: Community-Based Organisations (CBOs), the private sector, NGOs, research institutions, and universities (Van Niekerk, 2006). The CBOs are not very common, maybe because they are the cooperatives. In another view, Raju and van Niekerk (2013) assert that disasters will be more damaging if there is no involvement of these stakeholders and decision-making in disaster recovery is poor. The assertion can be that little research has been conducted in South Africa on how legislation and policies can assist in having effective and efficient post-disaster measures to ensure disaster-resilient and adaptive capacity communities. However, the evidence presented above demonstrates that disaster management can be considered a multidisciplinary field in South Africa that necessitates the involvement of various stakeholders and role players. Following the Constitution, South Africa established some structures to deal with natural disasters, but they must be strengthened and better managed. Given the progress in Disaster Management in South Africa regarding institutional arrangements, some progress has been

made. Nevertheless, there is a need for more research to determine the impacts and shortcomings of post-flood disaster management.

2.4.5. Concerning countries

Seemingly, some countries are still in the process of developing their disaster management policies and acts. However, it is worth mentioning that the Philippines was in the process of replacing the PD1566 with more modern and robust legislation, according to Britton (2006). The new legislation addresses institutional challenges such as location, funding, and naming (Britton, 2006). About 59.4% of Brazilian municipalities could not submit risk management and flood planning plans in 2017 (De Almedia et al., 2020). Furthermore, only 25% of those asked to submit a flood prevention master plan did so (DeAlmedia et al., 2020). Subsequently, De Almedia et al. (2020) recommend strengthening disaster risk management systems in Brazil, including DRR and disaster incident preparation through contingency plans. Similarly, Vitale et al. (2020) assert that integrated flood risk management approaches are still used in developing strategies in Italy despite economic losses and fatalities. The scientific database currently concentrates on the significance of having varied flood risk management strategies (Vitale et al., 2020). Several countries do not have disaster preparedness plans in place. In Africa, Swaziland's dominant DRR structures are International NGOs, local NGOs, and Civil Society Organisations, a trend also seen in Kenya (Van Niekerk, 2015). In some instances, there was an observation that the government takes a back seat when implementing disaster management functions; non-government structures subsequently take over. Uganda has been prone to hazards since 1818 (Nakileza, 2007) and probably before. However, the existing strategy was not implemented or actioned at the community level. Subsequently, the landslide disaster response is irregular or sporadic (Nakileza, 2007). Other developed and emerging countries are still far behind regarding post-disaster disaster management institutional arrangements. The impact on most developing countries will be high compared to developed countries. Thus, there should be intervention or strict legislation and policies to ensure institutional arrangements are in place to assist the countries lagging because of human resources, funding, or even a lack of knowledge.

2.5. Post-disaster challenges

A comprehensive list of the difficulties encountered during disaster relief is still needed (Petrudi et al., 2019). This statement implies a failure to record the challenges faced by disaster-affected communities

and disaster management officials after the disaster. In one study, Malla et al. (2020) explain that bureaucracy makes centralisation particularly problematic in major disasters. As far as Okada et al. (2018) are concerned, relying on expertise for physical recovery exposes the affected group to decisions imposed by external institutions and experts. Moreover, Danquah et al. (2014) highlight displaced people's anxiety and development constraints as the main challenges and barriers to effective post-disaster recovery. Likewise, Okada et al. (2018) observed that residents faced financial, psychological, and interpersonal difficulties. Similarly, volunteers' experiences indicate psychological, emotional, and physical demands when providing relief (Chen et al., 2019). Poor infrastructure, information technology, cultural differences in various organisations, unclear policies, a lack of knowledge management systems, and trust issues are among the challenges and barriers identified by Petrudi et al. (2019). Other post-disaster complications include balancing the extent of the improvement to structural designs and land use plans, time constraints, affordable risk reduction, affected individuals' choices, and traditions (Dube, 2019). There is a view that the challenges must be documented, as political principals, officials, and communities might not be aware of each other's challenges.

Both communities and officials face post-disaster challenges. Though on different scales, these challenges are found in developing and developed countries. Therefore, it is important to have a list of failures that will occur after a flood disaster. In addition, Olowu (2010) elaborates that countries cannot manage or mitigate disasters in Africa for various reasons, such as inadequate planning, lack of funding, reliance on outdated and ineffective disaster management systems, inaccessibility to technical data, and lack of capacity. Having a list of challenges helps in addressing them accordingly. There is an understanding that it may be difficult to circumvent some obstacles. Therefore, there is a need to adapt to them. These challenges disproportionately affect vulnerable groups, as they typically lack the resources to address them. Additionally, Olowu (2010) elaborates that Africa cannot manage or mitigate some disasters because of inadequate planning, a lack of funding, reliance on outdated and ineffective disaster management systems, an inability to access technical data, and a lack of proficiency. The challenges in Africa outnumber those in other parts of the world. Several reasons exist, including a lack of resources and outdated technology. Some individuals may worry that admitting their struggles will make them seem vulnerable. Thus, there should be safe platforms for them to voice their views. Moreover, they should not be made to feel responsible for the difficulties they experience. The main challenges linked to the post-disaster phase are elaborated on below.

2.5.1. Lack of resources and skills

In a recent survey, 87% of respondents stated that the main post-disaster challenge was human resources, specifically trained human resources (Rivera et al., 2020). In the same light, volunteers in a Malaysian study conducted by Chen et al. (2019) complain about inadequate and insufficient support. Conversely, Ringo's (2018) concern is using low-tech activities, such as weather forecasting in Africa. Specifically, Abaya et al. (2019) cited the deficiency of boats, life jackets, trained swimmers, and insufficient medicine as some of the resource challenges encountered during the response in Ethiopia's Gambela Region. Municipalities in Senegal lack financial and human resources and have poor coordination (Schaer & Hahonou, 2017). People may be available but lack resources when confronted with identified challenges. According to Vogel (1998), DMCs in South Africa face challenges like limited resources and personnel, particularly in rural areas. Similarly, Zuma et al. (2012) state that the study found that South African district municipalities struggled to deal with floods in the 2010/11 fiscal year due to skill shortages and insufficient disaster management structures. A lack of resources and skills is a challenge because it affects officials and negatively impacts communities that should receive assistance from those officials. Put differently, Malesic (2020) believes that ill-prepared personnel, frequent communication challenges, unstandardised reporting, inadequate disaster risk assessment, and the absence of a Municipal Flood Relief Plan all hamper disaster response. Officials cannot implement their statutory and policy-mandated duties without adequate resources and skills. This situation may jeopardise them because they must carry out post-disaster management activities. Subsequently, there is a high likelihood that they will be ineffective during disasters. Conversely, communities that require external support for post-disaster activities, particularly the vulnerable ones, may suffer ongoing distress without crucial aid. There may also be a legal aspect, as some communities can litigate against officials for failing to fulfil their post-disaster management mandate.

2.5.2. Inaccessible infrastructure

Disasters can severely damage infrastructure in some cases, affecting officials and communities. When it comes to the communities, they will be unreachable, prolonging their agony. Communities risk being ignored and forgotten due to the excuse that they are inaccessible. Similarly, officials risk their lives by venturing into inaccessible areas. Country-specific challenges are vast; for instance, Malak et al. (2020) found that the challenge faced by older people post-disasters was that they could not fetch drinking water in Bangladesh if the infrastructure were damaged, making it inaccessible. Furthermore, because

older people are less mobile, they cannot access healthcare facilities unless accompanied by young adults (Malak et al., 2020). Vulnerable people appear to be more affected than younger people. Their voices are then silenced, impacting community recovery (Okada et al., 2018). Thus, inaccessible areas must receive assistance post-disaster to reduce disaster victims' suffering and even fatalities. Moreover, during Zimbabwe's Cyclone Idai disaster in 2019, disaster management officials took five days to access the area, preventing critical information from being recorded (Chanza et al., 2020). Accessing inaccessible areas can be costly. This trend was common during the KZN flood disasters, where the road infrastructure would split into two, and the disaster affected communities would not be accessed (Jooste, 2022). Subsequently, it took days for some disaster victims to get help. Maybe the number of fatalities would be lower if some areas were accessible. In some cases, there was eventually access to inaccessible areas, even if it was only to retrieve the bodies of deceased individuals for accountability purposes and to provide closure to family members. The disaster impacts affect the people's human rights to access basic services (Jooste, 2022).

2.5.3. Misuse of donations/corruption

An issue of great concern in developing countries is the distribution of post-disaster relief, which often results in the misuse of relief material designated for marginalised and impoverished groups (Ahmad & Ma, 2020). In Senegal, for example, there were allegations of fraud as the disaster management project grew increasingly expensive and inadequate (Schaer et al., 2018). It becomes a concern when funds are misappropriated. Corruption in post-disaster activities can take many forms, including misappropriating funds or distributing relief materials to people who do not deserve them. In a separate study, Ringo (2018) in Tanzania also indicates that people thought that aid workers helped their friends first. Sadly, even political ideology meant they favoured their acquaintances in Tanzania; some people were disadvantaged and thus received less assistance than others (Ringo, 2018). These unfortunate events appear to have occurred in several instances.

Sometimes, people steal disaster relief resources meant for vulnerable disaster victims. Even during the devastating 2022 KZN floods, there were concerns about the theft of the relief material (Molapo, 2022). However, the KZN Premier assured the citizens that the government had learned lessons from COVID-19, where some people stole billions of rands meant to deal with the pandemic, and that theft and rampant corruption would be intolerable (Molapo, 2022). In addition, there is favouritism where people

with access to disaster relief materials and donation distributors are prioritised, sometimes even at the expense of vulnerable groups. Given the setbacks in post-disaster recovery, Ahmad and Ma (2020) raise concerns about cash compensation, such as misappropriation and non-affected individuals benefiting. It means the donations are not secure, and there are no stricter safeguards to prevent such incidents. There may even be social unrest to demand assistance because their suffering will continue if the assistance is unsatisfactory. The affected community may also be hopeless because they know that reporting to authorities will not result in positive outcomes; instead, they may be victimised. Unfortunately, officials and individuals who unjustly receive relief materials may sell them for financial gain. The progress of some investigations is unclear since the relevant law enforcement authorities are aware of some of these concerns.

2.5.4. Poor governance systems

The governance system plays a role in effectively and efficiently implementing the post-disaster phase. The main challenge is the centralised governance system that the HFA and Sendai Framework advocate for (Malla et al., 2020). Indications show that poor governance systems make locals vulnerable to climate change (Odufunwa et al., 2012). In New Zealand, for example, the study found insufficient mechanisms for assessing and enforcing emergency planning for lifetime utilities (Huck et al., 2019). Furthermore, there is no proper plan for dealing with humanitarian organisations, resulting in unplanned and uncoordinated actions (Malesic, 2020). In India, the problem is the dispersion of data among various agencies based on their expertise. Furthermore, in some cases, the data is incomplete, inconsistent, or incorrect (Mohanty et al., 2020). During the 2021 floods in South Africa, stakeholders and role players disagreed on implementing post-disaster activities. These challenges may mean a lack of proper leadership and governance systems, resulting in unprofessional behaviour with no accountability. This situation impacts working relationships with stakeholders and role players. Relevant policies, procedures, and codes would assist in ensuring accountability.

The study by Douglas et al. (2008) highlights that an elderly woman lost everything in Mozambique because she could not remove her belongings in time, unlike her neighbours. The victim complained about a lack of appropriate assistance from the government and NGOs, citing that her only source of assistance was her family (Douglas et al., 2008). When there are poor government systems, the most vulnerable people may suffer the most. This happens when the government fails to provide adequate

tangible or intangible assistance to vulnerable disaster victims. Moreover, according to Odufunwa et al. (2012), poor building codes and enforcement standards make households and communities vulnerable to natural disasters. Specifically, Mavhura (2019) states that there is concern that the social impact of the dam's development ranges from loss of land and homes to a lack of compensation resources, relocation, resettlement, unrealistic due dates, a lack of planning, and restricted consultation on funding. In addition, Dube (2019) notes that many post-disaster construction and reconstruction projects in Zimbabwe have failed to reduce vulnerability. Poor housing construction was a major concern for the Senegal Relocation Project, and an improper sanitation system worsened the situation (Schaer et al., 2018). The study also indicates an insufficient rainwater drainage system, which explains why 'Cire Jaxaay' flooded in 2010, 2011, and 2012 (Schaer et al., 2018). The negative outcomes could be because municipal and government departments do not execute their duties as expected. People do whatever they want because they know they will not be held accountable for their failures. Therefore, people will likely become more vulnerable and suffer because of this.

Another view was that local governments in Nigeria cannot respond effectively to floods (Odufunwa et al., 2012). In amplification, Olowu (2010) stipulates that confusion and improper coordination are critical challenges during disasters in Nigeria when providing relief. There may be a limitation on the necessary work if no systems are in place. Municipal or government departments may be willing to do the job, but the scope of the work restricts their ability. Consistently, Odufunwa et al. (2012) elaborate that local authorities in Nigeria cannot enforce the law due to scarce human and financial resources, ineffective laws, and disaster response plans. Similarly, Ahadzie and Proverbs (2011) state that the main challenge in Ghana is its National Disaster Management. They are unable to implement other activities in their advisory capacity. Organisations can only advise people during a disaster since they lack the authority to enforce evacuation. Furthermore, risk management planning measures were lacking (Ahadzie & Proverbs, 2011). Thus, Ghana must create a comprehensive flood risk model (Ahadzie & Proverbs, 2011). Challenges experienced in Tanzania were that the officials took a long time to acquire information for assistance, delayed issuing relief materials to affected individuals, and the private sector and the Government worked in silos (Ringo, 2018). According to a Tanzanian study, the most significant challenges were delays in assisting flood victims' bureaucracy, inadequate funding, and insufficient coordination among relevant agencies (Ringo, 2018). The officials may not assist the disaster victims because the law prevents them from implementing other activities. Equally, the law must be balanced

to avoid abuse of power. The challenge may be that communities are unaware of the limitations and believe officials are incompetent. Platforms, such as workshops and meetings, can assist stakeholders and role players understand the challenges they encounter during the post-disaster phase.

2.5.5. Inadequate funding

Regarding funding, Rivera et al. (2020) identified two additional challenges post-disaster: financial constraints and political interference. The threats of risk financing include high relief and reconstruction costs, slow recovery rates, and political interference in post-disaster assistance allocation (Katolonge, 2019). The limited funding covers short-term relief rather than long-term community investment activities (Petrudi et al., 2019). There are indications that funding is one of the critical resources required post-disaster. Undesirably, it is seldom available and thus cannot meet basic needs. According to Mohanty et al. (2020), the challenge in India is the depletion of limited funding when building large structures. Furthermore, the St. George City Council provided self-mitigation funding to affected households outside the levee (Okada et al., 2018). However, there were concerns that the funds would not be sufficient to cover individual mitigation costs (Okada et al., 2018). The challenge in South Africa is that even service delivery funding is inadequate. As a result, when there is a disaster, the situation becomes worse.

Municipalities and government departments may be unable to budget because there should be adequate funding for post-disaster management activities. As a result, the planned projects may not be carried out. South Africa is a developing country, so the government is financially pressured and constrained to provide the necessary infrastructure to reduce disaster risks (Chagutah, 2009). Subsequently, the affected communities may take longer to recover because the disasters destroyed their livelihoods. It's rare for funds to be directly distributed to affected individuals. Social grant assistance or funeral costs are two indirect ways to allocate funding in South Africa. Thus, individuals cannot prioritise their needs and must wait for extended periods without guaranteed assistance. Some community projects are carried out for the benefit of everyone rather than individuals.

2.5.6. Lack of communication/working in silos

A lack of communication among various stakeholders and decision-makers is another post-disaster challenge, particularly during the recovery phase (Raju & van Niekerk, 2013). It harmed mutual trust

between the municipality and the community in St. George City; as a result, the levee project had a secondary effect as it inhibited access across residents' properties and damaged their gardens (Okada et al., 2018). Every department wants to shine in the aftermath of a disaster, sometimes at the expense of others. As a result, they fail to follow the protocol. Officials may sometimes want to protect their territories and thus work alone. Integrated coordination of role-players and activities is necessary to avoid working in silos (Van Niekerk, 2006). Correspondingly, Raju and van Niekerk (2013) indicate that municipal officials were concerned about departments working in silos. In contrast, China encourages internal capacity-building initiatives, such as establishing training centres and interaction among pilot project communities (Biedenkopf et al., 2017). Working in silos is not encouraged because working as a team has more benefits than working alone. Working together can ensure effective and efficient post-disaster activities implementation. It could encourage officials' and communities' collaboration. The current NGOs and civil society's critical expertise is sometimes overlooked (Raju & van Niekerk, 2013). The fact that stakeholders' treatment is not equal is a concern.

2.5.7. Lack of understanding/knowledge

Post-disaster challenges in Nepal are government representatives and elected officials' lack of knowledge and preparedness (Malla et al., 2020). In Nepal, the post-disaster governance knowledge challenge is that the role of disaster response is implemented by security forces and the chief district officer, resulting in overburdened district officers (Malla et al., 2020). In addition, there may be a trend that change, unwillingness to learn, and reluctance to read can cause a lack of understanding and knowledge. An uninformed person will thus lack the necessary skills to implement post-disaster activities effectively and efficiently. Furthermore, communities unfamiliar with disaster management may be disadvantaged because they will not know what to do post-disaster. Based on these weaknesses, Raju and van Niekerk (2013) discovered inadequate knowledge about the extent of the recovery process based on these weaknesses. Understanding must be improved through training and information dissemination (Malak et al., 2020). Therefore, acquiring post-disaster management knowledge should be encouraged. It can take various formal and informal forms among communities and officials.

2.5.8. Early warning system and communication system

Fundamentally, Chagutah (2009) advances that while there is monitoring and extreme weather conditions forecasting improvement due to technological advancements, regrettably, local

communication mechanisms and raising awareness remain lacking. In Bangladesh, for example, despite adequate early warning systems, there is still a visible lack of understanding of early warning systems, resulting in reduced timely compliance (Malak et al., 2020). Officials must ensure that all stakeholders and players understand early warning systems. It does not end with issuing an early warning system; timely reactions must occur. Additionally, some Zimbabweans believed that Cyclone Idai's warnings were delayed and that the severity was not specified (Chanza et al., 2020). The early warning system must be accurate and reliable. However, there are differing viewpoints because some survivors felt the warning was adequate; however, the communities did not take the warnings seriously (Chanza et al., 2020). Similarly, Mozambique has developed early warning systems for floods and cyclones, improving communication (Manuel, 2007). Studies establish that communities respond poorly to the early warning system (Chagutah, 2009). Another factor that compromised Zimbabwe's response to Cyclone Idai was the failure of communication systems; there was no electricity or network signal, and thus, phones were inoperable (Chanza et al., 2020). As a result, delays may give the impression that people's lives were not prioritised. Determining the source of the early warning system is imperative because it may influence how the community responds to the warning. Moreover, there can be an insinuation that the timing of the early warning is significant. Warnings issued during the day may be more effective than those issued at night because people act faster due to increased visibility and the availability of resources. Additionally, the presence of stakeholders and role players may improve the coordination, as more officials are on duty during the day than at night.

2.6. Implemented projects

Researchers have reported that countries employ various strategies to address the challenges (Hegger et al., 2020). These challenges require a multisectoral approach because a single department cannot manage them. Various adaptation measures, such as regular access to weather information, agricultural expansion, varying cropping patterns, credit services, and migration to towns to diversify income sources, have been implemented in some communities to improve capacities to secure livelihoods after floods (Jasmed et al., 2020). To some extent, European countries have ongoing efforts to implement effective flood risk governance and improve societal resilience to address the increasing risks caused by urbanisation and climate change (Hegger et al., 2020). In some cases, participants are concerned that the lack of disaster risk management training in implementing recovery measures contributes to the poor response (Raju & van Niekerk, 2013).

Principally, Ringo (2018) details that some strategies African countries have implemented include establishing institutional and governance structures. Nonetheless, some communities do not sit back and wait for the government to assist them; instead, they take the initiative to address their challenges. Residents in Alejo have built boats to rescue communities in danger during floods due to the government's lack of assistance (Douglas et al., 2008). Some structural post-flood measures implemented in Mozambique include the maintenance of storage dams and dykes, roads, bridges, and buildings (Manuel, 2007). The country has not constructed a big water storage dam. The non-structural activities entailed mapping flood-prone areas throughout the Country (Manuel, 2007), particularly in the Limpopo and Buri river basins. Communities and officials are responsible for implementing projects. Some projects are tangible, while others are not. However, the continued occurrence of floods does not indicate that the projects in place are effective or efficient enough. Thus, there should be a comprehensive approach. It's possible to come up with solutions that can be either temporary or permanent. Nevertheless, it is significant for the projects to improve people's lives. The projects must provide excellent value for money., therefore, undergo a cost-benefit analysis before implementation.

2.6.1. Evacuation and relocation

Evacuation planning is a significant aspect of resilience (Borowski and Stathopoulos, 2019). Even though some children survived in Alejo, some mothers tragically lost their lives (Douglas et al., 2008). Similarly, during Cyclone Idai in Zimbabwe, some mothers with children were evacuated (Chanza et al., 2020). Regarding evacuation after disasters, communities may take matters into their own hands. For instance, they evacuate from disaster-prone areas and relocate to safer locations to save lives and property. There are also efforts to assist those who are unable to help themselves. Unfortunately, sometimes, it is too late because people would have lost their lives and possessions. Another strategy in Accra is temporarily relocating and staying with friends or family (Douglas et al., 2008). In addition, areas are shared with people who lack access to safe spaces (Douglas et al., 2008). Similarly, during floods in Kampala, Uganda, communities make impromptu efforts to survive and protect their possessions (Douglas et al., 2008). Relocation can be to nearby lodges and public facilities such as mosques and churches, while most people build barriers to channel water away from their homes (Douglas et al., 2008). However, evacuation should be considered a temporary rather than a permanent solution because, most of the time, the living conditions in evacuation centres are not conducive. In some cases, though, these centres end up being a permanent arrangement. On the contrary, some people

have refused to be evacuated, putting themselves at risk of injuries and losing their lives. The most common reason is apprehension about losing their possessions. Another observation is that sometimes, communities do not want to leave their ancestors' graves.

2.6.2. Migration and relocation

Migration is another post-disaster adaptation strategy (Malak et al., 2020). Chiefly, Einali et al. (2019) suggest that rebuilding a village in a new location opens opportunities for residents to improve their livelihoods by providing access to the environment, employment, and public services. Specifically, Malak et al. (2020) say that older people migrate to cities where their children live. Additionally, Nguimalet (2018) elaborates that individuals in developing countries immigrate to find work, but climate change impacts also cause communities to migrate. The primary goal of migration appears to be to seek better opportunities and be with their families. Therefore, emigrants are concerned about disaster risks. On the other hand, officials believe relocation is a long-term solution for protecting lives and property (Abaya et al., 2019). Therefore, when implementing relocation, considering people's viewpoints is essential. This approach is important because relocation is a long-term solution. According to some studies, relocation brings about beneficial improvements such as better housing conditions, improved infrastructure and public facilities, and new economic opportunities (Einali et al., 2019). Redesigned cities can positively impact around 70% of humanity's ecological footprint (Odufunwa et al., 2012). These new sites reduce communities' vulnerability while improving their living conditions (Einali et al., 2019). Specifically, Malak et al. (2020) note that countries such as Turkey, Sri Lanka, and India must establish new towns or repopulate existing ones because of disasters or development. Furthermore, direct benefits can result in secondary advantages such as improved nutrition, increased employment opportunities, and increased Growth Domestic Product (Mavhura, 2019). Van Ogtrop et al. (2005) highlight that relocation is less expensive in the United States than in countries constantly responding to flood disasters. In India, Einali et al. (2019) found it less costly in severely damaged villages. In addition, Lumbroso et al. (2008) indicate that living on higher ground is a solution proposed in Mozambique, which is prone to flood disasters. Disaster management officials must assess disaster risks to ensure the relocation site is not in a disaster-prone area.

In contrast, Reham et al. (2019) state that the challenge in developing countries is the prohibitive cost of structural flood management methods. As explained in the Abaya et al. (2019) study, the difficulty

with relocation is that communities are not always keen to relocate. Furthermore, Abaya et al. (2019) clarify that the main reason for community resistance to relocation is the inability to cultivate land near riverbanks. Additionally, Einali et al. (2019) highlight that moving from agricultural lands and neighbouring villages is another challenge in building villages. According to Lumbroso et al. (2008), the dilemma with flood plains is that they are a source of fertile farmland, so most rural communities prefer to work on and live near them. For example, people working as tea estate workers in Badulla rural village needed critical amenities such as water and electricity and to be closer to schools, hospitals, and their livelihood as conditions for agreeing to relocate (Sridarran et al., 2018). Furthermore, there are costs associated with demolishing and constructing old and new houses, which are especially burdensome for the elderly and unemployed (Okada et al., 2018). Large-scale settlements are criticised for providing only short-term relief and failing to meet the community's long-term expectations (Sridarran et al., 2018).

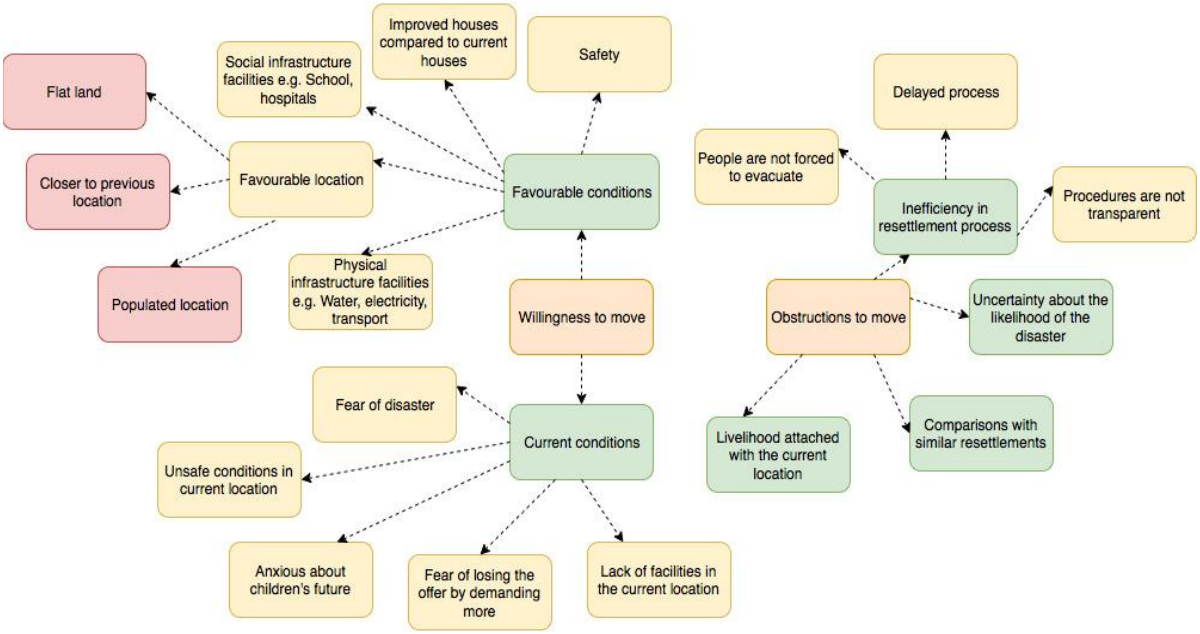

Figure 2.4: Required favourable conditions for relocation (Sridarran et al., 2018)

People may relocate permanently or temporarily from disaster-prone areas. Relocation is one method of disaster prevention and mitigation, but as previously stated, it is fraught with difficulties. Aside from the negative aspects of relocation, there are some advantages. When people relocate, safeguards must be in place so they do not return to the disaster-prone area. In addition, the disaster-prone area must be protected to ensure no one else lives there. If new people move in, it becomes a never-ending cycle in

which they constantly require rescue. Government officials must also be aware of people who intentionally stay in disaster-prone areas to be prioritised over deserving individuals, particularly vulnerable groups. From the above, in urban areas, the relocation leaders are government and municipal officials. In rural areas, that task is for the traditional leaders. They need to identify suitable land to relocate the people and provide necessary resources, particularly for basic needs.

2.6.3. Indigenous measures

Indigenous knowledge is a collection of knowledge and skills passed down through generations, enabling people to benefit from their natural environment (Ringo et al., 2016). Indigenous knowledge is also crucial during the response period (Pertiwi et al., 2019). According to Ringo et al. (2016), communities' most common indigenous knowledge is steep slope control techniques, indigenous vegetation planting, and evacuating from flooded areas by running, swimming, and climbing trees and roofs. In Bangladesh, one of the mitigation strategies was for participants in Focus Group discussions to plant dense trees to reduce damage to houses (Malak et al., 2020). Indigenous measures can take many forms and come from various sectors. Some of these measures are tangible, while others are intangible. The communities use these indigenous knowledge techniques to save their lives. Another distinguishing feature of these techniques is that they are typically free of charge, though they can sometimes be risky because communities do not rely on expert knowledge. Indigenous knowledge can also help to present information in a language that end users understand for better implementation.

Additional activities implemented in Africa include preparedness awareness campaigns, urban planning, and discouraging residents from residing in flood-prone areas (Ringo, 2018). In Accra, Ghana, people used stones, blankets, and furniture to construct high places to store the most critical assets safely, and they placed belongings at the top of the wardrobe and in small spaces between the ceiling and roof. In Maputo, Mozambique, the communities put their belongings on bricks and slept on them (Douglas et al., 2008). In contrast, Douglas et al. (2008) state that there was a collective effort to open drainage systems by constructing barriers to rechannelling water away from doorsteps in Kampala, Uganda. Similarly, in Zimbabwe, some individuals have formed channels at the back of their houses to allow water entering their homes to flow out quickly (Douglas et al., 2008). Another indigenous strategy was seen during the Cyclone Idai Disaster in Zimbabwe when people used rope to rescue people who could not cross the river (Chanza et al., 2020). Additionally, temporary plank bridges were constructed

between houses in wetlands to allow residents to move around during floods (Douglas et al., 2008). In individual households, the cloth pieces keep water from entering the house and are removed once the water level has dropped, allowing the water inside to drain (Douglas et al., 2008). Moreover, Douglas et al. (2008) divulge that communities in Lagos, Nigeria, scoop water from houses with buckets. Wealthy individuals, in contrast, use mechanical water pumps to drain water from their homes (Douglas et al., 2008). The Nairobi rich community, according to Douglas et al. (2008), employs the following strategies:

i. Removing water from the house to avoid property damage and loss.

ii. Putting children on tables and moving them to nearby unaffected houses.

iii. Before floods, construct channels to divert water from the house.

iv. Using waterproof recycled materials to cover the houses.

v. Using sandbags to keep water from overflowing.

Sometimes, communities do not trust their governments and consequently decide to assist themselves. Communities' efforts to help disaster victims, particularly vulnerable groups, are sometimes unsuccessful. It demonstrates that experts must also play a role in assisting disaster victims to save lives. The information above shows that community members' responses vary further based on affordability. Thus, some community members have better measures depending on their financial situation. On the other hand, they may wish to supplement governments' efforts in ensuring effective and efficient post-disaster activities. It is imperative to nurture the latter since it will likely become second nature and be passed down to the next generation. Moreover, the community may rely on the government to successfully implement indigenous knowledge. Consequently, when constructing disaster mitigation strategies, officials must consider indigenous knowledge. As safe solutions are required to avoid disaster recurrences, indigenous knowledge should be balanced with technical or scientific expertise. The disadvantage is that indigenous knowledge may be inaccurate because it is mainly based on memories and secondary information rather than written information.

2.6.4. Using networks

In terms of using networks, Chanza et al. (2020) demonstrate that communities in Australia assisted one another during floods. Similarly, residents in Taiwan mobilised their families, assigned responsibilities, and distributed disaster relief materials (Pertiwi et al., 2019). Moreover, Pertiwi et al. (2019) believe that some individuals conduct an impact assessment while others perform an emergency repair. The

Rusitu Valley community in Chimanimani, Zimbabwe, responded to disasters using their local networks, values, resources, and ingenuity (Chanza et al., 2020). This approach is partly attributable to the fact that, unlike in urban areas, there is constant communication with local leaders in rural areas (Chanza et al., 2020). On the other hand, in Zimbabwe, Manyema (2006) discovered that countries with low human development indexes are more vulnerable to rising natural and man-made disasters. Rural Zimbabwe communities depend on natural resources, which are affected when environmental conditions deteriorate or access is limited (Gwimbi, 2009). A study conducted in Poland supports this view and found that rural residents value social cohesion more than urban communities (Chanza et al., 2020). In another argument, Ahmad and Ma (2020) indicate that community identification and participation are critical for effective governance. Communities respond to disasters by leveraging their local networks, values, resources, and creativity. Community members establish and develop different roles and responsibilities among each other. However, implementing social cohesion in urban areas may experience hindrances than in rural areas. Essentially, Malesic (2020) indicates that communities vulnerable to seasonal disasters have developed a subculture that allows for a rapid shift of traditional roles into disaster roles. One of the reasons is that rural communities have constant communication, which is uncommon in urban areas. Since networks consist of people with different skills, knowledge, and experiences, they have more influence than individual approaches. There may be numerous impediments that prevent networks from being used. For instance, during the national state of the COVID-19 pandemic, there were restrictions on using social networks. These restrictions can, therefore, happen in the future with other disasters.

2.6.5. Funding

The World Bank has funded initiatives such as household reinsurance pools in Peru and disaster insurance in the Pacific Islands (Katongole, 2020). Kenyans have also benefited from World Bank cash transfers (Katongole, 2020). On the other hand, Ahmad and Ma (2020) report on post-flood disaster funding opportunities that include remuneration in Afghanistan, cash assistance in Mozambique, cash distribution for shelters in Ingushetia, cash allocation in Bamand in Iran, and a cash receipt program in West Bank. It is worth noting that international funding has assisted various African countries, particularly rural communities. Many countries have been affected by disasters but may not have received World Bank funding. Moreover, potential beneficiaries must abide by the criteria to avoid delaying the requested assistance post-disaster. Intrinsically, Ahmad and Ma (2020) conclude that cash

assistance is essential for satisfying the affected population's needs because they can spend money on what they require. The World Bank committed $50 billion to various recovery and reconstruction efforts following the 2010 Pakistan floods, while the Asian Development Bank and the Asian Pacific Disaster Response Fund contributed $2 billion and $3 billion, respectively (Gomez-Cunya et al., 2019). There was a similar approach in Pakistan, where the Government implemented the Watan Card Program to help flood victims reconstruct their houses (Kurosaki, 2017). The Government made payments in instalments of Rs. 100,000 (Kurosaki, 2017). The project helped, though there was insufficient money in other months. Cash assistance is necessary for meeting the needs of affected people because it allows them to spend their money on what is most important to them. However, considering the increasing number of disasters, it is unclear whether this funding has been adequate. The possible challenge may be misappropriating the funds. Perhaps distributing vouchers with strict terms and conditions would be effective. Countries such as Somalia, Zimbabwe, and Mozambique have opted for seed distribution as an alternative to cash, primarily to assist rural farming communities (Ahmad & Ma, 2020).

2.6.6. Disaster management structures

Crucially, Reham et al. (2019) reveal that Pakistan established disaster management structures. Since disaster management officials cannot coordinate all disaster management activities following a disaster, having management structures and supporting local officials is critical (Raju & van Niekerk, 2013). Practically, Zuma et al. (2012) state that the South African floods of 2010/11 provided an opportunity to establish disaster management structures and strengthen local officials. The established disaster management structures play a significant role in coordinating various people. There is some hope that the existing structures have considered community inclusion somehow. Some structures, however, can only be community structures and would play a significant role when officials cannot assist them, mainly when there are unforeseen or uncontrollable circumstances. The need to suggest reconsidering flood management could indicate that current measures are ineffective.

2.7. Identified opportunities

The post-disaster discourse focuses on the perception that disasters can be a catalyst, a window of opportunity for changes that benefit the environment (Davidsson, 2020). Disasters can be opportunities for social change, reducing inequality, and promoting sustainable development (Davidsson, 2020). In addition to the mentioned opportunities, Einali et al. (2019) identify the government's strategy for house

reconstruction. Establishing links between villagers and external disaster response agencies is one noted opportunity post-disaster in Zimbabwe (Chanza et al., 2020). Floods in Nigeria can be managed by collaborating with local communities, NGOs, volunteers, and donors (Odufunwa et al., 2012). Disasters appear to provide opportunities as well as harm. There are both structural and non-structural opportunities. Collaboration among the various stakeholders and role players is one of the common opportunities. Officials need to include vulnerable groups when implementing post-disaster strategies. There was also the opportunity to establish disaster management advisory forums and volunteer units in South Africa (Zuma et al., 2012). Disasters can lead to collaboration among stakeholders and communities. Indeed, having some structures in place could help address the concern of working in silos. Vulnerability and priorities in different areas result in varying identified opportunities. Officials should implement these opportunities as they align with community needs based on their experiences.

2.8. Long-term strategies

Despite some successes, there is concern that disaster response measures are erratic and temporary, focusing on humanitarian assistance rather than long-term resilience building (Katongole, 2020). Moreover, solutions to flood risk are rarely long-term (Mai et al., 2020). The emphasis is on short-term recovery goals, thus overlooking long-term ones (Raju & van Niekerk, 2013). Social networks, education, the number of working-age individuals in households, and having multiple income sources are all factors that contributed to higher adaptive capacity in Pakistan's Khyber Pakhtunkhwa Province (Shah et al., 2018). As a result, the proposed strategies may include financial assistance, appropriate land, technical assistance, and the construction of new homes.

2.8.1. Accurate planning

Researchers, disaster management officials, and planners all agree that proper planning and accurate data can result in disaster-proof infrastructure and the protection of vulnerable groups (Weinstein et al., 2019). A major contribution of Mohanty et al. (2020) is their proposal to create a central database that contains information about the topography, land use activities, historical flood levels and rainfall, drainage records, and flood mitigation measures. Social networks can help mitigate the vulnerability of others, such as family members, next of kin, neighbours, and friends (Malak et al., 2020). One of the recommendations by Zuma et al. (2012) is for South African Municipalities to implement early warning systems. Accurate planning entails developing a plan of action to build resilience and adaptive capacity

in vulnerable communities. Effective and efficient post-disaster management requires proper planning. Since planning is not an individual's responsibility, there must be coordination. It would also assist in considering different strategies because one might not work since post-disaster activities are complex and require different stakeholders and role players.

2.8.2. Development

Importantly, Davidsson (2020) argues that development can have positive and negative impacts. Vitally, Mavhura (2019) elaborates that dam construction, for example, can positively or negatively impact communities directly and indirectly. Explicitly, according to Mavhura (2019), dam construction benefits range from irrigation, hydropower generation, industrial and domestic water supply, tourism, fishing, and job creation. Development should ensure that the assisted community is better positioned after the disaster. It is essential to monitor the development of new infrastructure during the implementation process so that it is more resilient than before. Importantly, Gimenez-Maranges et al. (2020) state that developing a sustainable drainage system is one of the strategies that can assist in responding to flood management challenges. It is also called stormwater control measures (Gimenez-Maranges et al., 2020). There would be an improvement in development because the situation of the affected individuals' buildings would change. It would imply that the new infrastructure would also be concerned about future disasters. Therefore, implementing development projects should avoid prolonged suffering and emerging disasters.

2.8.3. Financial support

Notably, Katongole (2020) reveals that disaster-risk financing is among the components of long-term resilience. Chiefly, Mohanty et al. (2020) recommend allocating funds and "bifurcation" to develop the necessary structural and non-structural infrastructure to improve flood risk management. Similarly, Malak et al. (2020) advocate for storing savings securely to use the money in a disaster situation. Governments employ a variety of instruments, such as collective reserves and conservancies, risk transfer, post-disaster budget reallocations, contingent credit, and post-disaster lending. These ensure financial resilience infrastructure and assist people's livelihoods to deal with and recover from disasters quickly (Katongole, 2020). For instance, Malak et al. (2020) demonstrate that increasing financial security is necessary to downgrade older people's vulnerability and increase their resilience. The enrolment must be in a suitable social safety-net program (Malak et al., 2020). Various funding options

assist in rapidly implementing critical long-term, non-structural, and structural measures. It facilitates the quick implementation of post-disaster measures.

On the other hand, one of the implemented measures is using flood insurance to reduce flood losses, as the funds can assist affected people in recovering (Mohanty et al., 2020). Numerous factors influence insurance adaptation option selection and willingness to pay for rainfall insurance products (Senapati, 2020). Senapati (2020) discovered that the government needs to educate farmers about accepting and paying more for insurance. Insurance is one way to ensure that funds are available post-disaster. However, during disasters, most people rely on government assistance because they do not have insurance since it seems too expensive. The high cost might be because insurance companies think disasters are high-risk, looking at their nature, frequency, and magnitude. Whatever the source, adequate funding must be available to guarantee the necessary post-disaster steps. The concern is that some insurance sources are unreliable and compromise beneficiaries post-disasters.

2.8.4. Coordination/collaboration

Communication and coordination among multiple stakeholders aim to avoid duplication of duties while achieving the desired results, such as programs that help communities reclaim their livelihoods (Dube, 2019). In the same vein, one of Mohanty et al. (2020) study recommendations is to improve coordination and partnerships among agencies and local communities following a disaster. Similarly, Malesic (2020) claims that the 2010 floods improved because national civil protection staff worked in a formalised, broadened operational setting where various stakeholders collaborated. As a result, the operation was a success (Malesic, 2020). An extensive range of stakeholders and role players are involved in coordination. To put it differently, Hossain (2013) emphasises the significance of community participation in problem-solving and establishing socioeconomic conditions. Pertiwi et al. (2019) agree that communities are essential during response times since they are familiar with their surroundings, people, and infrastructure. Proper coordination is likely to guarantee the satisfaction of those affected, particularly in the post-disaster period. Certain critical strategies are intangible; others are tangible. Collaboration also has more benefits than working in silos. However, complex and severe challenges obstruct various stakeholders' collaboration (Musavengane & Simatele, 2016b).

2.8.5. Reserves

There is also a requirement for reserves. As a result, affected communities stockpiled essential items such as food and water and prepared for disasters independently (Kato & Endo, 2019). In addition, older adults in Bangladesh suggested that potable water and dry food be safely stored before the disaster to cope with the incident (Malak et al., 2020). Therefore, vulnerable groups strongly recommend having water and food reserves. Furthermore, the reserves will assist the community in need because they will easily access essential resources. In a disaster's aftermath, resources are typically insufficient to assist all affected individuals, including vulnerable groups. Therefore, having more reserves would be necessary to cover the broader scope. There should be an appropriate process to ensure that the reserves are of high quality and have not expired. Having reserves also indicates proper planning for the officials and the community. Maintaining reserves in communities can be challenging due to the risk of destruction if disasters occur unless they are elsewhere. A different location is a luxury for vulnerable groups, who are typically poor. Therefore, they are unlikely to have additional resources in various locations. In contrast, the government and local governments can have on-site and off-site reserves to tap into when required.

2.9. Summary and identifying the gaps in knowledge

The summary and identified knowledge gaps are detailed below. Categorically, Olowu (2010) indicates that natural and man-made disasters are unavoidable in life; thus, no state is immune to disasters. In some instances, the impacts of these extreme events include devastating physical, environmental, and socioeconomic effects, as well as disruption of documented development plans (Islam et al., 2020). Floods cause high fatalities and low economies in developing countries compared to developed countries (Van Ogtrop et al., 2005). Some communities have taken steps against these to protect themselves and cope with floods because of their awareness of settling in flood-prone areas (Adedeji et al., 2012). Floods are sometimes unavoidable and have devastating consequences, particularly in developing countries. They must, however, be managed because it is impossible to avoid flood risks (Tingsanchali, 2012). Subsequently, community members must implement flood-prevention measures. Pointedly, Van Ogtrop et al. (2005) suggest considering highly variable environmental conditions when developing countries' flood management strategies. It is necessary to relocate disaster victims from flood-affected areas after a disaster (Khalid & Shafiai, 2015). Post-disaster resettlement and reconstruction are varied and complex due to various factors (Danquah et al., 2014). Moreover, Deria

et al. (2020) make a comparable observation, stating that the recovery process following a disaster typically takes several decades.

Indicatively, Khalid and Shafiai (2015) suggest that different stakeholders must work together and understand each other. Various stakeholders involved in disaster management provide experience, resources, and technical skills to local communities (Ringo, 2018). The main challenge is that many countries manage floods with a crisis-driven approach (Mai et al., 2020). The problem in cities is that they have a high percentage of impervious areas, which results in ineffective rainfall infiltration into the soil (Tingsanchali, 2012). Subsequently, there is a lot of rain and flooding, which causes much damage (Tingsanchali, 2012). Thus, inadequate land use management may result in poorly managed water runoff and floods. In summary, Qin et al. (2019) argue that understanding survivors' needs is critical to ensuring the equitable distribution of relief and efficient recovery. The government response is the most difficult challenge for governments worldwide (Malla et al., 2020). It is also significant to know how responsible individuals allocate resources (Qin et al., 2019). Addressing issues of gender and social vulnerability can effectively reduce disaster risk and provide adequate resilience (Mukuna, 2015). Floods and flood damage necessitate a comprehensive policy focus in South Africa and other countries. Therefore, according to Reham et al. (2019), the responses must be socioeconomically and environmentally achievable. Flood coping strategies can be economic, technological, structural, or social (Adedeji et al., 2012). One of the most highly recommended approaches to flood disasters is community involvement.

According to Rivera et al. (2020), disaster risk management and planning are essential, primarily in Sub-Saharan Africa, because the perception is that there are limited resources to devote to disaster management activities in other sections of the world. Therefore, disaster risk management and planning are critical in Sub-Saharan Africa. According to Ziervogel et al. (2005), climate change threatens South Africa's infrastructure, ecosystem services, water resources, health, food security, and biodiversity. Furthermore, since South Africa is a developing country with high inequality, disasters negatively affect national development (Ziervogel et al., 2014). The effects can hinder the national plan to improve the communities' living conditions. Ascribed to the flood’s frequency and severity in South Africa and other countries, better protection is required (Du Plesis et al., 1999).

As a result, developing tools for assessing community resilience is critical (Sharifi, 2016). Moreover, Sharifi (2016) adds that measuring community resilience benefits disaster risk reduction and the community's coping ability and adaptation to various natural and man-made disasters. For instance, Harte et al. (2009) used the qualitative method to determine community fire hazard resilience in Cape Town's Imizamo Yethu Informal Settlement. Broadly, Jones and Tanner (2016) establish that measuring resilience has focused on using "objective" frameworks and indicator selection methods. These are observable socioeconomic variables, such as the social capital and income of households (Jones & Tanner, 2016). Specifically, Yoon and Keng (2013) believe resilience measurement is critical for developing disaster-resilient communities and implementing disaster risk reduction strategies. Like other studies, Suidemeier and Jaboyedoff (2013) also show less agreement on measuring resilience. Moreover, Sharifi (2016) reveals that a few researchers have investigated community resilience assessment, summarising existing tools and their structure. Measuring disaster resilience is essential for successful climate change adaptation and disaster risk management (Marzi et al., 2019). This will assist in ensuring that there are effective and efficient post-disaster activities.

Community institutions encouraging community participation and individual resourcefulness were the primary factors that enabled the community to be resilient (Harte et al., 2009; Cai et al., 2018). Therefore, different methods can be implemented and measured in South Africa and other countries. Strikingly, King et al. (2019) point out that research has not concentrated on the experiences of vulnerable groups in disasters. Specifically, Sharifi (2016) indicates that the Resilience Assessment Framework's disadvantage is that no specific variables and characteristics are in place for community measurement purposes. Based on this point of view, seemingly disseminating accurate, timely, and widely known information about a disaster can help mitigate its impact in disaster-prone areas (Malak et al., 2020). For example, Lumbroso et al. (2008) indicate that promoting education programs on floods can result in fewer fatalities and damage caused by floods. The disasters are dynamic, so the learning culture must never stop for communities and officials. Unambiguously, De Almedia et al. (2020) conclude that it is necessary to implement appropriate disaster risk indicators, accuracy, and validation models for further discussion of indicators. Since they are more familiar with and understand the challenges, the individuals affected by disasters should also propose post-disaster measures.

2.10. Specific gaps

Researchers and academics have documented factors that promote or hinder the achievement of SDGs (Ozili, 2022). However, few studies indicate the global progress and challenges linked to sustainable development and sustainability (Seddiky et al., 2020). Many commentators and scholars, such as Kunguma (2022) and Rosselló et al. (2020), opined that amidst the escalating incidence of natural disasters, there appears to be a noticeable dearth of awareness and accessible information on preparing and responding to such events. Bang et al. (2019) further highlight that post-disaster management research has received insufficient attention with no standardised mechanism to deal with post-disaster effectively and efficiently. Schwarz et al. (2021) believe that in some instances, post-disaster information is on a temporal and ad-hoc basis, resulting in temporal structures, inadequate resources, and inaccessible areas. More evidence of the possible inadequate knowledge was demonstrated by how officials responded to flooding disasters in KZN Provincial in April and May 2022, Eastern Cape Provincial in May 2023 and Northern Cape Provincial in June to July 2023. New thinking is required to address upcoming disaster incidents (O'Brien et al., 2010). For dealing with future disaster incidents, it is necessary to adopt new ideas (O'Brien et al., 2010). Hewitt (2013) asserts that considering its challenges, South Africa needs to find ways to increase its resilience to extreme weather events. Rezende et al. (2020) argue that other social vulnerability indicators require emphasis, while the flood index needs improvement.

As a result, many researchers and scholars, such as Korstanje and Korstanje (2019), Davis-Reddy and Hilgart (2021), Cartwright (2022) and Singh et al. (2023), commented on these encounters. Their observations ranged from weak coordination among various disaster management structures, interoperability challenges of disaster databases, inconsistencies in disaster reporting, working in silos, community exclusion, and emotional and psychological effects. Subsequently, they recommended approaches, including diversification and expansion of measures to deal with post-flood disaster encountered obstacles. However, the use of institutional structures that integrate capacity building and resilience to address post-flood disaster situations is absent from various works of literature. In light of these gaps, this research analysed factors contributing to the post-flood disaster adaptive capacity and resilience of vulnerable urban and rural communities and appropriate systems in South Africa to achieve sustainable development**.**

CHAPTER 3
METHODOLOGY

3.1. Introduction

Chapter 3 discusses the methodology, which outlines the activities and processes to respond to the research questions. The study is empirical; thus, based on personal experience and observation of the outside world (Punch, 2004). The first section deals with philosophical worldviews and presents the philosophical approaches that influenced this study's data collection and analysis approach. The second section is the research design, which entails a detailed description of the research sites, target population, sampling procedure, data collection instruments, data analysis, and data presentation. The validity and reliability of the methodology are discussed in the third section. Finally, the fourth section concerns methodological reflection, which addresses the researcher's experiences and identified challenges. The researcher personally collected data using documents, interviews, focus group interviews, questionnaires, and observation analysis. This empirical research utilised both quantitative and qualitative methodologies.

3.2. Research approach/philosophy

The research could not position the researcher in positivism or constructivism philosophies. The study thus adopted the pragmatism paradigm, whereby concepts are relevant when they support action (Saunders et al., 2015). Moreover, Morgan (2014) specifies that pragmatism concerns the most meaningful goals and appropriate methods. Pragmatism was selected because there were no boundaries; the researcher had complete freedom regarding research methods, techniques, and procedures. Participants in the study included disaster management officials from all spheres of government, members of the HGDM Advisory Forum, Ncakubana, and Mphela Township Ward councillors, and Ncakubana and Mphela Township community members. These people were affected by or responded to disasters between the 2008/09 and 2017/18 financial years. Thus, they have different realities and numerous differences, such as areas, roles, and experiences. Therefore, their facts are diverse and crucial to the study. Secondary data sources included reports, journal articles, Acts, theses, and policies. The researcher adopted the notion of intersubjectivity, which provides for objective and subjective dimensions (Parvaiz et al., 2016). This pragmatism study aimed to contribute to effective post-disaster management by influencing policy change as flood disasters continue to occur despite policies in place.

The goal was to devise workable solutions for flood victims and disaster management officials by considering various perspectives.

Pragmatism philosophy is concerned with practicality (Morgan, 2014). Therefore, pragmatism was relevant in resolving the practical research problem because it focuses on what works. The study called for practical solutions in the form of implementable measures that could ensure that vulnerable groups have the adaptive capacity to be disaster resilient. The researcher is a pragmatist because she focuses on the individual and practical solutions when trying to achieve a goal. Moreover, the research is objective because variables including home language, age, gender, religion, marital status, and government sphere are objective. However, some questions were subjective, such as asking participants if they were satisfied with the municipality's response or asking disaster management officials about their views of resource adequacy. All participants must provide measures to establish communities that are adaptable and resilient. These solutions will assist vulnerable groups since the focus is on improving the status quo and helping vulnerable groups develop adaptive capacity and disaster resilience. Some questions gave participants the option of selecting measurables. As a pragmatist, the researcher believes that reality is a process or an experience. The researcher also believes in learning through trial and error, in which the norms of the respective society determine the values; thus, they differ. According to pragmatists, individuals interpret the real world differently (Parvaiz et al., 2016). Individuals see the world differently, resulting in differing perspectives on the same research topic (Henning et al., 2009). Pragmatist research on disaster management offers diverse perspectives, even from disaster victims, who are affected differently due to background, severity of effects, and resource availability. Disaster management officials have a wide range of experiences from different spheres, provinces, or even types of municipalities. They thus have different views on post-disaster matters.

There was little subjectivity regarding axiology, which can affect the research (Parvaiz et al., 2016). According to the research, some participants did not fully utilise the available post-disaster resources. Additionally, some community members were waiting for the government to intervene and were not proactive in implementing measures despite previous experience. On the other hand, some disaster management officials and Advisory Forum members did not consider alternative methods of obtaining adequate resources because their primary focus was on the funding available in their respective organisations and resource stockpiling. To reduce perceived resource demand, some DMCs did not even

have a Memorandum of Understanding (MOU) with neighbouring organisations. However, to remain neutral and objective, the researcher recorded the participants' views without being judgmental and did not persuade them to change their minds because it was their reality. The researcher was careful to remain impartial and was not biased.

3.3. Research design

Knowing about different realities required integrating research methods because the study followed a pragmatism philosophy. A mixed methods approach is primarily pragmatic (Creswell, 2009; Morgan, 2014; Creswell & Creswell, 2018). This mixed methods study employs qualitative and quantitative data collection procedures (Creswell, 2009; Van Ness et al., 2011; Fakis et al., 2014; Creswell & Creswell, 2018). In mixed methods research, there is a combination of quantitative and qualitative research benefits (Morgan, 2014; Parvaiz et al., 2016). Therefore, there was a blending of the strengths of qualitative and quantitative research while minimising the weaknesses of each approach (McNabb, 2017). Similarly, Creswell (2009) agrees that mixed methods research incorporates qualitative and quantitative strengths, resulting in more insights. Therefore, mixed methods assisted in better understanding the research data findings in response to the research questions. The study used concurrent mixed-method inquiry strategies. So, the study collected and implemented data concurrently, allowing the researcher to avoid returning to the field several times. This approach efficiently allows for the blending of measurable and immeasurable variables. As a result, some points of view would not dominate over others. The study included both open-ended and closed-ended questions.

The qualitative data quantitative analysis did not replace qualitative analysis but complemented it (Fakis et al., 2014). The quantitative data would supplement the research participants' views on institutional arrangements, challenges, disaster types, ongoing projects, and long-term measures. Moreover, the study used quantitative methods to assess the participants' specific and measurable aspects, such as gender, age, and marital status. The quantitative methods used in the study assisted in describing some measurable aspects of disaster management officials and victims. Quantitative data, such as graphs and tables, is presented descriptively to support the numerical or measurable data. The study had open-ended questions for qualitative data in which participants expressed their interpretations. There was also a consultation of many documents to acquire information that deals with research questions.

3.4. Description of research sites

Chapter 1 introduced the background of the study, which is the issue explored. It also presented thematically South Africa's government, comprising national, provincial, and local levels (Constitution of the Republic of South Africa (RSA), 1996). According to the Constitution, each sphere of government has a political and administrative arm. The National Government is responsible for making laws, establishing policies for the country, and providing the services it is responsible for. It entails three branches: legislative, executive, and judicial. As shown in Figure 3.1, the country has nine provinces. The Provincial Government enacts provincial laws. The local sphere is the one closest to the community. Thus, local governments and ward councillors are accountable for providing essential services such as electricity and water and promoting a healthy and safe environment. The three types of municipalities are A, B, and C (Municipal Systems Act, 2000). Category A is a Metropolitan, B is a District, and C is a Local Municipality. The study focused on all three categories. The following section details the research sites, focusing on social, economic, and environmental aspects.

While Mphela Township and Ncakubana community study areas were urban and rural, the 10-year trend analysis of the NDMC annual reports from 2007/08 to 2017/18 indicated that they were more vulnerable to disasters than others. There were repeated disasters such as floods, droughts and storms and extensive damage to buildings, roads, bridges, and utility infrastructure (Savage, 2018; KZN PDMC, 2018). Additionally, the province is home to vulnerable communities, and these disasters have exacerbated the existing social vulnerabilities, such as poverty, inequality, and access to resources (KZN PDMC, 2018). Furthermore, according to reports, previous disasters have severely impacted both areas when floods occur in KZN Province. In addition, the description of the study sites assisted the researcher in establishing that the sites had the appropriate population for the selected type of research. The characteristics of the research sites are relevant to the study; they would significantly contribute to answering the research questions. As shown in Figure 3.1, the researcher gathered data for this study across the country. As for community participants, data collection was at two research sites, Mphela Township and Ncakubana. The researcher believed that the two community-chosen areas in one province would be sufficient to reach a research conclusion.

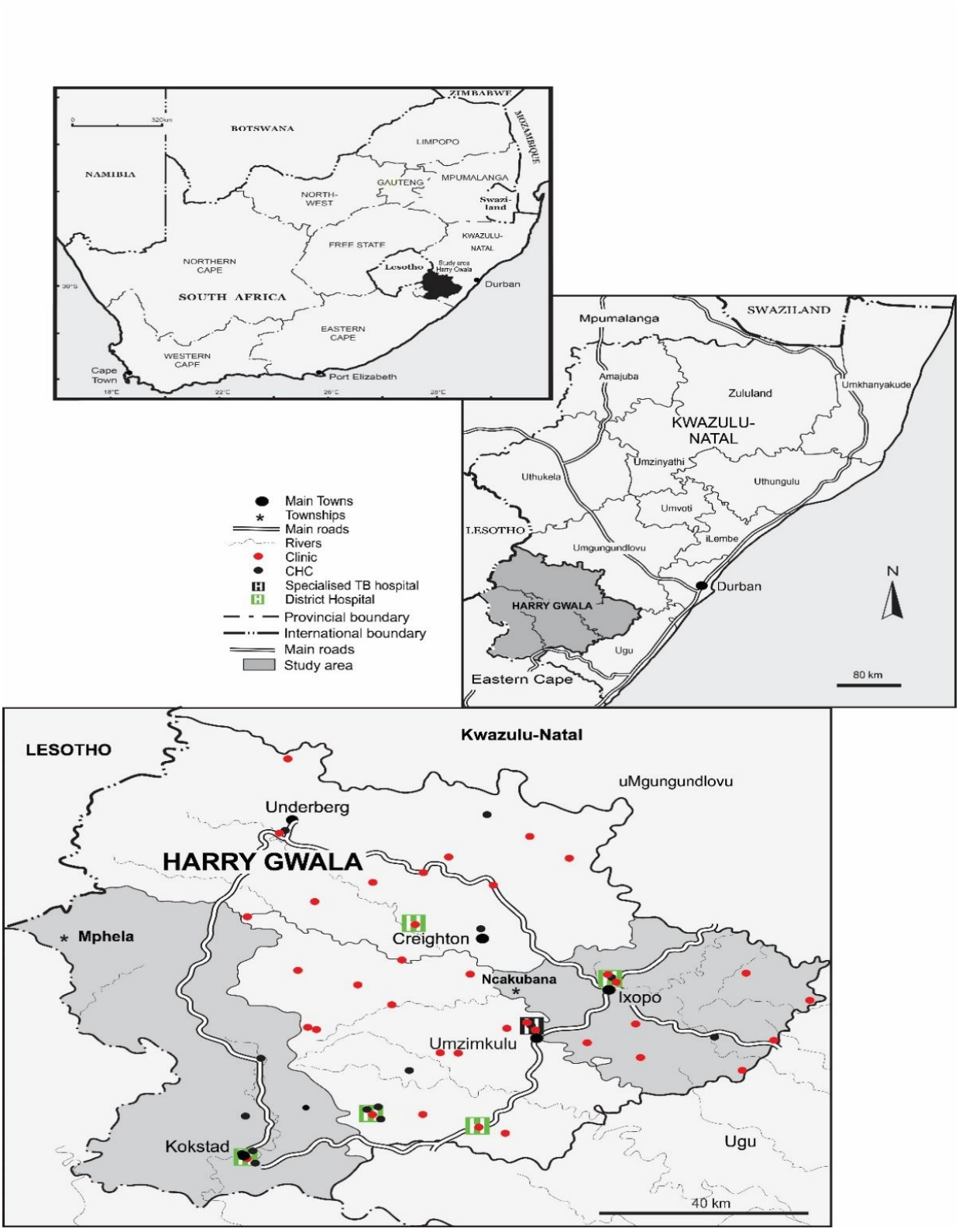

Figure 3.1: Location of study sites: Greater Kokstad and Ubuhlebezwe LMs.
Source: Cartography Unit, University of the Witwatersrand (2022)

3.4.1. Mphela Township

According to the Greater Kokstad 2019/20 IDP Review (2019), Mphela Township is in Greater Kokstad LM, in Kokstad Town. Furthermore, Greater Kokstad 2019/20 IDP Review (2019) indicates that Greater Kokstad Municipality covers 2680m^2 and has ten wards. Mphela Township is part of Ward 9 but mostly part of Ward 5, so data collection was in Ward 5. A total of 42.2% have women as heads of households, and 44% of the population is employed (Media Monitoring Africa, 2019). Mphela Township was established in 1993. Mphela is an IsiXhosa word for "end." Accordingly, Mphela Township is located at the end of Kokstad Town, and it thus means "the end of the town." Shackfires frequently affect Marikana, a nearby informal settlement. Other neighbouring areas include Area 5, Shayamoya Location, Area 6, and Riverview. Due to its proximity to the Eastern Cape Province and Lesotho borders, the area is also home to AmaXhosa-speaking individuals and Lesotho nationals. The Municipality's primary economic sectors are agriculture, trade, community services, transportation, manufacturing, and electricity (Greater Kokstad 2019/20 IDP Review, 2019). As a result, the area has become an economic hub and a focal point for many communities' job opportunities and government services. The Umzinhlava River runs through the neighbourhood, which can pose a flood risk. The dominant vegetation type in the area is grassland (Greater Kokstad 2019/20 IDP Review, 2019).

Most houses were built with mud and corrugated iron. The Municipality’s DMC planned to relocate some families to temporary housing a few kilometres from the research site. There was a hostel next to the temporary houses. The Department of Human Settlements project consisted of 14 houses in Phase 1. For Phase 2 of the project, the Municipality constructed 81 temporary dwellings. A problem with relocation to the new temporary houses is the prohibition of animals (Field Survey, April - July 2021). There are only a few primary and secondary schools in the ward, with other schools in neighbouring wards. Nonqubela Primary, Kokstad Public Primary, Shayamoya High, and Carmel Commess High are among the schools. For waste collection, the Municipality collects garbage every Wednesday. However, a dumping site about 1 km away from the dwellings may pose health and environmental risks to the community. There is also illegal dumping and waste next to the houses. Construction companies also illegally dump construction debris along the river. Some households have livestock, while others cultivate crops. However, it was unclear whether the livelihoods assisted the communities in getting income. Among the NGOs in the area is Sivile Ithembalethu Centre and Skills and Training Centre. The transect walk at the research site helped identify additional risks and challenges. The proximity of the

houses makes households and individuals more vulnerable to disasters. Furthermore, there is no space for emergency vehicles to pass during an emergency or disaster-related callout. Some houses are built along the riverbank, endangering the residents. In addition, some houses are constructed on top of stormwater drainage systems.

3.4.2. Ncakubana

Ncakubana is in the Ixopo area. Ixopo is the administrative centre for many surrounding villages (Ubuhlebezwe IDP Review, 2019). Ubuhlebezwe LM is in southern KZN between Pietermaritzburg and Kokstad, next to the Eastern Cape Province (Ubuhlebezwe IDP Review, 2019). Ncakubana is a predominantly rural area near Creighton, administered by the Madikane Tribal Authority (Ubuhlebezwe LM IDP, 2019). Of interest, natural vegetation, large agricultural plantations, and traditional authority land distinguish the Municipality (Ubuhlebezwe IDP Review, 2019). Per Harry Gwala District Municipality 2017/18- 2021/22 IDP (2019), Ubuhlebezwe LM has 12 wards. Ncakubana falls under Ward 1. Only 27.8% of the community works, and approximately 50% of women are household heads (Media Monitoring Africa, 2019). Moreover, the Ubuhlebezwe LM 2019/20 IDP (2019) indicates that agriculture, manufacturing, utilities, mining, business services, construction, and tourism are the Municipality's economic drivers. Most households have livestock, primarily chickens and cows. Some families have planted crops and beans for their consumption. There was no clear indication of whether the communities financially benefited from the agricultural activities.

Houses are far from one another due to the vast distance between them. Most dwellings are mud houses with few brick houses. Additionally, the area contains homes constructed under the Reconstruction and Development Programme (RDP) (Field Survey, April - July 2021). The gravel roads ran through the Village, and the main road, far from the houses, was tar. People fetch water from afar because there is no water in the area; thus, vulnerable groups also walk to get water. Since there is no electricity in the area, some residents cook with firewood. It means that even the most vulnerable families must travel a long distance to gather wood. Furthermore, children attend schools far from home and must walk long distances to access education. Ncakubana is along the uMzimkhulu River. Subsequently, the research site was perceived to be usually cold and windy due to the nearby river (Field Survey, April - July 2021). Moreover, mountains surround the research site, exacerbating natural hazards (Letsie & Grab, 2015).

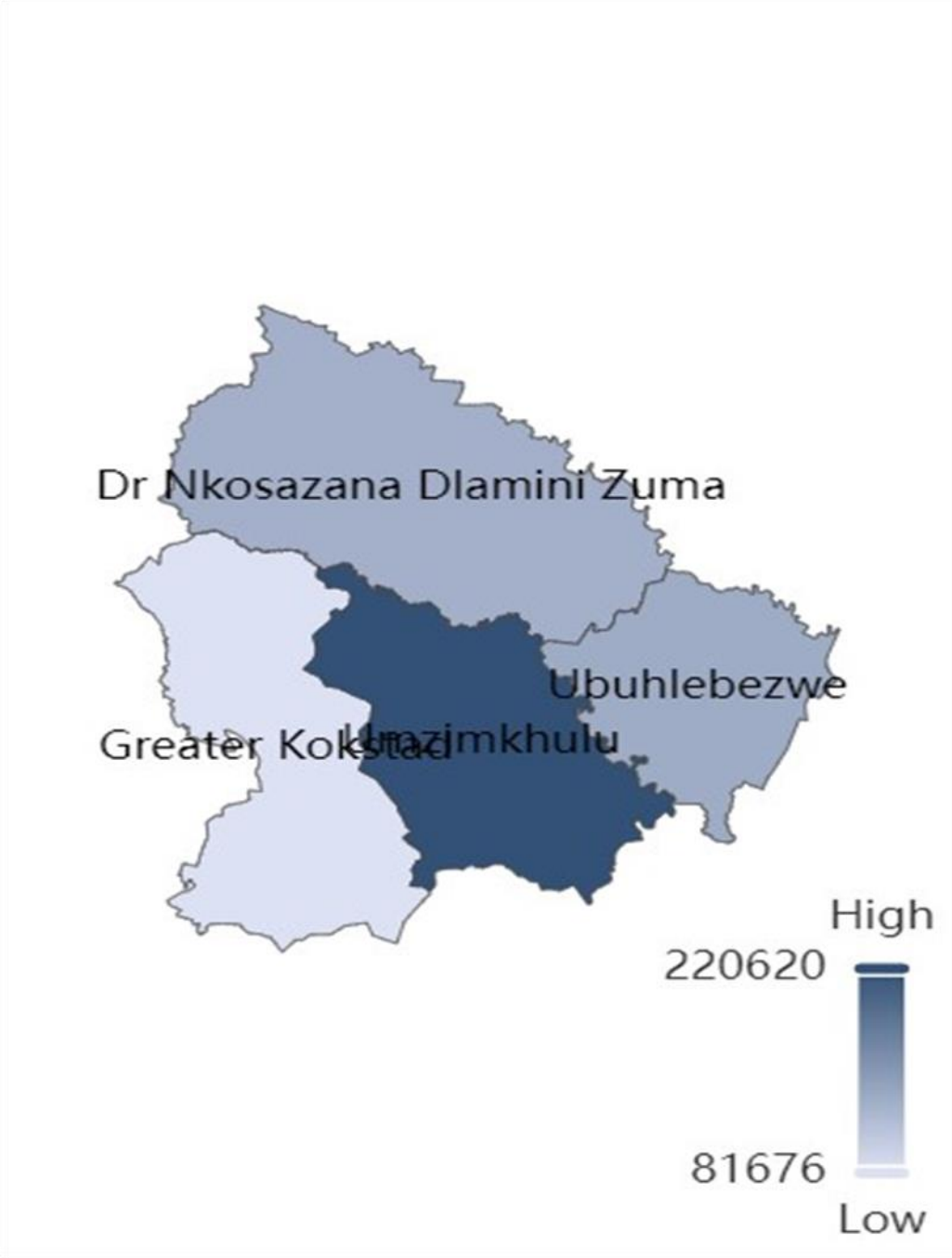

Figure 3.2: Population density of Harry Gwala DM (Stats SA, 2023)

Population density can entail the total population, the number of households, and the portion of the female population (Letsie & Grab, 2015). As per Figure 3.2, the total population was 563893, whereas the population size per local municipality was Umzimkhulu, 220620, Ubuhlebezwe, 133032, Dr Nkosazana Dlamini Zuma, 128565, and Greater Kokstad, 81676 (Stats SA, 2023).

Figures 3.3 and 3.4 show the population group frequency in Ubuhlebezwe and Greater Kokstad LMs.

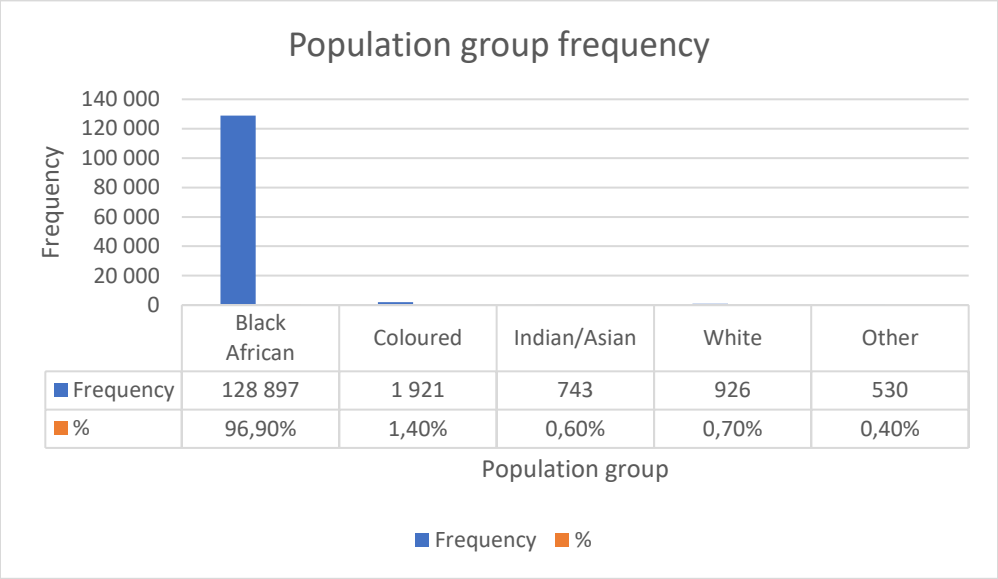

Figure 3.3: Ubublebezwe LM Population growth frequency (Stats SA, 2023)

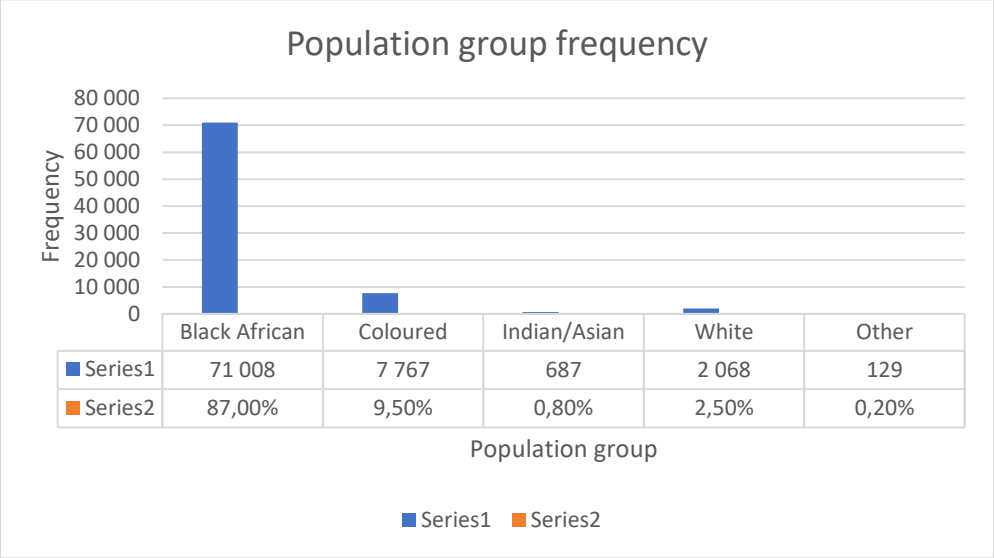

Figure 3.4: Greater Kokstad LM Population growth frequency (Stats SA, 2023)

3.5. Study population and sampling procedure

During the research planning phase, it should be clear who should be selected and why (Boynton, 2005). Specifically, Bezuidenhout et al. (2014) indicate that a population is an entire group, people, or entities known as artefacts that provide the required information. The subsection that follows describes the characteristics of the study's subjects and the reasons for their selection.

3.5.1. Characteristics of subjects of the study

The study determined the sample frame, which entailed the population elements from which the sample was drawn (Etikan & Babatope, 2019). A sampling frame lists the individuals or objects constituting the representative sample (Rossouw, 2003; Bezuidenhout et al., 2014). Therefore, the target population consisted of the following elements:

a) Heads of Centres (HoCs), managers, PDMCs officials, and Municipal DMCs (MDMCs): These officials are knowledgeable about the post-disaster phase, which is the primary focus of the research topic, as they could have been involved in some activities.

b) Greater Kokstad and Ubuhlebezwe Ward Councillors: There was a belief that councillors are well-versed in community strategies, disaster-related challenges, opportunities, post-disaster activities, and communities, specifically vulnerable groups. They are ostensibly the conduit between communities and the government.

c) Ubuhlebezwe and Mphela Township Community Leaders: The Greater Kokstad and Ubuhlebezwe LMs disaster management officials asked leaders to assist with logistics during fieldwork, participate in the study, and organise focus groups in each municipality.

d) Members of the HGDM Advisory Forum: Various stakeholders would have implemented capacity-building and resilience projects in the study areas following disasters. In addition, they assisted with implementing the Acts and Framework used to deal with floods post-disaster activities and knew available resources, previous disasters, challenges, and opportunities.

e) Mphela Township and Ncakubana Communities: They responded and shared their financial, human, cultural, social, political, environmental, technological, organisational, institutional, and infrastructure capitals analysis to determine their level of disaster capacity and resilience.

3.5.2. Sampling of supporting stakeholders

Due to time constraints, inadequate human and financial resources, and large population size, sampling was used (Etikan & Babatope, 2019). Using the sample was cost-effective, and it would be impossible to research the entire population of interest (Andrande, 2020). The sampling approach impacted the study's scale, not its quality. As the two main sampling designs, the study implemented non-probability or non-random and probability or random sampling methods (Burger & Silima, 2006; Bezuidenhout et al., 2014).

3.5.2.1. Non-probability sampling

Non-probability sampling is commonly used in qualitative research (Burger & Silima, 2006; Merriam & Tisdell, 2016), as the research needs an in-depth description and understanding. Furthermore, Burger and Silima (2006) suggest that non-random sampling is more appropriate, cost-effective, and less complicated. In contrast, Bezuidenhout et al. (2014) point out that the limitation is that the non-random sampling study's results cannot be extrapolated to a larger population. The study employed purposive and snowball sampling methods, as described below.

a) Purposive sampling

Chapter 1 introduced the background of the study, which is the issue explored and presented the thematic purposive sampling of selected individuals who had experienced a central phenomenon, namely flood disasters (Creswell, 2009). Purposive sampling assisted in capitalising on expert knowledge that would contribute specific information (Suri, 2011). The purposive sample makes the estimates biased (Singh & Masuku, 2014). The sample initially comprised nine disaster management officials, six HGDM Advisory Forum members, and two ward councillors. Purposive sampling reduced the time and costs of drawing a sample (Rossouw, 2003). The study population elements and typical characteristics were present in the purposive samples.

b) Snowballing Sampling

The study's sample size of disaster management officials was initially nine PDMC officials. This number was too small to make a definitive research conclusion; thus, the research required a larger sample size. Hence, there were eventually 34 disaster management officials in the study. Conclusions from samples can represent the population (Andrande, 2020). Inappropriate sample size may result in erroneous conclusions (Singh & Masuku, 2014). The smaller sample would have insufficient statistical power to answer the research questions and are thus statistically non-significant and not beneficial (Andrande, 2020). When the sample is too small, it becomes unscientific and unethical (Andrande, 2020). In addition, a very small sample size will be unable to identify key effects or associations, or the estimate may be imprecise (Singh & Masuku, 2014). On the other hand, a large sample size may result in complex and inaccurate results (Singh & Masuku, 2014; Andrande, 2020). Large sample sizes lead to narrower confidence intervals, resulting in more reliable conclusions (De Winter, 2013). Furthermore, a large sample size will be costly (Singh & Masuku, 2014). N=x5 is the small sample size

(De Winter, 2013). The research found that nine disaster management officials were relatively low, though above five since the number of disaster management officials in the country is far more than five. The low number would have resulted in inaccurate patterns or results.

Snowballing selection was done because prospective interviewees had information relevant to the study, not because it was convenient (Yin, 2011). The snowball sampling resulted from the researcher learning about other potential interviewees from the interviews with DMCs officials. As a result, the lead was pursued, and the newly approached interviewees identified the new potential interviewees (Yin, 2011) who met the study's criteria for research interest. The snowball grew when there was a request for additional participants (Merriam & Tisdell, 2016). The researcher asked for multiple referrals from some respondents to ensure they were not breaking the chain (Burger & Silima, 2006). The snowball sample was helpful because identifying the population of disaster management officials was not easy (Rossouw, 2003). Finding disaster management officials to participate was challenging because not all are responsible for post-disaster activities. Besides, obtaining the contact information of some disaster management officials proved difficult because some officials were not in the NDMC database. Also, knowing all practising disaster management officials in the country was infeasible. The total snowball sample included 27 respondents from three spheres of government.

3.5.2.2. Probability sampling

For probability sampling, there was an equal chance for individuals or social artefacts to be included in the population (Rossouw, 2003; Bezuidenhout et al., 2014; Creswell & Creswell, 2018). The participant is equally likely to be selected (Singh & Masuku, 2014). Therefore, Burger and Silima (2006) agree that if all members get an equal opportunity to be selected from a sample, the sample will represent the selected population. Thus, the population element is selected sequentially (Etikan & Babatope, 2019). In summary, Rossouw (2003), Burger and Silima (2006) and Merriam et al. (2016) elaborate on the fact that with probability sampling, the results of the chosen sample can be extrapolated to the entire population. Random sampling strengthens the credibility of a large sample (Creswell, 2007; Suri, 2011). The advantages of using probability sampling included no biases in case selection because the method was random and systematic. The study utilised a systematic random sample, as discussed below.

a) Systematic random sampling

The research randomly selected Mphela Township and Ncakubana community members in a predetermined sampling method and administered them with questionnaires. The first element selection was random, and then every x number of households was determined. The study employed systematic random sampling to choose cases in an orderly manner by selecting the n^{th} case from a population. As a result, the element was chosen randomly using a sampling interval. In instances where dwellings were not systemically clustered or arranged in rows, the survey followed major roads and small paths, rivers, and streams. Subsequently, a systematic pattern was established and implemented during the fieldwork to ensure that execution was effective and efficient, as there were no house numbers. Drawing 10% of a population sample is the convention and thus serves as a rule of thumb (De Vos, 1998). Due to time and resource limitations, the researcher could not include everyone in the study, so she calculated a 10% margin of error to obtain a smaller sample. Random sampling ensured the selection of everyone, allowing the sample to generalise to the larger population (Burger & Silima, 2006; Creswell, 2009). A total of 35 randomly sampled participants were from Mphela Township and Ncakubana study areas. The sample selected was evenly distributed across the population (Etikan & Babatope, 2019).

To select and confirm the number of participating households in the research survey, the researcher conducted a transect walk with disaster management officials and community members in the study areas. They helped with the areas' boundaries. The boundaries entailed landmarks such as rivers, roads, schools, community centres, and halls. Thus, the research identified and determined various sections and boundaries for the research. The study used the statistical census data in Section 3.4 to determine the number of community members to interview for a survey. The two study areas, as indicated above, were Mphela Township and Ncakubana. The total population of the research sites was 3289 people. It is the sum of the total numbers in the research sites of the communities' study wards, which is 1523 + 1766 = 3289. Since it was impossible to include everyone, the research implemented the SMART methodology formula to calculate the total sample size. The justification for choosing the method was that it was simple and the selection method was easy (Etikan & Babatope, 2019). Thus, the sample size and houses were chosen using the following formula:

a) Determined sample size based on the margin of error X study population

b) Calculated the Sample Interval (SI) to obtain the Basic Sampling Unit (BSU)

c) Starting with number 1, the randomly selected number was the first BSU in the survey area.

d) To choose a BSU, add the SI to the first BSU.

e) The above criteria were applied to subsequent Households (HHs).

The different years were based on the available/ accessible information. Mphela and Ncakubana are in different Municipalities and wards.

Mphela Township Community Sampling:

The 2016 census prescribes that the total population of the Greater Kokstad municipal area is 76753 people (Greater Kokstad LM, 2019). Since Mphela Township is in Kokstad, the population of Kokstad was calculated. The population of Kokstad was 25373 people (Greater Kokstad LM, 2018). Mphela Township is in Greater Kokstad LM Ward 5. There are approximately 1523 households in the ward (Media Monitoring Africa, 2019). The ward had a population of 4049, 52% females and 48% males (Statistics South Africa Community Survey, 2016). As there is no specific population data for Mphela Township, the Ward 5 population was used. The systematic random sampling for Mphela Township is:

Step 1: Determined the sample size: the margin of error X study population

10% X 1523= 152.3

Step 2: SI = Total number of BSU in the population/ sample size = 1523/ 152 = 10

Step 3: The number 2 was chosen at random.

Step 4: Since 2 was randomly selected, 2 was then the first BSU in the sample

Step 5: Chose the second BSU; 2 (randomly selected household) + 10 (SI)= 12

Step 6: The process was repeated until all elements were met, as shown in Table 3.4 below.

Ncakubana Community sampling:

The 2016 census prescribes that the total population of Ubuhlebezwe Municipality is 118346 people (Ubuhlebezwe LM, 2019). Ncakubana is in Ixopo, with approximately 12500 people (Ubuhlebezwe LM, 2019). The estimated ward population is 7694, 52% females and 48% males (Statistics South Africa Community Survey, 2016). Ncakubana is in Ward 1, with approximately 1766 households (Media Monitoring Africa, 2019). Since there is no precise population information for Ncakubana, the Ward 1 population was used. The systematic random sampling for Ncakubana is as follows:

Step 1: Calculated the sample size: the margin of error X study population

10% x 1766 = 176.6

Step 2: SI= Total number of BSU in the population/ sample size

SI= 1766/ 177= 10

Step 3: The number 2 was chosen at random.

Step 4: Since 2 was randomly selected, 2 was then the first BSU in the sample

Step 5: Chose the second BSU; 2(randomly selected household) + 10 (SI)= 12

Step 6: The process was repeated until all elements were met, as seen in Table 3.1 below.

Table 3.1: Systematic Random Sampling: Mphela Township and Ncakubana Communities

HH Rank	Calculations	Total	HH Number
1st household	2	2	2
2nd household	2+10	12	12
3rd household	12+10	22	22
4th household	22+10	32	32
5th household	32+10	42	42
6th household	42+10	52	52
7th household	52+10	62	62
8th household	62+10	82	82
9th household	72+10	82	82
10th household	*Etc.*	*Etc.*	*Etc.*
16th household	142+10	152	152
19th household	172+10	182	182

As a result, Mphela Township's systematic sample was the 16th household, as the area's 10% sample was 152.3. On the other hand, the systematic random sample for Ncakubana was the 19th household because the village's 10% sample was 176.6, putting it between the 18th and 19th households. As a result, questionnaires were distributed to 16 and 19 households in Mphela Township and Ncakubana, respectively. Then, the study took steps to include 10% of the sample, 35 households. The margin of error was determined by using the formula:

The margin of error =100/ √n,
100/ √35,
100/ √5.91,
0.169,
The margin of error was 16.9%

3.6. Data collection tools

Data collection tools' complexity, interpretation, design, and administration vary (Pandey & Pandey, 2015). Data collection tools differ, each with advantages and disadvantages (Pandey & Pandey, 2015).

Therefore, selecting the appropriate tools to address the pragmatist's research questions was vital. The study used various means to collect data based on their suitability for answering the research question. As a result, the study was strengthened using multiple data collection methods (Yin, 2011). Each research tool collected a specific type of data (Pandey & Pandey, 2015). Documents, interviews, focus group interviews, questionnaires, and observation analysis were all used to collect data, as discussed below. Selection of participants was based on expertise, skills, experience, exposure, and willingness to participate. These comprised disaster management officials (*n= 34*), the HGDM Advisory Forum (*n= 6*), councillors (*n= 2*), thirty-five (35) *(n =35*), systematically randomly sampled participants, and Community Focus Group members *(n =13*) were from the communities' study areas of Mphela Township and Ncakubana. Ninety people (*n=90*), in total, took part in the study. The study conducted the pilot study first. The researcher used various data collection methods.

3.6.1. Pilot study

According to De vos et al. (2017), the research must discuss the study's pre-testing procedures involved in the study. Five disaster management officials were requested to provide feedback on the data collection instruments. It was like the main study, though on a smaller scale (De vos et al., 2017). For the pilot study, a baseline survey helped determine the feasibility of the research process. The piloting assisted in deciding whether the chosen tools were appropriate for collecting a specific type of information (Pandey & Pandey, 2015). It provided an opportunity to assess the suitability of the sample frame, population variability, and data collection procedure (De vos et al., 2017). The piloting process offered a chance to determine whether the questions were relevant to the study's objectives. Hence, the pilot study verified the relevance of the questions. The pilot study also sought to establish whether potential participants understood the questions in the same way the researcher did. Thus, the ambiguous questions were corrected and changed. Through this process, the researcher also determined whether the time allocated for data collection was adequate. The pilot study assisted the researcher in fine-tuning and amending the process where necessary to ensure a successful main study (De vos et al., 2017). This process contributed to the study's effectiveness and success (De vos et al., 2017).

3.6.2. Analysis of documents

Documents were a valuable source of information (Henning, 2009). Sampling was not possible for secondary data collection (Mouton, 2006). Data from the documents came from various government

and non-government sources, including books, conference papers, journal articles, reports, newspapers, dissertations, national and provincial legislation, and policy documents (Mouton, 2006; Yi & Yang, 2014; Zonke & Matsiliza, 2015). The researcher also sent e-mail requests to NDMC, PDMCs, MDMCs, and other departments, such as the South African Weather Service and Statistics South Africa, seeking information unavailable on their websites. Moreover, the researcher analysed the NDMC 2008/09 to 2017/18 fiscal years, some HGDM, Kokstad and Ubuhlebezwe LMs Disaster Management Annual Reports, and IDPs to determine flood post-disaster challenges and implement community capacity building and resilient projects. The primary focus of the discussion was on the data source, its value, and its limitations. Table 3.2 critically analyses the documents and data considered in the study.

Table 3.2: Study data sources

Data source	Value	Limitations
a) Books	Experts in the field often write books and can provide more comprehensive and authoritative opinions than online sources.	Since books take a long time to publish, some information maybe outdated and not used.
b) Legislation and policies	*They entailed information that impacts communities and countries at large. *They are the formal legal documents used and thus have an element of binding to a certain extent if implemented accordingly.	*The policy analysis process was conceptualised differently in each country, with no standardisation. Thus, conducting analysis and comparison was sometimes tricky.
c) Theses	*There was diversity and comprehensive details regarding evaluating research topics in various countries and even within the same country. *Assisted in determining research gaps. * Published theses were easily accessible.	*Topic-specific and didn't address all of the current study's research questions. *Sometimes, the approaches and methodologies differed from those used in the study.
d) Research journals	* They enabled broad, diverse, and rapid quantitative and qualitative research exploration, resulting in more data. *Most were easily accessible online.	*Some only covered a specific minor aspect of the research study. *At times, the information was not detailed enough for proper analysis.
e) NDMC annual reports	Official incident reports were helpful for comparisons and trend analysis, establishing the national disaster management status quo and thus selecting the study areas.	*There was little information available regarding post-disaster activities. *Some information may be missing due to non-submission by DMCs.
f) Municipal Reports	*There was information and statistics about all Municipal Departments. *Assisted with a better understanding of municipal activities and challenges.	Reports combined the administrative report with the public information report, thus lacking critical, specific disaster management information.
g) Municipal IDPs	*The IDPs entailed Municipal planned projects and their budgets.	Usually, the data was general and not tailor-made to answer the

Data source	Value	Limitations
	*There was some information regarding the community's needs.	researcher's questions regarding post-disaster management projects.
h) Newspaper articles	*The newspaper articles contained updated information about a specific disaster incident post-disaster activity. *Some entailed various post-disaster needs, challenges, and recommendations.	The emphasis was primarily on relief measures and challenges raised by community members. This information could be biased against disaster management officials and organisations to gain public sympathy and thus more resources.
i) Primary data	* The researcher had complete control over the collected research data. *Data was usually up to date, as the collection was in real-time and accurate.	Collecting primary data from all participants is improbable because of its costly and time-consuming nature. Hence, there was the use of samples, not the entire population.

Source: Researcher's research notes

Reviewing documents was vital because it was the first step in determining and addressing gaps. Most documents could be accessed, making it convenient for the researcher (Rossouw, 2003; Creswell, 2009). Text and document analysis was simple; there was an avoidance of errors because of linkages with interactions between researchers and subjects (Mouton, 2006; Henning, 2009). The documents assisted in answering some of the research questions and helped to inform study design, methods, and fieldwork decisions (Chabalala, 2017). Documents, without a doubt, saved time and the expense of transcribing (Rossouw, 2003; Mouton, 2006). With documents, the information could be quickly recorded and transmitted. However, content analysis had limitations, such as the researcher's inability to control data collection errors when using documents (Mouton, 2006). Another disadvantage was that the researcher could only use the available information and not reconstruct the documents (Henning, 2009).

3.6.2. Interviews

Interviewing was the most common method of gathering data on the research topic. The question phrasing allowed the interviewees to express their views and concerns in depth. For this study, the researcher was the instrument used to collect face-to-face, telephonic, virtual, and e-mail interviews. There was an opportunity to probe further into all interviews, allowing interviewees to provide detailed responses. Importantly, the locations of the face-to-face interviews were free of distractions and convenient for participants. There were open-ended and closed interview questions (Creswell, 2009; Yin, 2011). Closed-ended questions, data collection, and analyses were simple (Creswell & Creswell, 2018). The open-ended general questions assisted interviewees in responding in various ways, sharing

their experiences and perspectives, and providing comprehensive responses (Creswell & Creswell, 2018; Dube, 2018). Open-ended questions dominated the interview schedules. As a result, the researcher could request that the issues be discussed in detail. Furthermore, the researcher could simultaneously follow up and clarify information (Rossouw, 2003). Since interviews were interactive, the researcher could elicit a specific response and probe further (Alshenqeeti, 2014). Another advantage was that interviews were less expensive than other data collection methods (Alshenqeeti, 2014).

The conducted interviews were with selected 34 disaster management officials and two Ward Councillors because they are ethically and methodologically appropriate for addressing disaster-related issues (Peng et al., 2013). The selection process was based on the participants' engagement in disaster management activities. They offered insight into the research questions, as expected. In the interview preparation phase, the study followed the steps recommended by Henning et al. (2009), which included designing the interview and selecting participants, ethical considerations, and conducting and recording the interview. The researcher contacted some research participants by phone to establish trust (Englander, 2012) and informed them about the interview topic (Rossouw, 2003). In support, Henning et al. (2009) agree that knowing the participants before the interview helps prepare. According to Dube (2018), this method was efficient and effective because all identified participants were sent interview questions via e-mail. Due to COVID-19 regulations and restrictions, most interviews were conducted over the phone, via e-mail, or Microsoft Teams. The interview questions prepared ahead of time were straightforward to ensure the collection of relevant information.

a) Interview schedule

The interview schedule for disaster management officials (See Appendix L) investigated the role of disaster management officials from three spheres of government involved in post-disaster activities from 2008/09 to the 2017/18 financial years. The schedule was divided into two sections, with 20 questions in total. Section A dealt with the demographics, the organisation's duration, and the area's most common disasters. The section ensured that the interviewees were well-versed in disaster management. Section B had a variety of features. The first part focused on the policies and legislation, checking their synergy, and establishing whether they are updated. There was also a focus on determining if there were flood-specific policies. The next step was identifying the difficulties encountered in implementing the Acts and legislation. Since disasters affect multiple areas, establishing

MOUs with neighbouring organisations was critical. Another section asked participants to describe the difficulties they faced following the disaster to determine whether there was adequate support from relevant sectors. Furthermore, determining the officials' skills aided in knowing their capabilities, as simply learning about their experience is insufficient. It was also crucial to know whether there were measures to address the challenges. The final section allowed participants to provide recommendations to assist vulnerable groups in developing disaster-resilient communities with adaptive capacity.

The structured interview schedule for Ncakubana and Mphela Township Ward Councillors (See Annexure M) focused on gathering data about the prevalent disaster incidents and the political office's role in dealing with disasters, particularly floods, in their wards. The interview schedule of the Ncakubana and Mphela Township Ward Councillors included two sections and 15 questions. Section A of the interview schedule provided the background information. Knowing the gender and having councillor experience were essential. Section B had several subsections, where the first set of questions asked about common disasters and their effects. Knowing whether disaster management matters were discussed and prioritised in council meetings was significant. In addition, the questions assisted in determining whether there was political support, which may result in resources being made available and appropriate post-disaster implementation. The other segment discussed the challenges that councillors face after a disaster to determine if the political challenges are the same as the administrative and community challenges. The last section ascertained recommendations to assist vulnerable groups in becoming disaster-resilient and adaptive, focusing on flood disasters.

a) Audio recorder

The researcher sought consent from the participants in the telephonic interviews to record the interview using the Call Recorder App. Using a recorder allowed the interviewer to pay attention, listen, and better record the responses later (Dube, 2018). Concurrently, during the telephone interviews, the researcher took notes to revisit or omit some questions during the analysis. The recorded information was then transcribed into the Word Document. The transcription occurred the same day or within four days after the interviews, which helped the researcher because she could still remember the collected data. In addition, since the smartphone has a controlled speed setting, the desired audio play speed was selected, allowing the researcher to record the responses at a suitable pace. The study also used direct quotations to illustrate specific findings (Rossouw, 2003).

3.6.3. Focus Group interviews

In brief, Boynton (2005), Creswell (2009), Alshenqeeti (2014), Creswell and Creswell (2018) define a focus group as discussions among a small group of participants for a specific purpose. The focus group supplemented traditional data collection methods, entailing interviews and questionnaires (Chabalala, 2017). This study planned Ncakubana and Mphela Township focus group interviews to validate the results of the interviews and questionnaires (Eighmy & Hall, 2012). The focus group results were compared with the interview and questionnaire results to check or confirm similarities or differences. This was done during COVID-19 Alert Level 1 as additional one-on-one data collection through interviews, and questionnaires were also collected during this period. Additionally, the focus group had the advantage of being efficient because it could interview multiple people simultaneously. For each focus group, the researcher considered the research purpose, objective, demographics, and required size criteria. These were vulnerable people from the study areas and ranged between 4 and 10 individuals. The focus group entailed the facilitator, participants, and moderator. There were six participants in Mphela Township and seven in Ncakubana.

More than a week before fieldwork, the researcher arranged a focus group in Mphela Township with a Greater Kokstad LM disaster management official. The process enabled the official to communicate with community leaders and thus arranged for the required participants to be available on the specified date and time. There were prior arrangements with the participants because they might have commitments and, therefore, be unavailable for the focus group interview. The meeting occurred at a neutral location, a school in the Ward. Furthermore, it was more convenient for the participants to walk to the venue, owing to the high cost of arranging public transportation. In addition, some participants would have hesitated to use public transport for safety reasons, primarily due to COVID-19 concerns. This approach was also advantageous because booking the vehicle and obtaining liability insurance would have posed a financial constraint for the researcher.

There was a focus group interview with Six (6) focus group members in Mphela Township. The study followed COVID-19 protocols to ensure participants' safety and ease their anxiety. The researcher disinfected the classroom and its furniture and sanitised everyone’s hands before entering the classroom, there was physical distancing, and everyone wore a mask, as shown in Figure 3.5 below. During the research, the disaster management official was granted permission to take photographs, as he needed

the pictures for his Portfolio of Evidence at work. It was also critical to ensure the participants were comfortable, as this was their first encounter with the researcher. The community leader officially opened the session and greeted everyone in attendance. He then introduced the Greater Kokstad LM disaster management official. Community members were familiar with the official because he sometimes responds to disaster incidents in Mphela Township. The disaster management official summarised the session's purpose and urged community members to answer the research question truthfully. After that, he introduced the researcher formally.

The researcher greeted everyone and thanked community members for their keenness to partake in the focus group interview as they put their other commitments on hold to attend the session. The research information sheet (See Annexure F) was circulated, read, and clarified to the participants before the start of the session. They were also issued consent forms to sign to agree to the stipulations of the study. Then, everyone in the classroom discussed and approved housekeeping rules, such as raising a hand before speaking, no answer being incorrect, and mutual respect for the duration of the session. The icebreaker activity involved participants introducing themselves and expressing their opinions on the session's relevance. This information from this activity was pivotal, as it assisted the researcher in establishing whether the participants understood the purpose of the session.

Figure 3. 5: Focus group interview in Mphela Township
Source: Fieldwork

Afterwards, the researcher asked questions from Annexure N, the focus group interview schedule. Interaction between the group members assisted in generating the data (Barbour & Kitzinger, 1999). During the focus group session, the Greater Kokstad LM DM Official was asked to translate some of the words from English to IsiXhosa and vice versa so that the researcher and participants could understand each other. The research participants recorded their responses on the interview schedule. During the focus group, the researcher also took interview notes (Do Amaral & dos Santos, 2018). After each question, the researcher summarised and captured the answers.

As a pragmatist, the researcher remained neutral and non-judgmental, allowing the participants to be free. Sometimes, the researcher asked clarifying follow-up questions in which the participants provided new information. Body language and gestures were also analysed and recorded by the researcher. The researcher encouraged all participants to speak during focus group interviews, avoiding dominant participants. Thus, all focus group participants were actively participating. Due to the interactive nature of the discussions, the session lasted about two hours. Attributable to the COVID-19 pandemic, arranging and conducting the focus group in Ncakubana was neither safe nor feasible, as houses were too far apart for people to walk to a communal area. However, some participants were asked focus group interview questions while administering community questionnaires. Therefore, although the approach did not meet all the focus group interview criteria, the responses to the focus group interviews were recorded. As recommended, all interview responses were recorded and transcribed (Rossouw, 2003; Creswell & Creswell, 2018). The researcher typed the responses into the Word Document to prepare for data analysis.

a) Focus Group Schedule

Before the session, the interview guide assisted in constructing the questions. The Focus Group interview schedule was semi-structured and open-ended, allowing in-depth discussion. The general questions were asked first, followed by more specific questions as the session progressed. The Focus Group Schedule (see Annexure N) acquired information from community members affected by floods in Ncakubana and Mphela Township between the 2008/09 and 2017/18 financial years. The Focus Group research schedule entailed four sections with 21 questions. Section A required background information, such as demographics and employment. It also inquired about the involvement of community structures in determining assets. Section B concentrated on disasters in the area,

information-sharing measures, and the prioritisation of vulnerable groups. Section C defined the level of preparedness regarding the acquired skills and knowledge. The focus was also on the Municipality's role during disasters. Similarly, there was an investigation into the recommendations. Finally, section D discussed additional information to help vulnerable groups be disaster-resilient and adaptive.

3.6.4. Questionnaires

The questionnaires were administered to Six HGDM Advisory Forum members via e-mail and telephone. Before data collection for e-mailed questionnaires, the researcher sent an e-mail to the Advisory Forum Members' sample, which served as an advance notice letter. The e-mail included a signed request letter, consent form, permission letter, ethics clearance, and questionnaire. In addition, the researcher had telephonic and one-on-one pre-contacts with identified respondents before an e-mail and one-on-one, which were both effective (De Leew, 2015). There was a follow-up e-mail with a signed request letter, consent form, permission letter, ethics clearance, and questionnaire to the sampled Advisory Forum Members and non-respondents (Creswell & Creswell, 2018).

Additionally, 35 one-on-one questionnaires were disseminated in communities. The questionnaires were distributed following strict COVID-19 protocols, including masks, physical distancing between the researcher and the participants, and constant sanitisation. A structured, one-on-one community questionnaire survey was conducted in a convenient, comfortable, and private location for the participants while also being safe from the COVID-19 pandemic. The interviewer used a questionnaire to ask the sampled participants questions at a specific time with detailed information (De Vos, 1998; Rossouw, 2003; Do Amaral et al., 2018; dos Santos, 2019). The response rate for one-on-one questionnaires was high (Rossouw, 2003). Questionnaires were more effective than other tools because they included immediate follow-up questions where necessary. The researcher also implemented a telephonic collection method to avoid prolonged physical contact in the field due to the COVID-19 pandemic. This method assisted the researcher in contacting people unavailable during the fieldwork. Thus, the study response rate increased during the follow-up phase (De Leew, 2015).

The questionnaires for this study were designed to collect qualitative data through open-ended questions and quantitative data via closed-ended questions. The questionnaire was significant because it allowed the participants to answer various questions, including descriptive questions about relationships

between variables and predictive relationships over a specific period (Creswell & Creswell, 2018). The strengths of the questionnaires were that they could be generalised to large populations if the proper sampling design was used (Mouton, 2006). Questionnaires were also selected because gathering public views, preferences, habits, and demographics was easy, quick, and low-cost. They saved time and money during the data collection phase (Zhou & Wang, 2015). Another advantage was that the researcher primarily created them. Closed-ended questions were the easiest to answer, record, and analyse because they had specific answers, and participants chose the appropriate response (Rossouw, 2003). The disadvantage was the excessive cost of printing and dissemination arrangements. Another disadvantage was a lack of depth; participants' perspectives were not always adequately indicated because they were closed questions (Mouton, 2006). The other limitation was that closed-ended questions could not address complex matters (Rossouw, 2003). On the other hand, open-ended questions were helpful when detailed information and certainty about the question posed were required (Rossouw, 2003). Additional notes were written on questionnaires during the fieldwork and later transcribed for analysis. Then, the responses were coded and analysed.

i. Questionnaire surveys

The HGDM questionnaire (see Appendix O) was for organisations participating in disaster management dealing with post-disaster management in HGDM. It had two sections with 15 questions. Section A asked about the advisory forum's membership and frequency of attendance. Section B entailed several subsections. The first part focused on the disasters the organisation specialises in and the relevant Acts and legislation. Another section discussed resources and the budgeting of resources to establish the level of awareness and state of readiness. It also focused on vulnerable groups and whether any measures were in place to assist them. Another critical question concerned the challenges encountered post-disaster. Advisory Forum members were also requested to propose measures to increase disaster capacity and disaster-resilient communities.

The questionnaire survey of community members (see Appendix P) gathered the views, opinions, and recommendations of individuals affected by floods in the study areas from 2008/09 to the 2017/18 financial years. The disseminated questionnaire consisted of two main sections and 29 questions with subsections. The first section covered personal information such as gender, language, religion, marital status, age, education level, health status, income, study duration, and home structure type. These

questions determined the factors that would exacerbate the research participants' vulnerability. The next group of questions identified if the participants were active community members by checking if they participated in community structures and meetings. It was vital to establish whether the Municipality provided the required essential services. It was also essential to demonstrate the effectiveness and efficiency of the area's communication systems. The aim was to determine if the information was disseminated during a disaster and the hindrances encountered. Knowing whether the communities were familiar with the Disaster Management Acts and policies was crucial, as knowledge goes hand in hand with readiness. Furthermore, it was significant to determine the resources available in the area. It assisted in assessing the willingness to deal with future disasters. In addition, one of the questions was about the most common disasters, their frequency, and their effects. The final segment of the questionnaire established the community's measures to assist vulnerable groups and ensure community disaster resilience. It would help to implement community-implemented and approved measures. The literature has shown that involving disaster-affected individuals in their post-disaster efforts is significant (Arain, 2015).

3.6.5. Observations

The observation method was used when COVID-19 restrictions were at Alert Level 1. Henning et al. (2009) state that observations provide a sense of real-life actions because they are captured in real-time. The participant observation assisted the researcher in collecting data to supplement the information from study participants. Participant observation exposes the researcher to the residents' occurrences, situations, points of view, and understanding of the place and its people (Rossouw, 2003). As with Mouton (2006), Kobus (2007), Wagner et al. (2012), and Ranjan and Abenayake (2014), observation data were collected through stakeholder perceptions during transect walks. The researcher asked appropriate research questions to examine the post-disaster challenges and projects in Mphela Township and Ncakubana. This study used the observation method because Henning et al. (2009) believe it fills gaps that interviews may leave. The advantage of observation was that the researcher had first-hand knowledge of the participants' information and could thus record real-time data (Creswell & Creswell, 2018). In addition, unusual aspects can be observed and recorded (Creswell & Creswell, 2018). Furthermore, the researcher could focus on multiple problem themes (Rossouw, 2003). However, being physically on the field posed numerous challenges due to COVID-19 restrictions and regulations, as

there were COVID-19 protocols. Fortunately, the participating Ward Committee Members and disaster management officials assisted the researcher in observing various activities at the research sites.

The researcher used the observation schedule while in the area, focusing on the participants and other forms of communication (Henning et al., 2009). The observations were open-ended since general questions were posed, and participants were encouraged to share their thoughts (Creswell & Creswell, 2018). The researcher was not passive during the study, as her previous experience and knowledge were implemented, and notes were taken. Participation and observation were done simultaneously, which assisted the researcher in not returning to the field multiple times (Rossouw, 2003; Henning, 2009). There was an observation of people's gestures, scenes, social interactions, actions, and physical environment (Yin, 2011). In addition, the researcher documented pedagogical activities with a camera, a notebook, or audio and video recording devices (Mouton, 2006; Kobus, 2007; Wagner et al., 2012; Ranjan & Abenayake, 2014). The notes assisted in capturing contextual factors such as gestures, facial expressions, tone of voice, change in speech direction, and body language. The researcher observed and noted gestures that suggested sadness, fear, secretiveness, and discomfort. The researcher dealt with these concerns appropriately upon becoming aware of them. Field notes recorded conversations and observations (Devers & Frankel, 2000). In their emphasis, Creswell and Creswell (2018) agree that research notes should include information about individual behaviour and activities. The observation data were meticulously recorded and prepared for examination (Henning, 2009). Some information was interpreted immediately, per the researcher's experience and knowledge; however, more data was processed after revisiting field notes (Rossouw, 2003).

3.7. Data management

In this study, it was necessary to read the collected data many times to comprehend them, as Creswell (2007) suggests. All collected data were captured and prepared for analysis (Froggatt, 2001; Dube, 2018). As per Rossouw (2003) and Dube (2018), research interviews, questionnaires, observations, transect walks, e-mails, messages, and telephonic discussions with various participants were transcribed. Memos were written in the margins of notes, transcripts, or photographs (Creswell & Creswell, 2018). The questionnaire responses were grouped and captured into an MS Word document. Moreover, the researcher listened to the recordings and captured the responses regarding the audio-recorded information. Additionally, notes taken during the data collection phase were considered and

recorded. Moreover, where applicable, all data were translated and recorded in English. The strategy assisted in data organisation for processing and analysis. In addition, data management assisted in database exploration (Creswell, 2009). It entailed storing, labelling, and indexing data to be traced back to its source (Froggatt, 2001). The collected data were saved in folders and files labelled with research dates to ensure that information was quickly retrieved when needed (Chabalala, 2017). Backups such as an external hard drive and Google Drive prevented data loss. The files were then converted to text units suitable for manual or computer analysis (Creswell, 2007).

3.8. Data analysis and presentation

The collected data were reviewed to determine their meaning. The transcribed information was manually captured on a computer (Dube, 2018). The transcribed notes were translated into subsections for the research, as Mouton (2006) and Sina et al. (2019) did, and the content was analysed to ascertain facts and how best to respond to research questions. The objective was to establish the significance of the collected data. The data analysis assisted in understanding the different elements that constitute data (Creswell, 2009; McQuitty, 2018). Furthermore, it reduced the data to intelligible and interpretable information to study, test, and draw conclusions about the relationships in the research problem (De Vos, 1998). Moreover, data analysis ensured that the data were consistent (Froggatt, 2001). Respondents were given pseudonyms because they filled out questionnaires and interview schedules anonymously. Therefore, in line with the signed consent forms, the study used alphabets and numbers to label the participants. As elaborated below, the researcher used tabulations, correlations, and statistical graphs, such as bar charts and pie charts, for visual data presentations.

3.8.1. Quantitative data analysis

The data from the numeric questionnaires and interview schedules were quantitatively analysed using statistical tools (Bhattacherjee, 2012). These were closed-ended questions. Age, gender, race, and ethnic group were some of the statistical variables. As the participants had options, the options ranged from two to four, which were short and direct answers. The research used monovariate and bivariate analysis. For data analysis, the research used both Ms. Excel and SPSS. The first step in quantitative data exploration for the study was to use univariate statistical description and bivariate statistical inference (Zhang, 2016). This study used SPSS Statistics 27.0 Version because it is a quantitative software program capable of analysing extensive samples (Fouche & Bartley, 2016). SPSS enabled the

researcher to enter data or variables and perform statistical computations (De vos, 1998). Moreover, SPSS could generate graphic tables and create, modify, and analyse large databases (McNabb, 2017). The study also employed MS Excel for quantitative analysis because it is a number cruncher (Meyer & Avery, 2009). Moreover, it could handle massive amounts of data, provide diverse attributes, and enable multiple display techniques (Meyer & Avery, 2009). MS Excel output included various formats, such as frequency charts and figures.

3.8.2. Qualitative data analysis

Preparing and organising transcripts and photographic data for analysis is a component of qualitative research data analysis (Creswell, 2007). This process focused on understanding the collected data through descriptive statistics to assist in summarising the information and determining the key findings. The data were then coded, and similar themes were grouped. Thus, qualitative data analysis was employed to label and code the data to determine similarities and differences (Dube, 2018). The study developed a coding system that entailed organising data and writing a label associated with a category (Froggatt, 2001; Creswell & Creswell, 2018). After coding, similar information was gathered to form categories. Each category was named using context words as related words, and sentences were identified and sorted into categories to determine relationships. There were also subcategories to expand on the identified categories. Following the development of categories, themes were created (Lester et al., 2020). Themes were noteworthy findings in the study and were subsequently considered as main headings in the findings section (Creswell & Creswell, 2018).

3.9. Data presentation

Collected data were converted to be interpreted meaningfully (Bhattacherjee, 2012). The results were presented after data collection, summary, and analysis. The qualitative data in the study was then presented using quotes from interviews and field notes. Conversely, the quantitative research results were displayed numerically. Thus, after analysis, the data were presented in text, table, or figure form, as discussed below:

i. Themes: The themes identified served as the framework for the findings (Rossouw, 2003). Direct quotes from interviewees supported some themes, categories, and subcategories, illustrating various people's points of view (Creswell & Creswell, 2018). Another method of presenting data was to use quotes from interviews and field notes (Froggatt, 2001).

ii. Frequency distribution: The frequency distribution tables were simple frequency and grouped frequency (De vos, 1998). The coded data were entered into the table to determine it.
iii. Graphic presentations: Graphs were the most common way to visually demonstrate data reflection (Slutsky, 2014). Graphs assisted in understanding the critical characteristics of frequency distributions and comparing one to another (De Vos, 1998). MS Excel analysed, presented data, and created bar graphs (Kuchartz & Raider, 2019). Moreover, flat pie graphs were generated because they were easier to read and interpret than three-dimensional pie graphs (Kuchartz & Raider, 2019).
iv. Contingency tables or cross-tabulation: The study also used SPSS for cross-tabulation, known as the pivot table, after the collected data were cleaned, organised into variables, and a database was available (White, 2004; Kuchartz & Raider, 2019). Cross-tabulation classified subjects based on qualitative variables determined the degree of association (De vos, 1998). In addition, cross-tabulation assisted in revealing hidden relationships, which helped explain the data's meaning in greater detail (De vos, 1998).
v. Correlation: Correlation analysis presents the direction and strength of a relationship between two variables of information (De Vos, 1998; Schober, 2018). The research study contributed to identifying similar trends and gaps in current legislation, frameworks, and policies. Furthermore, it collated information from interviewees who may wish to portray their organisation's policies and frameworks as effective and efficient.

3.10. Data interpretation

The research interpretation was conducted to obtain the results, meaning, and implications (De Vos, 1998). The interpretation also included considering other people's interpretations of one's data and indicating the level of support for the preferred data understanding (Mouton, 2006). Data interpretation made sense of the produced text and image data (Creswell, 2007; Creswell & Creswell, 2018). Moreover, the findings were compared to the existing literature (Merriam & Tisdell, 2016). Following data processing, the conclusion was subsequently drawn (Chabalala, 2017). Chapter 5 of this research presents the detailed research data analysis.

3.11. Validity and reliability

The study used questionnaires, observations, and interview schedules as measuring instruments. Steps in research decision-making influence validity and reliability (Rossouw, 2003). Rather than research

tools and procedures determining validity, reliability, truthfulness, and consistency, another dimension focused on the strength of the relationships (Berryman et al., 2013). The validity and reliability concepts are further discussed below.

3.11.1. Validity

Credibility, authenticity, transferability, dependability, and confirmability are synonyms for validity (Creswell, 2007). Even though some interview schedules were e-mailed, the researcher's role was also the primary data collection instrument, as she collected all interviews and questionnaire data. One of the approaches implemented to ensure validity was the collection of various types of data from numerous sources. For example, data included photos in determining unspoken responses, sounds, or digital messages, such as Short Message Services, WhatsApp, and e-mails. There were also different data analysis phases or levels, such as single codes, themes, and bivariate. The researcher also validated the accuracy by employing multiple validation procedures, including triangulation data sources such as secondary data analysis, field observation, and focus group interviews. Furthermore, the study supervisors were frequently requested to check the research, and they provided input. Following that, the researcher incorporated feedback from the Supervisors. Moreover, the University of the Witwatersrand Ethics Committee's comments and suggestions on the research instruments added a validation dimension. Based on the above, A high degree of certainty exists that the response came from the selected participants since the researcher personally selected them and then administered the data collection tools.

3.11.2. Reliability

The instrument's consistency was determined when measuring the tool's reliability (Rossouw, 2003). In addition, there was the possibility of measuring reliability if the questionnaire was appropriately constructed (Mouton, 2006). For the research to authenticate the reliability of the collected data, the results of various interviews and questionnaires were meticulously transcribed, ensuring that adequate information would be available if different researchers repeated the study. Moreover, data was collected and analysed using vast computer programs, including MS Word, Word Cloud, SPSS, MS Excel, and Atlasti. Therefore, the chosen research data collection and analysis tools were reliable, thus ensuring the study's reliability.

3.12. Methodological reflections

The study adopted a mixed methods approach to investigate the means and avenues for effective disaster management to promote the most vulnerable groups' adaptive capacity and resilience. Interviews, focus groups, questionnaire surveys, observations, and secondary data collected various participants' responses, opinions, and suggestions. The researcher collected all the data herself. Moreover, the researcher had to use e-mails and her cell phone to communicate with the participants to ensure the collected data's confidentiality and reliability. The data were collected from Disaster Management officials in three spheres of government, HGDM Advisory Forum members, Ncakubana and Mphela Township Councillors, community members, and secondary sources. Self-reflection contributes to validating the research conducted (Creswell, 2007). The section discusses the researcher's positive and negative study experiences. The top management: City Managers and Heads of Centres in the respective municipalities agreed to assist the researcher in any way they could when they granted the researcher permission to conduct research in their Municipalities. Disaster Management officials in Ubuhlebezwe and Greater Kokstad LMs assisted the researcher in collecting data in Ncakubana and Mphela Township, respectively, in arranging for the community leaders, councillors, and community members to be research participants.

In terms of experience, the researcher met people she would never have met if the study had not been conducted. Some disaster management officials were forthright, honest, and eager to assist. In some cases, responses were even received on the same day the interview schedule and supporting documents were e-mailed. Even though most disaster management officials did not know that the researcher was also a disaster management official, they were accommodating. The researcher did not disclose her occupation as a Disaster Management to participants who did not know her. This approach assisted because the participants did not feel compelled to mould their responses; thus, they responded honestly. However, those who inquired were informed, and there was an opportunity to share disaster management experiences and thus benchmark. Those who knew her were honest and comfortable sharing their views. Some HGDM Advisory Forum (HGDMAF) participants initially believed their participation post-disasters did not qualify them to answer disaster management-related interviews. Their concerns were addressed, and they eventually agreed to partake in the study. Regarding disaster impacts, community respondents described how the disasters personally affected them. The researcher applied the pragmatism philosophy, putting herself in the shoes of the disaster victims. The discussions

caused the researcher to imagine herself as a participant in the situation. The researcher controlled her emotions and was not judgemental by looking at the situation through the participants' lenses.

There was a plan to reach out to more community members who were unavailable during the fieldwork. The researcher had to call the individuals from the houses identified during the fieldwork because neighbours and disaster management officials provided the contact numbers. The researcher gathered additional information thanks to the conducted telephone interviews. Furthermore, the researcher managed to collect data from the target sample. However, because there was enormous information, listening to and transcribing the responses took a long time. On the other hand, those disaster management officials who preferred phone interviews to e-mails underwent telephone interviews. They said they preferred phone interviews to answer questions while allowing the researcher to follow up. Furthermore, some officials cited a lack of time to type interview responses, whereas others lacked the resources to print and scan documents. Some even alluded to their strength as talking rather than writing; thus, they provide more information when speaking.

Even though the researcher was from KZN, she had never visited the research sites. Going to the field helped the researcher better understand the study areas and gain information that secondary data would not have provided. The researcher was exposed to other people's ways of living while conducting field research in Ubuhlebezwe LM, Ncakubana, and Greater Kokstad, Mphela Township. The residents were welcoming, making the community visits memorable. They were eager to share their personal lived experiences even though the country was on COVID-19 Alert Level 1, they engaged the researcher. The COVID-19 protocols were strictly followed for the duration of the fieldwork to ensure the safety of participants. They hoped that their voices would be heard by the government and individuals, which might bring positive change in their areas.

The researcher improved her data collection and analysis skills. The research Supervisors used their vast experience in researching to help nurture the researcher's capabilities through regular comments to enhance the value of the research. Furthermore, the researcher acquired various life skills by participating in workshops and writing groups organised by the University of the Witwatersrand, held physically and online. Subsequently, her writing skills improved because the researcher learned to explain her views more thoroughly. Through the research, the researcher also had to present her research

in various platforms, such as the 2020 GCI Annual Colloquium, the 2022 Wits Post Graduate talks, and the 2023 Climate Change & Disaster Management Workshops in Limpopo and Western Cape Provinces. The researcher improved her personal and professional planning and time management skills through self-education. Moreover, the researcher is undoubtedly more knowledgeable and understands Disaster Management better, thus having a national perspective. The researcher also gained a better understanding of African countries and international trends regarding disaster management. The participants trusted the researcher with confidential and sensitive information and engaged in an open and frank discussion. The researcher remained objective throughout the data collection and analysis periods. The researcher also took into account any potential conflicts of interest.

Nonetheless, some problems arose during the data collection process. The field survey was from April to July 2021, which was a bit long. The reason was that the research was self-funded**, so** the researcher did not have funds to remunerate enumerators. She collected all the data herself. Moreover, the researcher had to give the participants enough time to respond. Furthermore, there was a delay in the response from some participants. The researcher had to make follow-ups, also giving the respondents enough time. Also, due to COVID-19 restrictions and safety concerns, the availability of some respondents was scarce. It was better when the country was in Alert Level 1. A few participants did not cooperate and thus did not contribute to the study. It was one of the drawbacks of using e-mail interviews. At least three e-mails were sent, and telephone calls were made to non-responding potential research participants to make a follow-up regarding the request for them as research participants. Some prospective participants were also sent SMS and WhatsApp messages. Other officials also stated they could not share their organisation's information for protocol reasons. They then referred the researcher to senior management; some did not assist. Even though receiving responses from non-responders would have been beneficial, the lack of participation did not affect the quality of the study. Another obstacle was cancelling the Ncakubana focus group discussion due to health and safety concerns regarding the COVID-19 pandemic and restrictions associated with alert levels. Consequently, the identified individual community participants were administered focus group interview schedules. This strategy worked because the focus group was diverse and met most of the focus group requirements. The only aspect lacking was that the participants were not interviewed simultaneously.

Given that the research was primarily self-funded, the researcher was required to cover her tuition fee, including costly research activities. The researcher had to pay for phone calls, data analysis tools, travel to research sites to collect data, accommodation at research sites, and editor fees. Thankfully, some participants called the researcher after receiving the e-mailed research documents, saving money on phone calls. However, because the researcher used limited resources to conduct the research effectively and efficiently, the limitation did not affect the quality of the research. In addition, the researcher's mother tongue is IsiZulu; her understanding of IsiXhosa was limited in Mphela Township, where most participants spoke IsiXhosa. This challenge was overcome because, besides IsiZulu, English, and Afrikaans questionnaires, there was an IsiXhosa questionnaire. The presence of a Greater Kokstad disaster management official assisted in interpreting and explaining the questions to the participants, which was also beneficial. He also assisted the researcher in understanding some responses better. The language barrier challenge was not experienced in the Ncakubana, as the area is predominantly IsiZulu speaking, the researcher's mother tongue. When communicating with officials, English was the medium of communication. The conclusion is that the study is unique because it involves possibly all critical stakeholders in one study, as they were allowed to state their opinions and make recommendations. There is a new opportunity for a holistic approach to ensuring flood adaptation capacity and disaster-resilient communities. The responses can help ensure effective and efficient post-flood disaster activities are implemented.

3.13. Conclusion

Chapter 3 discussed the study's methodological approach in detail. Pragmatism was the philosophical approach. There was also a research design that implemented a mixed-methods approach. Data was gathered through interviews, focus groups, questionnaires, observations, and secondary sources. The researcher consulted various data collection sources to ensure appropriate participant data collection. The data collection tools were questionnaire surveys, interview schedules, a camera, and a Call Recorder App. The section also described the sampling methods. Chapter 3 also entailed the data collection approach, processing, analysis, and presentation of information. Furthermore, the section highlighted the various measures to ensure validity and reliability. Lastly, the section elucidated an overview of the researcher's methodological reflections. The following section, Chapter 4, deals with presenting empirical evidence.

CHAPTER 4
EMPIRICAL EVIDENCE PRESENTATION

4.1. Introduction

Chapter 4 of the research presents empirical evidence gathered between October 2020 and July 2021. The chapter also includes data from secondary sources. Since the study employed a mixed-methods approach, data collection was qualitative and quantitative. The chosen method met the data collection requirements because it assisted in answering the research questions and objectives. The data were analysed either manually or automatically. The numerical data collected were quantitatively analysed using statistical tools such as MS Excel and SPSS. Word Cloud and Atlasti were applied for coding, categories, and themes for qualitative data. The characteristics of a data set were summarised and organised using descriptive statistics. The data presentation was in textual, tabular, graphical, and statistically descriptive forms. Essentially, the Chapter details research findings on institutional arrangements, prevalent disasters and measures, post-disaster challenges, projects and opportunities inventories post-disaster, and proposed long-term measures.

4.2. Institutional arrangements

The section discussed the results regarding disaster management participants, level of exposure or experience in disaster management, social and cultural factors in communities, disaster management's relevant legislative documents, disaster management information dissemination, disaster management resources, and the occurrence of disaster incidents.

4.2.1. Disaster management participants

Disaster management is a multidisciplinary and multisectoral field (DM Act, 2002; Prinsloo & van der Waldt, 2016). Similarly, Van Riet (2012) asserts that disaster management is multi-sectoral, integrated, continuous, and multi-disciplinary. Therefore, it is a collaborative, multisectoral, multidisciplinary process involving three spheres of government, NGOs, the private sector, capacity-building partners, and communities (DM Act, 2002; National Disaster Management Framework (NDMF), 2005). Disaster management should be human-centred, with first responders, decision-makers, and community members all involved (Janssen et al., 2010). In South Africa, disaster management stakeholders include government agencies, relief organisations, NPOs, research institutions, private sector organisations, the

public, and disaster victims (Bean et al., 2011). In summary, Seaberg et al. (2017) concur that government agencies, private and NPOs, and communities must collaborate to understand and meet the needs of disaster victims. This section established the participants' connectivity to the South African Disaster Management discipline. The question informed the researcher regarding the involvement of different participants in disaster management activities, particularly post-disaster flooding. Establishing the demographic presentation of the sample population provided a picture of the sphere of government and the sector represented by the population. As seen in Figure 4.1, initially, there were 77 responses, but after adding 13 Community Focus Group Members, the total number increased to 90.

Figure 4.1: Participants' linkage to Disaster Management

The respondents represented various sectors from the three spheres of government, namely, national, provincial, and local. The nature of the research participants confirmed that disaster management was a multidisciplinary and multi-sectoral field.

4.2.1.1. Disaster Management Advisory Forum

After a disaster, disaster management officials' primary function is coordinating various role players (DM Act, 2002). Specifically, Zuma et al. (2012) explain that the Advisory Forum is a mandatory Forum established by the DM Act. Thus, determining whether disaster management officials attend Disaster

Management Forums was critical. According to the officials' responses, all participants attended Advisory Forum meetings in their respective organisations. Approximately 32 out of 34 participants, or 94%, said yes, no one said no, and 2 participants, or 6%, said sometimes. The analysis suggests that disaster management officials complied with the DM Act, which advocates for establishing disaster management forums. Advisory Forum meetings were typically held quarterly. However, the manager of the Free State District DMC indicated that:

> *"Yes: Advisory Forum is the means of communication. However, due to COVID-19, there are virtual meetings, which has affected attendance. Moreover, because of the established COVID-19 structure, the Advisory Forum is not as strong as before." (Pers. Comm. 2021u).*

The DMA (2002) and Zuma et al. (2012) specify that the Advisory Forum is a platform for all stakeholders to meet and contribute to disaster management matters. Unfortunately, COVID-19 appeared to have impacted attendance at advisory forum meetings, a concerning trend.

4.2.2. Communities' social and cultural factors

Essentially, cultural and social factors, for instance, disability, ethnicity, age, health, gender, and economic status, all influence risk and coping mechanisms during disaster events (Pertiwi et al., 2019). Also, Riveria (2019) concurs, adding that race and ethnicity influence vulnerability and recovery. Age, socioeconomic circumstances, location, possession access, and political incorporation are interconnected components and vulnerability features (Muysoki et al., 2015). Age, gender, number of family members, income, education level, employment status, building materials, and house ownership make people vulnerable to floods (Sha et al., 2019). The Rezende et al. (2020) study reveals that vulnerable groups face the most difficulties post-disaster rehabilitation. Given these points and elements, it was critical to consult affected communities (Dube, 2019) to obtain the necessary information about the communities' social and cultural factors in the study areas. The expectation was for children, the elderly, people with disabilities, and women to be the most vulnerable groups. However, there should have been an alternative option because some participants did not fit into the presented categories. For example, the researcher was made aware that there was a father who was a single parent. Moreover, one disabled female participant mentioned that her husband was disabled as well. In Ncakubana, there were 17 females, two males, six elders, and one disabled respondent. Mphela Township had 15 females, one male, one elderly, and one disabled person. Females were the study's most vulnerable group. In total 3 males and 32 females were in the study areas, representing 9% and 91%, respectively. Given that the study focused on traditionally vulnerable groups, women

predominated over men. The study was conducted to identify the specific needs of these groups, and women are more likely to be affected by these issues.

Mphela Township's dominant age group was 35 to 60, and the least represented age group was over 60. In addition, only one person in Mphela Township was over 60 years, compared to six in Ncakubana. None of the participants were between the ages of 10 and 18. A similar pattern was observed in Ncakubana. Regarding education, 3, 28, 1, and three respondents had primary, high, tertiary, and other education, respectively (Table 4.1). The breakdown was as follows: 9% for primary education, 80% for secondary education, 2% for tertiary education, and 9% for other education. With 14 respondents in each area and 28 people, high school was the most common level of education in both Ncakubana and Mphela Township. The other option revealed that two respondents had never attended school.

Table 4.1: Community level of education

Area * Level of Education Crosstabulation						
		Level of Education				Total
		Primary School	High School	Tertiary	Other	
Area	Mphela Location	1	14	0	1	16
	Ncakubana	2	14	1	2	19
Total		3	28	1	3	35
Percentage		9%	80%	2%	9%	100%

Source: Field Survey, April - July 2021

Regarding the source of income, the most common one was government social grants, which included old age, child, and disability benefits. The Table 4.2 findings, however, established that some participants earned money from two or more sources, albeit not much. According to the findings, one respondent in each community was self-employed. Only one respondent was employed full-time. As a result, five participants were employed part-time. Most respondents selected none; this was 28 people, or 80% of the sample. The officials also confirmed that the unemployment rate was very high since most people rely on these social grants (Field Survey, April - July 2021). High unemployment was concerning because it may exacerbate vulnerability. When asked about their house type, 4, 20, 4, and 9 said corrugated iron, mud, brick, and other, mainly blocks. According to the results, most Ncakubana and Mphela Township participants chose mud as their house structure. The blocks option came in second, followed by corrugated iron and brick.

Table 4.2: Community members' employment type

Area * Employment type Crosstabulation						
		Employment type				
		Self-employed	Full-time employed	Part-time employed	None	Total
Area	Mphela Location	1	1	2	12	16
	Ncakubana	0	0	3	16	19
Total		1	1	5	28	35

Source: Field Survey, April - July 2021

On a more personal level, the participants were asked about their home language, religion, marital status, and health status. South Africa has 11 official languages. Since the study's community population was from KZN, the province's dominant languages are English, IsiZulu, and IsiXhosa (HGDM, 2019). For Ncakubana, 18 respondents chose IsiZulu, and 1 chose IsiXhosa. In Mphela Township, all 16 participants chose IsiXhosa as their home language. The respondents were African, the dominant race in the Harry Gwala District Municipality. Section 31 of the Constitution of the Republic of South Africa stipulates the right to freedom of religion (Constitution of RSA, 1996). Regarding religion, 18 people chose Christianity in Ncakubana, while 16 chose it in Mphela Township. The findings meant that most participants were religious, which requires attention post-disaster because previous experience showed that community members want to continue their religious practices. Ahmed and Mzimela (2018) indicate that marital status is not a permanent social category but impacts social, gender relations, rights, and duties, particularly among women.

Table 4.3 showed 23 single participants for marital status: 8 married, 1 divorced, and 3 widowed. In Ncakubana and Mphela Township, women in the single category constituted the majority, accounting for 66%. The results suggested these were female-headed households, making them more vulnerable post-disasters. Then it was married at 23%, widowed at 8%, and last divorcees at 3%.

Table 4.3: Marital status

Marital Status * Frequency of Disaster Crosstabulation					
		Frequency of Disaster			
		Every yea	Once in five years	Once in 10 years	Total
Marital Status	Single	20	2	1	23
	Married	5	3	0	8
	Divorced	0	1	0	1
	Widowed	3	0	0	3
Total		28	6	1	35

Source: Field Survey, April - July 2021

The expectation was for married couples to fare better post-disaster because they would help each other. Widows and divorcees, on the other hand, can be more vulnerable because they are usually alone, with no partner to help with post-disaster needs.

The health status responses of the participants ranged from good to confidential. The highest number of respondents selected good. The next option chosen was bad. Some of the participants who chose the no option explained their reasoning. The participant's health status can be classified as good. When assisting disaster victims in the post-disaster, personal situations must be considered. Gender, age, race, and source of income were the demographics of the Ncakubana and Mphela Township Focus Groups. According to the findings, there were 12 females and 1 male. The participants' ages ranged from 28 to 70, the youngest and oldest, respectively. The 13 participants were all Africans. When asked about their source of income, two respondents from each community said it was salary. Furthermore, ten respondents mentioned a child or children or elderly grant. Only one person stated that they had no income. They were staying with their grandchildren and receiving child support. The findings confirmed that many participants were unemployed and relied on government social grants.

4.2.3. Experience and skills in disaster management

The NDMF advocates for Disaster Management HoCs and staff to be qualified and skilled in disaster management (NDMF, 2005). Therefore, conducting structured interviews to ascertain the experience and skills of individuals in the Disaster Management field was critical. For example, the Manager in the Metropolitan Municipality highlighted the qualification and mentioned:

> *"I possess operational and strategic management qualifications and 15 years of experience in disaster management. After ten years, I moved from the Fire and Ambulance Brigade and got appointed in disaster management as the first senior disaster management official in one of the Metropolitan Municipalities in 2006. I also hold an Advanced Diploma in Disaster Management National Certificate in Disaster Risk Management with UNISA. Municipal Integrated Development for Service Delivery Programme- National Qualifications Framework (NQF) Level 7 and Advanced Municipal Finance certificate- NQF Level 6, New Managers Programme all with Wits Business School – NQF Level 5." (Pers. Comm. 2021h).*

In the same vein, another manager in a different Province spoke about the position, years of experience, qualifications, and duties:

> *"I have worked as a Disaster Management Manager for over eight years. I have a Post Graduate Development, Public Management, and Finance qualification. In addition, I have a*

few short courses. Responsible for pre- and post-disaster management activities, such as Awareness Campaigns, Disaster Risk Assessment, and DRR." (Pers. Comm. 2021u).

Some participants answered the question by indicating their soft skills and years of experience in disaster management. A Deputy Director from the PDMC, for example, stated:

"Coordination, Negotiation Skills, Report Writing, Presentation Skills, a good understanding of Legislation and Policies, and 18 years of experience." (Pers. Comm. 2020h).

The respondent from the District DMC in the Free State, in contrast, revealed the level of exposure, Professional Body Affiliation, and position and indicated that:

"I am participating in all three levels of Government (National, Provincial and Municipal) disaster forums. I am a Disaster Management Institute of Southern Africa member, commonly known as DMISA. I am the HoC at the District." (Pers. Comm. 2021v).

Officials in disaster management are responsible for planning, managing, coordinating, and executing activities that mitigate, prepare for, prevent, and respond to disaster incidents (DM Act, 2002). According to the responses, participants had various skills and experience in disaster management, though at different levels.

Knowing what to do in a disaster significantly impacts recovery (Fransisco, 2014). Therefore, Councillors were asked about their thoughts on community disaster management skills, training, and their officials' disaster management skills. When asked if the communities have the skills to deal with disasters, the Councillors said no, implying that they did not believe the communities could deal with disasters. Another question posed to the Councillors was whether the communities had received disaster management training, to which they both chose yes. It meant awareness campaigns were conducted in the respective wards. Concerning skills, Councillors were questioned about whether personnel in their offices were equipped to assist vulnerable groups post-disasters; both Councillors selected yes.

4.2.4. Level of exposure to disaster management

Reducing disaster losses entails taking preventative measures before a disaster, assigning experienced individuals to respond, and managing the disaster effectively (Aydin et al., 2015). Disaster management officials were asked about their years of experience in the DMC to determine their level of exposure. Most disaster management participants, 22, or 65%, had worked in their organisations for more than ten years. One person indicated 0 to less than a year, six said more than 1 to five years, and five stated

more than 5 to 10 years. In their organisations, the average or median length of service was more than 10 years. Disaster Management officials are individuals with extensive experience. Figure 4.2 depicts the results of the number of years the participants have been in their organisations.

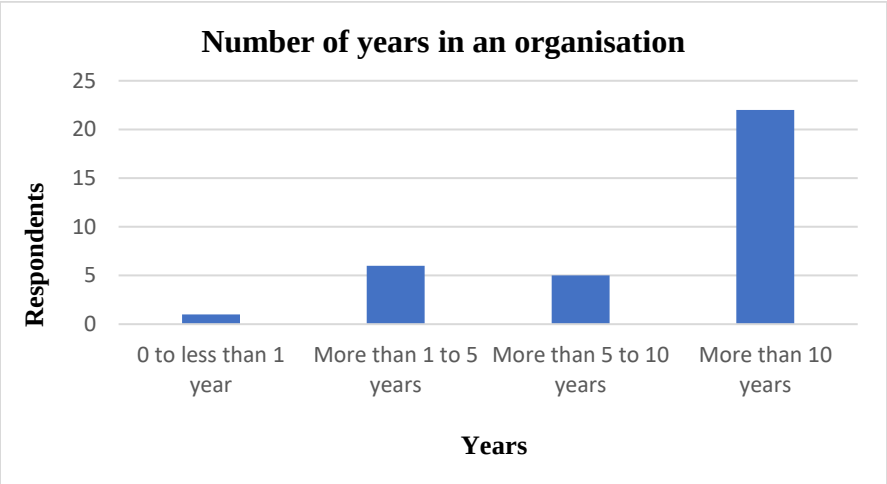

Figure 4.2: Number of years in the organisation

Many years of experience as disaster management officials in an organisation meant that they were adequately acquainted with the Disaster Management field and understood disaster management roles. This vast experience was encouraging because experienced individuals are familiar with the environment and can effect positive change. It also implied that skilled individuals could pass on their knowledge to newly appointed personnel.

The HGDMAF members had varying experiences for various reasons. Only 1 participant had 0 to less than 1 year of experience, and two others had more than 1 to 5 years of experience. In addition, 1 participant had more than 5 to 10 of experience. Finally, two respondents had worked for more than ten years. These findings indicated that some participants had been members for longer than others. People with more years of experience may be more experienced and knowledgeable about disaster management. On the other hand, those with fewer years were not necessarily inexperienced in Disaster Management. One participant, for example, had experience in Disaster Management in different spheres of government, not necessarily in the District DMC, as he had worked in one of the PDMCs. Some interviewees could bring experience from previous organisations, which will benefit the HGDMAF. As a result, the District Advisory Forum can benchmark and learn about new effective and efficient post-disaster measures.

Years of experience for Councillors revealed that 1 had more than 1 to 5 years of experience. The other Councillor chose a period of more than ten years. According to the second Councillor, it had been over 15 years in a Councillor position. It meant that one Councillor had served more than four full terms. On the other hand, the second Councillor indicated that it was his first term. According to the focus group findings, most Ncakubana and Mphela Township participants had resided in their respective areas for over ten years. None of the community members selected a period of 0 to less than one year. More than 1 to 5 years, more than 5 to 10 years, and more than 10 years were chosen by 1, 8, and 26 people. Most individuals were born and raised in the study areas. Other community members revealed they were not born in the area but had relocated to the study areas. Some said they moved because their parents moved to the area; for example, one parent is from the area or married someone who lives there. A 33-year-old Ncakubana resident elaborated further:

"More than 1 to 5 years, lived permanently from 2016" (Pers. Comm.2021Nn).

According to one Focus group participant, she said:

"My parents were born here 63 years ago. I have been living in this area since birth; I am 34 years old. So, I have been living in Ncakubana for 34 years." (Pers. Comm.2021FGNe).

The participants were assumed to be more knowledgeable about the area and disasters since some were born and stayed in the respective areas for decades. Additionally, long-term residents were more likely to be familiar with the area and have experienced various disasters.

4.3. Disaster management relevant legislative documents and status

Reviewing and analysing policies and guidelines helps fathom international, continental, and national disaster management content relationships (Chabalala, 2017). Therefore, the question about relevant legislation documents for disaster management was to elicit participants' perspectives on various known Acts, legislation, and policies. Stakeholders and role players post-disasters subsequently implemented these Acts, legislation, and policies in their respective organisations.

4.3.1. Disaster-specific Acts and Policies

The study sought opinions from the Advisory Forum and disaster management officials on the Acts and policies they use, particularly during the post-disaster period in South Africa, and their implementation. The question aimed to determine knowledge and implementation of post-disaster legislation and policies. In terms of disaster-specific Acts or policies, 33 disaster management officials stated that

various Acts and policies were in place. Only 1 participant said no; there were no Acts and policies. The disaster management officials listed the following legislation and policies: National Policy Framework, Provincial Policy Framework, Disaster Management Act, Division of Revenue Act, Fundraising Act, No Specific Policy, Emergency Housing Policy, Disaster Relief Policy, Standard Operating Procedures (SOPs), Municipal Systems Act, Municipal Veld, and Forest Fires Act, National Environmental Management Act, Fire Brigade Services Act, and Sendai Framework. Others cited the Disaster Management Plan and the Disaster Management Sector Plan. Similarly, Mozambique had a disaster contingency plan (Manuel, 2007). Table 4.4 depicts some documents identified by disaster management officials.

Table 4.4: Details of availability of Post-disaster management policy documents

Instruments	**Frequency**	**Priority**
National Policy Framework	16	1
Provincial Policy Framework	2	5
Disaster Management Act	12	2
Division of Revenue Act	1	6
Fundraising Act	1	6
Emergency Housing Policy	1	6
Disaster Relief Policy	6	4
Disaster Management Sector Plan	2	5
Disaster Management Plan	9	3
Standard Operating Procedures	1	6
Municipal Systems Act	1	6
Veld and Forest Fires Act	1	6
Fire Brigade Services Act	1	6
National Environmental Management Act	1	6
Sendai Framework	1	6
No specific Policy	9	3

The NDMF and the DM Act were the most frequently mentioned post-disaster instruments, as shown in Table 4.4. They were selected 16 times and 12 times, respectively. These were policy documents that guided effective and efficient post-disaster management. According to Raju and van Niekerk (2013), the DM Act and the Disaster Management Framework were primarily responsible for governing disaster management in South Africa. Consistent with the responses, participants could use one or more pieces of legislation and procedures, as seen in Table 4.5.

Table 4.5: Views on Post-disaster Acts and Policies in place

Various responses	Details of responses
a) DM specific Documents	Most respondents relied on Disaster Management legislation. For example, one respondent from the Metropolitan DMC mentioned: "*The Municipality uses a disaster management plan last updated in 2012. Should have had approved level 2 and level 3 plans as per section 7(1). DM Act as amended, the disaster management framework of 2005 would have been synchronized and aligned." (Pers. Comm. 2021h).* A snowball sample participant reiterated: *"Post-disaster recovery plans and Contingency Plans guided by National Disaster Management Framework, Disaster Management Act, and Sendai Framework. (Pers. Comm. 2021w).*
b) Policies in place	Some DMC officials confirmed that policies were in place. For instance, this view was from a District DMC official based in a different Province, who said: *"Relief policy reviewed in 2014 is in line with Red Cross humanitarian policy. However, the policy does not address communities' core challenges; hence, we are still procuring tents and mattresses." (Pers. Comm. 2021i).*
c) Other Legislation	The response demonstrates that officials can rely on other legislation and policies besides the Disaster Management Act and Framework during the post-disaster period. An official from a District, for example, put it differently and stipulated: *"Disaster Management Centres through the DM Act play a coordinating role during disastrous incidents; line functions, legislations and policies are utilised however empowered under DM Act when a disaster has been declared. Such policies or legislations including but not limited to the Fire Brigade Services Act, National Environmental Management Act, National Veld & Forest Fires Act, and Regulations/Directives introduced and approved specifically to deal with such declared disaster or incident." (Pers. Comm. 2021r).*
d) No specific policies	One notable response was the lack of post-disaster policies in some DMCs. For example, the disaster management official from a KZN LM was precise and said: *"The Municipality provides disaster relief material and engages various stakeholders to assist in recovery and rehabilitation. There is no specific policy." (Pers. Comm. 2020k).* Similarly, a Free State District DMC manager indicated: "*The District is not that strong with Policies. Essentially, the JOC and DOC decide whether to declare. It depends on how strong the lead Department is. The recommendations go to the mayor's office. There is a Post-incident Policy, especially for indigents. It includes SASSA and the Department of Social Development. For fire, it is difficult, as only one Local Municipality has a fire engine. Moreover, the workforce is also a challenge." (Pers. Comm. 2021u).*

Source: Field Survey, April - July 2021

In contrast, Table 4.6 illustrates the feedback of Advisory Forum members on the consulted and implemented legislation and policies. Five participants selected the DM Act from the Advisory Forum's responses. Likewise, five participants chose the Disaster Management Framework. The DM Act and NDMF were the most frequently consulted and implemented legislation and policies by participants following a disaster, as most research participants selected them as the principal Act and Policy.

Table 4.6: Advisory Forum Consulted and Implemented legislation and policies post-disaster

a) Departmental specific Act	**b)** DM Act and NDMF
c) DM Act, NDMF, Departmental specific Acts	**d)** DM Act and NDMF
e) DM Act and NDMF	**f)** DM Act and NDMF

Source: Field Survey, October 2020 - May 2021

According to Lu et al. (2019), community support for a policy influences policy adoption and implementation. Community members were probed about their knowledge of the Disaster Management Act, policies, and bylaws that govern disaster management. The questions assessed community members' understanding and application of the DM Act, policies, and bylaws. In addition, the questions were posed to determine the community members' educational level by the Municipality or if they were self-taught about disaster management documents. All the respondents said they were unaware of the DM Act and Policies, as they all responded by saying no. The 33-year-old woman from Ncakubana elaborated, saying:

> *"No: I hear mainly about the disaster response on the media, do not necessarily know the applicable acts and policies." (Pers. Comm.2021.Nm).*

A similar trend was observed when community members were questioned about disaster management by-laws. Again, all respondents stated that they did not know them. Finally, members of the Focus Group were questioned on disaster legislation and policies. Once again, all members of the Focus Groups were unaware of disaster legislation and policies. Their answers ranged from none to I do not know, I do not know who they are, and I am not aware. A 40-year-old female from Mphela Township, for example, responded as follows:

> *"I do not know any." (Pers. Comm.2021FDMe).*

In the same vein, a 34-year-old female from Ncakubana stated:

> *"I do not know if there are any." (Pers. Comm.2021FDNe).*

Another critical issue is that the DM Act emphasises that disasters have no boundaries; thus, it is critical to collaborate with neighbouring municipalities and other organisations to develop plans and tactics to prevent or mitigate the severe disaster impacts (Louw & van Wyk, 2011). The Act recommends developing structures, frameworks, plans, procedures, and strategies to implement across all government sectors (Van Niekerk, 2006). The DM Act requires all three spheres of government to establish the statutory and physical structures necessary for effective disaster response, risk reduction coordination and implementation, and recovery (Raju & van Niekerk, 2013). The Disaster Management Plan, Disaster Management Advisory Forum, Policy Framework, DMC, and Interdepartmental Disaster Risk Management Committee are among them (Raju & van Niekerk, 2013). Specifically, Zuma et al. (2012) indicate that the DM Act 57 of 2002 governs institutional capacity at all three levels of government: national, provincial, and local. The DM Act stipulates the purpose and disaster management activities in all three spheres of government (Van Niekerk, 2006). Moreover, Zuma et al. (2012) suggest that the DM Act defines the role and responsibilities of National, Provincial, and Local DMCs. The Act further prescribes the establishment of Disaster Management functions within South African government departments (Van Niekerk, 2006). Furthermore, Van Niekerk (2006) postulates that the DM Act requires the establishment of a Forum where various stakeholders can consult and conduct business. It also emphasises the importance and role of civil society and NGOs (Zuma et al., 2012).

Just as important, the DM Act requires the inclusion of a Disaster Management Plan in the Municipal IDP process (Van Niekerk, 2006; Louw & van Wyk, 2011). Furthermore, Section 26 of the Municipal Systems Act, 32 of 2002, underscores the link between the IDP and the Disaster Management Plan (Louw & van Wyk, 2011). However, the Raju and van Niekerk (2013) study expresses concern about excluding disaster management coordinators and professionals from IDP meetings in general. The Disaster Management Act concentrates on disaster risk reduction and accentuates the establishment of appropriate structures, planning, and implementation of integrated and coordinated disaster management activities in all three spheres of government (Van Niekerk, 2006). According to Raju and van Niekerk (2013), the Act also calls for decentralising disaster risk reduction activities in all three branches of government, with an emphasis on intergovernmental cooperation. The Act outlines the adopted state of the disaster declaration legal process, which involves certain powers and responsibilities (Raju & van Niekerk, 2013). According to the DM Act, the declaration process is the responsibility of the uppermost political authority in each sphere of government (Van Niekerk, 2006).

It denotes the local government's mayor, the provincial government's designated Premier, and the National Minister. The DM Act also includes new measures for managing South African communities that are complex and dangerous (Van Niekerk, 2006). The Act's contents can help approach post-disaster management efficiently and effectively.

The DM Act and the Framework's primary focus is establishing suitable disaster risk reduction, response, and institutional recovery arrangements (Raju & van Niekerk, 2013). South Africa's DM Act and Framework are among the best examples of DRR legislative reform globally (Van Niekerk, 2015). In 2015, the DM Act was amended to become Act 16 of 2015. Following the 2002 DM Act, the NDMF was established in 2005. The DM Act assisted in the establishment of the NDMF (Chagutah, 2009). It entails four Key Performance Areas (KPAs) and three "enablers." Enablers should be present in all four KPAs to be implemented successfully (Chagutah, 2009). The Framework's KPAs and enablers are as follows (Van Niekerk, 2006; Chagutah, 2009):

i. KPA 1: Integrated institutional capacity for disaster risk management
ii. KPA 2: Disaster risk assessment
iii. KPA 3: Disaster risk reduction
iv. KPA 4: Response and recovery
v. Enabler 1: Information management and communication
vi. Enabler 2: Education, training, public awareness, and research
vii. Enabler 3: Funding arrangement for disaster risk management

Two positive aspects of the adopted South African National Policy Framework are its exposure to disaster risk reduction and its emphasis on efficient and effective responses (Ndille & Belle, 2014). In addition, the NDMF ensures consistency in disaster management implementation in South Africa (Van Niekerk, 2006). However, the level of standardisation is not that clear. The NDMF also underscores the value of collaboration among government agencies and disaster management structures (Vogel, 1998). Another critical issue is that the NDMF requires post-disaster measures to be in place (Chagutah, 2009).

4.3.1.1. Synergy in legislation and policies

The multidisciplinary nature of disaster management necessitates a partnership between public and private organisations to respond to a disaster swiftly and effectively (Janssen et al., 2010). Therefore,

legislation and policies in all spheres of Government must be consistent with effective and efficient implementation. When it comes to the synergy of legislation and policies in all three spheres of government, 25, which is 74% of Disaster Management officials, said there was synergy, 7, resulting in 21%, said no, and 2, amounting to 5%, said they do not know. In trying to demonstrate that there is an effort to ensure synergy in Disaster Management legislation and policies, a manager from a District DMC in another Province stated:

> *"Not much, especially about synergy with the PDMC. There is still room for improvement." (Pers. Comm. 2021u).*

On the contrary, a Deputy Director in the Government Department detailed:

"No, the spheres try to synergise, but the implementation is not synergised." (Pers. Comm. 2021w).

The four District Advisory Forum members said there was synergy, and the other two stated there was no synergy. Therefore, to a certain extent, there was some synergy, as 67% said there was synergy, while the remaining 33% said there was no synergy. However, from the responses, not all participants agreed on synergy; some respondents expressed concern about the lack of synergy.

4.3.1.2. Status of legislation and policies

Since disasters are not static, legislation and policies must be reviewed regularly (NDMF, 2005). Therefore, updating legislation and policies to deal effectively with emerging and persistent disasters was crucial. Thus, it was critical to check the status of the legislation and policies with disaster management officials and the Advisory Forum. A total of 27 disaster management officials, or 79%, indicated they were up to date. A total of 6 participants, or 18%, stated they were not updated. Finally, one respondent, or 3%, said they did not know. During the interviews, a senior District DMC official stated unequivocally:

> *"Yes: It was last updated in 2018. It is reviewed every three years." (Pers. Comm. 2021q).*

Another manager in the District DMC shared this viewpoint and stated:

> *"Yes: The DMC is in the process of updating the Disaster Management Plan and Framework. The DM Policy Framework is updated on an annual basis but internally. The Service Provider last updated the DM Policy Framework in 2006. There should be changes, especially with the DM Act amendment and environmental changes." (Pers. Comm. 2021u).*

Another unusual response came from a Senior Manager from a National Government Department, who alluded to the following:

> *Yes, the updating is an ongoing process. It is part of the work plan every year. (Pers. Comm. 2021w).*

Since it was a close-ended question, it was unclear which sections were updated or if the legislation and policies were activated during the disaster. Similarly, four Advisory Forum respondents indicated that their organisations' legislation and policies were updated. However, the other two stated that they were not updated. It can be concluded that some organisations updated their disaster management legislation and policies as required by law, while others did not.

4.3.2. Floods-specific legislation or policy

Flooding is among the most visible effects of climate change (Samu & Kentel, 2018; Shah et al., 2018). Therefore, determining whether flood-specific legislation or policies existed in disaster management institutions was critical. In addition, because the study's focus is flooding, it was significant to decide whether the policies implemented were generic or flood specific. Only one disaster management participant said yes, meaning the institution had flood-related legislation or policies. Surprisingly, the responses revealed that many participants' organisations did not have a flood policy. Some respondents, however, justified the lack of policies by citing various reasons. For example, the PDMC's Deputy Director stated that there were no flood-specific policies and advised:

> *"Have a sectoral Disaster Management Framework that talks to all types of disasters. There is also a Flood Management Plan for the Sector". (Pers. Comm. 2021w).*

Moreover, the LM DMC in KZN Province addressed the lack of flood-specific policies and specified alternative measures in place, stating that:

> *"There are no specific policies on floods, except by-laws that prohibit the mushrooming of informal settlements and ensure building control." (Pers. Comm. 2020j).*

The District DMC Manager, on the other hand, stated:

> *"Not for floods, as there are generic documents, Contingency Plan, and Disaster Management Plan. The Plan is not talking to divers and boats; only Fire Stations assist when floods occur. Normally, when there are floods, the affected individuals are evacuated, and once the water has subsided, they return to their houses." (Pers. Comm. 2021u).*

Disaster management respondents' responses suggested a generic approach to dealing with floods. There was no specific flood-control legislation or policy in place in almost all organisations. The results

of the Advisory Forum and disaster management officials also revealed a concerning trend, as participants indicated that no flood-specific policies existed. Instead, they relied on generic documents such as Disaster Management Plans and bylaws.

4.3.3. Specific policies of disaster vulnerable groups

There is a recognition that disaster experiences and outcomes differ in communities due to people's disaster vulnerability (King et al., 2019). As the study focused on vulnerable groups, it was also significant to establish whether there are specific Acts and policies for vulnerable groups and to specify them. Disaster plans should be tailored to specific scenarios and areas and not generalised (Simon & Teperman, 2001). It was also essential to understand the prioritisation of vulnerable groups. In line with these assertions, the study pursued the opinions of disaster management officials and the Advisory Forum on whether there are policies in place in their organisations to assist vulnerable groups. According to disaster management officials, regarding specific policies of disaster vulnerable groups, 21 out of 34 disaster management participants, or 62% of all participants, indicated that their organisations have specific policies. In total 10 respondents were unsure, accounting for 29% of the total. Three participants, or 9%, said emphatically no. Figure 4.3 displays the results.

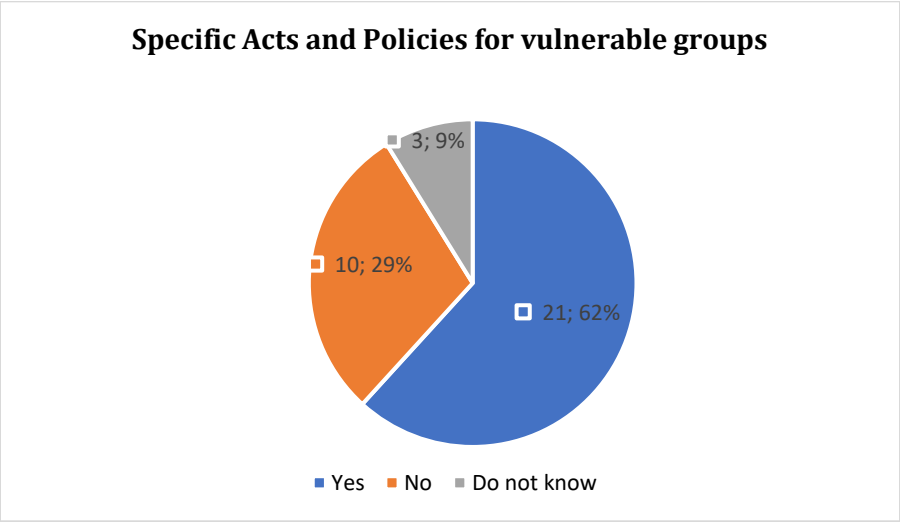

Figure 4. 3: Awareness of specific vulnerable groups Acts and Policies

However, further probing showed that it was the incorporation of vulnerable groups' information into other policies rather than vulnerable groups' specific policies. The organisations are primarily dependent on the current DM Act and NDMF. DMCs sometimes need assistance from other Departments and

NGOs to support vulnerable groups. Though unsatisfactory, having information about disaster-vulnerable groups in other policies was better than none. Most disaster management respondents stated that no specific policies exist, though some legislation and policies, as detailed below, cater to vulnerable groups. The official in the PDMC mentioned that:

> *"Section 37(1)(e)(xii) and Section 51(1)(d)(xii) of the Disaster Management Act, White Paper on Integrated National Disability Strategy, White Paper on the rights of persons with disabilities." (Pers. Comm. 2020e).*

A senior disaster management official in the National Sphere of Government elaborated that:

> *"No, not specifically for vulnerable groups, the policy is generic. However, the Department is trying to mainstream the policies to focus on gender mainstreaming and vulnerable groups." (Pers. Comm. 2021w).*

Similarly, the District DMC mentioned that:

> *"The policies are too generic; they do not address vulnerable groups' needs and focus more on the response part. The policies focus 75% on response and 25% on preparedness and mitigation. The problem is that Disaster Management is still treated as an add-on unit of local government; hence, it is difficult to do the right thing if the political head is clueless about the Disaster Act and Framework." (Pers. Comm. 2021i).*

While the PDMC official made an intriguing revelation, he stated:

> *"Department of Social Development and South African Social Security Agency (SASSA) use their policies*; *three even added that they work with NGOs." (Pers. Comm. 2020c).*

4.3.4. Memorandum of Understanding

National Departments, Provinces, and Municipalities must enter MOUs with neighbours, the private sector, other Government Departments, and communities to reinforce their capacity to deal with disasters (Lu et al., 2019; NDMF, 2005). The MOUs are legally binding documents that outline financial arrangements, reimbursement, and liability (NDMF, 2005). The research investigated the existence of post-disaster MOUs with other organisations. About 22 disaster management officials said they had MOUs with other organisations. The other 12 participants stated they did not have MOUs with institutions for various reasons. Those who had MOUs even mentioned the organisations with whom they had MOUs. According to a Manager at one of the Metropolitan DMCs, for example:

> *"Municipalities and Gauteng Disaster Management Centre have MOU and Service Level Agreement on account of incidents or disasters which might occur. However, there is fragmented coordination and silo mentality during incidents." (Pers. Comm. 2021h).*

Another Manager from the District DMC went on to mention that:

> *"There are Memorandum of Agreements with four District in the Province, sharing the borders. It is a 5-year agreement. There is an MOU with the South African Weather Service, a 5-year agreement. There was an MOU with the Red Cross, which lapsed in 2020; we are still reviewing it. The South African Space Agency MOU needs finalisation. Another Humanitarian NGO approached the Municipality, and there are still discussions regarding working together." (Pers. Comm. 2021q).*

The Free State District HoC stipulated that there was an MOU with the neighbouring Province, specifically the PDMC, and thus explained:

> *Yes, MOU with the Eastern Cape Province- Provincial Disaster Management Centre. In addition, the Disaster Management Centre works with all the District Disaster Management Centres. However, there are no MOUs. (Pers. Comm. 2021s).*

On the other hand, an official from another Province's District DMC indicated that the DMC has MOUs with other private organisations:

> *"Yes, we have MOUs with organisations such as the Working on Fire and the SA Red Cross, as they distribute relief material, assist in the relocation and resettlement of the destitute, and conduct damage assessments." (Pers. Comm. 2021r).*

Similarly, in terms of private organisations, the HoC in one of the PDMCs explained:

> *"The organisation has MOUs with NGOs, The Council For Scientific and Industrial Research, and even other Government Departments." (Pers. Comm. 2020i).*

In contrast to the norm of MOUs, a senior official from another PDMC stated:

> *"We used to have MOU, not anymore." (Pers. Comm. 2020c).*

The DM HoC in Free State provided the following concerning reasons for the lack of MOUs:

> *"No, there are no MOUs in place. The DMC tried with Provinces such as Northwest and Northern Cape, as LMs bordering the provinces. However, there is always a question of indemnity, and the Municipalities are unwilling to pay. So, there is an ad-hoc arrangement." (Pers. Comm. 2021u).*

The signing of MOUs was possible with DMCs, government departments, or the private sector. However, the interpretation of the participants' responses suggests that, while some organisations had MOUs, it was unclear how effective they are when disasters occur or whether there have been challenges in previous post-disaster activities. Some DMCs, for example, were willing to have MOUs; however, they were not in place due to the challenges and complications encountered in establishing

them. As a result, when they could not cope with the disaster's effects, they relied on informal relationships with neighbouring municipalities for assistance, which cannot be ideal.

4.4. Occurrence of disaster incidents and measures in place

Natural or anthropogenic-related disasters occur worldwide and can damage the environment and the population (Chen et al., 2019). For example, there was a warning that stadium disasters, remote mass transit accidents, and aeroplane crashes need different planning since they differ in nature and possibly impact (Simon & Teperman, 2001). Therefore, there was a probe to gather information from participants about disaster incidents that affected them. The aim was to determine the types of disasters South Africa is vulnerable to, their frequency, and the affected sectors. The section also discussed the resources available to deal with disasters during the post-disaster phase.

4.4.1. Common disasters

The subsequent section discusses the most prevalent disasters in South Africa, HGDM, Ncakubana, and Mphela Township, as well as their frequency.

4.4.1.1. Common disasters in South Africa

Natural disasters ranging from droughts, floods, and earthquakes pose various risks to households globally (Kurosaki, 2017). Therefore, disaster management officials were allowed to select the most common disasters they dealt with. Some respondents mentioned one, two, or three hazards, while others mentioned more. Figure 4.4 below shows the responses from the participants. Some of the ten hazards mentioned were more common than others. Most of the disasters selected were hydrological in nature. Floods, fires, and drought were the three most frequently mentioned disasters by participants. Floods were mentioned 29 times, drought 12 times, and fires 23 times. When asked about other disaster incidents, focus group members stated various incidents that had affected them. The Ncakubana 70-year-old female, for example, stated:

"Heavy rainfall, the whole area can be affected" (Pers. Comm.2021FGNf).

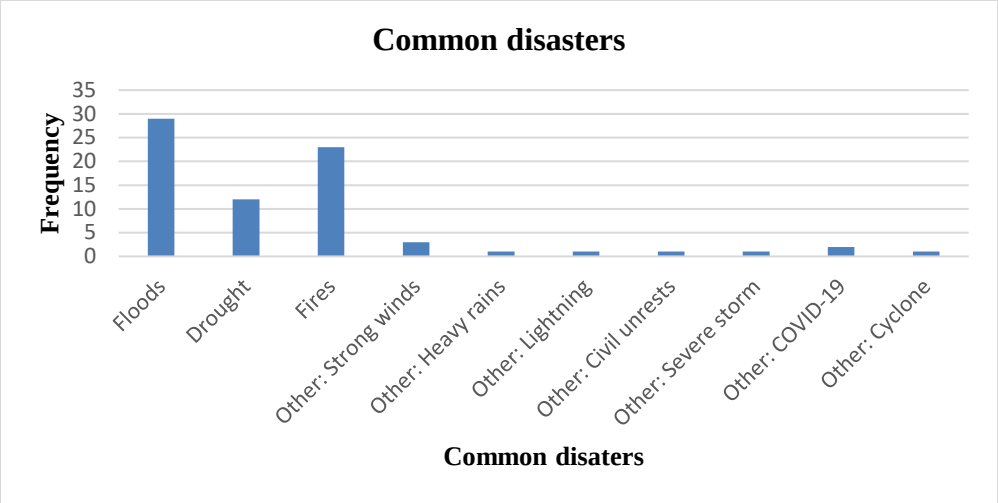

Figure 4.4: Perceived common disasters

According to the participants' responses, floods were seemingly the most common disaster in South Africa. However, floods were also identified as the most common disaster in KZN.

4.4.1.2. Common disasters affecting Harry Gwala District Municipality

The Constitution of the RSA prescribes that the government's sphere must ensure the well-being of its citizens (Raju & van Niekerk, 2013). The government is responsible for implementing disaster risk reduction, response, and recovery measures (Raju & van Niekerk, 2013). Members of the Advisory Forum and Councillors were required to specify the type of disaster they typically respond to. They selected floods, droughts, fires, bus and taxi accidents, livestock and crops, pests, and diseases. One can conclude that the above disasters were the ones that impacted HGDM. Moreover, the study scrutinised the roles and responsibilities of departments. Departments had distinct roles and responsibilities. Additionally, each department can respond to one or more hazards.

4.4.1.3. Common disasters affecting Ncakubana and Mphela Township communities

Internationally, disasters negatively impact communities, development efforts, and the economy, affecting essential human, natural, infrastructural, and other resources, as Chagutah (2009) explains. Thus, to ensure effective communication, vulnerable societies must understand their risks and sustainability (Yasui, 2017). In addition to research questions, community members were asked for information on the types of disasters they had encountered, the ones that had affected them the most, the affected sectors, and the impact and frequency with which they had been affected. Another option was disaster incidents such as strong winds, heavy rainfall, and thunderstorms. Therefore, it was critical

to determine the disasters that directly impacted the respondents. Strong winds due to flooding were chosen by 15 respondents in Ncakubana, making it the most popular choice. Floods were the primary concern for respondents in Mphela Township, with 16 selecting floods. Floods and strong winds, essentially floods, have caused the most damage in Ncakubana and Mphela Township, respectively. The findings supported the notion that disaster occurrences differ in communities. Thirty-one respondents in the study areas chose flooding as the most common disaster. In Ncakubana, fires were the least common disaster, whereas the fire disaster was the second most common disaster in Mphela Township.

Furthermore, the Councillors' probe was about the disaster types that have affected their areas, the most affected sectors, and the effects of previous disasters. To determine the most common disasters in their respective areas, the Councillors had to choose between floods, drought, fires, and strong winds. Floods, fires, and strong winds were the selected disaster types, each chosen once. These disasters negatively affected communities.

4.4.2. Disaster impacts

Based on the findings of Kwan (2020), literature and policy discourse have shown different disaster experiences. The database demonstrates that communities do not experience disasters the same way and, thus, do not recover at the same rate (Riveria, 2019). To determine where disaster damages were most severe, communities indicated which sector impacted them most. The response would assist in prioritising the affected sector and people. The household option was chosen by all 35 participants, accounting for 100% of the respondents. According to community responses, household prioritisation was essential because households are the hardest hit when disasters occur in their areas. Community members were also questioned about the severity of the disasters to evaluate the impact of previous disasters. The question was to determine the severity of disasters that had affected communities. The results showed 29, 3, and 0 for severely, slightly, and do not know. Some respondents elaborated on their personal experiences with the magnitude of the disasters' impact. For example, the 51-year-old Ncakubana respondent stated:

> *"Severely: the house that was still being renovated got damaged and aluminium windows. Even the car was damaged." (Pers. Comm.2021Nh).*

The 41-year-old from Mphela Township shared the exact sentiment and revealed:

"Severely, the 2019 floods that affected the area destroyed the house. I had to stay with the neighbour." (Pers. Comm.2021Mj).

The disasters impact people's social, financial, and cultural well-being (Malak et al., 2020). Similarly, Mabuku et al. (2020) observe that hazards lead to societal, economic and psychological damage. Floods, according to the Councillors, primarily affected households and infrastructure. There were two selections for households and one for infrastructure. As evidenced by the above results, disasters have wreaked havoc on communities. There were indirect and direct effects and short and long-term consequences. As Mai et al. (2020) emphasise, floods pose a global risk to human settlements. Floods have a wide range of effects on people's lives (Sha et al., 2019). The Councillors listed various disaster impacts from previous flood disasters; for household damages, the respondent stated that:

"Houses were damaged, and roofs were blown away." (Pers. Comm.2021cb).

Another Councillor added infrastructure and stipulated that:

"Houses filled with water and infrastructure damaged." (Pers. Comm.2021ca).

Understanding the frequency of disasters was critical to determining study area trends. In addition, understanding the disaster trend will enable Disaster Management officials, relevant stakeholders, and even community members to plan on time and implement appropriate post-disaster measures. Therefore, respondents were 27, 7, 1, and 0 for every year, once every five years, once every ten years, and once every more than ten years. The outcomes are in Table 4.7.

Table 4.7: Frequency of disasters in communities

Frequency disasters	**Ncakubana**	**Mphela Township**	**Total**		**Ranking**
			Number	**Percentage**	
Every year	13	14	27	77%	1
Once in 5 years	5	2	7	20%	2
Once in 10 years	1	0	1	3%	3
Once in more than 1 years	0	0	0	0%	4

Source: Field Survey, April - July 2021

According to Table 4.3, 77% of respondents chose the option of every year. It was followed by the selection once every five years, accounting for 20% of the total. Only one person, or 3%, chose once every ten years. Finally, no participant selected once in more than ten years option. The community generally perceived that disasters occur regularly in the study areas.

The community was frequently affected by more than one type of disaster, according to responses from Focus Group interviews on the disaster's frequency. There was a discussion on the frequency of disasters from various perspectives. A 60-year-old female from Ncakubana, for example, stated:

> *"Many times, but the worst was the severe strong winds, which has happened after a long time, maybe ten years." (Pers. Comm.2021FGNa).*

A 38-year-old female from Mphela Township also shared this view, saying:

> *"Frequent, sometimes, more than once a year." (Pers. Comm.2021FGMb).*

When disasters occur, it is critical to determine whether secondary disasters affect the communities. However, none of the members of the Focus Group had experienced secondary disasters. For example, the 48-year-old female from Ncakubana explained:

> *"Do not know, have not experienced any." (Pers. Comm.2021FGNd).*

A 38-year-old female from Mphela Township agreed with the preceding viewpoint and added:

> *"Disasters are seasonal, so it is one disaster at a time." (Pers. Comm.2021FGMf).*

In a different vein, a 34-year-old female stated:

> *"It is a more psychological impact due to the traumatic experience." (Pers. Comm.2021FGNe).*

According to the responses, some disasters in the research study areas are seasonal.

4.4.3. Role and responsibilities during post-disaster

Section 11 of the Constitution prescribes that everyone has a right to life, meaning that the three spheres of government, including municipalities, must implement measures to prevent the loss of life (Constitution of the RSA, 1996). Therefore, municipalities must implement appropriate measures to prevent or mitigate disaster effects (DM Act, 2002). Probing the community about the Municipality's Constitutional and DM Act mandate was thus necessary to determine if they knew the Municipality's role in disaster relief and if they were satisfied with the Councillor's response. The Yes, No, Not Sure, and No Comment results were seven, 11, 16, and one. The summary of the findings is in Table 4.8. This outcome was in line with the Letsie and Grab (2015) study, which found that vulnerable areas have a high level of vulnerability when accessing services. The lesser the social vulnerability of areas in urban community councils, the higher their ability to cope with the natural hazard (Letsie & Grab, 2015).

Table 4.8: Community Satisfaction with the Councillors

Satisfaction with the Councilor	Ncakubana	Mphela Township	Total		Ranking
			Number	Percentage	
Yes	4	3	7	20%	3
No	8	3	11	31%	2
Not sure	6	10	16	46%	1
No comment	1	0	1	3%	4

Source: Field Survey, April - July 2021

Some community members expressed dissatisfaction with municipal service delivery. They provided various explanations. A 70-year-old Ncakubana respondent, for example, stated:

> *"No: Lost everything: had to move house. Provided only corrugated iron and planks." (Pers.Comm2021Ne).*

Some were unsure whether they were satisfied. The 65-year-old Mphela Township resident elaborated:

> *"Not sure: The Municipality only once donated blankets to all elderly in the area, after a disaster." (Pers. Comm.2021.Mg).*

The 31-year-old Mphela Township resident was also unsure and added:

> *"Not sure, as there are existing service delivery concerns, due to lack of basic services such as water, roads, and toilets." (Pers. Comm.2021.Mp)*

Some participants said yes. The 44-year-old female from Ncakubana defended the Councillor, saying:

> *"Yes: The Councillor cannot be blamed" (Pers.Comm2021Np).*

Another response with specific examples came from a 35-year-old in Mphela, who highlighted that:

> *"Yes: sponges, blankets, food, and building material." (Pers.Comm2021Mb).*

Section 24 of the Constitution prescribes that citizens have the right to live in an environment that does not endanger their health or well-being (Constitution of the RSA, 1996). Pollution and environmental degradation should be avoided, according to Section 24(b)(i) of the Constitution (Constitution of the RSA, 1996). Therefore, community members were questioned about land pollution to determine whether the Municipality upheld their constitutional rights. Four, 19, 7, and 5 people selected severe, not bad, do not know, and other. The most popular option in Ncakubana and Mphela Township was not bad, accounting for 55%. It was followed by those who said, do not know, at 20%. Next was other, selected by 14%. Finally, the option with the fewest selections was severe; 11% chose it.

Another study by Wentik and Van Niekerk (2017) confirms that the Advisory Forum's role should go beyond decision-making and include disaster management advice to government infrastructure departments. Different stakeholders and role players play different roles (Wiggil, 2013). Mitigation, preparation, response, and recovery are the four consecutive disaster management activities, according to Yu (2020). In support, Kwan (2020) advises that the typical post-disaster phase entails response and recovery efforts. Researchers have proposed many phases, including emergency relief, rehabilitation, and development (Petrudi et al., 2019). Members of the Advisory Forum also answered questions about their post-disaster roles and their opinions on the Advisory Forum's effectiveness. First, most participants were involved in the impact and need assessment, which was chosen by five. Second, four participants mentioned relief, and three participants mentioned project implementation. Finally, one respondent selected other, which was a rescue. Some roles' implementation was immediate, while others took longer. Immediate post-disaster activities are impact and need assessment and relief distribution. The project implementation is a long-term measure; normally, it deals with the reconstruction phase. Based on the findings, the conclusion can be drawn that some organisations played multiple roles post-flood disaster. It is also worth noting that some activities could be carried out concurrently.

The question asking the community if they were aware of the Municipality's role when floods occurred determined whether it plays a role as prescribed by the Constitution. Moreover, it was to determine whether the communities were aware of the Municipality's function and to assess the resources it provided. A total of 31, 91% said yes, one, accounting for 3%, said no, and two, 6% selected do not know. Most respondents said yes and explained why by mentioning occasions when the Municipality assisted them. However, the Ncakubana respondent expressed concern, stating:

> *"Yes: However, the distribution is not reaching everyone, maybe because of limited resources, e.g., Blankets." (Pers. Comm.2021Np).*

Another response by a female Ncakubana respondent elaborated:

> *"Yes: Assisted with corrugated iron and planks. However, the assistance was not adequate. The received material for the strong winds disaster is kept until there is money to buy enough to rebuild. The Municipality also distributed COVID-19 food packs to some individuals." (Pers. Comm.2021Ns).*

The Mphela respondent explained the type of assistance received from the Municipality, stating:

> *"Yes: They provide help such as blankets and food." (Pers. Comm.2021.Mg).*

In a different aspect, the Ncakubana research participant mentioned another type of assistance and stipulated that:

"Yes: Organised vouchers from Social Development" (Pers. Comm.2021Nb).

4.4.3.1. Prioritisation of the vulnerable groups

According to Rezende et al.'s (2020) study, vulnerable groups encounter the most challenges post-disaster rehabilitation. Leaders must prioritise vulnerable groups when resources are limited to provide them with the most effective relief materials (Fransisco, 2014). Therefore, it was critical to determine whether measures were in place to prioritise vulnerable groups. Acknowledging that they must be prioritised is one thing; however, putting measures in place ensures their prioritisation is equally significant. Councillors, HGDM Advisory Forum members, and Focus Group participants' queries were about prioritising vulnerable groups after disasters. The question posed to Councillors regarding the measures in place to assist vulnerable groups elicited various responses. However, the measures appeared inadequate to deal with preeminent disasters effectively and efficiently. For example, the first Councillor stated:

"Is to give people blankets and sponges." (Pers. Comm.2021ca).

The other Councillor was of the view that:

"Arranged for food parcels. Assisted females to start Cooperation, such as the Chickens Coop. However, the challenge is that members ended up eating those chickens and subsequently did not get profit." (Pers. Comm.2021cb).

Councillors' offices have different community strategies to deal with disasters. One Councillor said:

"Is to tell the community about building the houses next to the river. Communities must stop making a fire in the houses." (Pers. Comm.2021ca)

The second Councillor, on the other hand, stated:

"Discuss disaster-related matters in community meetings. There is a war room where disaster matters are discussed. The office then liaises with Departments of Social Development and Home Affairs to assist affected individuals with relief materials and Birth Certificates and Identity Documents, respectively." (Pers. Comm.2021cb).

Four participants agreed that the Advisory Forum was a good platform for assisting vulnerable groups. Two participants, on the other hand, stated that they disagreed. According to the sentiments, 75% of participants believed the HGDMAF prioritises vulnerable groups. However, 25% of respondents

disagreed that the Advisory Forum prioritised vulnerable groups. Prioritisation measures could be in the short or long term.

The Mphela Township Focus Group members stated that some vulnerable groups were not prioritised. Similarly, according to the Ncakubana respondents, vulnerable groups were not prioritised. However, the elderly, particularly grannies, were sometimes prioritised in Mphela Township. A participant from Mphela Township revealed that when it came to prioritising vulnerable groups:

> *"Grannies are called first and given relief when there are disaster incidents." (Pers. Comm.2021FGMc).*

Contrary to this, according to a respondent from Ncakubana:

> *"It is the same with everyone; there is no priority. It depends on what the Municipality gets." (Pers. Comm.2021FGNf).*

The respondents and the officials had different opinions regarding prioritising vulnerable groups. These opinions conflicted, as the communities mainly felt that vulnerable groups were not prioritised, whereas the officials indicated they were prioritised.

4.4.4. Dissemination of disaster management information

It is necessary to have a reliable, disaster-effective communication system for receiving and disseminating information to manage disasters effectively (NDMF, 2005). Effective communication management is essential for disaster management (Skinner, 2014). In addition, municipalities must involve communities in disaster management planning and implementation (NDMF, 2005). Even more important, Yasui (2017) believes that to ensure effective disaster communication, vulnerable societies must understand their risks and the sustainability of those risks. Meetings, Information and Communication Technologies (ICT), and the media can disseminate post-disaster information.

4.4.4.1. Community meetings

People's perspectives must be heard, and challenges and solutions must be identified collectively (Chagutah, 2009). Hence, Fan (2015) recommends that incorporating knowledge helps understand flood disasters and risk management, which assists officeholders in developing appropriate measures to reduce vulnerability and risks for people. Community meetings can incorporate such information. The research sought to learn from Councillors whether Mayoral Committee meetings discuss post-

disaster matters. Councillors had three options: yes, no, and do not know. The outcome was that both Councillors said yes. Next, the community members were asked if they attended community meetings. For this reason, Seaberg et al. (2017) emphasise the importance of community interactions in disaster management. According to the findings, nearly all participants, 31 91%, attended service delivery community meetings, with only three, or 9%, saying no. However, some participants said no and gave reasons for their responses. For example, the 72-year-old from Ncakubana said:

> *"No due to ill health." (Pers. Comm.2021Ni).*

The 58-year-old female from Ncakubana, on the other hand, said yes and stated:

> *"Yes: The meetings have stopped due to COVID-19. Sometimes, the meetings are held in Mahhehle, which is a problem, as one struggles with transport money." (Pers. Comm.2021Ns).*

There was a question to Community Focus Group members to check if the community meetings discussed disaster management matters. The majority agreed that disaster matters were occasionally discussed at community meetings. Five participants, four from Ncakubana and one from Mphela Township stated that disaster management issues were only discussed when disaster incidents occurred. Other participants, on the other hand, did not say yes outright.

4.4.4.2. Access to information

Explicitly, Aydin et al. (2015) stipulate that ICT is significant because it serves as knowledge storage, infrastructure for communication, and social interaction. Therefore, community members were asked about their access to Wireless Fidelity (Wi-Fi). The goal was to determine whether the community had access to the information published online. The results showed that Wi-Fi access was as follows: 0 at home, 5 at government business facilities, 11 at private business facilities, and 21 chose none. None of the participants had Wi-Fi at home. An overwhelming number of 21 respondents did not have access to Wi-Fi. The findings disclosed that those with access primarily obtained it from private business facilities. Some access Wi-Fi from various sources, not just one, depending on where they are on the day. The respondent who accessed Wi-Fi was a 33-year-old in Ncakubana and revealed that:

> *"Government business facilities: library, Private business facilities: Nedbank and KFC." (Pers. Comm.2021Nm).*

The use of cell phones by communities assists in improving communication resilience (Aydin et al., 2015). Thus, establishing network coverage for disaster management information dissemination was

critical. The results were encouraging, with 30, 2, 1, and 2 people choosing good, bad, depends, and do not know. These results accounted for 85%, 6%, 3%, and 6%. They demonstrated that almost all the participants selected good, as there were 17 in Ncakubana and 13 in Mphela Township. The inference could be drawn that the network coverage from different national mobile telecommunications companies was good in both areas. Unfortunately, constant loadshedding experienced countrywide in various stages sometimes affected network coverage.

4.4.4.3. Sources of information

Information is essential because it may be the only affordable means of disaster preparedness for people with low incomes (Chagutah, 2009). When disasters occur, Ultramari (2016) agrees that the media plays a role in society. Communication technology ranges from Television (TV), radio, telephones, and the internet (Fransisco, 2014). Respondents were then requested to indicate their communication channels to access disaster management information. The question explicitly asked whether radios, TVs, newspapers, the Internet, or word-of-mouth were ways to disseminate disaster management information in communities. Members of the community chose various communication systems. Some respondents chose one option, others two, three or more. In total, 31 people mentioned TV, whereas 28 indicated radio. Furthermore, 15 respondents said word of mouth. In addition, 8 participants cited newspapers and the Internet. The findings are in Table 4.9.

Table 4.9: Communication channels in community study areas

Communication channels	Ncakubana	Mphela Township	Total Number	Ranking
Television	15	16	31	1
Radio	18	10	28	2
Newspaper	2	6	8	4
Internet	1	7	8	4
Word of Mouth	7	8	15	3

Source: Field Survey, April - July 2021

There was a slight difference between Ncakubana and Mphela Township in the results. Radio was the most common mode of communication in Ncakubana, as selected by 18 participants, and only 10 respondents chose it in Mphela Township. TV was the most common in Mphela Township, as 16 participants selected it compared to 15 in Ncakubana. The Internet and newspapers were the least selected options in both study areas. According to Chagutah (2009), informing communities about reducing their vulnerability can significantly reduce disasters if communities are willing to act. Then

again, Yasui (2017) expands on this principle by stipulating that risk messages help communities become more aware of existing vulnerabilities, allowing them to take the necessary precautions. Members of the Community Focus Group indicated numerous sources of information.

4.4.5. Disaster management resources

The Disaster Management Framework stipulates that the Disaster Management Operational Plans must specify the mechanisms for activating and mobilising response and recovery resources (NDMF, 2005). According to Seaberg et al. (2017), a disaster management official coordinates resources for all disaster management phases to reduce disaster impacts. The entity's resource base determines its ability to manage disasters (Buou, 2019). When implementing a Flood Risk Management Policy, the government must allocate public resources toward activities that protect high-risk areas and the most vulnerable groups (Chakraborty et al., 2019). Therefore, it was paramount for the investigation to identify the resources utilised by disaster management officials during post-disasters. The intention was to establish disaster management officials, Councillors, Advisory Forum Members, and community members' state of readiness regarding post-disaster activities. This would assist in having floods disaster-resilient and adaptive communities.

4.4.5.1. Disaster management officials' resources

The open-question responses from disaster management officials regarding the availability of resources differed from participant to participant. Some disaster management officials, for example, stated that their organisations do not have available resources. Some participants, on the other hand, listed their resources. For instance, the Manager of a local DMC in KZN revealed:

> *"To deal with post-disaster activities, the municipality typically provides relief measures to intervene in incidents: Blankets, Sponges, Gel stoves, Food parcels, Tents, Roof plastics, and Community Halls. In addition, the municipality installed lightning conductors in some wards in the areas affected by the lightning strike last November and December. (Pers. Comm. 2021d).*

Most respondents mentioned the above short-term relief materials. A senior disaster management specialist in the Metropolitan Municipality DMC also listed:

> *"4x4 bakkies, Staff, Relief materials (food parcels, blankets, donated clothes, mattresses, temporary tents, and Utility packs containing items such as pots, knives, teaspoons, tablespoons, stove, basin, enamel bowl, and cups, Cell phones, Laptops, and Plastic sheets to cover the damaged roof." (Pers. Comm. 2021g).*

A Metropolitan DMC employee expressed a different point of view, saying:

> *"The short-term post-disasters in the City have limited internal resources and largely depend on civil society organizations to deal with humanitarian activities in the immediate aftershock. However, in the medium- to long-term, the City has access to grant funding as a resource through the Provincial Disaster Management Centre." (Pers. Comm. 2021b).*

In contrast, the senior Government Department official elaborated:

> *"Organisations: Private Farmer Organisations assisting, though the assistance is limited. There are departmental conditional Grants assisting farmers. However, there is prioritisation. There is an NDMC arrangement to access disaster grants. The commercial Sector is a blended finance model, though it is still not finalised. The land bank was also assisting through loans with low interest. (Pers. Comm. 2021w).*

The Manager of the District DMC in Free State pointed out that:

> *There is no storage at the DMC. The Municipality used to have storage for blankets and parcels. There was irregular usage from Councillors, as the disaster relief materials were for things other than assisting disaster management victims. The DMC tries to assist other Departments as disasters affect infrastructure and human settlement. However, there is usually no money. Currently, the District is getting assistance from the Red Cross, Gift of the Givers, businesspeople, and individuals. The challenge is that some volunteers want jobs, and some businesspeople want contracts." (Pers. Comm. 2021u).*

Some organisations' resources included relief materials, temporary shelter, vehicles, budgets, personnel, ICT equipment, and building materials. However, the resources mentioned were primarily for short-term use by disaster management officials.

4.4.5.2. Councillors' available resources

The Councillors were also required to indicate the resources available to deal with disasters and the measures to assist vulnerable groups post-disaster. According to one Councillor:

> *"Is to provide people affected by the floods or fire with blankets and sponges." (Pers. Comm.2021ca).*

In the same vein, another Councillor stated:

> *"There is staff, which assist in coordinating acquiring assistance with various resources such as food parcels, wheelchairs, and blankets." (Pers. Comm.2021cb).*

4.4.5.3. Communities' specific resources

Ncakubana and Mphela Township Community members were also asked if they knew of any resources in their communities. Hospitals or clinics, critical facilities, NGOs, schools, and universities were among the resources. Again, respondents could select yes, no, or do not know (DNK). The question

sought to identify resources that can assist communities in recovering from disasters. The results are displayed in Table 4.10.

Table 4.10: Community Resources/ Facilities

Community Resource Facilities	Ncakubana			Mphela Township			Totals		
	Yes	No	DNK	Yes	No	DNK	Yes	No	DNK
Police Stations	17	2	0	16	0	0	33	2	0
Hospitals/ Clinics	18	1	0	16	0	0	34	1	0
Critical Facilities	1	5	13	8	0	8	9	5	21
NGOs	5	2	12	9	2	5	14	4	17
Schools	18	1	0	16	0	0	34	1	0

Source: Field Survey, April - July 2021

In Ncakubana and Mphela Township, 33 people said yes, 2 said no, and 0 said they did not know about the police station. About 34 respondents said yes, one said no, and 0 said they did not know hospitals and clinics in their respective areas. The critical facilities questions yielded the following results: 9 said yes, 5 said no, and 21 did not know. Regarding knowledge about NGOs in the area, 14 said yes, 4 said no, and 17 did not know. About 34 people said yes, 1 said no, and 0 said they did not know about schools. Both Ncakubana and Mphela Township did not have universities. According to some respondents, most students pursued their education after completing their Matric in Pietermaritzburg or Durban. Ixopo and Kokstad, on the other hand, had some higher learning institutions, although they were insufficient. Moreover, the local institutions of higher learning were far from the communities, requiring students to have transportation money or pay for accommodation next to the institutions. The community members were concerned about the cost of post-secondary education. They were indeed far away and thus not easily accessible to the communities. Most families' lack of financial means was likely to exacerbate the situation. Most students were unlikely to continue their studies beyond Matric.

Regarding Focus Group members' resources in place to capacitate community members to deal with disasters and be disaster-resilient, some respondents indicated there were resources, while others said there were not there. In addition, some people highlighted that they assist each other as community members. A respondent in Mphela, for example, explained that:

"People donate to kids in the area." (Pers. Comm.2021FGMa).

In the same vein, another female participant from Mphela Township provided an example:

"Helping an elderly granny, who is a neighbour before and during disasters." (Pers. Comm.2021FGMb).

The Ncakubana participant, conversely, revealed:

"None from the community, the Municipality sometimes help." (Pers. Comm.2021FGNd).

According to Francisco (2014), community social, religious, and other organisations can reduce the effects of disasters by providing support during and after disasters. Moreover, Fransisco (2014) notes that community organisation membership was an example of social capital. Social networks influence the household's susceptibility to the effects of the hazard (Sha et al., 2019). The study determined which community members belong to which social groups. The findings showed that some participants belonged to social groups while others did not. Participants indicated that 23:66% participated, 11:31% did not, and 1:3% selected no comment. Some community members were involved in their community's social groups. The young participant indicated:

"Yes: Youth Group, Stokvel, and have a funeral cover." (Pers. Comm.2021.Nm).

Regarding social groups, some participants belonged to only one, while others belonged to two. According to the findings, the burial society and stokvel were the most common social groups at the research sites. In Mphela Township, for example, one participant revealed:

"Yes: Stokvel and burial society. The stokvel is only money stokvel, not food." (Pers. Comm.2021.Mk).

It was concerning to note the response of a disabled Ncakubana participant, who said:

"No: tried to establish it, they stole our bricks." (Pers. Comm.2021.Nh).

In contrast, Chanza et al. (2020) suggest that political affiliations can disintegrate existing relationships, making them less effective during disasters. Similarly, Prinsloo and van der Waldt (2016) emphasize that political risk leads to less effective disaster management efforts. As demonstrated by Chanza et al. (2020), political interference can sometimes exclude non-members even when they are in the same area. Therefore, determining which members of the community are politically active was critical. Community members' responses to the question of political affiliation varied. The 28 respondents said they were not involved in community political matters, while the remaining seven said they did participate. The responses amount to 80% and 20%, respectively. Therefore, many participants did not belong to a political party.

4.4.5.4. Adequacy of resources to deal with disasters

Easy access to economic resources hastens recovery (Francisco, 2014). When disaster management measures are in place, resource constraints can cause DMCs to fail to respond effectively to disasters (Chanza et al., 2020). Therefore, another crucial focus area of the research was to question disaster management officials about the adequacy of resources for post-disaster activities. Nearly all participants said no when asked if the resources used after a disaster were adequate. Participants also provided reasons for citing the scarcity of resources to underscore their points. The Metropolitan DMC's Manager elaborated that:

> *"They are not adequate for dealing with disasters. We need an approved volunteer policy and appointment of such unit per volunteer regulations and employment of support staff, drivers, and runners for logistical responsibilities post-disaster. Availability of other resources from municipal departments for logistical imperatives and transportation of the vulnerable community members post-disaster where a need arises." (Pers. Comm. 2021h).*

The District DMC official's response was concerning, as it revealed:

> *"The resources mentioned above only assist with house or shack fires and strong winds but not with floods. In the relocation of communities during floods, it was clear in 2016 that we had blind and deaf among the victims. Communication was difficult because our response plan was for abled bodies; the vulnerable groups were aggrieved; fortunately, they did not go to the Human Rights Commission. The early warning systems in public places exclude deaf people because they are mostly alarms or sirens. We also look at our day-to-day public transport; it does not accommodate people using wheelchairs normally; they hire cars, which automatically excludes them financially. Due to inaccessible roads, many people cannot move around when it rains normally. The vulnerable communities are frustrated even when no disasters exist; you can imagine frustration multiplies during disasters." (Pers. Comm. 2021.i).*

Surprisingly, the Local Municipality DMC participant stated:

> *"Yes, public facilities are being utilized to evacuate the affected communities. For example, the municipality uses community halls, churches, and sports facilities. The municipality has 12 wards, and each ward has a hall. So far, the municipality has dealt with post-disaster activities with the available resources." (Pers. Comm. 2021.d).*

The HoC in the Free State District DMC is also of the opinion that:

> *"The availability of different technicians or experts and the participation of all organs of states and NGOs determines the availability of resources. Districts and Municipalities do have a minimum budget." (Pers. Comm. 2021 v).*

Poor disaster victims, a lack of resources, budget constraints, daily operation resources, personnel shortages, and a slow turnaround time to acquire funding were some reasons for resource adequacy or inadequacy. In addition, organisational resource scarcity was a cause for concern.

Another question sought to ascertain the Municipalities' available resources from the perspective of the communities. Municipal assistance to ensure disaster capacity and resilience elicited various community responses. Ncakubana respondents, for example, accentuated tangible assistance, whereas Mphela Township respondents emphasised intangible assistance from the Municipality. One 48-year-old respondent from Ncakubana stated:

> *"Provided corrugated iron when affected by strong winds." Assist with vouchers (food)." (Pers. Comm.2021FGNd).*

In contrast, the 28-year-old Mphela Township resident revealed:

> *"Community awareness campaigns." (Pers. Comm.2021FGMa).*

Similarly, the 53-year-old from Mphela agreed and elaborated, saying:

> *"Distribution of pamphlets about disasters written in both IsiXhosa and English." (Pers. Comm.2021FGMc).*

A mix of structured and unstructured measures was implemented based on the results. Some measures were long-term, while others were short-term.

4.4.5.5. Sources of post-disaster activities resources

Some organisations have internal resources, while others may have external resources. Furthermore, some businesses outsource resources internally or require additional resources if they are lacking. Sometimes, organisations do not have any resources. There was a request for Advisory Forum members to identify where they obtained their resources. They had to decide whether it was internally, externally or outsourced resources. In the study, five respondents stated that resources were internal, while three stated they were external. Two participants, on the other hand, indicated that they were outsourced. The conclusion is that some organisations had more than one source of resources. It was also encouraging that no member of the Advisory Forum stated that they lacked resources for post-disaster activities. However, this response was unconvincing since community members, disaster management officials, and Councillors indicated inadequate post-disaster resources. Most participants obtained post-disaster resources from within, suggesting some level of post-disaster planning. Similarly, departments ensured that resources, including outsourced resources, were available for post-disaster activities.

4.4.5.6. Capacity and resilience to cope with disasters

Coping strategies for extreme events, such as flooding, are measures implemented before, during, and after a disaster (Muysoki et al., 2015). As a result, less vulnerable groups have the greatest adaptive capacity, while the most vulnerable groups have the least (Malak et al., 2020). Resilience-building is not a linear process (Kwan, 2020). Equally, Chuang et al.'s (2020) perspective on resilience concerns the community's disaster response-ability and achieving adaptive governance, both of which are critical for improving resilience. Another question for community members was whether they had developed the capacity and resilience to deal with disasters. These would have been projects carried out by individuals or groups. All respondents lack the capacity or resilience to deal with disasters. Some responses indicated that the communities were unprepared for the inevitable future disasters. For example, the 52-year-old Ncakubana resident believed:

> *"No: Not ready for other disasters." (Pers.Comm2021Nj).*

The Mphela, a 65-year-old who shared the above viewpoint, stated:

> *"No: Call the neighbour to assist." (Pers.Comm2021.Mg).*

Previous disasters that impacted communities did not seem to have yielded any lessons. The interviewed communities still lacked the disaster management capacity and resilience to deal with disasters. The findings presented above were concerning because the respondents would likely be affected similarly, if not more when the next disaster strikes.

The strategies implemented by the communities revealed that the Focus Group members lacked strategies. Lack of community strategy was a similar challenge in Uganda, where the community could not mitigate landslide risks (Nakileza, 2007). There was not a single respondent who stated that they had a strategy. Some respondents provided more information about their responses. According to one Ncakubana participant:

> "*I can run away if there are disasters, again. There is nothing a person can be able to do." (Pers. Comm.2021FGNb).*

Another Ncakubana-based respondent explained:

> *"No strategies. The experience, especially where there was a huge fire, was a traumatic experience because livestock burnt, as it could not run." (Pers. Comm.2021FGNf).*

4.4.5.7. Funding

A proactive approach to disaster risk reduction, according to Katongole (2020), is funding. Governments worldwide use a variety of risk-financing instruments (Katongole, 2020). Hence, disaster management officials were questioned about whether funding arrangements for post-disaster recovery were in place. Not everyone said yes. A total of 19 people, or 56%, said yes. In contrast, 10 participants, which is 29%, indicated no funding arrangement. Lastly, 5 individuals, making up 15% of the population, said sometimes. The results are depicted in Figure 4.5.

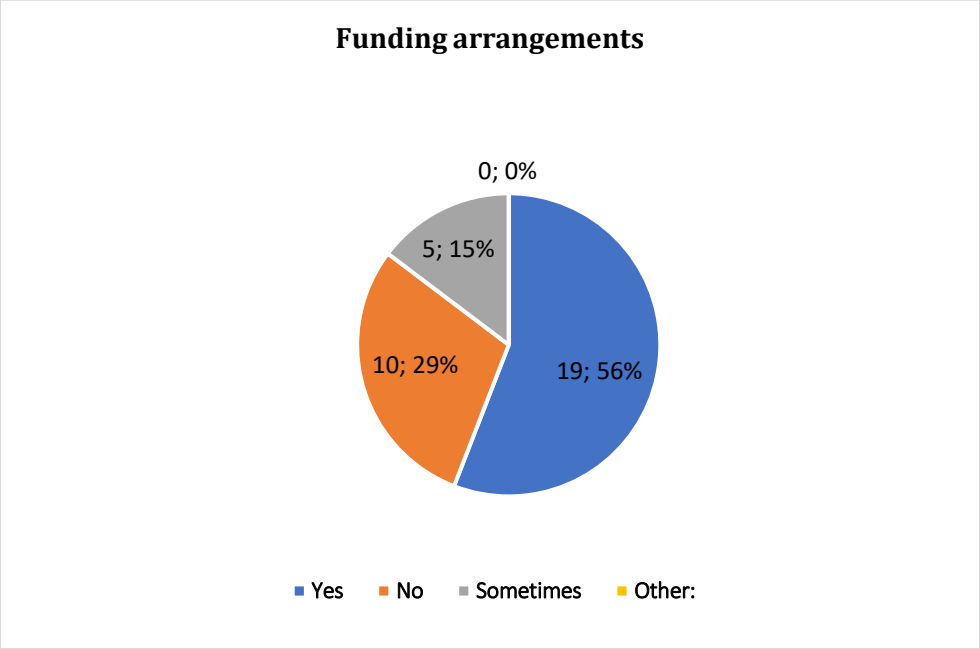

Figure 4.5: Existence of funding arrangements
Source: Field Survey, April - July 2021

In terms of funding arrangements, one PDMC's Deputy Director agreed and elaborated that:

> *"Yes: National funding through disaster fund." (Pers. Comm. 2020b).*

Moreover, the HoC in the Local Municipality stated:

> *"Yes, mainly for relief materials. It is insufficient for Disaster Risk Reduction and projects." (Pers. Comm. 2021k).*

One of the District DMC's senior officials echoed the same sentiments and indicated:

> *"Yes, a budget is put aside for temporary relief." (Pers. Comm. 2021q).*

In contrast to the existing funding arrangement, the Director of another PDMC responded:

> *"No, we use Division Of Revenue Act: DORA and adjusted budget." (Pers. Comm. 2020c).*

Without funding, it may be complex to carry out post-disaster activities. Importantly, Katongole (2020) believes funding needs entail identifying disaster risks early on and allocating financial resources to assist affected individuals during post-disasters to ensure efficiency and improve resilience. However, even having funding for day-to-day pre-disaster activities seemed challenging for most organisations. As a result, there was an expectation that resources for post-disaster activities would be scarcer during high-magnitude incidents.

4.4.5.8. Budgeting for post-disaster activities

The DM Act prescribes that all state organs must budget for disaster response and recovery activities (NDMF, 2005). Therefore, the Advisory Forum members were required to indicate whether their organisations have budgets for disaster management activities. The results showed that 33% do not budget and 50% budget. Moreover, 17% said sometimes. Therefore, budgeting for post-disaster activities was possibly compromised at the expense of pre- and during-disaster activities. Consequently, there was anticipation that a lack of budgeting would affect flood post-disaster activities. The activities would likely be slow, delayed, ineffective, and inefficient.

4.5. Post-disaster challenges

The research also sought to determine the challenges experienced during post-disaster management in South Africa. Its purpose was to elicit information on the obstacles to the effective and efficient implementation of post-disaster activities. The question was from the interview schedules for disaster management officials and the Ncakubana and Mphela Township Municipal Ward Councillors. The information was also from questionnaires administered to HGDM Advisory Forum members, who were various stakeholders who had implemented multiple projects post-disasters and may have encountered challenges. Moreover, questionnaires were administered to randomly selected community members and Focus Groups participants in Mphela Township and Ncakubana, as disaster-affected communities may have faced challenges post-disaster. Since challenges are likely to occur at different scales, disasters affect some people more than others, depending on their vulnerability (O'Brien et al., 2010).

4.5.1. Challenges encountered when implementing the DM Act and policies post-disaster

The researcher discussed the DM Act and policy implementation challenges with research participants. The goal was to obtain participants' opinions on whether there were challenges in implementing the

DM Act and legislation post-disaster. Atlasti was used to analyse the difficulties encountered when implementing the DM Act and policies post-disasters. Table 4.11 depicts the codes as well as the perspectives of some of the participants.

Table 4.11: Challenges encountered when implementing DMA and policies post-disaster

Recurring Responses Codes	Details of responses
a) Lack of Multistakeholder approach	Some disaster management officials mentioned the lack of a multistakeholder approach. The District DMC official shared: *"I have found a lack of understanding of the role of Disaster Management Centres. During the post-disaster phase, one has found that both Political and other administrative leaders assume that disaster management centres are directly/physically responsible for rebuilding (e.g., rebuilding houses damaged by storm). The opposite is true; Disaster Management Centres' duties involve assessing and providing immediate assistance where such capacity or resources exist. Furthermore, bring all required stakeholders, such as the Departments of Human Settlement, Public Works, Roads, Transport, Water & Sanitation, on board to enable overall management of the incidents or disaster as it may be." (Pers. Comm. 2021r).*
b) Challenges faced by disaster management officials	The study elicited overwhelmingly negative responses to disaster management officials' challenges. For example, the District DMC in KZN Province's HoC stated: *There are delays in procurement, construction of emergency houses by service providers appointed, and complaints from community members about the quality of material received. There were also complaints about community members saying their households were not assessed and were left behind, although they were affected. Everyone wants to get something even if they are not affected, especially food parcels." (Pers. Comm. 2021d).*
c) Unsatisfactory Commitment by Sector and Municipal Departments	Unsatisfactory commitment by Sector and Municipal Departments contributed to the difficulties encountered. For example, the manager of the District DMC, located in Free State Province, said: *"Since disaster is everybody's business, organs of state and NGOs are reluctant to assist Disaster Management Unit, they believe is that Disaster Management Centres are the ones responsible forgetting that Disaster Management is there for coordination." (Pers. Comm. 2021v).*
d) Inadequate Funding arrangements	Almost all respondents expressed the same concern about insufficient funding arrangements. For instance, the HoC of a District Municipality voiced concern, stating: *"Lack of Institutional Arrangements in Local Municipalities, thus there are no fully functional Units. Subsequently, the updating of plans and funding of disaster management are limited. In addition, there is a lack of equipment, and issues with LMs impact preparedness, e.g., flash floods are maintenance issues. Post-disaster funding- Municipalities want to transfer funding*

Recurring Responses Codes	Details of responses
	responsibilities to NDMC, whereas there must be impact assessments." (Pers. Comm. 2021u).
e) Insufficient Institutional Arrangements	The majority of DMC officials were dissatisfied with the lack of institutional arrangements. A senior official in a government department elaborated on the issue and pointed out that: *"Policies are not encouraging resilience, but reliance on the Government. They are not encouraging affected individuals to resist future disasters; instead, the Government is dishing out assistance to the farmers. The affected individuals should use post-disaster relief as an incentive to stand on their own, not rely on handouts. The problem is that the Government provides relief every year, but the situation is not improving." (Pers. Comm. 2021w).* According to the Manager of a Metropolitan DMC: *"During declared incidents, the centre cannot fully exercise its legislative powers due to lacking a designated Head of Centre. The DMC is not placed in the municipal Echelon office as recommended in the National Disaster Management policy framework and thus cannot coordinate/ cut across departments fully. It is difficult for the centre to coordinate inter-departmental agencies to implement contingency plans. The lack of a Disaster management funding model is also a major challenge. There is political interference. Standard Operating Procedures are not in place, with no uniform approach to disasters and non-availability of emergency funds." (Pers. Comm. 2021e).*
f) Political interference and unfairness	Another issue that concerned some DMCs officials was political interference and unfairness, particularly where vulnerable groups were compromised. For example, the HoC in the PDMC believed that: *"The grey area is political instability, which results in different parties interfering with the work of disaster practitioners. For example, the community suffers from different political views, especially the Department of Social Development, when distributing food parcels during floods. The councillors will fight over food parcels or want to give them to their families and friends." (Pers. Comm. 2020i).*

Source: Field Survey, April - July 2021

The responses advocated that wide-ranging challenges impede the implementation of post-disaster legislation and policies. They included the multi-stakeholder approach, disaster management officials' challenges, commitments from Sector and Municipal Departments, funding arrangements, institutional arrangements, and political interference and unfairness. The officials raised a challenge regarding the South African Post Office, as there were incredibly long queues as people travelled from Matatiele, uMzimkhulu, Mount Frere, Mount Ayliff, Bizana, and Ntabankulu to receive Government social grants, the COVID-19 Social Relief of Distress Grant (Field Survey, April - July 2021).

4.5.2. Common challenges encountered during the post-disaster phase

It was also crucial to check on the common difficulties encountered by disaster management officials during post-disasters. The responses were focused on the post-disaster phase, even though there are also pre-disaster phase challenges. Table 4.12 indicates the common Atlasti-coded challenges and reasons provided by participants:

Table 4.12: Common challenges encountered during the post-disaster phase

Recurring Responses Codes	Details of responses
a) Power dynamics	The unique challenge was power dynamics that affected organisations. For instance, the respondent from the District Municipality provided a brief history of challenges encountered and stipulated that: *In the Local Municipality when I was there, political leadership was on point, maybe because the Act and Framework were still new. In another Municipality, it was not difficult because I was allowed to perform my duties without interference. My current employment is at the mortuary; the profession is in disrepute. The communities become greedy and selfish during resource allocation, especially for food parcels. There is a duplication of services by different entities. They fight over authority and power instead of helping the vulnerable community. They approach different disasters in the same way, which is wrong. (Pers. Comm. 2021i).*
b) Limited Funding arrangements	Almost all participants were dissatisfied with the limited funding options. A Deputy Director in a PDMC, for example, specified that it was: *"Limited budget for the provision of efficient and effective post-disaster response, failure by organs of state to expedite implementation of post-disaster interventions." (Pers. Comm. 2020b).*
c) Vulnerable communities' challenges	The views on the challenges faced by vulnerable groups were among the most identified challenges. In terms of communities, the District DMC HoC in KZN reiterated: "*High expectations from the community expecting to get houses and groceries. Community members complained about the materials received from disaster management, saying they wanted houses, not only relief materials. Some complain about not being on the list of people going to benefit. Some complain about their households not being assessed." (Pers. Comm. 2021d).*
d) High frequency of disasters	The high frequency of disasters added to the list of challenges. One of the Government Department's Deputy Directors summarised the various challenges and indicated: *"Disaster-affected individuals do not practice proper disaster management methods because they know the Government will rescue them. There is a sense of entitlement. Declaring a state of disaster process is a challenge. It is long and tedious. The bureaucracy of getting the disaster relief funds is*

Recurring Responses Codes	Details of responses
	also challenging because of the red tape encountered during the process." (Pers. Comm. 2021w).
e) DM officials' roles and responsibilities	Another challenge raised by respondents was inadequate human resources. For example, the District Municipality DMC Manager stated: *"There are five personnel, and the DMC is under-resourced. Thus, the implementation of what is required by the Disaster Management Legislation is limited." (Pers. Comm. 2021q).*
f) Shortage of resources	A common challenge mentioned by respondents was a shortage of resources. A Local Municipality DMC official in KZN Province, for example, stipulated: *"Community: Some people who are not affected deliberately destroy their belongings; to be given relief materials. Moreover, some take chances and claim to have been affected, whereas they were not. Political leaders request relief materials for people not affected, especially during election season. Stakeholders: Delayed disaster response by stakeholders. It can take days before the stakeholders respond." (Pers. Comm. 2020k).*
g) Multistakeholder complications	Several respondents concurred that multi-stakeholder complications occurred post-disaster. For example, the District Municipality DMC Manager believed that: *"Lack of participation of line function stakeholders citing that DMCs are solely responsible. Delays in implementing reconstruction and rehabilitation programs." (Pers. Comm. 2021r).*

Source: Field Survey, April - July 2021

Many responders stipulated power dynamics, funding arrangements, vulnerable communities' challenges, the high frequency of disasters, disaster management officials' roles and responsibilities, a shortage of resources, and multistakeholder complications as the most common challenges. According to these perspectives, DMCs faced numerous challenges they could not control.

Uncertainties hinder effective response planning (O'Brien et al., 2010). Determining whether Disaster Management Advisory Forum members faced challenges post-disasters was significant. Administrative, funding and other challenges were identified as categories. There was also a none option if some organisations did not face challenges. According to the findings, nearly all participants indicated they faced difficulties somehow. Some participants experienced only one type of challenge, while others encountered more than one. Three participants, for example, selected administrative challenges. Five participants stated that funding was their biggest challenge. Three participants chose the other option. One participant specified that the challenge is the officials' noncompliance in the post-disaster phase. Another participant raised the issue of "red tape" as a challenge. The LM respondent, on

the other hand, indicated a response delay. It could be concluded that the main challenge Advisory Forum members faced was funding. It was because, as shown above, 75% of respondents identified funding as a challenge. Unfortunately, most organisations lacked adequate funding and, thus, the resources required for post-disaster activities.

It was also essential to determine the challenges encountered by Councillors to comprehend the difficulties faced in the study areas. According to the first Councillor, it is as follows:

> *"Continuous floods and other disasters. (Pers. Comm.2021ca).*

The second Councillor concentrated on both immediate and long-term challenges, revealing that:

> *"Some people not affected are greedy: they want relief materials. Sometimes employed people want to be prioritised more than the unemployed and vulnerable people, whereas they have the means to provide for themselves. There is a lack of funding, and relief material is not adequate. There are big families; sometimes, the relief material is insufficient." (Pers. Comm.2021cb).*

The first Councillor was concerned with the environment, while the second was concerned with socioeconomic factors that affect vulnerable communities.

4.6. Projects and opportunities inventory post-disasters

Determining existing projects and establishing whether opportunities might arise post-disasters was critical. The study sought to develop an inventory of opportunities, systems, and processes for effective post-disaster management in South Africa. There was a question for disaster management officials, Councillors, and Focus Groups participants about existing projects to assist vulnerable groups. In addition, another question for participants was about post-disaster opportunities.

4.6.1. Projects in place to assist vulnerable groups post-disaster

Post-disaster projects must prioritise and address community needs (NDMF, 2005). Another suggestion is to focus on managing heatwaves, drought, floods, and soil erosion (Amoah & Simatele, 2021). The responses provided information on the measures taken to assist vulnerable groups post-disaster. Furthermore, if the identified projects help vulnerable groups effectively, they can be recommended and replicated in other DMCs. Table 4.13 details the projects that various disaster management officials implemented in their organisations, including providing relief materials, shelter, information dissemination, structures, and relocation.

Table 4.13: Projects in place to assist vulnerable groups post-disaster

Projects	Description of Projects
a) Shelter and relocation	Some participants mentioned the provision of shelter and the location. For example, the PDMC Deputy Director stated: *"There are many interventions which include housing reconstruction targeting child-headed households, people living with disabilities, and indigent communities at large." (Pers. Comm. 2020b).* Some people mentioned informal settlement-specific projects. For instance, one Metropolitan DMC participant stated: *"Reblocking project- focus on the informal settlement. Winter and summer awareness campaign-formal and informal areas" (Pers. Comm. 2021g).*
b) Information dissemination	Awareness campaigns were implemented to disseminate information. For example, the LM HoC from KZN elaborated on the preceding viewpoint: *"Outreaches are fundamental in curbing or reducing the impact. These are known as awareness or preparedness plan, which helps communities with hazard prevalent in a particular ward. These projects are proactive rather than reactive. In terms of KPA 4 of the DM Act, post-disaster projects are reactive and involve relief material supply to the displaced. Post-disaster projects are a by-the-way approach in that one waits for an incident to happen and becomes active. Contingency plans are activists based in that programs are developed and activated." (Pers. Comm. 2021p).*
c) Establishment of structures	Some respondents mentioned the creation of structures that could help with various activities. There was a PDMC HoC, for example, who reported: *"Establishing a ward-based approach to identify all vulnerable community members." Developing and implementing ward-based disaster management plans to emphasise people with disabilities." (Pers. Comm. 2020f).*
d) Temporal measures	Aside from the various projects mentioned by many participants, few respondents revealed the temporary measures in place, such as shelters. However, the Manager of the District DMC held a different opinion, stating: *"Most disasters are short-term. Therefore, the vulnerable groups evacuate to temporary facilities and return to their homes after a disaster. Sometimes, there is a provision of temporary shelter. However, the challenge is that the neighbours who are not affected burn down their houses to get temporary houses as they are perceived to be better. The provision of temporary houses thus exacerbates the situation." (Pers. Comm. 2021u).*
e) No projects	Some DMCs were currently not implementing any projects. The District Municipality DMC respondent statement revealed the following: *"In our case, the status quo remains even though there is partly implementation of normal service delivery is partly implemented. The sad part is that in our Disaster Centre, we do not cater for disabled people; we are facing a case from the Human Rights Commission; one of us is disabled, and the office setting is not good for her." (Pers. Comm. 2021i).*

Source: Field Survey, April - July 2021

The Councillor's responses regarding projects implemented post-disasters varied. One Councillor answered no, while another said yes. The Councillor who answered yes explained and indicated:

"Yes, there are people that identified to be built houses." (Pers. Comm. 2021cb).

When asked about specific disaster management projects in the area, almost all Focus Groups community members revealed that they were unaware of any such projects. Surprisingly, only one person in Mphela Township responded positively and mentioned the temporary structure project to relocate disaster-affected individuals. The responses of some participants ranged from "no," "not really," "not sure," and "don't know." For example, a Ncakubana participant responded as follows:

"Not that I know of." (Pers. Comm.2021FGNd).

There might be both non-structural and structural measures. Departments such as Housing, Education, Social Development, EMS, Environmental Affairs, and Home Affairs are required to assist with the implementation. Some projects were long-term in nature, while others were short-term or ongoing. Another observation about the projects was that they varied from area to area.

4.6.2. Determining opportunities post-disaster

According to O'Brien et al. (2010), disaster management implementation can be a double-loop approach that eliminates risks. A new learning model can be implemented whereby things are done differently (O'Brien et al., 2010). Members of the Advisory Forum were asked if they thought there were possible opportunities following disasters. This question sought to ascertain whether opportunities exist post-disaster. Members of the Advisory Forum had to choose between Yes, No, and I don't know responses. From the results, all participants believed that opportunities existed post-disaster. Interestingly, one participant stated that post-disaster, there is an opportunity to discipline people who do not follow the policy. These responses advocated that the disasters could provide various opportunities; they were not all bad and could yield helpful outcomes.

This study was critical in determining whether inventory development opportunities might arise post-disaster. Francisco (2014) states that disasters may help develop new disaster-response strategies. It could be because disaster-affected communities and officials learn and develop new disaster-response measures. Similarly, Davidson (2020) believes that a disaster can be a good catalyst, a window of opportunity, and a source of positive change. Convincingly, Ultramari (2016) argues that undesirable and unexpected situations can result in institutional, financial, political, and human opportunities. Therefore, the questions of disaster management officials, Councillors, and community members' Focus

Group members elicited information about the proposed post-disaster opportunities to assist vulnerable disaster groups. Most disaster management officials agreed that there were opportunities post-disaster. Table 4.14 displays some of the identified post-disaster opportunities.

Table 4.14: Identified post-disaster opportunities

Identified opportunities	Details of identified opportunities post-disaster
a) Strengthening relationships	Some respondents were concerned with establishing or strengthening relationships. For example, the PDMC's Assistant Director believed: *"Partnership with Private, NGOs and Government Institutions in helping victims." (Pers. Comm. 2020a).*
b) Reconstruction	Other participants identified opportunities for rebuilding infrastructure such as water resources, roads, and homes. In KZN, for example, The District Municipality HoC specified: *"Development such as the construction of roads, bridges, emergency houses, or houses, donations received from donors to affected victims, disaster can lead to development." (Pers. Comm. 2020d).*
c) Wide-ranging	Some respondents stipulated many opportunities, such as volunteers, workshops, and resources. As an example, the local DMC official listed: *"Have Disaster Management Volunteers, Ward Councillors, Amakhosi, and Izinduna workshops to know which disaster incidents to report. Employ more Disaster Management Officials, as there are 14 wards in the municipality. Acquiring more resources to do disaster management activities. Quicker response from stakeholders, such as the Department of Social Development and SASSA, to at least respond within three days of the incident." (Pers. Comm. 2020k).* Another respondent based in Gauteng Province proposed the opportunities that DMCs can implement and listed the following possibilities: *"Development of disaster unemployment assistance policy, Mass Care and Emergency Assistance Policy framework, Individual and Households Program Assistance, Disaster Case Management Program., Crisis Counselling Assistance and Training Program and Standard Operating Procedure' Disaster Legal Services, Voluntary Agency coordination program and checklist., and Survivor Resources and database." (Pers. Comm. 2021h).*
d) Specific Education and Training	There were numerous calls for specific education and training measures to be implemented based on the lessons learnt. A Manager in a Metropolitan Municipality DMC, for example, elaborated: *"With each post-disaster phase passed, disaster centres miss an opportunity to do a post-mortem or survey better to understand an affected community's expectations and experiences to enhance its stakeholder relations, risk messaging, training, and awareness. To convert community vulnerability into sustainability during the post-disaster phase through enhanced risk*

Identified opportunities	Details of identified opportunities post-disaster
	messaging, more significant stakeholder relations, and sustainable risk reduction interventions." (Pers. Comm. 2021b). In addition, the District DMC official mentioned: *"The need for the training of community members to ensure their resilience, using the previous occurrence of disasters as a case study or practical example. With exemplary leadership, disaster management can be a stronghold for vulnerable communities. For instance, there can be Risk Reduction strategies so that the empowerment of communities is priority number one. The risk measures that can be implemented are as follows: Agriculture activities for people living in flood areas. The information dissemination mechanism is friendly to disabled communities. There are many opportunities within the disaster, but nothing will be achieved while the leadership is not there." (Pers. Comm. 2021i).* Furthermore, the Government official focused on rural areas and proposed: *"Empower farmers how to utilise nature to avert risks of disasters, e.g., properly manage ecosystems to withstand disasters such as floods and drought." (Pers. Comm. 2021w).*

Source: Field Survey, April - July 2021

Among the opportunities identified by disaster management officials were forming partnerships, conducting research and development, strengthening support, and developing effective and efficient disaster management systems and structures. Some of the opportunities mentioned above were tangible, while others were intangible. Some had a long-term, while others had a short-term purpose. In addition, some required funding, whereas others did not necessitate spending money. Nevertheless, the proposed opportunities suggested that there might be positive outcomes post-disaster.

The Councillors were also questioned about their perceived post-disaster opportunities to assist disaster-vulnerable groups. According to one respondent:

"*Is to give them blankets and sponges*" (*Pers.Comm.ca*).

The other participant stipulated:

"Continuous training. Provide more support for the established Cooperation, so that it can make a profit. They need training in business management." (Pers.Comm2021.cb).

The first Councillor identified short-term opportunities that do not necessarily assist with improving disaster capacity and resilience. The second Councillor identified long-term intangible opportunities

that can help vulnerable groups during disaster phases. Focus Group members mentioned multiple post-disaster measures. Table 4.15 displays the opportunities proposed by focus group members.

Table 4.15: Focus group opportunities

Proposed Opportunity	Ncakubana Frequency	Mphela Township Frequency	Selection Priority	
			Ncakubana	Mphela Township
a) Building houses	6	3	1	2
b) Building roads	2	0	3	
c) Installation of piped water	3	2	2	3
d) Planting of trees	3	0	2	N/A
e) Mobile clinic	1	0	4	N/A
f) Rechanneling water	1	0	4	N/A
g) Relocation	0	4	N/A	1
h) Electrification	0	1	N/A	4
i) Building halls	0	1	N/A	4
j) Dealing with social ills	0	1	N/A	4
k) Education and Training	0	1	N/A	4

Source: Field Survey, April 2021

The opportunities proposed by community members were mainly about service delivery. These were temporary and permanent opportunities. Building houses and relocation were the top priorities in Ncakubana and Mphela Township, respectively.

4.7. Proposed long-term measures

It is significant to understand vulnerable communities and the flood risk they encounter to implement the necessary measures (Chakraborty et al., 2019). The question sought to ascertain the respondents' recommendations for assisting vulnerable groups in South Africa post-disaster to have disaster capacity and be disaster resilient, particularly in floods. This open-ended question was posed to disaster management officials, the Advisory Forum, Councillors, community members, and Community Focus Group members, who all play distinct roles post-disaster. Since disaster management should be multidisciplinary and involve many stakeholders, this question was addressed to all participants (Wentik & Van Niekerk, 2017). Similarly, Chanza et al. (2020) reiterate that communities and external role players must implement disaster management activities collaboratively. Stakeholders and role players enhance understanding of flood risks, resulting in more effective and long-term flood management (Tingsanchali, 2012). Amoah and Simatele (2021) highlight the need for the municipality to engage rural communities. Therefore, it is critical to involve disaster-affected individuals in post-disaster

efforts (Arain, 2015). The participation of community members allows them to express their needs and ensures that their requirements are included in the decision-making process (Tingsanchali, 2012). Moreover, Aydin et al. (2015) argue that there can be no effective or efficient disaster management without citizen participation. Table 4.16 shows the proposed measures.

Table 4.16: Proposed measures by research participants

Recurring Responses Codes	Details of responses
a) Collaboration of stakeholders and role players	Many participants from various sectors of society resonated with the proposal for stakeholder and role-player coordination. In terms of involving vulnerable groups, the PDMC Assistant Director suggested: *"Participation in disaster management structures where issues about them will be deliberated and escalated to higher decision-makers such as Municipal-Councils, Cabinet." (Pers. Comm. 2020a).* A proposal from a LM DMC representative in KZN is another illustration: *"Evacuate people staying next to the river and wetlands. The dam needs to be protected. Need lighting conductors, as some areas are prone to disasters. Each person to plant a tree at least one tree once a year, the Izinduna and Department of Agriculture to be involved." (Pers. Comm. 2020k).* One of the Advisory Disaster Management Forum Members emphasised the importance of having effective structures in place and proposed: *"Sector departments need to work together and have one relevant report to assist them in community outreach instead of wasting resources in one area due to lack of communication and coordination. Build one system that can work with all local task teams and be piloted at the district and provincial levels. Create a web-based system to interact with and learn more about the specific area you are servicing. Create strong capacity building of the community response team; they assist in correct data capturing. Deploy more resources in community education and create strong resilience communities that can develop recovery and proactive contingency plans of all seasons on their own." (Pers. Comm. 2020o).*
b) Skills Development	According to the responses, ensuring community skills development for officials and community members was also critical. The research participants proposed a wide range of informal and formal training options. The officials at the LM DMC focused on disaster management officials' measures. They ranged from: *"Community awareness campaigns, Administration of fire breaks, training of ward committees, increase capacity to respond to fires, implement an early warning system, and source assistance in planting trees. (Pers. Comm. 2021d).* The senior government official went on to elaborate:

Recurring Responses Codes	Details of responses
	"Training, capacity building, awareness campaigns linking them to financial skills that will link the vulnerable groups to markets. It will help them to be able to stand on their own. They cannot sell their produce to the markets; they eat it." (Pers. Comm. 2021w). The respondent from the District Municipality concurred with the sentiments and believed that: *"Education and awareness programs on weather, climate, and climate change. Eco-system-based adaptation, disaster risk reduction, and Climate-smart agriculture. (Pers. Comm. 2020n).* Moreover, a sizable number of participants suggested that awareness campaigns be launched. For example, one Mphela Township participant believed: *"The Municipality must teach the community about the dangers of building in areas next to the river, where they are not supposed to be built. The problem is that when they are affected, they blame the Municipality." (Pers. Comm.2021Mf).*
c) Prioritise vulnerable groups	There was a proposal to prioritise vulnerable groups to ensure they do not suffer. Various proposed measures include providing RDP houses, relocation, food, and service delivery such as water connections. In addition, a Senior Disaster Management Specialist in a Metropolitan DMC proposed ways to prioritise vulnerable groups by suggesting: *"Prioritise vulnerable groups when allocating the RDP houses. Intensify School Emergency Response Team program. Re-establish Community Emergency Response Team in the informal settlement." (Pers. Comm. 2021g).* The respondent from Mphela Township supported the argument and believed that: *"Relocate vulnerable groups to a better place. Always look after the vulnerable groups, even when there are no disasters. For example, food is expensive; they can be assisted with food. There is water shortage; vulnerable people must fetch food from a distance; thus, people need assistance with water connection." (Pers.Comm.2021Mj).*
d) Address social ills	A minority of respondents suggested a novel solution to social ills that primarily affect vulnerable groups. For example, concerns about taverns staying open late, theft, and break-ins resulted in fatalities. For example, one of the Mphela respondents proposed: *"Noise level reduction so that people can sleep at night. Taverns need constant monitoring and closure when they do not comply. Some homeless people steal the vulnerable group's belongings. There must be curbing of the selling of drugs." (Pers. Comm.2021Md).* On the same point, the participant from Mphela Township voiced that: *"Address social ills in the area. For example, there have been three break-ins in our house to date. The infant nearly died last time, as the criminals used*

Recurring Responses Codes	Details of responses
	pepper spray. Therefore, vulnerable groups need RDP houses, as the current mud houses are unsafe." (Pers. Comm.2021Mk).
e) Developed relevant Disaster Management Documents	Respondents explored the significance of developing Disaster Management Documents. Floods and vulnerable group-specific plans, relevant frameworks, SOPS, and MOUs are examples of such documents. The District DMC respondent mentioned the possibility of disaster authorities creating documents and stated: *"Identify skills gaps and develop skills development programs (various streams) to cover such skills gaps. Develop and enter MOUs with the business sector and training institutions to enable collaboration, training, and skills transfer. Develop/Iron out or review financial regulatory frameworks to accommodate emergency procurement procedures easily." (Pers. Comm. 2021r).*
f) Fully functional DMCs	The DMC officials from various levels of government agreed that there should be a fully functional DMC to assist them in prioritising vulnerable groups. Thus, there must be an allocation of adequate resources. For prioritisation of vulnerable groups, the Deputy Director at the PDMC indicated: *"Indigent families, child-headed households, and destitute families need prioritisation for post-disaster interventions. Policies must be reviewed to cater to this. Moreover, integrated awareness programs should be intensified, and funding must be readily available to ensure rapid response post-disaster." (Pers. Comm. 2020b).*
g) Improved service delivery	One of the most common pleas from the community was for officials from all levels of government to improve service delivery in communities. The priority areas were identified as water, electricity, roads, and drainage. However, the top priority appears to be shelter and grant assistance. According to the Ncakubana respondent: D*uring disasters, they need salvage sheets when roofs are blown away to cover the roofs because the tents are small. Therefore, the belongings cannot fit inside. Assist vulnerable groups with houses; some struggle to rebuild post-disasters. For example, to date, a granny is staying in a house without shelter. She is suffering, and the children are not working to assist her. (Pers.Comm.2021Nm).* Another proposed measure was to assist vulnerable groups. For example, the female respondent from Ncakubana stipulated: "*Need to assist people, especially people with disability, to get disability grants. Sometimes, give vulnerable groups food vouchers to assist them. The community to be encouraged to assist vulnerable groups and treat them well." (Pers. Comm.2021Np).* Some members of the community suggested additional infrastructure construction. For instance, the Ncakubana respondent believed that: *"There should be RDP houses, as they are stronger than mud houses. Need roads to the house, as there are gravel roads. Need water, as there is no water in the area." (Pers. Comm.2021Nj).*

Recurring Responses Codes	Details of responses
	Another participant augmented this view and stated: *"Build houses, roads, and halls. Put electricity and toilets. Install taps. Move vulnerable groups to safe areas. Put and maintain drains on the roads." (Pers. Comm.2021Mc).*

Source: Field Survey, April - July 2021

Flood control measures are unsustainable unless affected communities and other stakeholders participate because relevant stakeholders' needs must be fulfilled (Tingsanchali, 2012). There is a widespread perception that by improving community flood resilience, impending flood-related damage can be avoided (Mai et al., 2020). The objection is like the one outlined in the Sendai Framework for DRR, 2015- 2030, which defines flood resilience as the reduction, prevention, and coping of flood risk (Mai et al., 2020). The responses assisted in the discussion of disaster capacity and resilience measures for vulnerable groups. The respondents proposed a broad range of short- and long-term projects. Some individuals proposed multiple measures. The most frequently mentioned proposals included stakeholder and role player collaboration, skills development, prioritising vulnerable groups, developing relevant disaster management documents, fully functional DMCs, and improved service delivery. Similarly, the reconstruction of the dam for farmers was also identified as a necessary project in the Eastern Cape Province, South Africa (Amoah & Simatele, 2021). House reconstruction was one of the most popularly suggested projects. There needs to be numerous stakeholders' collaboration on the proposed measures. Furthermore, since various departments fall under different spheres of government, most projects would require budgets from all spheres of government. The participation of community members is critical when implementing the recommended initiatives.

CHAPTER 5
DISCUSSION OF RESULTS

5.1. Introduction and summary

Chapter 5 examines the significance of the research findings derived from the empirical evidence presented in Chapter 4. Again, there was an investigation to ensure the critical research issues were clear, understood, and related to the argument presented in Chapter 1. The study's key themes are institutional arrangements, prevalent disasters, post-disaster challenges, post-disaster management projects and opportunities, and long-term disaster capacity and resilience-building measures for vulnerable groups. The research confirmed that disaster management is multidisciplinary and multi-sectoral. The existing institutional arrangements in organisations do not currently assist in the efficient and effective implementation of post-disaster management measures because the frequency and intensity of floods are rising. Considering these realities, the thesis identified the need for overhauling the institutional arrangements to improve South Africa's post-disaster management phase. The research perceived that both tangible and intangible challenges were hindering the implementation of post-disaster strategies. Lack of funding and resources were the most mentioned challenges for post-disaster activities. Coordinating and communication issues often arise between stakeholders and the affected communities. Unfortunately, the implemented projects do not contribute sufficiently to disaster resilience and adaptive capacity. Based on the above discussion, disaster management officials have a vision of ideal DMCs and disaster-resilient communities with adaptive capacity, but it is unclear whether they can capitalise on those existing projects to create opportunities. The study participants proposed long-term measures to assist vulnerable groups. The study suggests a Post-flood Disaster Checklist in Annexure A, given that it is non-existent in South Africa. The checklist can gauge disaster resilience and adaptability in vulnerable communities. The officials would have to rethink the value for money when implementing post-disaster activities.

5.2.Disaster management institutional arrangements in South Africa

Disaster management is complex because it involves many different aspects of society: social, political, cultural, physical, environmental, and economic (Becker, 2009). A transdisciplinary approach may enable broader insight into implementing disaster and disaster risk reduction measures (Culwick & Patel, 2017). This phenomenon was observed in the Muysoki et al. (2015) study, where various role

players and stakeholders played significant roles post-disaster. According to Figure 4.1 in Chapter 4, the research participants came from all three spheres of government in different provinces. The observation was also with members of the HGDM Advisory Forum, who were also from three government spheres. Disasters directly impact communities, so participants were also from Ncakubana and Mphela Township. This multisectoral and multidisciplinary approach helps disaster preparedness, response, and recovery (Rizza & Pereira, 2014). Accordingly, Wentik and Van Niekerk (2017) conclude that a single government department or subsection cannot oversee disaster management. Similarly, Okada et al. (2018) highlight the significance of residents playing a pivotal role in recovery and risk reduction. More specifically, Ahmad and Ma (2020) agree that community identification and participation are critical for effective disaster governance. The engagement of various participants signifies that disaster management is a responsibility shared by all and cannot be exclusively managed by one entity or a single DMC sphere. All parties involved in post-disaster management must collaborate. The findings also showed that different stakeholders were involved in other types of disasters, indicating that they were not limited to one type. The disaster type determines the stakeholders, as each has a specific role in the post-disaster phase, depending on the disaster type.

5.2.1. Capitals vulnerability

Inexplicably, Pertiwi et al. (2019) observe that the needs of vulnerable groups differ. Therefore, vulnerability is classified into levels or types based on the requirements. The study's findings indicate that various vulnerable groups require prioritisation and assistance, particularly post-disasters, so they are not severely affected. Assistance and prioritisation can assist them in re-establishing normalcy in a short time. According to Section 4.2.2, age, education level, health status, source of income, employment type, and house type all contributed to vulnerability. Specifically, Malak et al. (2020) suggest that different age groups experience vulnerability differently, with older people being more vulnerable than young ones regarding physical, human, social, cultural, and financial circumstances. The age group of the participants inferred they were of working age. However, there were no job opportunities because most participants were unemployed. This background paints a concerning picture of the lack of skills and poverty eradication. As a result of various socioeconomic factors, the community was more disaster-vulnerable because they were not disaster-resilient regarding their assets. The status quo will remain or worsen if the high unemployment rate doesn't improve.

Gender impacts disaster resilience and recovery as it can either hinder or improve people's chances of recovery (Riveria, 2019). In support, Malak et al. (2020) provide evidence that gender dynamics can influence adaptation strategies. First, women were the most dominant category, followed by older people, and lastly, people with disabilities. The dominance is because approximately 70% of the world's poor are women, whose livelihoods depend on natural resources and climate-dependent sectors (Ahmed & Mzimela, 2018). According to Mukuna (2015), women are disproportionately affected when disasters strike. Similarly, Ahmed and Mzimela (2018) agree that women's vulnerability to climate change's adverse effects is greater than that of their counterparts. Compared to men, women are the most affected and vulnerable populations (Shitangsu and Routray, 2011). The study's findings were consistent with those of Ahmed and Mzimela (2018), who found that gender-related power dynamics impact women's agency, resource access differences, capabilities, and risk perceptions. Conversely, Ahmed and Mzimela's (2018) research emphasises that rural women are vulnerable to climate change. In the research, women in rural areas fetched water and wood from afar. Children and women are the most vulnerable during natural disasters (Sadeka et al., 2020).

Then again, Malak et al. (2020) attest that older people are more vulnerable than other groups, and there is a likelihood of being affected by all disaster phases. Furthermore, when disasters strike, assistance from relatives and friends to the elderly, children, and disabled may be disrupted, making these groups more vulnerable to flood damage (Sha et al., 2019). The elderly become more vulnerable during disasters as their support structure prioritises their needs. Moreover, Riveria (2019) accentuates that this is due to their dependency on others for monetary assistance, transportation, medical care, and day-to-day assistance. The elderly and children are particularly vulnerable to disasters, and as a result, individual recovery is negatively affected (Riveria, 2019). This assertion is consistent with Dos Santos et al.'s (2019) study, which discovered that younger people are less likely than older heads of households to become disaster victims. According to a Bangladesh study, younger adults were not as severely affected as older people, who lost their source of income due to a lack of cultivation (Malak et al., 2020). The older a person gets, the more vulnerable they become, as age gradually erodes their capabilities and advantages compared to young individuals (Shitangsu & Routray, 2011).

With age, people become increasingly vulnerable because of their diminishing abilities. They become more vulnerable as they age and rely on others for various needs. Hence, older people are more

vulnerable to disasters than young people because they depend on them. The elderly people who do not have young children suffer post-disaster because they are alone and receive assistance after their support structure attends to their immediate family members. Since young people prioritise their family members over assisting vulnerable neighbours, assistance from neighbouring communities will likely arrive later. The effects on the elderly who stay alone are likely to be higher compared to the ones assisted earlier on. However, in other countries, Shitangsu and Routray (2011) discovered that, while age may increase the probability of vulnerability to disasters, their experience may help them. They may be able to predict impending disasters such as cyclones and interpret early warning systems better than younger generations (Shitangsu & Routray, 2011). According to research and earlier studies, having a long life of experience makes older people wise, so being old is not entirely bad. As a result, they can advise on post-disaster measures. Another positive aspect of the elderly was that they could provide indigenous knowledge. People with disabilities face additional challenges during and after disasters despite their already challenging circumstances (King et al., 2019). To that end, King et al. (2019) believe that during disasters, people with disabilities will likely lose interpersonal support and mobility. On the other hand, people with disabilities usually do not receive resources (King et al., 2019). Evidence suggests that vulnerable groups may be overlooked during disasters. In line with the preceding, Rezende et al. (2020) interpret that vulnerable groups are becoming more vulnerable to future disasters. The findings of this study also support this fact, as disabled people felt neglected.

Another view is that educated and illiterate people have different knowledge about preventative measures, making knowledgeable people more resilient and less vulnerable (Shah et al., 2018). Most community respondents had primary education, indicating partial achievement of the 2014 universal primary education goal. However, only a few respondents had a post-secondary education. Meanwhile, Jasmed et al. (2020) show that households with lower education levels and limited multiple skills have low disaster-coping capacity. Specifically, Shitangsu and Routray (2011) explain that individuals with a secondary school or college education understand weather forecasting better than people with a primary school education or those who are illiterate. On the other hand, residents' awareness or knowledge of disaster risks should not be confused with adequate preparation (Kubisch et al., 2020). This study revealed no issues with the communities' educational level, although other researchers have suggested that individuals with higher education can better manage post-disaster activities. There was little difference in the participants' understanding when answering research questions. The main

difference was comprehension; the discussions flowed when the mother tongues, IsiZulu and IsiXhosa, were used instead of English. Therefore, the study was inconclusive in comparing the two communities because they had a similar level of education and disaster management understanding. The study could not establish the difference between educated and illiterate research participants.

Natural disasters are frequently linked with economic vulnerability (Deria et al., 2020). From the research responses, most participants are state-dependent, as they rely on social grants. Some people stated they received the R350.00 Social Distress Grant during the interviews. After the COVID-19 National State of Disaster declaration in 2020, the South African government instituted this grant (Mlangeni, 2022). SASSA dispenses it through all major South African Banks, South African Post Office, or retail stores. The money is insufficient, but it can cover some basic needs. During the Medium-term Budget Policy Statement to Parliament on 26 October 2022, the Minister of Finance announced that the implementation would be until March 2024 (Geldenhuys, 2022). The problem is that the relief is not permanent, like the EPWP. The extension will relieve many beneficiaries due to slow growth, COVID-19 effects, high cost of living, poverty, and an unprecedented high unemployment rate (Geldenhuys, 2022). Of concern, the number of people approved for the grant has decreased because of SASSA's new stringent measures (Mlangeni, 2022). Thus, there should be a permanent solution to assist individuals aged 18 to 59, as they do not qualify for any permanent government grant. Other unemployed age groups in South Africa receive permanent social grants.

Some jobs are casual and can put people at risk when a disaster strikes. Disasters significantly impact lower-income people because they are less resilient (Deria et al., 2020). Moreover, Deria et al. (2020) also elaborate that natural disasters disproportionately affect low-income people because they lack resources for recovery, response, and reconstruction, resulting in more fatalities and psychological trauma. They cannot purchase the necessary items to be resilient and adapt to disasters. What made matters worse was that the unemployed participants depended on the insufficient wages of their family members. Individual and community poverty impacts recovery (Riveria, 2019). A practical example occurred during Hurricane Katrina in New Orleans, when low-income people without vehicles were stranded due to the government's failure to provide emergency mass transit (Flanagan et al., 2011). Consequently, in flood-prone areas, disaster incidents and their consequences disproportionately affect low-income residents (Deria et al., 2020). It appears that vulnerability convergence exists between low-

and high-income communities. Since they are focused on daily survival, people who are unemployed or poor may be unable to purchase basic needs such as food. Subsequently, they depend on municipalities and the government and are thus less likely to respond to disasters quickly when they strike. In contrast, the wealthy have sufficient resources to cope with disasters. According to Shah et al. (2018), communities' high vulnerability, exposure, and properties are the leading causes of disaster effects. So, it is essential to identify vulnerable groups before disasters to receive additional assistance during disasters (Flanagan et al., 2011).

Furthermore, Dube (2019) contends that housing structures in disaster-prone areas constructed with substandard materials increase people's vulnerability. Communities' houses or structure types can determine the vulnerability level. For example, mud and corrugated iron houses are less durable than block and brick houses. Unfortunately, few people were living in formal dwellings in the study areas. As a result, the stronger participants' houses were usually unaffected by disasters. Therefore, constructing houses with more robust structures reduces exposure to disaster risks. In some cases, the disaster's impact will be enormous, affecting even the most resilient structures. For example, the fire in St. Francis Bay illustrated a disaster that affected wealthy individuals, as the fire damaged their holiday homes (Times Media Group, 2018). The section also discovered that when dealing with vulnerable communities, home language, marital status, and religion were important factors. Many factors made vulnerable groups more vulnerable in the study areas.

5.2.2. Knowledge and experience

Section 4.2.3 revealed that most disaster management officials had qualifications, some even more than one. Academic qualifications ranged from diplomas and junior degrees to honours and master's degrees. These findings indicate that Disaster Management is a skilled job, implying that individuals must have a post-matric, also known as grade 12, or equivalent qualification to work in the Disaster Management field. Even the DM Act encourages disaster management officials to have relevant qualifications (DM Act, 2002). Similarly, disaster management personnel in Ghana have education qualifications ranging from the most basic to the most advanced, including a university degree (Oteng-Ababio, 2013). However, the researcher noticed that some disaster management officials interviewed did not necessarily have Disaster Management qualifications. The Disaster Management qualification will possibly make them more knowledgeable about disaster management, making them more effective and

efficient when dealing with post-disaster disaster management activities and stakeholders. Officials can be encouraged to obtain disaster management-specific qualifications to understand disaster management better. On the other hand, community members must know what to do if they are affected by a disaster while waiting for a response from officials. Disaster management knowledge and the implementation thereof will assist in minimising the disaster's impacts. Section 4.2.3, conversely, showed that the councillors believed the communities lacked the necessary skills to deal with disasters. The section also revealed that Councillors' offices had plans to assist vulnerable groups in the aftermath of disasters. There was, therefore, a revelation that community members may not be adequately trained in disaster management, a great concern.

In contrast, previously, the Zuma et al. (2012) study found that sometimes the police and fire and rescue services did some disaster management duties. The findings are consistent with Wentik and Van Niekerk's (2017) findings, who discovered that most municipal officials were full-time employees in other departments, assisting in disaster management on an as-needed basis. Thus, Wentik and Van Niekerk (2017) contend that part-time employees do not devote full attention to disaster management activities. Therefore, according to the findings, part-time employees may ignore disaster management activities. Naturally, people would concentrate on their primary jobs rather than the secondary role of disaster management. Surprisingly, the study findings suggested that DMCs have advanced in this regard, as most officials interviewed were appointed explicitly for disaster management tasks. Thus, they were primarily responsible for disaster management. Only one LM participant stated that he was appointed an environmental specialist but would implement disaster management activities as needed. The status quo is a fantastic and welcomed development compared to the past because it ensures accountability when implementing post-disaster management activities. Subsequently, the officials can only focus on disaster management duties.

Figure 4.2 in Chapter 4 detailed the number of years disaster management officials had been with an organisation. According to the findings, most individuals had more than ten years of Disaster Management experience. As shown in Section 4.2.3, the disaster management officials interviewed had extensive experience in their respective organisations, meaning that if disasters occur, they may be able to deal with them. Similarly, the findings of the Ghana study show that years of disaster management experience range from one to 15 years (Oteng-Ababio, 2013). Another aspect is that some officials may

have had fewer years in their current positions but more years in disaster management in general. One can consider that officials with experience in various organisations might bring a new perspective to an organisation. However, long-term service can have advantages, such as a better understanding of the environment and solid relationships with post-disaster management officials. Nonetheless, the study findings didn't indicate a considerable difference in the level of knowledge and concerns raised by employees with short-term or long-term service.

The members of the Advisory Forum were in their respective organisations for varying times, ranging from zero to more than ten years. The more experienced participants were more likely to understand their roles and responsibilities than the less experienced participants. According to Section 4.2.4, one Councillor was still in his first term, while the other had more than ten years of experience. However, based on the engagements, both Councillors were seemingly actively involved in post-disaster activities. The longer the Councillor stays in the area, the longer the leadership and programs continue. Nevertheless, the benefits of having the same Councillor for a long time were unclear. The interviews were conducted a few months before the 2021 Local Government elections. The communities in Ubuhlebezwe Ward 1 and Greater Kokstad Ward 5 have new Councillors, as both 2016- 2021 Councillors were replaced. The reason for their replacements is unknown, even though their respective terms had ended. Most community members had been residents for more than ten years. Accordingly, most community members were more knowledgeable about the area and were expected to be more conversant about the challenges and all implemented activities in their respective areas. Considering there were different generations, they were anticipated to have diverse backgrounds.

5.3. Legislation and policies

According to the disaster management officials in Table 4.4 and Table 4.5, disaster management had many legislations and policies with varying objectives. For instance, Rivera et al. (2020) summarise the four key priorities of the adopted Sendai Framework: strengthening disaster risk governance to manage disaster risk, understanding disaster risk, enhancing disaster preparedness for effective response, investing in DRR for resilience, and building-back-better recovery, rehabilitation, and reconstruction. The UN's key Global Frameworks in 2015 were the SDGs, the Sendai Framework for DRR, and the Paris Agreement on Climate Change (Djalane, 2019). On the other hand, the HFA 2005-2015 and the African Regional Strategy for Disaster Risk Reduction assisted by empowering authorities to address

disaster risks and DRR matters in a holistic and multi-sectoral approach through a policy scope (Van Niekerk, 2015). According to the views expressed in Section 4.3.1, many disaster management officials in South Africa primarily used the DM Act of 2002, as amended. Table 4.6 shows that Advisory Forum members also indicated that most respondents selected the DM Act. Correspondingly, Zuma et al. (2012) state that Chapters 4 and 5 of the DM Act govern the roles of the Provincial Government and Municipal Government, respectively. In agreement, Culwick and Patel's (2017) study contends that the DM Act prescribes disaster management to be proactive to reduce the risk of a disaster. Disaster management officials must promote the DM Act to other stakeholders and role players. In contrast, Raikes and McBean (2016) expressed concern that most Canadian Provincial Emergency Management legislation lacked regulatory local government guidelines to reduce community vulnerability.

Likewise, in Kenya, as much as it is easier to plan for natural disasters or if they were there, they were not adequately implemented (Wa Teresia, 2007). Similarly, the field-based evidence in Section 4.3 revealed legislative gaps in the post-disaster management phase. Moreover, a review of the DM Act confirmed legislative gaps. For instance, the DM Act did not provide a comprehensive approach to ensuring that post-disaster is effective and efficient in providing disaster adaptive capacity and disaster-resilient communities (DM Act, 2002). Poor guidelines expose communities to greater disaster vulnerability (Raikes & McBean, 2016). The findings suggest that South Africa may lack appropriate guidelines despite the legislation and policies in place.

In Section 4.3.1, numerous disaster management officials mentioned the 2005 DM Framework as the most consulted framework. The Framework can be adopted and implemented at the provincial and local levels and must adhere to the National Framework. In the same vein, HGDM members also consulted the DM Framework. As much as the HGDM Advisory Forum used the DM Act and Framework, their organisations had legislation dealing with the dynamics in their respective fields. Accordingly, Barnes et al. (2019) agree that developing regulatory Frameworks, which include mitigation strategies and plans to reduce potential disaster effects, is an effective strategy for dealing with natural hazards. Emergency management legislation's roles are to outline the powers and authority to put measures in place, respond to an emergency, and minimise civil publicity to protect the Government's actions (Raikies & MacBean, 2016). One can conclude that a well-informed disaster management policy is a catalyst for change (Barnes et al., 2019). Even though most officials were familiar with the DM

Framework, there was no consensus on whether policy implementation was appropriate. According to the responses, disaster management officials implemented the DM Act using the DM Framework. Unfortunately, in Section 4.3.1, Ncakubana and Mphela Township community members interviewed were unaware of the DM Act and policies. There is concern that the community will not support the legislation and policy Framework since they do not know them. According to Skinner and Rampersad (2014), the DM Act requires disaster management linkage to development goals; thus, if the community is unaware of the disaster management requirements, achieving the disaster management-linked development goals will be challenging.

In Section 4.3.2, disaster management officials revealed no flood-specific policies. Organisations instead relied on Disaster Management Plans, Acts, and Framework documents. Even in Sri Lanka, no specific disaster management plans were in place (Caymaz et al., 2013). A similar trend is evident in Pakistan, where the Disaster Management Plan is multi-hazard (Mukhtari, 2018). Equally, the Nepal National Disaster Response Framework (NDRF) is not specific regarding the type or magnitude of the disaster for the NDRF to be activated. It was, however, enacted in 2013 and went into effect during the August 2014 landslides, floods, and earthquakes (Bisri & Beniya, 2016). Another study conducted in 85 countries by Nohrstedi et al. (2021) shows no specific flood policies. Devastating disasters rarely result in significant policy changes that support their outcomes. More resources were allocated instead of developing proactive DRR policies (Nohrstedi et al., 2021). Likewise, Birkmann et al. (2010) believe that minor disasters rarely cause major changes in communities, institutions, and organisations because existing regulatory measures deal with the effects. Major disasters can result in events that lead to organisational change, where ways of doing things are bound to the review process and subsequently changed (Birkmann et al., 2010). This reality was the case in Cape Town, where the initial Water Shortages Plan had to be developed and operationalised. Strangely, the DMCs had not developed flood-specific Disaster Management Plans, even though most respondents identified floods as one of the most common disasters. Previous research studies showed little evidence of a flood-specific plan to help with flood-response measures.

In their emphasis, Rivera et al. (2020) underscore that the Sendai Framework deals with understanding the processes that lead to vulnerability and increasing resilience to disasters to reduce harm to life, property, and the environment. Technology, information, social capital, resource access and distribution,

risk perceptions, community structure, and an existing formalised institutional framework that organises warnings, plans, and other services all contribute to the vulnerability (Deria et al., 2020). Section 4.3.3 and Figure 4.3 revealed that respondents primarily relied on the DM Act and the DM Framework for specific policies for vulnerable groups. According to research findings and previous studies, there were no explicit policies for vulnerable groups. The lack of vulnerable group-specific policies would likely make focusing on vulnerable groups difficult. Subsequently, there was no consistency in dealing with vulnerable groups across government spheres. As a result, there was no guiding legislation, so vulnerable groups may not receive the assistance they deserve. The preceding studies show that vulnerable people and areas are excluded from decision-making that impacts them. There appears to be much work needed to address the problems that vulnerable people face. Members of the Advisory Forum indicated that they prioritised vulnerable groups during post-disasters. This assertion could not be deliberated on or proved because it was a closed-ended question.

To begin, Siriwardana et al. (2017) believe there is a need to check whether there is alignment with global standards. The SDGs, the Paris Agreement, the Sendai Framework, and the New Urban Agenda all share a vision of international sustainable development (Moure et al., 2021). Aligning policies with global trends will ensure the implementation of best practices, resulting in a more effective and efficient post-disaster phase. Disaster management officials believed there was a synergy between legislation and policies, based on data collected from Section 4.3.1.1. Even most Advisory Forum members indicated there was synergy. Nevertheless, the alignment did not seem to be at the desired level. For instance, few participants referred to international standards, including the Sendai Framework, when responding to research interview questions. Of concern, Thailand has no integration, even regarding local operations (Yodsuban & Nuntaboot, 2021). In government, the lack of synergies leads to redundancies and inefficiencies, which impede collective goals and result in inter-agency trade-offs (Moure et al., 2021). Alignment with global standards is beneficial because it indicates that the country also follows global trends that guide disaster management.

The Sendai Framework encourages governments to develop, review, and implement disaster risk management laws and policies to protect their communities from disaster risks (Bang, 2021). The key findings in Section 4.3.1.2 revealed that many disaster management officials interviewed suggested that the Disaster Management legislation and policies were up to date. It was the opposite of the Nepal

NDRF, which ignored national and local NGOs (Bisri & Beniya, 2016). Similarly, following the 2011 earthquake, Caymaz et al. (2013) discovered no strategic plan in Turkey. No Earthquake Action Plan, regional hazard maps, or other mitigation measures were in place (Caymaz et al., 2013). As disasters are not static, the outdated document will make it challenging to address disasters. If the plan is obsolete, it may not cover the new ensuing disasters due to improper planning. Since disasters are not constant, resources and circumstances change, and disaster management officials must regularly update documents in consultation with the stakeholders and role players.

The results also show that most disaster management officials did not have MOUs. Subsequently, some respondents stated that it was difficult to respond when there was a requirement for additional assistance from neighbouring municipalities and provinces. The responses were not surprising because, according to Culwick and Patel (2017), disaster management in South Africa centres around technocratic solutions with little coordination, even between municipal departments. The lack of MOUs by most municipal and provincial DMCs was cause for concern. Respondents alluded that the neighbouring entities found assisting each other in various post-disaster situations challenging. There will be no clear roles, responsibilities, or accountability if something goes wrong. On the other hand, it is preferable to implement planned decisions because there will be no confusion in terms of roles and responsibilities, resulting in effective and efficient post-disaster management. Moreover, there will be no duplication of resources but rather resource sharing among all individuals involved. Another advantage of having an MOU is knowing whom to contact and what resources are available before the disaster incident. The MOU ensures that the required activities are carried out smoothly and without hindrances. An apparent lack of coordination among stakeholders means the necessity of collaboration to ensure effective and efficient post-disaster phase implementation.

5.4. Disaster occurrences

The International Disaster Database shows that the average number of recorded annual natural disaster events over the last ten years is around 333, with an annual economic impact of more than US $140 billion (Yu, 2020). Section 4.4.1.1 and Figure 4.4 of the study's findings confirmed that Disaster Management officials responded to various types of disasters. Both urban and rural areas in South Africa experienced disasters, as regularly reported in the media. Even areas that were not disaster-prone were now affected. In this regard, Katolonge (2019) indicated 315 natural disasters worldwide in 2018,

causing 11804 fatalities and affecting over 68 million people. Additionally, Katolonge's (2019) results reveal 750 disaster incidents from January to June 2019, resulting in an estimated 7 million new displacements in 102 countries. Furthermore, according to dos Santos et al. (2019), disasters are becoming more frequent and intense in rural areas, and climate change is likely to increase their occurrence. The findings show that many disasters have varying degrees of impact on communities. If this trend of increasing disaster frequency and intensity is not addressed, it can hinder effective and efficient post-disaster management by depleting limited resources.

In a recent study, Egbionola et al. (2017) narrowed the scope by indicating that floods are the most prevalent type of disaster and that their frequency has increased significantly. These findings are coherent with those of Malla et al. (2020), who conducted a study in Nepal and identified floods as one of the most common disasters in the country. Floods were the most common disasters that affected communities, according to the responses of Disaster Management officials and community members in Sections 4.4.1.1 and 4.4.1.3. In this case, Odufunwa et al. (2012) concur that floods are the most common, widespread, disastrous, and frequent natural disasters on the planet. Similarly, floods are the most destructive of all recorded natural disasters, according to Mabuku et al. (2020). Generally, Mohanty et al. (2020) support these findings and show that, according to the IFRC World Disaster Report, floods contributed to most known disasters. Floods affected 730 million people, accounting for one-third of the approximately 2 billion people affected by natural disasters between 2008 and 2017 (Mohanty et al., 2020). For instance, Pakistan's worst floods occurred in 2010, affecting 54 of the country's 121 districts and killing over 1700 people (Kurosaki, 2017).

Floods are responsible for more deaths worldwide (Olanrewaju et al., 2019), resulting in global misery and fatalities (Mohanty et al., 2020). Floods cause fatalities and social and economic risks (Shah et al., 2018). In support, according to Odufunwa et al. (2012), more people have died or been severely affected by floods. Floods cause one-third of all fatalities, injuries, and property damage (Adedeji et al., 2012). Moreover, ISDR elaborates that floods have killed 6.8 million people in the first two decades of the twenty-first century, and 2.8 billion people have been affected globally (Ringo, 2018). A further hurdle is that floods affect many people, cause economic loss, and harm the environment (Mai et al., 2020). Similarly, Ulasi and Ulasi (2016) concur that floods have increased economic losses. According to research and previous studies, flood disasters were on the increase, and they caused a lot of damage.

They had devastating effects on communities, some of which were natural and others that were anthropogenic-related disasters. When floods impact people, they cause injuries and deaths. Given the preceding assertions, Katolonge (2020) added that disasters continue to wreak havoc on communities worldwide in overwhelming ways. Disasters have increased in magnitude over the last decade, affecting communities and destroying buildings, infrastructure, and livelihoods (Dube, 2019).

Floods affect various sectors at different scales, most likely depending on the sector's vulnerability. For instance, floods cause property damage and loss of life at certain levels, times, and intensities (Du Plesis et al., 1999). Specifically, Nguimalet (2018) demonstrates that floods cause crop damage, home damage, and loss of lives. Ncakubana and Mphela Townships communities identified households as the most severely affected sector. When the researcher collected data, house and infrastructure damage was still visible in some homes. Some people had not recovered from previous disasters, so the direct impact on their homes may explain their responses. It means the damage was severe for the communities, and they could not deal with the disastrous consequences. Councillors' choice of infrastructure indicates that the infrastructure is significant post-disaster. Due to the damaged infrastructure, affected individuals may be unable to be reached, delaying the post-disaster activities' efficiency and effectiveness. According to other authors, disasters disrupt systems on which vulnerable people rely (Sha et al., 2019). According to the preceding observation, disasters have both tangible and intangible consequences. Some have long-term effects, while others are only temporary. Disasters have both direct and indirect impacts. If one person is affected, the people around them may feel the effects as they may have to assist and could experience psychological effects. The households were possibly selected as the most affected sector in the study areas because most community members did not own businesses, making their homes their primary and only asset. Individuals who do not have diverse assets are affected because they lose everything when their assets are affected. This contrasts with an individual, who can have a backup if one of the assets is compromised.

It is also worth noting in Table 4.9 displays disasters frequently affected communities. The results support previous studies that indicate disasters are becoming more frequent. As a result, they have become a burden on the communities in which they live. According to the Rezende et al. (2020), the current population at risk of flooding is approximately 1.2 billion Rands; this figure can rise to 1.6 billion Rands by 2050. The other disasters reported were an earthquake, a fire, landslides, a drought, a

tsunami, an avalanche, and a volcano (Malla et al., 2020). The evidence by Ahmad and Ma (2020) specifies that there is an estimate that from 2000 to 2015, around 341 climate-related disasters were recorded annually, which is 50% more than the previous 15 years. Therefore, Rivera et al. (2020) add that disaster frequency and persistence are linked to weak local and national government capabilities, weak national institutions, and reliance on vulnerable natural environments.

5.4.1. Roles and responsibilities

The findings indicate that the Advisory Forum could play a variety of roles. Similarly, Bean et al. (2011) support the idea that role players are typically involved in more than one disaster management phase and can play multiple roles. In addition, the results of the communities in Section 4.4.3 regarding the role of municipalities demonstrated that they play different roles in disaster management. To that end, Samuel and Siebeneck (2019) agree that emergency managers, regardless of their organisation, can hold various positions throughout the Disaster Management Cycle. Furthermore, Nespeca et al. (2020) explain that stakeholders can be classified into different groups and thus play different roles within each group. Due to that, disaster management stakeholders and role players are multifaceted. Therefore, the person designated for disaster management must be knowledgeable and experienced, as that individual will participate in various post-disaster activities.

Following the disasters, most community members were either unsure or dissatisfied with the role of the Councillors, as per the results. Councillors' competence determines the response's effectiveness (Malla et al., 2020). Such findings are homogeneous with the conclusion reached by Sadeka et al. (2015), who found that community members have mixed feelings about the performance of the local municipality, with some satisfied and others dissatisfied. Accordingly, Sadeka et al. (2020) conclude that this demonstrates a lack of trust and that an improved strategy for increasing confidence in the community is required. The discontent can be due to the scarcity of resources. The community will be dissatisfied with the municipality if it does not provide the anticipated assistance. Therefore, the communities will not portray the municipality favourably. However, if the municipality can prioritise post-disaster activities, most community members may be satisfied and, as some participants did, view the municipality in a good light. It will also reduce other challenges, like service delivery protests and infrastructure vandalism.

Councillors and some Advisory Forum members stated in Section 4.4.3.1 that measures were in place to prioritise vulnerable groups. Members of the Advisory Forum shared this view. However, community members believed that vulnerable groups were not prioritised in most cases and that everyone receives the same treatment during disasters. This trend was also observed post-disaster in Thailand, where older people were usually ignored, discriminated against, and received little assistance (Yodsuban & Nuntaboot, 2021). Subsequently, these experiences may result in a stress disorder, an increase in dementia cases, and illness (Yodsuban & Nuntaboot, 2021). However, some community research participants indicated that the elderly, particularly grannies, were sometimes prioritised. Similarly, community members assisted the most vulnerable society members in Cuba, such as women, the elderly, and children (Aragon-Duran et al., 2020). The Advisory Forum's results and community members' views on prioritising vulnerable groups conflicted. Despite the contradictory responses, it is crucial to prioritise vulnerable groups during disasters since they cannot always assist themselves. They need additional assistance compared to less vulnerable groups.

5.4.1.1. Dissemination of information

One of the significant roles of the Sendai Framework is to encourage an understanding of natural hazards and their impacts in all aspects (Quitana et al., 2020). Respondent consensus in Section 4.4.4 advocated for different stakeholders to disseminate information via different platforms. According to the Councillors, they held community meetings to discuss service delivery issues, including disaster management. Community members at both research sites confirmed this viewpoint and stated they attended community meetings. Meanwhile, Roosli et al. (2018) emphasise the importance of community participation in identifying and prioritising challenges during disasters. Moreover, Roosli et al. (2018) state that without consideration of community perspectives, interpretations will be ineffective and thus short-term and temporary. Therefore, holding community meetings is one of the most viable methods of disseminating information. Moreover, everyone will receive the information during the meeting and can ask for clarification if necessary. Even though there were meetings in the study areas, they did not always discuss general disaster management matters. The researcher believes that discussing disaster management only post-disaster will be ineffective, as community members will likely forget what is expected of them post-disaster. For effective post-disaster management, they require constant reminders. Therefore, disaster management can even be a standing agenda item in meetings. However, some members could not participate due to illness or unavailability during the

meeting dates. The WHO characterises a healthy person as fit in psychological, physical, and social well-being (Sha et al., 2019).

Using information and ICT to gather more facts and make better decisions can help manage disasters more effectively (Aydin et al., 2015). Corroborating the findings in this study, Fransisco (2014) suggests that having access to technology can mean faster response to disaster incidents and recovery. According to Section 4.4.4.2, most participants did not have access to Wi-Fi, which made it impossible to access online information at any time. Therefore, the lack of easy access to Wi-Fi and information access was limited, as some community members indicated using Wi-Fi when visiting government and private business facilities. Thus, communities had scarce and limited free Wi-Fi hotspots. The results also showed that many individuals in rural communities lacked access to Wi-Fi more than those in urban areas. According to Aydin et al. (2015), ICT improves adaptation capacity, receives feedback, allows active participation, and reduces vulnerability. Thus, it will be difficult for communities in study areas to gain access to information disseminated through the Internet. Furthermore, purchasing data to access the Internet will undoubtedly be difficult due to its unaffordability. Another explanation for the individuals' lack of Wi-Fi access appeared to be the type of phone they use, as some phones were not Wi-Fi compatible. Even if they had Wi-Fi access, it would not assist because they did not own smartphones. Smartphone users can be geolocated and connected to emergency networks, such as text warnings and phone calls (Kouadio & Douvinet, 2015). Since disaster management officials have an indistinct communication strategy, it is unclear whether limited or no access to WI-FI impacted their communication strategy.

It is worth noting that network coverage in both community areas was good, according to many respondents in Section 4.4.4.2. It indicates that proper communication infrastructure was in place. It could be because of the amplified use of mobile devices in the study area. In support, research shows that 95% of the world's population has mobile signals (Paul et al., 2021). A communication network enables end-users to access critical network services such as remote working, online banking, and online government services (Rak et al., 2021). It ensures consistent access to communication services (Rak et al., 2021). Limited mobility and coverage are technological challenges impacting knowledge generation and dissemination (Sukhwani & Shaw, 2020). The research findings did not show that officials use the reliable network to communicate with communities.

Pre- and post-disaster information on disaster management activities is required (Sakurai & Murayama, 2019). In addition, Yasui (2017) expands on this principle by stipulating that risk messages help communities become more aware of existing vulnerabilities, allowing them to take the necessary precautions. Similarly, Lumbroso et al. (2008) indicate that promoting flood education programs can result in fewer flood deaths and damage. Ncakubana relied more on radio, whereas Mphela Township heavily relied on TV. Moreover, Chagutah (2009) underscores that the NDMF emphasises the significance of public awareness campaigns and various communication platforms in instilling a risk-aversion culture. Table 4.9 established that communities did not have to rely on a single source of information. Multiple sources are beneficial because communities can use another source if one is unavailable or there is no information on a particular platform. Some early warning information came from news channels, while others came from social media, as evident in the study by Chanza et al. (2020). Local radio stations such as East Coast, Ukhozi FM, Lotus, and Gagasi Radio Stations were critical areas of communication in Durban, eThekwini Metropolitan (Skinner & Rampersad, 2014). Interestingly, Rizza and Pereira (2014) see social media as a bottom-up initiative. Regarding communication, Bean et al. (2011) agree that traditional and social media roles cannot be ignored. Therefore, information can be disseminated using both conventional and social media. The crucial consideration should be the dissemination of reliable information. The media can influence how the community perceives disasters and their causes, as well as the roles of stakeholders (Ultramari, 2016).

However, according to Yasui (2017), many people would instead consider messages from family members, acquaintances, or neighbours rather than from experts. For example, experts in Zimbabwe disseminated information through word-of-mouth, as evidenced by some groups regarding Cyclone Idai (Chanza et al., 2020). Similarly, Skinner and Rampersad (2014) believe information content is important. According to the results, community members continued to use traditional communication tools, such as radio and television, in Ncakubana and Mphela Township. Some people had an advantage because they could obtain information from various sources, including radio and television. The information about disaster management comes from other municipalities and provinces, not the respective municipalities. In Metro Manila, however, access to information platforms was limited, particularly in rural areas lacking multimedia sources such as radio, TV, and the Internet (Juanzon & Oreta, 2018). The situation is different in South Africa; thus, disaster management officials need to

consider the platforms commonly used by the communities in their respective municipalities and provinces. This approach will ensure appropriate messaging and value for money.

5.4.2. Resources

Post-disaster, individuals would have lost their homes, land, crops, lives, and means of subsistence (Ahmad & Ma, 2019). According to the findings in Section 4.4.5, disaster management officials and Councillors had various resources to assist disaster-stricken communities. Regarding resources, Buou (2019) believes disaster relief entails providing food, shelter, and appropriate emergency services to affected communities following natural or man-made disasters. Following fires, for example, disaster victims in Alexandra were provided food parcels (Njilo, 2019). Food parcels, tents, and other necessities were distributed as relief materials during the Thulamela 2010/11 floods (Muysoki et al., 2015). Like their counterparts, Ahmad and Ma (2019) indicate that post-disaster relief is critical to restoring the lives of those affected. Some disaster management officials stated they did not have disaster response materials because they perceived disaster management as a coordinating function. As a result, they collaborated with relevant stakeholders to provide post-disaster relief materials. On the other hand, some disaster management officials stated that they had stopped storing relief material for distribution during disaster incidents because they were concerned it was being used for purposes other than disaster management. Another revelation was that relief material was sometimes misappropriated, primarily for political reasons. Therefore, limited resource usage should be reserved only for disaster management activities. Since some DMCs did not provide relief materials, they rely solely on donations. Due to a lack of resources, the Councillors' offices may be unable to deal with the disaster's effects. The key is for officials to ensure that there are necessary resources post-disaster to assist vulnerable disaster victims. The general concern, though, is that they were hardly adequate.

Table 4.10 shows that community resources included police stations, hospitals, clinics, critical facilities, NGOs, and schools. During the Sri Lanka disaster, temples, schools, and other locations were converted into shelters (Chesmal et al., 2012). Similarly, the resources that can be used were the central pavilion, schools, temples, mosques, headmen's offices, and centres for the elderly and disabled (Yodsuban & Nuntaboot, 2021). It is reasonable to conclude that the municipalities have community resources that have proven helpful during disasters. However, most participants indicated that resources were made unavailable due to previous vandalism and people refusing to vacate temporary shelters when requested.

The communities expressed concern that these resources were insufficient, too far away, or inadequately resourced, making them inaccessible. Arranging prior access to resources for post-diasters is critical for minimising delays. When disasters strike, the resources of the community help. Providing shelters, particularly for the elderly, is one of the strategies used in Thailand (Yodsuban & Nuntaboot, 2021). Additional resources in Santa Rosa include evacuation centres, communal toilets, and rescue vehicles (Juanzon & Oreta, 2018). They assist in meeting the needs of displaced people, storing resources, and providing meeting venues. The concern is that secondary disasters may impact these resources.

Communities rely on local social networks to respond to emergencies (Chanza et al., 2020). Social support is among the most important aspects of disaster recovery (Casagrande et al., 2015). Local social capital and community-based networks are essential for disaster response and recovery efforts (Fan, 2015). Social networks form and strengthen community-based disaster management activities (Chanza et al., 2020). According to the study, some community members belonged to social groups in their respective communities. Another example is the Tsunami disaster survivors in Sri Lanka, who demonstrated strong social cohesion (Chesmal et al., 2012). It means that community members assist one another in times of need. During the Hurricane Katrina disaster, Hawkins and Maurer's (2010) research found that almost all respondents benefited from social capital by assisting themselves or others in their circle. The assistance came from all racial and socioeconomic groups, regardless of the disaster victims' race or social status (Hawkins & Maurer, 2010). These findings imply that disaster victims are not alone; respondents strongly desire to assist other disaster victims. The results align with those of Casagrande et al.'s (2015) study, which found that during disasters, affected individuals are more likely to communicate with neighbours, even if they don't know them. It is human nature for people to want to help one another; there is a spirit of *ubuntu*. A community group's effectiveness depends on maintaining its social groups properly to avoid adverse outcomes. The daily lives of societies and their communities impact disaster recovery (Okada et al., 2018). Contrary to the findings, the Orang Asli community members are not involved in community or social organisations (Sadeka et al., 2020). As a result, they are missing all the benefits of social organisations. Social networks assist communities, especially post-disaster, as the disaster victims would have lost their assets.

Another point Nadiruzzaman and Wrathall (2015) raised is that political and power dynamics among groups, individuals, and communities influence access to resources and livelihood opportunities. They

impact the overall environment (Nadiruzzaman & Wrathall, 2015). In terms of political groups, most survey respondents stated that they had no affiliation with any political party. According to Nadiruzzaman and Wrathall (2015), political nepotism may be accepted or ignored, particularly by elite groups. These findings could imply that solid political affiliation does not confer a competitive advantage on community members. It was encouraging to learn that few participants in the research community had political ties. Not politically connected individuals tend to be ignored (Nadiruzzaman & Wrathall, 2015). Political affiliation can disadvantage those not politically connected because they may use political connections to get assistance before those affected.

In Section 4.4.5.4, many disaster management officials stated that post-disaster resources were inadequate. Even community members agreed with these points of view, claiming that the quality of assistance material received in their respective communities was insufficient. When disasters struck Sri Lanka, resources were similarly scarce (Siriwardana et al., 2017). Despite identifying resources before the Aranyaka Landslide disaster, no measures were implemented to acquire such resources (Siriwardana et al., 2017). Another example is when residents of Alexandra Township in South Africa hoped that the government would assist them in rebuilding because post-disaster resources were insufficient (Njilo, 2019). Moreover, Atlasville residents in the Ekurhuleni Metropolitan Municipality were similarly dissatisfied with the Municipality's post-disaster measures (Culwick & Patel, 2017). As a result, some affected people did not receive the necessary relief materials or assistance (Culwick & Patel, 2017). Major incidents necessitate more resources post-disaster. There can be additional resources and a broader mobilisation of private and public funds if there are many stakeholders (Chan et al., 2018). If the DMC's resources are insufficient, it is always advisable to contact donors. If donors do not assist, then a resource shortage is imminent. Donors are likely to contribute less than before due to the COVID-19 effects and high living costs. Moreover, disaster victims are likely to suffer even more because disaster management funding appears inadequate.

The Advisory Forum members indicated that the resources were internal, external, or outsourced. Similarly, Armah et al. (2010) categorised the organisation as external or internal. The stockpiling results from internal resources. Local, regional, and national organisations are classified as internal (Armah et al., 2010), whereas external organisations incorporate the United Nations and bilateral development partners. According to Muysoki et al., (2015), local businesses contribute to disaster relief

funding. They may come from service providers through outsourcing in some cases. In other words, resources can be obtained for free or purchased by DMCs when required. For example, there was the involvement of the following entities in fighting a fire during the Tlokwe LM 2011 Veld Fires: South African Police Service, Mounted Academy Potchefstroom Disaster Management Volunteers, Fire Protection Association, farmers, the Society for the Prevention of Cruelty to Animals, North West University Fire Brigade, and Working on Fire (Wiggil, 2013). Another example is the St. Francis Bay disaster, where various stakeholders were present, including disaster management volunteers, the Traffic Department, Eastern Cape Emergency Services, South African Police Service, private ambulance services, and various Fire Departments from St. Francis Bay, Humansdorp, Jeffreys Bay, Kareedow, Nelson Mandela Bay, and Kouga, as well as the National Sea Rescue Institution. Patensie Thornhills, Rocklands Farmers, and the Brakkenuine 4x4 Group were also involved (Times Media Group, 2018). Various stakeholders or role players in the Kouga Municipality of the Eastern Cape and neighbouring towns contributed resources (Times Media Group, 2018). Rizza and Pereira (2014) emphasise the importance of collaboration and consistency among various role players, including police, firefighters, infrastructure operators, public officials, and the community. The greater the magnitude of the incident, the higher the likelihood of inadequate resources, which necessitates collaboration among various stakeholders.

5.4.2.1. Funding

Dealing with floods needs considerable money to protect households from negative consequences (Muysoki et al., 2015). Governments worldwide use a variety of risk-financing instruments (Katongole, 2020). According to Figure 4.5, most disaster management officials had some funding arrangements to deal with post-disaster activities. Even among Advisory Forum members, some of them managed the budget for post-disaster activities. The funding contributed to making disaster management more efficient and effective. Contrariwise, respondents stated that the available funding did not cover all disaster management activities. Section 4.4.5.7 shows that many participants believed there was a need for post-disaster management financing. This situation can be attributed to focusing on pre-disaster management activities rather than post-disaster ones. For example, in Santa Rosa City, the Government used 5% of the Local Disaster Risk Reduction and Management Fund (Juanzon & Oreta, 2018). About 70% was set aside for pre-disaster programs, with the remaining 30% for an immediate response (Juanzon & Oreta, 2018). As a result, if there is a lack of funds, there will be insufficient material to

assist disaster victims post-disaster. There is an expectation of a resource shortage for post-disaster activities. The excessive cost of planning and the length required to implement some post-disaster management activities aggravate the situation. The delay in post-disaster funding will likely cause problems in impoverished communities and render DMCs ineffective. Other disasters may occur when the funds are available, resulting in the reprioritisation of post-disaster funds.

5.4.3. State of readiness

The findings in Section 4.4.5.6 are concerning because they confirmed that disaster-affected community members lacked the capacity and resilience to cope with future disasters. Similarly, the findings of the Orang-Asli study showed that most respondents lacked early preparedness measures (Sadeka et al., 2020). It means that when disasters strike, the impact will be continuous, and the affected community will be unable to cope with the consequences post-disaster. Therefore, Kato (2021) believes better disaster preparedness depends on previous disaster experiences. A well-informed community can do a lot to assist in preventing injuries and socioeconomic loss (Chong et al., 2018). For example, during the Kobe Earthquake in Malaysia, most victims survived due to prompt action by community members (Chong et al., 2018). On the other hand, communities become less resilient when ill-prepared for future flood disasters, limiting their recovery and adaptive ability (Sadeka et al., 2020). Thus, Boon (2014) contends that constant exposure to natural hazards makes people more disaster resilient. Measuring the success of coping strategies may entail assessing households' ability to distribute resources to deal with the crisis without jeopardising the long-term goal of livelihood security (Shitangsu & Routray, 2011). The worrying trend continues, as both communities' Focus Groups elaborated that they were unprepared to deal with future disasters. Community members need to take the initiative to cope with disasters.

According to the Armah et al. (2010) study, 67% of participants gained skills and knowledge that helped them cope with floods. Similarly, communities in Cuba have developed the ability to deal with risks and avoid negative consequences because they understand how to protect their assets and evacuate when necessary (Aragon-Duran et al., 2020). These results contradict research findings since community members did not have post-disaster coping skills. Informing communities about reducing vulnerability can significantly reduce disasters if communities are willing to act (Chagutah, 2009). Well-prepared communities are less likely to suffer severe disaster impacts, which can result in injuries or

fatalities. As a result of the shortcomings described above, communities should develop their coping mechanisms so that they do not rely solely on the government or NGOs.

5.5. Tangible and intangible challenges encountered post-disaster

The continued occurrence of disasters necessitates an urgent understanding of current mitigation measures and challenges (Boon, 2014). Many factors may contribute to governance challenges in the disaster management continuum (Riveria, 2019). Tables 4.11 and 4.12 show the various challenges experienced by participants during the post-disaster phase. Some challenges are common among all participants, while others affect only a few. Even though the relevant DM Act and policies were in place, some respondents believed the DM Act and policy implementation were ineffective. One of the reasons was that stakeholders did not fully implement the DM Act, particularly during planning, response, and recovery. Thus, only having the relevant Act and policies is inadequate because implementation is equally important. Otherwise, there will be no difference between having and not having Acts and Policies. Some research participants agreed that the current DM Act and NDMF did not adequately address the issue of capacity building to deal with future disasters. For example, the policies promote reliance on the government rather than resilience. The DM Act was also chastised for failing to reflect leading international trends, such as the importance of stakeholder relations and effective post-disaster coordination. In addition, poor execution made effective post-disaster recovery difficult. There were both internal and external challenges. Ineffective organisational procedures and processes, unclearly defined tasks, roles, and responsibilities, and staff resistance to change were all examples of internal challenges (Abdeen et al., 2021). As a result of these factors, the DM Act and Framework had gaps that may render them ineffective in the post-disaster phase.

One of the critical findings was that the main challenge to implementing the DM Act and policies post-disasters was a lack of fully functional DMCs. The reasons ranged from the HoCs not being officially appointed, inappropriate DMC placement, and a lack of equipment. In addition, disaster management documents, such as Disaster Management Plans and SOPs, were not updated as required by the DM Act due to a significant lack of appropriate institutional arrangements. Similarly, in Zimbabwe, the DMC, also known as the Civil Protection Unit, was a weak entity with an invisible role due to its incapacity to deal with disaster management coordination (Mutsau & Billiant, 2015). There was no research unit or technology to implement disaster management activities (Mutsau & Billiant, 2015).

There was also a lack of materials in Pakistan's District Civil Defence offices to register, train, or monitor community volunteers, as well as the ability to communicate with civil society members (Cheema et al., 2016). Moreover, there was no standard office furniture such as chairs, desks, or staff equipment (Cheema et al., 2016). In the research findings, DMC officials insisted that there was a need to address the state of DMCs because they did not comply with the DM Act. Then, some DMCs may not be fully functional, jeopardising their ability to implement the DM Act and the NDMF post-disaster.

Some respondents believed that an adequate budget would assist in implementing effective and efficient post-disaster activities. The findings were consistent with Adejuwon and Aina (2014), who discovered that respondents agreed that the major challenge is insufficient funding for effective and efficient preparedness and response. Even in the 2010 Pakistan floods, the relief activities by the Government and international and domestic NGOs were inadequate because of the magnitude of the disaster (Kurosaki, 2017). Similarly, there was insufficient funding for Bantul LM, Indonesia (Kusumasari & Alam, 2012). Ghana's financial resources were also limited, making it difficult for the NADMO to recruit qualified personnel (Oteng-Ababio, 2013). Oteng-Ababio (2013) suggests that a lack of funding influences the purchasing of logistics resources. In South Africa, the concern was that LMs did not budget for disaster management because they relied on District Municipalities for funding (Van Riet & Diedericks, 2010). As a result, disaster management personnel had limited access to computers, resources, and information management systems (Van Riet & Diedericks, 2010). The second most common challenge in Gambia was inadequate financial resources due to The Gambia Disaster Management Agency's reliance on the Government, UN bodies, and NGOs for disaster response and response plans due to the Agency's underfunding (Rivera et al., 2020). These findings are consistent with Culwick and Patel's (2017) Ekurhuleni Metropolitan Municipality study, which indicates that budget, personnel, and insufficient resources are the most significant barriers to effective DRR, even though the DM Act requires adequate funding and capacity for disaster risk reduction. Service providers may experience delays in procuring and constructing emergency shelters because of this weakness. Furthermore, community members may express dissatisfaction with the quality of the relief materials. It could imply that disaster management officials or high-ranking officials place little value on disaster management and, thus, allocate a small budget for post-disaster disaster management activities.

The post-disaster phase will most likely be compromised if insufficient funding exists. Surprisingly, there was a perception that disaster management stakeholders and role players did not understand their roles and responsibilities. Similarly, some respondents in the study identified local authorities' uncertainty about their roles and responsibilities and their indecisiveness as reasons for ineffective responses in Nepal (Malla et al., 2020). This problem is equivalent to the one identified by Abdeen et al. (2021), in which stakeholders were unacquainted with their roles and responsibilities. Moreover, a failure to comprehend disaster management at the decision-maker and formal actor levels contributed to Indonesia's disaster management weakness among stakeholders (Ali et al., 2019). Understanding the role and responsibilities of disaster management will assist in implementing appropriate post-disaster measures. In addition, it can assist in avoiding or minimising confusion during the post-disaster phase. Aside from a lack of understanding, some DMCs involved the NDMC before exhausting all internal resources. Some participants also mentioned the poor participation of line function stakeholders, disregarding that disaster management was everyone's responsibility. Some respondents reported a delay in implementing post-disaster projects. In the same vein, disaster management in Ekurhuleni Metropolitan Municipality was reactive, with poor cooperative governance (Culwick & Patel, 2017). Seemingly, post-disaster management requires more proactive measures than reactive ones.

Most participants were worried about the lack of collaboration among role-players and stakeholders. Equally, Siriporananon and Visuthismajarn (2018) emphasise that another main challenge to effectively implementing the policy was the lack of cooperation from government sectors, individuals, and stakeholders. This issue is like the one identified in the Rivera et al. (2020) study regarding a lack of stakeholder participation. Similarly, Rivera et al. (2020) discovered insufficient collaboration across government sectors, spheres, and agencies. Perceptions, willingness, and expectations are all factors that contribute to disaster management collaboration challenges (Raungratanaamporn et al., 2014). The lack of collaboration can be attributed to the multi-stakeholders inexperience in coordination and collaboration (Alam & Ray-Bennet, 2021). These findings build on the Sufri et al. (2020) study, which concluded that involving community members helps save lives, reduce injuries, and reduce environmental distractions associated with disasters. If everyone works together, a positive value or difference will likely ensure that post-disaster activities are dealt with appropriately. The collaboration will result in more tangible and intangible resource availability. According to Chan et al. (2018), the multi-stakeholder strategy allows for partnerships and cooperation among sectors and institutions to

strengthen disaster risk governance. Since disaster management is a multisectoral field, involving various roles and stakeholders is imperative.

Additionally, DMC participants raised concerns about the behaviour of community members. Community members sometimes expect more than what officials can provide post-disaster. Specifically, community members, for example, believed that DMCs were responsible for rebuilding houses. Community members also complained that disaster management officials were not thorough when capturing the disaster victims' beneficiary lists. Likewise, Chesmal et al. (2012) identified inappropriate disaster survivors' interventions. Compared to the Provincial and National Spheres, some Local Sphere Disaster Management officials highlighted extreme behaviours, as they typically responded to disasters and were closest to community members. For instance, some individuals destroyed their properties to receive relief material for a specific incident. In the same manner, many respondents in the Shitangsu and Routray (2011) study purposefully destroyed their homes to obtain more relief materials and new dwellings. This behaviour will likely deplete the limited relief materials, and legitimately affected individuals may not receive assistance. Moreover, there was evidence that some community members were insatiable in their desire for relief materials, even if they had not been affected by a disaster. These false claims compromised the affected individuals' available resources. There were even employed people who had not experienced a disaster who requested relief materials. Furthermore, they expected prioritisation over the most vulnerable affected individuals. The findings show that victims can lose more during disasters than they gain. The reason could be inadequate measures to ensure that the assistance provided is for the affected individuals.

Besides the above challenges, some disaster management officials stated that there was political interference during the post-disaster phase. Some politicians requested the distribution of disaster relief materials to the unaffected individuals. This pattern was most noticeable during the election seasons for the local, provincial, and national governments. As a result, those affected by disasters did not receive adequate relief materials since inadequate necessary relief materials exacerbated their situation. According to some Rivera et al. (2020) study respondents, political interference challenges affected disaster management efficiency. Interference impacts post-disaster relief distribution, disaster management, and prioritisation of vulnerability reduction (Rivera et al., 2020). Political interference can lead to the implementation of ineffective post-disaster measures. Politicians imposing their will on

processes usually go against Disaster Management Plans or Strategies. Some people benefit from political interference more than others. Resisting political interference seems complicated because the officials are on the administrative side and may be afraid to disobey political directives. Moreover, administrators may listen to a politician for personal gain. In some unfortunate cases, administrators cannot conceal their political affiliations. They thus end up openly working with certain political parties. This tendency is unacceptable in disaster management since officials should ideally be non-partisan.

Furthermore, the findings revealed that, in some cases, other stakeholders delayed providing resources to affected individuals. The argument stems from the fact that, for various reasons, stakeholders and role players did not always immediately respond when requested by disaster management officials. As a result, because the DMC sometimes relied on stakeholders to provide relief to disaster-affected individuals, relief was distributed days after the disaster incident. Comparably, Wiggil (2013) reported that one of the challenges encountered during the Tlokwe Fire was a deficiency of fuel for emergency vehicles resulting from the Municipality's failure to pay the fuel bill. As a result of this challenge, relief supplies were distributed late (Wiggil, 2013). Several factors could be causing the delay in distributing relief materials to disaster victims. The longer the delays, the worse the situation for disaster victims becomes. Another problem was disaster response after hours, on weekends, and public holidays. Delays in providing relief materials worsened the disaster victims' situation, exacerbating the disaster's effects since post-disaster was compromised.

The additional recurring theme was resource duplication. Resource duplication is equivalent to wasting resources because some response materials, such as food, can be spoiled when oversupplied. Conversely, a surplus can lead to a shortage of other resources. The failure to include all stakeholders in the post-disaster planning phase can be the cause. One participant attributed this to failing to establish the Joint Operation Centre (JOC). The JOC serves as a platform for various stakeholders to discuss disaster victims' needs, available resources, and roles and responsibilities. Despite the presence of numerous international NGOs, there was a lack of appropriate coordination in Sri Lanka (Chesmal et al., 2012). According to studies, a centralised governance system provides an adequate response (Malla et al., 2020). To achieve a satisfactory disaster response, the Sendai Framework 2015-2030 advocates a decentralised approach to disaster response (Malla et al., 2020). Therefore, discussing the required resources before the disaster can ensure their availability. On the contrary, the benefit of replication is

that resources will be abundant, thereby assisting all disaster victims. Subsequently, there will be no worry about resources because there will be a surplus.

Communication fragmentation is one of the difficulties mentioned by participants. One participant, for example, stated that incident and information management were insufficient. It led to less frequent information dissemination to those who were affected. It occurs even though communication is essential in disaster response and recovery planning (Houston et al., 2014). As a suggestion, Houston et al. (2014) emphasise that effective communication can help prevent disasters and reduce their impact. Conversely, ineffective communication can cause or exacerbate disasters (Houston et al., 2014). Failure to communicate with all stakeholders also contributes to inadequate disaster response (Abdeen et al., 2021). It may be challenging to address post-disaster phase obstacles when communication is fragmented. It is essential to have communication structures and protocols set up before implementing post-disaster measures to prevent inappropriate statements and their consequences.

Inadequate relief material to distribute to disaster victims was another critical area identified in the research. Also, Cole et al. (2021) believed that response resources are limited and thus insufficient. Similarly, even in Egypt, there were inadequate resources to meet all post-disaster needs and demands (Abulnour, 2014). In the study of Abdeen et al. (2021), respondents identified scarce resources as fundamental challenges that impeded multi-agency collaboration. The resource challenges are not new; according to Van Riet and Diedericks (2010), research participants reported a lack of resources such as budget, facilities, and skilled personnel. Correspondingly, Alam and Ray-Bennet (2021) identified the logistics and equipment shortages needed to address high-risk areas' challenges effectively. Some people will be unable to receive much-needed assistance due to scarcity. Again, Chan et al. (2018) support this point of view, as the study's findings show that government resources were insufficient and may be inadequate during large flood disasters. Disasters also strain materials, equipment, electricity, and transportation, reducing the effectiveness of collaboration among stakeholders and role players (Abdeen et al., 2021). This concerning shortage means that assisting affected individuals will be delayed. Some resources, such as food, have the potential to save lives, while a scarcity of resources can lead to secondary disasters, such as starvation and stampedes, as people compete for scarce resources. As much as some DMC participants had resources, officials and disaster victims reported inadequate resources. Metropolitan Municipalities appear to have more resources in South Africa than

District Municipalities (Van Riet & Diedericks, 2010). There is a possibility that the minimum Sphere Project Standards will not be met or even considered when distributing resources post-flood disasters. Human rights organisations may assist disaster victims in suing DMCs for providing insufficient or substandard resources to disaster victims post-disaster.

Power dynamics were mentioned as an additional challenge by some disaster management officials. Instead of assisting the vulnerable community, there are power struggles. When power dynamics and misunderstandings exist among officials, one of the DMC's core functions of ensuring that the post-disaster phase effectively and efficiently assists disaster victims is likely to be ignored. As a result, the emphasis shifts away from assisting disaster victims, and they are likely to be overlooked. Moreover, some power dynamics will likely halt some activities. In the United States, for example, the disaster declaration process was entirely at the discretion of the President (Gasper, 2015). The difficulty is that declaration denial was lower during election season and vice versa (Gasper, 2015), so the declaration process might be a tool to score political points. Similarly, power dynamics can lead to bureaucracy and, as a result, a delay in implementing critical decisions in some cases. Subsequently, instead of prioritising and addressing disaster victims' needs, officials will prioritise retaining power and protecting their territories, possibly at the expense of disaster victims' smooth post-disaster phase.

Some respondents mentioned that there was no effective disaster response strategy in place. One of the participants even elaborated that approaching different disasters in the same manner was incorrect. This acknowledgement may imply that there should be multiple strategies for implementing post-disaster activities effectively and efficiently. In this situation, Malla et al. (2020) found that government officials were sluggish in enacting policies supporting disaster response initiatives, consistent with the research findings. A lack of an appropriate policy can result in a situation like the one seen during the Sri Lanka Tsunami disaster, where one of the weaknesses was the apparent lack of a disaster management policy (Chesmal et al., 2012). The nature, frequency, impact, and root causes of disasters vary. Consequently, implementing post-disaster activities using the same approach is fundamentally problematic because a blanket approach to various disasters is likely ineffective. Furthermore, post-disaster issues are not addressed appropriately without disaster response strategies. As a result of not meticulously addressing the underlying causes during debriefing sessions, post-disaster challenges may reoccur.

Some participants claimed that their respective DMCs were understaffed. The conclusions were consistent with Cheema et al. (2016), who discovered that most District Civil Defence offices in Pakistan had personnel shortages, with as few as 12 officials serving as many as one million people in some districts. Similarly, Flanagan et al.'s (2011) study elaborated on how local governments are typically under-resourced regarding staff due to their social services and health roles. Analogously, the Rivera et al. (2020) study found that human resources were the most difficult challenge in disaster management for nearly 87% of interviewees. Thus, the concerns of disaster management officials were understandable. Although the frequency and magnitude of natural disasters have increased over time, there appears to be insufficient capacity to deal with disaster incidents, particularly during the post-disaster phase. Some disasters may not be attended to on time due to a lack of personnel, exacerbating the situation. In addition, the disaster victims may overwhelm the few disaster management officials deployed during post-disaster activities. The DMCs should also consider and be encouraged to have appropriately skilled disaster management personnel. Having many officials without appropriate post-disaster management skills is considered unhelpful.

Another source of concern was that the NDMC disaster declaration process encountered difficulties. Some participants thought the process was excessively long and tedious. The explanation was that there was red tape in obtaining disaster relief funds, which is common when a disaster is declared. Similarly, the LDRRMF concern was fund distribution proceedings (Juanzon & Oreta, 2018). In Ghana, chronic red tape from the national office caused disaster coordinators to clash with civil society when disasters occurred (Oteng-Ababio, 2013). The outcomes are consistent with those of a South African study conducted by Van Riet and Diedericks (2010), in which participants expressed concern that the lines of communication in the disaster management fraternity were cumbersome, resulting in a delay in responding. Officials expect that the disaster declaration will assist by providing more resources. Of great concern is that the immediate relief may not reach the intended recipients on time due to process delays. Given the length of the South African declaration process, there can be a declaration of another new disaster before the finalisation of the first disaster declaration process or intervention. It happened in several provinces where a second disaster was declared before the municipalities implemented all previous declarations' funds. This delay could result from stumbling blocks, such as the NDMC not executing thorough research or prioritising vulnerable groups and lacking communication with the PDMCs to determine the declaration priorities and requirements. Some participants indicated that

sometimes, the NDMC communicated directly with municipalities rather than through the PDMCs. The delay could also result from poor planning by officials. The declaration process challenges are concerning because they lead to post-disaster delays, impacting disaster victims.

There was also concern that DMCs have inadequate measures to ensure that affected communities developed disaster capacity post-disasters. Also, Rivera et al. (2020) findings show that the employees' main challenge was a lack of training. According to the responses, officials still used traditional methods, whereas there was an opportunity for innovation. Seemingly, disaster management officials perpetuated a culture of dependency in communities. Consequently, some community members appeared unwilling to accept responsibility and instead relied on the government for assistance after each disaster. Comparatively, Moreno (2018) identified a concerning approach in which community members were victims and recipients of external assistance, with no significant role during disasters. Furthermore, disaster victims may feel entitled to assistance rather than taking precautions to prevent future disasters. The dependency viewpoint is consistent with the Shitangsu and Routray (2011) study, which concluded that cyclone disaster victims became dependent on external assistance. Similarly, the Sri Lankan study discovered that continuously distributing relief packages to fishing community members developed a culture of dependency, delaying productivity and the rehabilitation process (Chesmal et al., 2012). The conclusion is that the upward disaster trend will continue because the emphasis seems to be on government assistance rather than self-sufficiency. As a result of insufficient efforts, people will continue to rely on DMCs and donors post-disaster.

According to some respondents, one of the challenges was the recurrence of disasters. The International Disaster Database stipulates that disaster occurrences have increased (Mukhtari, 2018). Therefore, Stute et al. (2020) express a similar concern about the rise in the amount and gravity of natural disasters over the last decades. Correspondingly, Chen et al. (2021) agree that disasters occur regularly worldwide. Pakistan, for example, experienced several climate-related and geological disasters recently, including the 2005 Kashmir Earthquake and annual floods since 2010 (Mukhtari, 2018). Pakistan is vulnerable to natural disasters ranging from floods, heatwaves, earthquakes, drought, landslides, locust attacks, and epidemic diseases (Huo et al., 2021). Moreover, the country may be vulnerable to multiple types of disasters. The situation is even worse in Nepal's Tadi Rural Municipality, where natural disasters threaten nearly half of the population, with 12% living in disaster-vulnerable areas (Shrestha & Bhatta,

2021). Natural and man-made disasters, unfortunately, have presented new challenges to International Disaster Response (Stute et al., 2020). A disaster severely disrupts the capabilities of any community or country (Huo et al., 2021). These continuous disasters may hamper the effective implementation of the post-disaster phase. According to the research results, the increase in disaster occurrences will likely continue. Disasters will continue to affect and destroy communities. Worse, some disasters are unavoidable and unpredictable.

5.6. Discussion of identified projects and opportunities post-disaster

Post-disaster projects must focus on a participatory model involving the community (Fan, 2015). Therefore, it is significant to involve communities during the post-disaster phase. Despite the need to avoid disasters, the international research community recognises that disasters can also serve as catalysts for change, potentially leading to the developing of more resilient countries and societies (Birkmann et al., 2008). The following section examines the existing projects in Table 4.13 and the post-disaster opportunities in Tables 4.14 and 4.15.

5.6.1. Completed projects

Implementing awareness campaigns in vulnerable areas was one of the most popular projects among almost all disaster management officials. Some participants even mentioned that their public awareness campaigns were targeting schools. Similarly, Phaiju and Gautam (2013) highlight the training of Nepalese community members to monitor and track flood levels. Emergency and hygiene kits, posters, books, and sirens are among the resources distributed to disaster coordinators in public schools and community areas as part of the City of Santa Rosa's awareness campaign (Juanzon & Oreta, 2018). One of the most cost-effective disaster-response strategies was public awareness campaigns. There were different methods for implementing awareness campaigns to reach a broad audience. Awareness campaigns can be in organisations as well as in communities. Information acquired by community members during awareness campaigns should be valuable post-disaster. Awareness campaigns, when properly implemented, can have a positive post-disaster impact. However, the impact of community awareness campaigns conducted by officials was unclear.

A few respondents were also working on establishing community ward-based disaster management structures. These projects aim to identify and assist vulnerable groups in communities. Australia is an

excellent example of a country that has developed and advanced Disaster Risk Reduction in a community (Rasanen et al., 2020). The project fulfilled Australia's international commitment to the Sendai Framework and human rights obligations (Rasanen et al., 2020). Khalid and Shafiai (2015) explain that in Malaysia, the role of NDMRC was to coordinate flood relief operations across all levels of government to minimise flood damage and prevent fatalities. Specific disaster management structures can ensure that all relevant stakeholders and role-players collaborate effortlessly post-disasters. Some structures are permanent, while others are only temporary. Some involve officials only, while others include both community members and officials. It is also crucial to avoid duplication and wasting the participant's time by not having many structures. Creating ineffective structures in a community can be futile and a waste of resources.

Only one municipality reported successfully relocating disaster-vulnerable communities from informal settlements to another area. Before relocating, the Municipality ensured disaster prevention and mitigation measures were in place. Post-disaster or threatening disaster resettlement is a long-term solution (Sridarran et al., 2018). Danquah et al. (2014) define resettlement as the process by which people leave their original areas to live in new locations. Resettlement provides a safe environment for vulnerable groups at risk or individuals affected by disasters (Sridarran et al., 2018). For this reason, Danquah et al. (2014) indicate that resettlement projects either restore the communities' livelihoods or provide them with better conditions. Convincingly, Sridarran et al. (2018) argue that it is necessary to ensure that relocated individuals are content during resettlement. Hence, Abaya et al. (2019) advocate introducing new agricultural technology deemed suitable for the new relocation sites to entice more people to accept relocation if they are involved in agriculture. In addition, Abaya et al. (2019) emphasise the importance of essential amenities and social services such as schools, health care, water supply, and irrigation. Among the challenges in South Africa is that land ownership is expensive, and only a few people own land. Therefore, this reality explains the high number of people staying in disaster-prone areas, even post-disasters. What makes matters even more complicated is that the government and municipalities have limited land compared to privately owned land. Reports suggest it is merely 14%, about 17061882 hectares. Moreover, regarding private ownership, vulnerable groups own the least amount of land, if any. Relocation is a complex activity that can cause problems if done incorrectly. People who relocate may lose their jobs, exacerbating their risks and worsening the situation. Thus, having a clear and comprehensive plan to determine relocation's benefits and drawbacks is imperative.

Following the disaster, some municipalities stated the provision of temporary shelters in affected communities. Likewise, after the earthquake, Turkey built low-cost, recyclable temporary structures (Chen et al., 2021). If relocating disaster victims is not feasible, temporary shelters will likely be built in areas vulnerable to future disasters, increasing disaster risk. Due to the lack of addressing root causes, the project will probably be ineffective. Moreover, because these structures are generally temporary, they are more vulnerable to disasters than permanent structures. Furthermore, there is a high likelihood that affected individuals will remain in the temporal structures for years, becoming permanent. The challenge is that some shelters are under-resourced, poorly maintained, and provide insufficient services. In some cases, the benefit of temporary shelters is that they are usually a few kilometres away from the affected area, thus not severely disrupting the disaster victims' lives and livelihoods.

Another post-disaster project some participants undertook was housing reconstruction for households with children, people with disabilities, and general indigents. However, very few of these projects identified and assisted vulnerable groups. Indirect social vulnerability can occur because of non-monetary coping resources such as resilient personality traits, for example, education, occupation, and social support (Chakraborty et al., 2019). Conversely, Chakraborty et al. (2019) believe that social vulnerability can be linked to financial resources, including income, wealth, and savings. Post-disaster activities can be successful if vulnerable groups are assisted with basic needs such as shelter. Most do not have the financial means to bounce back after a disaster. Therefore, the officials can assist vulnerable groups post-disaster by prioritising them.

5.6.2. Opportunities identified

Some of the proposed projects are already underway in some organisations, as indicated below. Some participants believed there was an opportunity to form partnerships with private, non-profit, and government organisations. Similarly, Rivera et al.'s (2020) research findings suggested that the Gambia Disaster Management Agency should establish public-private partnerships (PPPs) for resource mobilisation. Unquestionably, Siriporananon and Visuthismajarn (2018) elaborated that there should be cooperation between society and the private sector to have conducive relationships, as service provides for the community's needs. Various stakeholders collaborate to establish and implement community disaster resilience strategies (Samuel & Siebeneck, 2019). Involving stakeholders can assist in addressing the existing problems (Rivera et al., 2020). In this situation, Hemingway and Gunawan

(2018) indicate that partnerships help integrate disaster risk reduction measures. As a result, rather than being ad hoc, including relevant stakeholders must become the norm. The inclusion ensures that all role-players understand their roles and responsibilities. Moreover, this approach will reduce the number of stakeholders and role-players working in silos. PPPs have the advantage of sharing resources and lowering costs thereof. Therefore, they will prioritise resource availability and allocation post-disaster. However, Abdeen et al. (2021) believe collaboration among multiple agencies is necessary, but research indicates it faces significant challenges. The challenges range from social to information, communication, political, environmental, inter-organisational, and intra-organisational (Abdeen et al., 2021). Therefore, the Terms of Reference should be clear during the partnership formation process.

Some participants believed there was an opportunity to strengthen political and administrative support since concerns about a lack of support post-disaster exist. There was a need to establish Disaster Management Systems and Structures where they were non-existent. One of the opportunities identified in the Cyclone Idai disaster was establishing links between external disaster response organisations and villages (Chanza et al., 2020). Political commitment to disaster management may improve disaster management activities and planning (Rivera et al., 2020). There will be more engagement and support if there is administrative and political backing when implementing post-disaster activities. Thus, there will be assistance for affected individuals and political will from politicians to support administrators. Perhaps there will be additional resources made available for post-disaster activities. The community will benefit because politicians and officials will better understand its needs. Moreover, community involvement may avoid a situation in which politicians and officials make decisions affecting communities without their consent. The post-disaster phase will likely be effective and efficient if administrators and politicians work together.

The implementation of development projects was another identified opportunity. Infrastructure such as bridges, roads, and emergency shelters were development projects examples. However, previous disasters have demonstrated that rebuilding communities to pre-disaster standards frequently reinvents previously existing vulnerabilities, leaving communities vulnerable to future disasters (Edgington, 2017). Equally, Ahmad and Ma (2020) reflect on opportunities to build back better during recovery and rehabilitation. Similarly, Edgington (2017) agrees with the planners that reconstruction provides an opportunity to rebuild better. In Bangladesh, for example, families use tactics to cope with disaster

effects where their homes have unique designs and construction (Shitangsu & Routray, 2011). Building houses on higher ground to protect them from the waves is another strategy the community adopted (Shitangsu & Routray, 2011). Likewise, in the post-disaster phase of the 2004 Indian Tsunami, BBB principle implementation strengthened resilience (Schreurs, 2021). Post-flood disaster development can be an opportunity to address the disaster's challenges. In addition, development usually improves the living conditions of flood victims. The development process must consider previous disaster risks and vulnerabilities when implementing post-disaster measures.

According to the study, DMCs were typically overwhelmed in the post-disaster phase, particularly during major disaster incidents. As a result, there was an opportunity to increase capacity by recruiting volunteers to assist vulnerable groups. These volunteers would assist DMCs in conducting disaster management activities effectively and efficiently. For example, volunteers from the Red Crescent Organisation in Bangladesh helped to strengthen disaster management (Alam & Ray-Bennet, 2021). Another proposed volunteer training was in the Rivera et al. (2020) Gambia study. The NDMF also advocated for using volunteers (NDMC, 2005). As disasters are becoming more common globally, informal volunteers can provide much-needed capacity during emergencies and disasters (Whittaker et al., 2015). More human resources become available when volunteers assist post-disaster. Therefore, the relief provision will be implemented swiftly and with minimal delay. Given the disaster's increasing magnitude, having volunteers on standby is a viable option. Volunteers can also contribute a wide range of skills, which are intangible resources. Before any disaster, it is also critical to establish relationships with volunteers. The first step would be to create a database of volunteers to determine the number and type of volunteers. Volunteers can be semi-permanent, while others contribute on an ad-hoc basis. The three types of volunteers are unit, general, and spontaneous (NDMF, 2005).

There was also a shared proposed opportunity to improve public awareness campaigns. Even though most disaster management officials conducted awareness campaigns, there was a strong consensus that they needed enhancement. Specifically, Rivera et al. (2020) also proposed political awareness needs. For example, participants suggested councillors, *Amakhosi*, and *Izinduna* as targets for awareness campaigns. The awareness campaigns will help with survival skills if the disaster strikes again. The ongoing awareness campaign will help train people in multiple disaster management aspects. On the other hand, Roosli et al. (2018) emphasize the importance of community awareness and ongoing

dialogue for the community to have the necessary skills and knowledge to participate. A society not adequately trained and mentored will lack the required technical resources to carry out reconstruction activities (Roosli et al., 2018). Seemingly, there is a necessity for awareness campaigns post-disasters.

Information can be gained through direct or indirect experience (Kubisch et al., 2020). Various forms and platforms for conducting awareness campaigns are available to ensure the message reaches the appropriate communities. Awareness campaign information dissemination can be through radio, posters, calendars, pamphlets, art, songs, theatre, and essays (Phaiju & Gautam, 2013). Multi-stakeholder awareness campaigns can be critical for disseminating information and reaching a large audience because DMCs conduct awareness campaigns unilaterally based on the information gathered. In Egypt, awareness campaigns are undermined as no awareness campaigns exist in schools, institutions of higher learning, or print and electronic media (Abulnour, 2014). However, to understand disaster management, community education about disasters is crucial (Kamil et al., 2019). More still needs to be done for effective awareness campaigns and dissemination.

Developing SOPs was also identified as a potential opportunity, as most participants stated that their organisations had no SOPs. Similarly, Egypt had no SOP for disaster management that deals with response, resource allocation, and action plans (Abulnour, 2013). Even the South African NDMF (2005) prescribes implementing SOPs (NDMF, 2005). The SOP is beneficial to formalise the roles and responsibilities of disaster management participants. It ensures that everyone involved is held accountable and committed. SOPs should be encouraged in as many DMCs as possible, especially given the challenges identified by the lack of SOPs. The DMCs should then become acquainted with the SOPs to prevent confusion or delay when the SOPs are activated post-disaster. To achieve this, officials can use various platforms to disseminate post-disaster SOPs. The SOPs define the necessary processes and procedures. The established SOP must follow the National SOP Guidelines.

There may be an opportunity to develop policies, guidelines, and action plans in response to potential large-scale disasters (Chesmal et al., 2012). One respondent identified an unusual and rare opportunity to create a disaster unemployment assistance policy and a framework for mass care and emergency assistance. These are post-disaster activities that the relevant officials need to consider. Moreover, implementing the Emergency Assistance Policy Framework suggestion was supported and viewed as a

strategy for quickly accessing post-disaster resources. So, while waiting for long-term assistance, there should be immediate means of assisting disaster victims. Another significant opportunity proposed was the Unemployment Assistance Policy, which could help unemployed people. Unemployed people are considered particularly vulnerable and take a long time to recover from the effects of the disaster. Unemployment figures are likely to increase during post-flood disaster. It is cognisant to acknowledge that different events affect other people differently. For the proposed policy to be successful, various stakeholders and role-players must be involved.

One of the flood disasters' consequences is psychological effects. As a result, another identified opportunity was to provide psychological assistance to disaster victims to assist them in coping with the disasters' effects. According to the research participants' responses, DMCs rarely considered post-disaster counselling. In the same vein, Mutsau and Billiant (2015) advocated for post-emergency and disaster counselling. Thus, having psychological assistance in place will benefit officials and community members who are psychologically distressed post-disaster. Unfortunately, therapy prioritisation is not always the case (Mutsau & Billiant, 2015). Accordingly, counselling for disaster victims and officials involved in post-disaster management activities should be prioritised, as they may have traumatic experiences and require professional assistance. In addition, employees and communities need counselling because of their exposure to and impact from disasters (Mutsau & Billiant, 2015). Counselling must be initiated by DMCs rather than individual victims, as in Zimbabwe, where counselling institutions have stated that the government has never authorised them to provide disaster victims with counselling (Mutsau & Billiant, 2015). In contrast, there was counselling for disaster victims in the Canterbury area, and some even went for follow-up visits (Brigg & Roark, 2013). Furthermore, Canterbury Hospital provided free counselling services (Brigg & Roark, 2013) to those who needed them. While counselling cannot erase or change the effects of disasters, talking about the experience can help flood victims cope post-disaster. Some people may require more time to heal and recover from disasters, while others may not.

It is critical to have up-to-date and accurate information on post-disaster management. Therefore, the information management system must be more compatible with other systems and more resistant to external actors. According to Nespeca et al. (2020), to coordinate disaster response, information systems must deal with new roles and responsibilities, as well as the information needs of stakeholders. The

information must be reliable and justifiable (Nespeca et al., 2020). When information is deemed reliable, it effectively and efficiently implements post-disaster measures. This system is essential for disaster management officials, community members, donors, and internal and external actors. The information management system must contain relevant and understandable post-disaster information and not jeopardise individuals' integrity or confidentiality. Another feature of the system is that it should cater to different languages, particularly the dominant ones in that area. This system must be accessible to all vulnerable groups post-disasters and be disaster resistant. Another feature is that there can be a braille option for blind people and an audio option for deaf people. Some officials acknowledged this proposal as an acknowledgement that they are not properly skilled to deal with disabled, vulnerable groups, as they must also have access to reliable and comprehensible information post-disaster.

Another suggestion was to make disaster legal services available to deal with legal matters. To put it differently, Alam and Ray Bennet (2021) see a legal authority as having the potential to coordinate and collaborate with the government and private institutions. There is a possibility that legal issues will arise during the implementation of post-disaster management. Many organisations and individuals can sue the government or the municipality for various reasons. Thus, having legal services available to assist Disaster Management officials when facing community lawsuits is critical. It will also ensure the non-violation of disaster victims' human rights. This is an often overlooked but critical aspect of disaster management. Although most DMCs have legal experts in their organisations, they are indirectly involved in post-disaster activities. If the DMC faces legal action, both the DMC and the organisation's reputation will suffer. Furthermore, the litigation process is expensive when compared to avoiding legal challenges. Moreover, in the Constitution of RSA Chapter 9, institutions such as the Office of the Public Protector and the Human Rights Commission may be involved in preventing corruption and human rights violations when carrying out post-flood disaster activities. Additionally, as the community's eyes and ears, the importance of the media cannot be overstated. The media exposes potential post-disaster illegal activities, thus creating negative publicity. Implementing constitutional post-disaster activities helps to avoid unnecessary litigations.

According to the participants, resources for disaster management activities were limited. Acquiring adequate resources was a proposal to deal with scarce resources. Consequently, the Disaster Case Management Program was a proposal to manage disasters more effectively. Participants suggested that

this response should not be associated with a failure to recognise available resources but rather with a desire to assist disaster victims as efficiently as possible. In the same way, Malesic (2020) contended that some local organisations did not respond to the 2007 Zelezniki Flash Floods due to their inability to respond. Furthermore, Malesic (2020) indicated that the equipment was insufficient in some cases, and some top rescuers' training was inadequate. As previously stated, resources can be both tangible and intangible. Some resources are internal, while others are external. Another way to divide resources is into short-term and long-term resources. If proper and adequate resources are unavailable, there may be delays in implementing post-disaster activities. Therefore, a delay in addressing primary disasters promptly and a lack of resources may result in secondary disasters. Individual vulnerability is linked to resource availability because vulnerable groups face challenges acquiring resources. With adequate resources and prioritisation, disaster victims can return to normalcy quickly post-disaster. These resources must meet the needs of the disaster victims.

5.7. Recommended long-term measures

Recent research studies advocate learning from disaster experiences to reduce future impacts (Raska & Bradzil, 2015). So, Sheikhbardsiri et al. (2017) classified rehabilitation interventions for vulnerable groups into physical, social, psychological, and economic categories. Similarly, change can occur on a social, economic, political, and environmental level (Birkmann et al., 2010). The post-disaster phase can be an ideal time to implement change. Long-term solutions are needed to assist vulnerable groups in becoming disaster-resilient and adaptive. Thus, long-term interventions are required (Fan, 2015), as evidenced by the long-term measures recommended in Table 4.16.

Based on the abovementioned challenges, some disaster management officials, Advisory Forum members, and community members believed the main problem was excluding vulnerable groups. As a result, there was consensus on including vulnerable groups in matters that affected them. To implement post-disaster measures relatively quickly, vulnerable groups must express their views, and the relevant stakeholders need to implement their suggestions. Community groups involving the elderly must collaborate to be safe during disasters (Abdeen et al., 2021). Women, marginalised people, and people with disabilities, for example, have been included in disaster management structures in Nepal (Phaiju & Gautam, 2013). During disasters, vulnerable groups appear to be ignored and voiceless, even though doing anything for vulnerable groups without their inclusion is discouraged. The Sendai Framework

prescribes involving people with disabilities and their representatives in the proposal and execution of disaster risk reduction measures (Villeneuve, 2021). Musavengane and Simatele (2016a) reiterate that the solutions to community problems should be locally driven, tailor-made, embraced, and implemented. If vulnerable groups are involved, they will readily accept the post-flood disaster measures put in place. They will also safeguard and protect any resources allocated to them. The inclusion of vulnerable groups must cater to their needs. They must be able to indicate and comprehensively voice their needs for the post-disaster phase to be successful.

In the aftermath of disasters, disabled people appear to be the most overlooked group. Subsequently, another matter that participants rarely recommended was prioritising people with disabilities. This recommendation was comparable to the difficulties encountered by some participants in the Christchurch Earthquake disaster, where people with disabilities believed they were inadequately assisted (Phipps et al., 2014). People with disabilities experienced challenges during disaster evacuation and sheltering (Villeneuve, 2021). Particularly, Phipps et al. (2014) support that disaster risk reduction strategies allow people with disabilities to remain autonomous during emergencies. In Christchurch, for example, there is an informal support network where community members check on and ensure the safety of disabled people in the area (Phipps et al., 2014). Some participants suggested that, of all the disabled people categories, deaf-mute and blind people need special attention because they cannot communicate with most people due to their inability to hear and see respectively. Other vulnerable groups can at least shout or avoid danger because they can talk and see. The format and type of message can obstruct access to various information (Phipps et al., 2014). Text messaging, for example, is required by deaf people, whereas auditory information is for vision-impaired or blind people (Phipps et al., 2014). In South Africa, disaster management officials have limitations regarding communicating with disabled people post-disasters, especially the mute-deaf and blind. Even most community members can be said to be unable to deal with disabled people in their respective communities. Assisting vulnerable groups should always be a priority for role-players and stakeholders.

As mentioned in Chapter 4, some disaster management officials, Advisory Forum members, and community members suggested that child-headed and disabled households prioritisation. Some Advisory Committee members stated that ensuring vulnerable groups' representation in all three spheres of government was a priority. Community members suggested that vulnerable groups needed assistance

with food vouchers and disability grants for those who qualify. Coordination among various entities contributes to the effectiveness of disaster management (Raungratanaamporn et al., 2014). Disaster management stakeholders include emergency services, the government, entities, civil society, NGOs, and the private sector (Raungratanaamporn et al., 2014). This recommendation emphasizes the importance of a collaborative approach. For example, the Department of Social Development and the SASSA have primary responsibility for child-headed and disabled people. DMCs should collaborate with other stakeholders and role-players to assist disaster victims. Moreover, NGOs and community members are also important in identifying child-headed and disabled households. Collaboration for post-disaster activities can be effective if it is appropriately managed.

Education, training, and public awareness were the most frequently mentioned suggestions by respondents. Similarly, raising community awareness was Abdeen et al.'s (2021) recommendation for overcoming obstacles. There was a suggestion to educate and train community volunteers, ward committees, traditional leaders, and community members. The recommended training courses included disaster management, climate change, and financial skills. English language training, computer lessons, debris removal work, business establishments, garment-making, fish processing, weaving and embroidery, construction work activities, and job recruitment processes were among the training provided to victims of the Aceh Incident (Ismail et al., 2018). Also, in the September World Trade Centre tragedy, one of the recommendations was to train the public in the initial care of victims (Simon & Teperman, 2001). However, Kamil et al. (2019) proposed conducting capacity building in schools through formal education. Workshops, teaching modules, and technical interaction were examples of capacity-building activities, according to Biedenkopf et al. (2017).

In Mozambique, though implemented, there was a recommendation that the awareness campaign should be on a larger scale and focus on hazards or disasters and risk reduction, as well as sustainable development concept (Manuel, 2007). Most people agree that citizens should be educated and sensitised about disaster management issues through public awareness (Adejuwon & Aina, 2014). Society must understand and act on instructions to properly plan for, respond to, and recover from disasters (Abdeen et al., 2021). The Sendai Framework also suggests that education and training should improve community capabilities (Chan et al., 2018). The Sendai Framework strategy helps communities become disaster resilient (Rasanen et al., 2020). In comparison, Hemmingway and Gunawan (2018) specify that

disaster-knowledgeable individuals are often appropriately prepared for natural disasters and thus become more resilient. Constant preparedness should be encouraged to help prevent or mitigate property and environmental damage, loss of life, and injuries. Individuals use different methods to implement education, public awareness campaigns, and training. Therefore, it is essential to determine the type of training community members require for the selected type to be effective post-disaster. The training needs to add value to the communities.

Other participants suggested implementing evacuation drills. One such simulation in the United Kingdom in 2017 was a terrorist exercise on the River Thames in London (Barnes, 2019). Another evacuation was carried out in 2015 (Barnes, 2019). Aside from raising community awareness, a well-planned and rapid evacuation drill is crucial to saving lives in rapid-onset disasters (Kubisch et al., 2020). Hazard maps promote evacuation procedures and raise community risk awareness by including hazard information, education routes, and assembly point locations (Caymaz et al., 2013). Specifically, Malla et al. (2020) state that drills enable responders to have effective, feasible, and coordinated planning, reducing stakeholder duplication of resources post-disaster. Furthermore, Mc Bride et al. (2019) add that drills help acquire procedural knowledge. Regular response drills are critical for improving response to hazards and disasters (Bang et al., 2019). The Malla et al. (2020) study puts it differently and indicates that regular training, exercises, and rehearsals are essential for preparedness. According to Sowetan (2018), the conducted drill assisted the community's evacuation in St. Francis during a fire disaster, as the community implemented the evacuation drill results. The disaster response operation will run smoothly if relevant stakeholders and role players practice their roles and responsibilities. Officials can implement evacuation drills in communities and organisations. However, Barnes (2019) pointed out that a real-time evacuation drill is time and resource-intensive. When taken seriously, less expensive tabletop exercises are equally effective. Numerous disasters can occur; thus, there should be different scenarios to test the plans. Lessons learnt and challenges encountered during the drill must be identified and corrected. The actual disaster situation requires proper post-disaster activities to deal with the disaster effectively and efficiently.

The participants generally advocated for a significant improvement in funding arrangements and sourcing. Some disaster management officials insisted on the importance of rapid response and emergency purchases. Disaster management officials and Councillors believed that post-disaster

funding was insufficient. Similarly, in the Rasta Rosa area, Juanzon and Oreta (2018) advocated for increased disaster management funding. Howitt et al. (2017) concurred that there was a need for emergency and long-term funding to support sustainable recovery. Likewise, some respondents in the Rivera et al. (2020) study suggested that the Gambia Disaster Management Agency should improve its relationship with the National Government and other stakeholders to improve its financial position. Almost all post-disaster activities necessitate a budget-appropriate implementation because resources may need to be purchased. Therefore, funding is one of the priority aspects and concerns during the post-disaster. Furthermore, lack of funding has long-term effects because post-disaster management resources require financing. The funding must be sourced before the implementation of post-disaster activities to avoid delays during the implementation phase.

Disaster management officials mentioned the development or review of disaster management documents. Some disaster management officials, for example, suggested reviewing MOUs with training institutions. Similarly, the HGDM Advisory Forum member indicated that there should be guidelines for including vulnerable groups in post-flood disaster activities. For example, community members, particularly those from Mphela Township, proposed a by-law to address noise levels and the closure of taverns at stipulated times, as they believed that they exacerbate vulnerability and, thus, disaster impacts. This recommendation was consistent with Target C of the Sendai Framework, which calls for national disaster risk reduction and resilience strategies (Wamsler & Johannessen, 2020). Similarly, many respondents in the Adejuwon and Aina (2014) study advocated for developing rules governing emergency preparedness and response. One official even stated that an institutional framework regulates disaster management personnel and communities (Adejuwon & Aina, 2014). A public policy's goal should be to respond to people's needs while attempting to improve the country (Siriporananon & Visuthismajarn, 2018). The first step is to either update existing policies and practices or develop new ones (Wamsler & Johannessen, 2020). Formalising the requirements by writing them down is essential, as this ensures documentation of the required action. Following that, the documents should align with national and international trends. In addition, there is staff turnover because of factors such as fatalities, resignations, or retirements. Therefore, updating the documents to address changing needs is appropriate since the information is not static. So, regularly updating disaster management documents is crucial to ensuring having the most recent data and not outdated information that could be an invalid

and unusable post-flood disaster. The updated documents must consider disaster trends to provide an effective and efficient post-disaster phase.

Most participants suggested that one of the measures was to relocate people in vulnerable areas to safe locations. There were relocations in Japan, Tohoku, the Philippines, Leyke, and Indonesia; Yogyacha (Iuchi & Mutter, 2020). According to the literature review, relocating disaster victims to new and safe places is an effective strategy for reducing secondary disasters and thus building resilient communities (Roosli et al., 2018). Furthermore, relocation assists in mitigating future losses that may occur because of future disasters (Iuchi & Mutter, 2020). Therefore, people should relocate to a safe location where disasters can be avoided or mitigated. The relocation site should be better than where people stayed in the vulnerable location. It must improve people's lives rather than exacerbate their vulnerability. During a relocation, the most vulnerable people, such as disabled people, should be prioritised. Considering that the relocation process is multisectoral, all relevant role-players and stakeholders are crucial to ensuring a successful relocation project in which all of them are satisfied with the decisions implemented. Essentially, keeping people in high-risk areas after disasters is futile because disasters will affect them every time they occur.

Some community respondents in Mphela Township expressed concern that they would be unable to relocate with their livestock owing to a lack of suitable grazing land in the proposed relocation area. The study by Boon (2014) highlighted the disadvantages of relocating due to a natural disaster. Congruently, due to mining operations, the relocation of people in Nepal was problematic (Shrestha & Bhatta, 2021). Sometimes, the relocated communities are disadvantaged because relocation disrupts their social network and economic stability, causing them to become poorer (Iuchi & Mutter, 2020). Correspondingly, Roosli et al. (2018) stated that relocation negatively impacts disaster victims by disrupting their daily routines and livelihoods. Thus, they usually prefer to stay and rebuild near their homes (Roosli et al., 2018). According to Phipps and Good's (2014) study, people with disabilities prefer to stay in their homes rather than evacuate. Specifically, Shrestha and Bhatta (2021) underscore that when choosing a relocation site, it is significant to anticipate the possibility of a land-use change in industrial activities such as stone and sand mining. Though relocation may present numerous challenges post-disaster, more documented benefits are available if implemented correctly.

The research findings postulated that the existing non-functional structures must be re-established. Different structures served various functions in assisting effective and efficient post-disaster coordination. One of the proposed structures was the establishment of the Response Team. Its function will be to gather data, as data collection is one of the post-disaster challenges. Correspondingly, Mukhtari (2018) also mentioned the establishment of National, Provincial, and District Disaster Management Authorities in Pakistan. In the United Kingdom, a similar body is the Natural Hazards Partnerships, consisting of Government Departments and structures from numerous parts of the country (Hemmingway & Gunawan, 2018). The Natural Hazards Partnership, on the other hand, was a PPP because it only had public organisations (Hemmingway & Gunawan, 2018). The NDMRC was formed in Ghana in the early 1980s (Oteng-Ababio, 2013). According to Oteng-Ababio (2013), the Committee aimed to provide disaster victims with relief materials. The specific structures will help streamline flood post-disaster activities, making them more effective and efficient. The key is to ensure that the structures are functional and can assist when required. Sometimes, newly developed structures become permanent, while others are ad hoc. Furthermore, each established structure should include relevant stakeholders and role-players. In support, Mukhtari (2018) cautions that informal communication structures among people and between people and the government are encouraged, while formal structures are necessary.

As a post-disaster structural measure, some participants proposed a tree-planting strategy. This proposal aligned with the one used in Bangladesh, where community members planted coconut, betel nut, and banana trees around houses (Shitangsu & Routray, 2011). The goal was to provide homes with protection, a source of income, and privacy, particularly for women (Shitangsu & Routray, 2011). Tree planting is a preventive or mitigation measure that can serve a variety of helpful roles. Aside from assisting with uncontrollable water runoff, planting trees has other functions. Examples include providing shade, blocking wind, and providing food for animals. Community members can plant trees or be a government project in strategic community places such as private homes, government offices, and municipal buildings. The key is to grow non-invasive trees, as invasive ones can harm the ecosystem. Planting trees is a low-cost but effective post-disaster measure that will save money in the long run, as they will prevent or mitigate disasters.

There were also calls to increase capacity due to staff and resource capacity concerns in many DMCs. Similarly, the Indonesian government had limited resources for disaster management (Ali et al., 2019). Attributable to a lack of capacity, research participants indicated that officials could not fully commit to disaster management activities such as updating policies and implementing post-disaster activities. Therefore, increasing the capacity to address post-disaster flood issues effectively and efficiently must be prioritised. Even if volunteers are available, other activities that require human resources must be carried out daily, not just during disasters. Fransisco (2014) stipulates that having diverse assets for post-disaster solutions minimises damage risks and increases the possibility of a quick recovery. There is a visible post-disaster phase staff shortage compared to the pre-disaster phase. Subsequently, the implementation of the post-disaster phase becomes unsatisfactory. Many community members expressed a desire for appropriate and sufficient disaster relief materials. A proper supply of relief materials post-disaster will help to avoid insufficient availability to meet the community's needs, in addition to an unequal and unfair distribution of relief resources.

Some respondents believed that the early warning systems' implementation was significant. One of the Sendai Framework's goals is to increase the availability of early warning and risk information (Mukhtari, 2018; Wilkins et al., 2021). International agencies, such as the Yokohama Strategy in 1999, the Hyogo Framework of Action in 2005, and the Sendai Framework for Disaster Risk Reduction, 2015-2030, emphasize the necessity of early warning systems (Sufri et al., 2020). Early warning systems have demonstrated their effectiveness in alerting communities to impending disasters. They have the potential to save property, lives, and the environment. In the United States, there are many early warning systems for extreme, sudden disasters, such as meteorological and geophysical disasters, such as tsunamis and earthquakes (Wilkins et al., 2021). Malaysia has an early warning system overseen by the Department of Irrigation and Drainage (Khalid & Shafiai, 2015). In South Africa, early warning systems are not that common; thus, more should be done regarding improving this aspect. Early warning systems will be more effective if tested during the post-disaster phase. The testing will make it easy for the stakeholders to understand the early warning system.

Intensifying people's understanding of early warning systems and how to respond to them can improve their skills (Malak et al., 2020). Hemmingway and Gunawan (2018) state that early warning is crucial for disaster risk reduction. The findings support the assertion that one of the most effective ways to

ensure the effectiveness of community-based early warning systems is through training and capacity building (Phaiju & Gautam, 2013). Schreurs (2021) acknowledges that an early warning system could have prevented 220,000 fatalities in the 2004 Indian Tsunami. Correspondingly, Moreno (2018) believes that delays in issuing tsunami risk warnings resulted in the deaths of many people in coastal villages. In addition, reliable and clear communication is vital before, during, and after disasters (Hemmingway & Gunawan, 2018). So, generating and disseminating incorrect communication can exacerbate the effects of a disaster (Hemmingway & Gunawan, 2018). Procedures may include the use of a language they understand, as well as multiple platforms. The challenge is that communities do not always pay attention to the warnings.

Disaster management officials proposed their inclusion in post-disaster activities, particularly during reconstruction and rehabilitation. According to Mavhura (2019), large infrastructure projects involve various stakeholders with diverse interests. Strategic documents such as the 1994 Yokohama Strategy, the HFA from 2005, and the Sendai Framework 2015-2030 encourage public and private stakeholders to participate. Stakeholders include non-profit organisations, municipal governments, the private sector, and communities (Samuel & Siebeneck, 2019). In addition, Musavengane and Simatele (2016) cite a multi-stakeholder approach to using resources effectively and sustainably. Disaster management officials must be involved from the start of projects, not just when problems arise. Their involvement will also ensure that other stakeholders know about disaster management and its functions. In some projects, disaster management will take the lead; in others, they will serve as consultants. Involving disaster management to advise project teams can save immediate and future costs due to the valuable information that disaster management officials can share. Sharing disaster management information, such as disaster risk assessments and previous incident reports, could result in cost savings by assisting in making informed decisions.

One of the most popular suggestions was implementing a multisectoral approach with stakeholders to form relationships that could help during disasters, particularly among disaster management officials and Advisory Forum members. These results were like the recommendations in Mozambique, which also advocated for institutional strengthening and coordination among different organisations and officials at the National, Provincial, Regional, and Local levels (Manuel, 2007). A collaboration to help avoid resource duplication because resource allocation and distribution would be a multi-stakeholder

team effort. Disasters put emergency services and governments to the test, and shared responsibility becomes even more significant (Atkison & Curnin, 2020). Thus, it becomes a strategy in which various individuals participate in disaster resilience (Atkison & Curnin, 2020). Fekete et al. (2021) elaborate that participation entails interpersonal interaction, involvement, and communication. In conclusion, Janssen et al. (2010) summarise the approach well by advancing that multiple agencies must transition from autonomous actors to interdependent decision-making teams when a disaster occurs. Similarly, Sparf and Petridou (2018) argue that collaboration enables better management of routine emergencies than working independently. The study by Sparf and Petridou (2018) details the benefits of collaboration as a system, concentration, network structure, trust among stakeholders and role players, and relationship building. Through proper planning, a multisectoral approach can comprehensively address the challenges. The multisectoral approach allows stakeholders to collaborate on developing various solutions before selecting and implementing the best ones. The approach certainly has more benefits than drawbacks. On the contrary, power struggles between agencies and sectors, goal and cultural clashes, and a paucity of clear roles are all collaboration challenges (Sparf & Petridou, 2018).

The involvement of community members was not a common suggestion from the officials and the community members themselves. As a result, disaster management is shifting toward community-based prevention, with communities, NGOs, and the international community encouraged to participate (Ali et al., 2019). To put it another way, Atkison and Curnin (2020) contend that various community members play a role in disaster management. For this purpose, Fan (2015) believes that a multidisciplinary and eco-developmental approach for vulnerable groups can result in long-term and culturally acceptable individual and community-level outcomes. Musavengane and Simatele (2016a) found that social inclusion and cohesion lead to individual and household participation in the community scheme. Therefore, a dearth of community involvement and participation leads to challenges (Musavengane & Simatele, 2016a).

Some DMC participants suggested fully functional DMCs to ensure the implementation of activities such as the appointment of the HoC, the proper placement of the Centre, and the resolution of the lack of equipment in the DMCs. For example, the strategy for overcoming political intervention in Sri Lanka was to minimise political intervention while empowering the DMC (Abdeen et al., 2021). A fully functional DMC includes having all resources and systems that contribute to the DMC's effectiveness

and efficiency. In the Gambia, for example, the National Disaster Management Authority reports directly to the Vice President (Rivera et al., 2020). This placement can help to prevent political meddling from other government services (Rivera et al., 2020). In addition, some of the intangible recommendations may consist of reporting and relationship building. Implementing the proposed measures will enable disaster-affected communities to benefit more effectively and efficiently from fully functional DMCs, particularly during the post-disaster phase.

Some disaster management officials, Advisory Forum members, Councillors, and community members proposed constructing houses, specifically RDPs for vulnerable people. Similarly, Sridarran et al. (2018) claimed that housing is the most critical asset needed after a disaster, even though house reconstruction takes time. Following the earthquake, Nepal implemented the Housing Reconstruction Project (Rawal et al., 2021). The project established a global trend by including the poor and vulnerable (Rawal et al., 2021). Since the disaster would have had physical, social, psychological, and environmental consequences, the provision of the house proposal is significant (Roosli et al., 2018). Following Nepal's post-earthquake disaster, building materials shifted from stone and mud to cement (Rawal et al., 2021). In Malaysia, for instance, because floods occur annually, there was a proposal to build houses on stilts (Roosli & Collins, 2016). House structures influence infrastructure vulnerability, damages, repair costs, and recovery speed (Francisco, 2014). The proposal is to construct RDP houses because they are more potent and, thus, more disaster resilient. Previous research has also advocated for the construction of disaster-relief housing. As the type of house should be better than the original house before a disaster, the structural project must consider the BBB principle. In post-disaster situations, reconstructed houses need to withstand various types of disasters. The widely media reported RDP construction backlog might require the government to reconsider its strategy to provide houses.

Water connection, road and hall construction, installation of electricity, building ablution facilities, and road maintenance were among the community members' suggestion that services be implemented or improved. In the same vein, Manuel (2007) recommended that Mozambique invest in large infrastructural facilities such as dams to minimise disasters. A lack of service delivery negatively impacts communities by putting them at risk. As a result, addressing service delivery could ensure that post-disaster activities are appropriately implemented. Effective and efficient post-disaster management is also a component of service delivery. Moreover, implemented service delivery ensures that vulnerable

groups are disaster-resilient and have disaster-adaptive capacity. However, as previously stated, most of the requested service delivery measures are outside the purview of disaster management officials. Therefore, recommendations for flood post-disaster management interventions may need escalation to relevant departments and entities. Similarly, Reham et al. (2019) suggest that all relevant stakeholders and sectors must be involved to ensure an effective integrated flood management strategy.

5.8. Conclusion

There was a discussion about the findings regarding institutional arrangements and existing measures in organisations and communities. Disaster management is a multidisciplinary and multisectoral field that includes communities and vulnerable groups. The community is critical to ensuring effective and efficient post-disaster implementation. Inadequate assets, communication strategies, and resources may also exacerbate post-disaster vulnerability. Age, disability, gender, and employment are critical assets that assist vulnerable groups in coping with disasters. Learning that most respondents attend Disaster Management Advisory Forums in their respective organisations was a positive revelation. Disaster management officials and communities need to work together post-disaster. In the post-disaster phase, crucial assets must be in place to assist vulnerable groups.

The study also determined and analysed the empirical findings on post-flood disaster-related Acts and policies, flood policies, and vulnerable groups policies. According to the data analysis, South Africa has various post-flood disaster Acts and policies. The most used documents are the DM Act and the Disaster Management Framework. Despite the existence of Acts, policies, and plans, they appear not to have been fully implemented. Moreover, most policies are generic and do not address floods or vulnerable groups. As a result, there seems to be a disjuncture between knowledge of the Acts and policies, actual implementation, and even gaps. The MOUs were also crucial in ensuring that the DMCs collaborated across provinces and spheres of government. The disaster management officials can also sign the MOUs with the private sector. The main challenge highlighted in adopting MOUs was a lack of commitment to indemnity due to funding constraints. It is also a concern that many community members are unfamiliar with the DM Act, policies, and by-laws. They appear unprepared to deal with future disasters, which may make them more vulnerable. Enabler 2 of the NDMF supports training, public awareness, education, and research (NDMF, 2005). According to Biedenkopf et al. (2017), capacity building can be a valuable strategy for developing and emerging economies.

There are numerous challenges following a disaster. One of the most critical difficulties is a lack of resources, such as human resources. Even though some officials have disaster management training, there is a staffing shortage. Stakeholders should collaborate when implementing disaster management activities; however, working in silos is common. There is also a threat of the continuous occurrence of disasters. Flooding is the most common disaster that affects communities. Fires and drought are two other disasters that the participants constantly mentioned. Severe disasters occur with increasing frequency worldwide (Karunasena & Amaratunga, 2016). Some participants have also mentioned political interference as one of the challenges they encounter. Finally, many participants cited a lack of funds as the most significant barrier to adopting and implementing post-disaster actions. It appears that the post-flood disaster relief materials are usually insufficient. These challenges underscore the requirement for new policies and strategies that address vulnerable groups' post-flood disaster concerns.

Based on the challenges mentioned above, few DMCs have implemented projects to help curb the surge of disasters, making effective post-disaster measures difficult for stakeholders. However, there is an appreciation that disasters can create opportunities for post-disaster interventions to improve the lives of disaster victims. Thus, disaster management officials and community members identified some opportunities to assist communities with adaptive capacity and be disaster resilient. These opportunities are essentially a wish list to ensure effective post-flood disaster activities. The anticipated increase in frequency and impact of disasters have devastating consequences and require improved resources and approaches. Research participants, including Disaster management officials, Advisory Forum members, Councillors, and community members, recommended assisting vulnerable groups in urban and rural communities to become resilient and adaptive.

CHAPTER 6
CONCLUSION AND RECOMMENDATIONS

6.1. Introduction

Chapter 6 entails four central parts. The first section presents the primary findings of the study while also exploring how the material addresses the research questions, goals, and objectives. The second portion is about the research's conclusion, which analyses various aspects that indicate whether the study accomplished the research aim and objectives specified in Chapter 1. The third segment considers recommendations for disaster management practitioners, policymakers from various fields, and academics to ensure effective and efficient flood post-disaster management. Finally, the fourth part outlines the recommended future research areas.

6.2. Recapping the key study findings

The study was keen to explore the following research questions in South Africa, focusing on the post-flood disaster phase and vulnerable groups: (1) existing institutional arrangements to pursue effective disaster management or governance during the post-flood disaster phase, (2) most common disasters and measures in place, (3) prevalent challenges and their causes post-flood disaster, and challenges when implementing post-flood disaster legislation and processes, (4) projects and opportunities that exist to develop systems and processes for effective post-flood disaster management, and (5) long-term measures and indicators to build disaster capacity and resilience. The research asked questions to Government sectors, disaster management officials from three spheres of government, and community members through questionnaires, interviews, focus group interviews, and observations. Participants provided information to answer the research questions by telephone, one-on-one, and MS Teams interviews. Some of the information came from different secondary sources.

6.2.1. Existing institutional arrangements

Disaster management is a multidisciplinary and multisectoral field. Hence, the research participants included representatives from the National Government, the Private Sector, PDMCs, Provincial Government Departments, Metropolitan Municipality DMCs, District Municipality DMCs, District Municipality Departments, LM DMCs, Councillors, and community members. Structure-wise, the HGDM has a functioning Disaster Management Advisory Forum. The study also revealed that most

disaster management officials participated in their organisations' Advisory Forums, and some even participated in other DMCs, PDMCs, and NDMC Forums. Participation implied they met the DM Act requirement to establish Disaster Management Forums. Community cultural and social factors, such as disability, ethnicity, race, gender, health status, age, education level, employment type, the type of house, and source of income, may influence the individual's vulnerability. Some variables make certain individuals more vulnerable than others.

Concerning experience and skills, many disaster management officials had qualifications and extensive years of experience in the Disaster Management field. Some even worked in different spheres of DMCs. However, when analysing the stipulated qualifications, the results revealed that some were not necessarily Disaster Management qualifications. Other officials recognised and acknowledged this shortcoming in their qualifications and skills. Moreover, some participants were still pursuing their Disaster Management qualifications. Nonetheless, most interviewees held top management positions in their organisations, assuming they made decisions and better understood the organisation they represented. Additionally, most disaster management officials had worked for their respective organisations for over ten years and, therefore, had vast experience. Similarly, some HGDM Advisory Forum members had more than ten years of experience. It means that they were also very experienced in their positions. On the other hand, Councillors had experience ranging from five to more than ten years. Evidently, they tried to assist their communities post-disaster phase despite limitations. People with many years of experience were expected to be more knowledgeable and capable of implementing post-disaster management activities. The Councillors were concerned that the communities lacked the relevant disaster management skills. Most community members alluded to residing in their areas for more than ten years. The duration meant they were more familiar with the history of the area regarding disaster occurrences, post-flood disaster phase, and challenges.

The results showed that disaster management officials and the HGDM Advisory Forum relied on various Acts, legislation, policies, and documents for post-flood disaster activities. The most frequently used was the DM Act, 57 of 2002, as amended. In terms of the policy, it was the NDMF of 2005. Another emerging trend was that most Disaster Management officials lacked specific flood policies or plans for vulnerable groups. Moreover, some DMCs mentioned having MOUs with neighbouring Local DMCs and PDMCs. In addition, some DMCs have MOUs with parastatals such as CSIR, the private

sector, and NGOs, for instance, Gift of the Givers and the Red Cross. Some participants, in contrast, indicated that they do not have MOUs due to the costs associated with acquiring indemnity insurance and other expenses. Oppositely, Ncakubana and Mphela Township community members stated they were unaware of the DM Act, policies, or by-laws. This was one of the most concerning revelations. On a favourable note, most officials indicated that there is synergy with other spheres of the DMCs in terms of legislation. It was also encouraging to note that many disaster management officials had updated existing legislation and policies. Similarly, the Advisory Forum suggested that the legislation and policies in their organisations were current. Nonetheless, the Acts, legislations, policies, and documents for post-flood disaster activities had several gaps that impeded the effective and efficient implementation of post-flood disaster activities.

6.2.2. Prevalent disasters and measures in place

The disaster management officials' results confirmed that the top three disasters in their jurisdiction were floods, fires, and drought. Correspondingly, Advisory Forum members highlighted flooding, droughts, and fires as the most common disasters in HGDM communities. Some Advisory Forum members reported other disasters, including bus and train accidents, livestock and crop diseases, pests, and strong winds. Similarly, floods, droughts, and fires were the most frequently mentioned disasters by community members in Ncakubana and Mphela Township. Strong winds, heavy rainfall, and thunderstorms have also impacted these communities. Ward Councillors also mentioned floods, fires, and strong winds. Households were the most affected by disasters in these communities, possibly because they were primarily the main asset in communities. Community members also added that previous disasters had severely affected them, with some losing everything. Others had yet to recover from disasters that occurred years ago. Other community members indicated that the disasters had psychological effects because people were traumatised. Most community members stated that disasters affected them yearly, though the impact was not always severe. The second significant group consisted of people who were affected every five years. The results confirmed an upward trend regarding the severity and the impact of disasters that affect communities. Of concern was the state of readiness regarding the available resources, as they did not match the current reality regarding the high frequency and magnitude of future disasters.

The responses were ambiguous concerning community members' satisfaction with the role of Ubuhlebezwe and Greater Kokstad LMs post-disasters. Nearly an equal number of members said yes, no, and not sure. Regarding prioritising vulnerable groups, councillors and Focus Group members disagreed, as councillors believed they prioritise vulnerable groups. On the other hand, Focus Group members suggested that everyone was treated the same during the post-flood disaster. In some cases, in Mphela Township, there was the prioritisation of the elderly over everyone, including other vulnerable groups, during a few disasters. Thus, females, the elderly, people with disabilities, and the unemployed were more vulnerable during the post-flood disaster phase and needed prioritisation. The results, however, did not explicitly show that vulnerable groups are prioritised post-flood disaster.

The Councillors revealed that there were Mayoral Committee meetings to discuss disaster management matters. The community members confirmed that the Ward Councillors convene meetings. However, the frequency of the meetings has decreased, partly due to COVID-19 regulations and restrictions. It remained to be seen whether the situation would normalise after lifting all the COVID-19 regulations and restrictions. In addition, some community members could not attend community meetings due to illness or a lack of transportation funds to travel to meeting venues in other areas. Then, members of the Focus Group revealed that such engagements did not discuss disaster management issues unless there was a disaster. The prominence of these meetings was primarily on general service delivery matters. Ultimately, the disaster management continuum may not receive adequate attention regarding post-flood disaster activities since disaster management is not an agenda-standing item. The community view also implied that communities do not necessarily receive regular feedback about the post-disaster management activities in their areas.

There was a challenge with Wi-Fi access in both Ncakubana and Mphela Township, as no one had access to it in their homes. Some Ncakubana and Mphela Township community members had no idea what Wi-Fi was or how to use it. The knowledge level was better in Mphela Township because some communities could access internet information through Wi-Fi from businesses, such as banks and restaurants, and Municipal buildings, such as the Library and administrative offices. Thus, because few people could access Wi-Fi, the internet-based communication method was unlikely to reach many people. Even internet access through a cell phone would be prohibitively expensive, given that most community members were unemployed and relied primarily on government social grants and family

members for financial assistance. Additionally, some community members did not even own a smartphone, so they could not access internet information from their phones, even if the internet was readily available. Hence, most people in Ncakubana relied on the radio and TV to access information. In Mphela Township, TV was the most common source of information, followed by radio. With the current load-shedding in the Country, there can be limited access to these communication tools. As a result, vulnerable groups may not be privy to post-flood disaster information.

According to the study, some DMCs had more resources than others in terms of tools of trade and personnel. The researcher observed that Metropolitan Municipalities in urban areas were better equipped than other municipalities, especially LMs. As for PDMCs, there wasn't much difference in terms of available resources. The Councillors mainly provided disaster victims with short-term resources such as sponges and blankets. In addition, there were resources such as police stations, hospitals, clinics, critical facilities, NGOs, and schools in both Ncakubana and Mphela Township. However, some of these resources were far from the communities, especially in Ncakubana. When inquiring about resources, as much as disaster management officials indicated that they have resources in place, many stated that they are inadequate. Only a few of the officials stated that their resources were sufficient. The conclusion was that the resources required for post-flood disaster activities were insufficient. Scarce resources were one of the most recorded disaster management officials' concerns. Advisory Forum members' resources were from internal, external, or outsourced sources.

Almost all Disaster Management officials stated they had funding arrangements to implement disaster management activities. However, in some instances, most funding did not necessarily come from the DMC. Instead, there was more reliance on external sources such as National and Departmental Funding. Further investigation revealed that there was even less funding available for post-disaster activities. A budget is one of the most critical challenges, as funding is a significant aspect required for effective and efficient post-flood disaster management measures, as almost all activities require funds for effective and efficient implementation. Other participants indicated that the cause of this situation was that the organisation allocated less funds to post-disaster management than pre-disaster management activities. At the same time, there were indications that the pre-disaster funds were also inadequate.

Regarding assets, social groups were among the assets found in communities. Most communities belonged to social groups, the most common of which were burial and stokvel societies. Since most community members had no political affiliation, they were uninterested in politics. Individuals openly declaring their affiliation with a political party were uncommon. These individuals comprised less than 20% of the Ncakubana and Mphela Township residents' participants. On another disturbing point, the study discovered that Ncakubana and Mphela Township community members had not developed the capacity and resilience to cope with disasters. As a result, they lacked post-disaster resilience and adaptive capacity. There was no indication that the officials learnt any lessons from the various disasters that have affected them. There was no self-taught or formal training to deal with the imminent disasters, as evidence suggested that disaster occurrences were rising.

6.2.3. Post-disaster prevailing challenges and barriers

The current post-disaster challenges impact the effective and efficient execution of flood post-disaster measures. The multi-stakeholder approach, challenges faced by disaster management officials, lack of commitment by Sector and Municipal Departments, funding arrangements, institutional arrangements, political interference, and unfairness were among the commonly identified challenges that impede the implementation of legislation and policies following disasters. On the other hand, disaster management officials faced post-disaster challenges ranging from power dynamics, funding arrangements, vulnerable communities' challenges, high frequency of disasters, disaster management officials' roles and responsibilities, resource shortages, and multistakeholder complications. Conversely, the Advisory Forum members encountered and listed challenges such as noncompliance with officers during disasters, administrative, funding, red tape, and response delays. Ward Councillors, on the other hand, mentioned continuous flooding in one area and false claims by unaffected communities, as well as a lack of funding and inadequate resources.

6.2.4. Projects in place and identified opportunities

There was the identification of long-term and short-term projects in the disaster management officials' respective organisations. They entailed the distribution of relief materials, the provision of shelter, the dissemination of information, the establishment of structures, and the relocation of people. It was unclear whether the BBB Principle was considered when implementing the identified projects. The study also showed that not all disasters have entirely negative consequences when they occur. Among

the opportunities listed by disaster management officials were forming partnerships, conducting research and development, strengthening support, and effective and developing efficient disaster management systems and structures. Some opportunities can be implemented solely by DMCs, whereas others necessitate stakeholder participation and collaboration to be successful because they are not the primary responsibility of disaster management officials. Even the Ward Councillors indicated opportunities they believed could be identified post-disasters. In support, Advisory Forum members agreed that there were opportunities post-flood disaster.

6.2.5. Proposed post-disaster long-term measures and indicators

All research participants proposed long-term measures to support vulnerable groups in becoming disaster-resilient and adaptive. Therefore, it was an excellent approach for soliciting contributions from participants. Furthermore, this approach can ensure community members accept the implemented measures because they were involved. Participants frequently mentioned stakeholder and role player collaboration, skills development, prioritising vulnerable groups, developing relevant disaster management documents, fully functional DMCs, and improved service delivery.

6.3. Conclusion

The research conclusion could be that the existing Institutional Framework in organisations seemingly does not currently assist in the efficient and effective implementation of post-flood disaster management measures because it had gaps. Consequently, stakeholders and role players cannot appropriately help post-flood disaster. Therefore, institutional arrangements must be improved in organisations, particularly DMCs, in all three spheres of government. There were numerous challenges; the most significant was a lack of funding and resources for post-disaster activities. As a result, the implemented projects did not properly contribute towards disaster resilience and adaptive capacity to achieve sustainable development. Conversely, disasters can also provide numerous opportunities, though it was unclear if disaster management officials thoroughly considered them. Unfortunately, there was evidence from officials that disasters were on the rise, implying that they were becoming more frequent and severe. Floods, fires, and drought are the most common disasters, with floods being the top-ranked. According to community members, the most affected sector was households. All study participants suggested long-term post-flood disaster measures to improve the situation. These long-term indicators can measure disaster resilience and adaptability in vulnerable communities.

6.4. Recommendations

The research findings stipulate that achieving flood disaster resilience and adaptive capacity in vulnerable communities will be impossible if gaps in institutional arrangements are not addressed. Moreover, there is a need to solve the identified challenges to implement post-disaster activities effectively and efficiently. It was also crucial for the study to identify existing projects and potential opportunities for post-disaster implementation. Finally, it was significant to identify flood disaster vulnerable communities' prioritisation measures. The study identified several recommendations to consider in assisting vulnerable communities' disaster-resilient and adaptive capacity:

i. According to disaster management officials, no specific flood policies exist. Disaster management officials must develop flood policies, particularly in flood-prone areas. There should be no blanket approach to dealing with specific disasters. Instead, officials should thoroughly consider lessons from previous flood disasters to avoid similar occurrences.

ii. Some DMCs did not have Disaster Management Plans, and those had generic plans. Thus, in consultation with relevant stakeholders and role-players, Disaster management officials must have hazard-specific Disaster Management Plans. While it may not be feasible to develop a Disaster Management Plan for all identified risks, plans should be in place to address the top three priority risks. However, a flood contingency plan should be in place since flooding is the most common perceived disaster.

iii. Almost all disaster management officials' organisations lacked vulnerable group policies. Therefore, disaster management officials must generate vulnerable group policies. The absence of such policies implies inadequacy in dealing with vulnerable groups and their prioritisation. Officials and community leaders must prioritise vulnerable groups and not treat them like non-vulnerable individuals. The prioritisation can be done by compiling a formal list of the most vulnerable groups before the flood disaster. The list will make the assistance provided more effective and efficient. The list should also be updated post-disaster.

iv. Disaster management officials expressed serious concern about a lack of funding. The available budget is inadequate to cover all the required post-flood disaster activities. DMCs are encouraged

to obtain post-disaster funding to ensure appropriate post-flood disaster management. A budget is essential because it assists communities in running their day-to-day operations. The budget includes funds required for adequate disaster management personnel. Even stakeholder collaboration requires funding to some extent. The DMCs can use other legal fund-sourcing methods to boost their finances and acquire funding from various sources.

v. Another source of concern among disaster management officials was a shortage of personnel at DMCs. This scarcity impacts the post-flood disaster phase, as they cannot implement post-disaster measures effectively and efficiently. The participants elaborated that they sometimes overlook some of their post-disaster roles and responsibilities because they are overwhelmed with day-to-day responsibilities. Hence, there was evidence that support from other DMCs was not always satisfactory. The DMCs should have adequate personnel to avoid these challenges, and all vacant positions should be funded and filled with qualified individuals. Filling the positions will also curb the number of people working long hours and claiming excessive overtime. Overtime payment is costly for the organisation and may result in an audit query.

vi. Due to the NDMC's guidelines, many were concerned about the slow declaration process. The lengthy declaration process delays the allocation of funds and the implementation of post-disaster projects. Most of the time, the declaration and categorisation are quick. However, due to the red tape regarding documentation, there are lengthy delays in providing funds to the applicants. Delays may exacerbate the disaster situation, which can cause challenges during the post-disaster phase. Thus, the NDMC can consider and simplify the declaration process without compromising the stringent processes and procedures. However, a careful evaluation of the roles and actions of local and PDMCs is also necessary to ensure they do not contribute to a delayed disaster declaration.

vii. It was a problem that some post-disaster reconstruction projects were not resilient to future disasters. The implemented projects should ensure that future disasters are prevented or mitigated. Therefore, the implementing department should have effective project management to monitor implementation. In addition, the implemented projects must always advocate for BBB Principles.

viii. There seemed not to be transparent processes and systems post-disaster. Therefore, the DMCs, led by NDMC, should have a clear methodology to serve as a road map to ensure post-flood disaster management. After that, regular workshops and trainings should be held to ensure that all the relevant parties understand the methodology.

ix. Based on the preceding, the study developed the proposed Floods Post-Disaster Checklist in Table 6.1. The higher the rating, the more likely the community will be disaster-resistant and adaptive. The proposed checklist can contribute to disaster resilience and adaptive capacity since it will be a tool to check the state of readiness. Different stakeholders and role-players can use the tool.

6.5. Future studies

Future research can:

i. Conduct a study comparing individuals with varying educational levels to assess the disaster vulnerability of community members. The study found no conclusive evidence of a difference in vulnerability between educated and uneducated individuals. The study focused on whether the participants could answer the research questions. There were no difficulties collecting data from illiterate community members because they verbally responded well to all questions and sought clarification where they did not understand the question. Moreover, the similarity of education levels among community members made the comparison somewhat difficult.

ii. Conduct a thorough investigation to determine whether the South African DM Act and its policies aligned with global trends. Keeping updated about the latest disaster management developments can assist in quickly adapting to new post-disaster methods. As much as the participants believed there was synergy, the study did not delve deeply into the concept because it was a closed-ended question.

iii. Given the need to implement the Fourth Industrial Revolution, assessing the effects of a lack of ICT on disaster resilience and adaptive capacity is necessary. It would help understand the function of ICT in post-disaster situations and the consequences of a lack of ICT. Moreover, the experts can elaborate on the type of ICT required for post-disaster management and its benefits.

iv. Most communities did not have access to temporary shelters following disasters. Another aspect to consider is investigating the most effective methods for establishing and utilising temporary shelters. One of the most basic post-disaster needs of disaster victims is shelter. Since only one Disaster Management official stated that they had successfully implemented relocation projects, a feasibility study and benchmarking on relocation should be conducted. This study can thus concentrate on the relocation process, required resources, challenges, advantages of relocation and best practices to ensure an efficient and effective post-disaster process.

v. According to the study, DMCs relied on external assistance for post-disaster resources because internal resources were inadequate, and some did not have post-disaster resources in place. There's a necessity for tangible or intangible support, either short-term or long-term. Relying on other stakeholders does not always guarantee that flood disaster victims will be provided with allocated resources post-disaster. The suggestion is to determine the factors that motivate individuals or organisations to provide post-disaster phase assistance. The study can examine the reasons for assisting and the type of assistance to assess if it meets the ethical standards.

vi. It was unclear whether storing post-disaster resources was advantageous or disadvantageous. Some disaster management officials have expressed concern about using post-disaster materials for political purposes, implying that relief supplies could be taken and used for election campaigning. Therefore, determining the DMCs' sustainability by only coordinating post-disaster resources instead of their resources would be beneficial. The study can compare the benefits and challenges of having and not having storage. A cost-benefit analysis would be useful in determining the best approach.

vii. Since some community members were dissatisfied with the Municipalities' assistance, this could imply that service delivery was unsatisfactory. Additionally, some challenges were associated with social ills. Establishing a correlation between satisfaction with service delivery and the effective implementation of post-disaster activities would be helpful. Determining feasible relief measures that satisfy disaster victims is crucial to meet their needs.

Table 6.1: Proposed developed Post-flood Disaster Checklist/ Model

Item	Rating			Comment
	Low: 1-3	Medium: 4-7	High: 8-10	
Institutional Arrangements				
Establish or revive structures[1]				
Functional DMC				
Hazard Specific Policy				
Hazard Specific Plan				
Vulnerable Groups Policies				
Legislation synergy				
Updated legislation				
Prioritisation of vulnerable groups				
Funding Model				
DMC Placement				
Multi-sectoral approach				
Community participation				
Volunteers SOP				
Information Management SOP[2]				
Signed MOUs[3]				
Community Capitals				
Challenges				
Resources[4]				
Political interference				
Working in silos				
Staff shortage				
Community members				
Delays in implementation				
Declaration process				
Service delivery concerns				
Affected sectors				
Post-disaster checklist- recommendations				
Capacitate vulnerable groups[5]				
Early warning systems[6]				
Information Management System				
Temporary/ Evacuation shelters				
Relocation- permanent				
Funding arrangements				
Donations				
Coordinated activities/ structures				
Search and rescue				
Medical attention				
Food security				
Burial arrangements				
Psychological assistance				
Legal services				
Tree planting				
Implemented projects: BBB				
Effective project management				

1 Advisory Forum Members, Technical Task Teams, temporal, and permanent post-disaster structures
2 Information dissemination, community meetings, media platforms, ICT, and Network coverage
3 Neighbouring DMCs, Government Departments, Parastatals, Private Sector
4 Resources shortage and duplication
5 Awareness Campaigns approach: Legislations and policies, hazard knowledge, and drills
6 The information should be in various platforms and languages

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7. APPENDICES

Appendix A: Ethics Certificate

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Research Office

HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)
R14/49 Nyide

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER: H20/02/32**
PROJECT TITLE	The role of institutional frameworks in post-disaster management in Kwa-Zulu province, South Africa: A study of Mphela Township and Ncakubana
INVESTIGATOR(S)	Ms S Nyide
SCHOOL/DEPARTMENT	Geography, Archaeology and Environmental Studies/
DATE CONSIDERED	14 February 2020
DECISION OF THE COMMITTEE	Approved Risk level: Low
EXPIRY DATE	17 August 2023

DATE 18 August 2020 **CHAIRPERSON** J Knight

(Professor J Knight)

cc: Supervisor : Prof S Grab and Prof M Simatele

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University. Unreported changes to the application may invalidate the clearance given by the HREC (Non-Medical)

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to completion of a yearly progress report.**

Signature Date 19/08/2020

Appendix B: Participant Information Sheet- Disaster Management Officials

PARTICIPANT INFORMATION SHEET:
DISASTER MANAGEMENT OFFICIALS INTERVIEW

Dear Sir/Madam

My name is Ms. Sindisiwe Nyide. I am a Doctor of Philosophy (PhD) student in the School of Geography, Archeology and Environmental Studies, Faculty of Science, at the University of Witwatersrand, Johannesburg. As part of my studies, I must undertake a research project. I am investigating the role of institutional frameworks in post-disaster management. This research project aims to investigate the ways and avenues in which effective management of disasters at the post-disaster phase can be an important tool to promote adaptive capacity and resilience of the most vulnerable groups in both urban and rural communities and then bring about sustainable development.

As part of this project, I would like to invite you to take part in answering telephone or e-mail interview questions. You were selected as a person involved in post-disaster activities between 2008/09 to 2017/18 financial years in your organisation. The interview will take about 30 minutes. I would like to record the interview using the call recorder, where applicable, as the interview cannot be conducted face-to-face for safety reasons due to the COVID-19 pandemic.

Please note that your participation is voluntary; you will not receive direct benefits from participating in this research. Whenever you are uncomfortable proceeding, you have a right to withdraw or request another time, and there are no disadvantages or penalties for not participating. You also have a right not to answer the questions you are uncomfortable with. The information you provide will be confidential and anonymous, as I will not be asking for your name. The information you provide will be held securely and not disclosed to anyone else. I will use a pseudonym or code to represent your participation in my final research report. If you agree to be part of the interview, I will request you to sign the consent form.

If you have any queries during or afterwards of this research, please do not hesitate to contact me on the details provided below. This study will be written up as a research report, which can be accessed online through the University library website. If you require a summary of the research, I will gladly send it to you. If you have any concerns or complaints regarding the ethical procedures of this study, you are welcome to contact the University Human Research Ethics Committee (Non-Medical), telephone: +27(0) 11 717 1408, e-mail: hrec-non-medical.researchoffice@wits.ac.za

Yours Sincerely,
Ms Sindisiwe Nyide

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Prof. Mulala Simatele (Supervisor), tel: +27(0) 11 717 6515, e-mail mulala.simatele@wits.ac.za

Appendix C: Participant Information Sheet-Councilors

PARTICIPANT INFORMATION SHEET:
GREATER KOKSTAD AND UBUHLEBEZWE LOCAL MUNICIPALITIES WARD 01 AND WARD 05 COUNCILLORS INTERVIEW

Dear Sir/Madam

My name is Ms. Sindisiwe Nyide. I am a Doctor of Philosophy (PhD) student in the School of Geography, Archeology and Environmental Studies, Faculty of Science, at the University of Witwatersrand, Johannesburg. As part of my studies, I must undertake a research project. I am investigating the role of institutional frameworks in post-disaster management. This research project aims to investigate the ways and avenues in which effective management of disasters at the post-disaster phase can be an important tool to promote adaptive capacity and resilience of the most vulnerable groups in both urban and rural communities and to bring about sustainable development.

As part of this project, I would like to invite you to take part in answering telephone and/ or e-mail interview questions. You were selected as a person who has been involved in post-disaster activities between 2008/09 to 2017/18 financial years in your ward. The interview will take about 30 minutes. I would like to record the interview using the call recorder and take pictures, where applicable. Taking into cognisance the current COVID-19 pandemic, the fieldwork will be conducted when the COVID-19 Disaster Management Regulations and Directions permit and it is safe to do so.

Please note that your participation is voluntary; you will not receive direct benefits from participating in this research. Whenever you are uncomfortable proceeding, you have a right to withdraw or request another time, and there are no disadvantages or penalties for not participating. You also have a right not to answer the questions you are uncomfortable with. The information you provide will be confidential and anonymous, as I will not be asking for your name. The information you provide me will be held securely and not disclosed to anyone else. I will be using your pseudonym or code to represent your participation in my final research report. If you agree to be part of the interviews, I will request you to sign the consent form.

If you have any queries during or afterwards of this research, please do not hesitate to contact me on the details provided below. This study will be written up as a research report, which can be accessed online through the University library website. If you require a summary of the research, I will gladly send it to you. If you have any concerns or complaints regarding the ethical procedures of this study, you are welcome to contact the University Human Research Ethics Committee (Non-Medical), telephone: +27(0) 11 717 1408, e-mail: hrec-non-medical.researchoffice@wits.ac.za

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Appendix D: Participant Information Sheet- Community Members Focus Group Interview

PARTICIPANT INFORMATION SHEET: COMMUNITY MEMBERS FOCUS GROUP INTERVIEW

Dear Sir/Madam

My name is Ms. Sindisiwe Nyide. I am a Doctor of Philosophy (PhD) student in the School of Geography, Archeology and Environmental Studies, Faculty of Science, at the University of Witwatersrand, Johannesburg. As part of my studies, I must undertake a research project. I am investigating the role of institutional frameworks in post-disaster management. This research project aims to investigate the ways and avenues in which effective management of disasters at the post-disaster phase can be an important tool to promote adaptive capacity and resilience of the most vulnerable groups in both urban and rural communities and to bring about sustainable development.

As part of this project, I would like to invite you to take part in answering the Focus Group interview questions. You were selected as a person who resides in the area and might have been affected by floods that affected the area between 2008/09 and 2017/18 financial years. The interview will take about 02 hours. I would like to record the interview using the audio recorder and take pictures, where applicable.

Please note that your participation is voluntary; you will not receive direct benefits from participating in this research. Whenever you are uncomfortable proceeding, you have a right to withdraw or request another time, and there are no disadvantages or penalties for not participating. You also have a right not to answer the questions you are uncomfortable with. If you feel distressed and require support, you will be referred to the Department of Social Development. The Social worker is Mr Mokena; the contact number is +27(0) [redacted]. The information you provide will be confidential and anonymous, as I will not be asking for your name. The information you provide me will be held securely and not disclosed to anyone else. I will be using your pseudonym or code to represent your participation in my final research report. If you agree to be part of the Focus Group interview, I will request you to sign the consent form.

If you have any queries during or afterwards of this research, please do not hesitate to contact me on the details provided below. This study will be written up as a research report, which can be accessed online through the University library website. If you require a summary of the research, I will gladly send it to you. If you have any concerns or complaints regarding the ethical procedures of this study, you are welcome to contact the University Human Research Ethics Committee (Non-Medical), telephone: +27(0) 11 717 1408, e-mail: hrec-non-medical.researchoffice@wits.ac.za

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Professor Mulala Simatele (Supervisor), tel: +27(0) 11 717 6515, e-mail mulala.simatele@wits.ac.za

Appendix E: Participant Information Sheet-Harry Gwala DM Advisory Forum Members

INFORMATION SHEET:
HARRY GWALA DISTRICT MUNICIPALITY ADVISORY FORUM MEMBERS QUESTIONNAIRE

Dear Sir/Madam

My name is Ms. Sindisiwe Nyide. I am a Doctor of Philosophy (PhD) student in the School of Geography, Archeology and Environmental Studies, Faculty of Science, at the University of Witwatersrand, Johannesburg. As part of my studies, I must undertake a research project. I am investigating the role of institutional frameworks in post-disaster management. This research project aims to investigate the ways and avenues in which effective management of disasters at the post-disaster phase can be an important tool to promote adaptive capacity and resilience of the most vulnerable groups in both urban and rural communities and then bring about sustainable development.

As part of this project, I would like to invite you to take part in answering the online and/ or telephone questionnaire survey. You were selected due to your involvement in a disaster management structure dealing with post-disaster management in Harry Gwala District Municipality. The survey will take about 30 minutes. I would like to record the survey using the call recorder and take pictures of the projects you have been involved in, where applicable. Taking into cognisance the current COVID-19 pandemic, the fieldwork will be conducted when the COVID-19 Disaster Management Regulations and Directions permit and it is safe to do so.

Please note that participation is voluntary; you will not receive direct benefits from participating in this research. Whenever you are uncomfortable proceeding, you have a right to withdraw or request another time, and there are no disadvantages or penalties for not participating. You also have a right not to answer the questions you are uncomfortable with. Your information will be confidential and anonymous, as I will not be asking for your name. The information you provide me will be held securely and not disclosed to anyone else. I will be using your pseudonym or code to represent your participation in my final research report. If you agree to be part of the questionnaire survey, I will request that you sign the consent form.

If you have any queries during or afterwards of this research, please do not hesitate to contact me on the details provided below. This study will be written up as a research report, which can be accessed online through the University library website. If you require a summary of the research, I will gladly send it to you. If you have any concerns or complaints regarding the ethical procedures of this study, you are welcome to contact the University Human Research Ethics Committee (Non-Medical), telephone: +27(0) 11 717 1408, e-mail: hrec-non-medical.researchoffice@wits.ac.za

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Appendix F: Participant Information Sheet- Community Members Questionnaire Survey

PARTICIPANT INFORMATION SHEET:
COMMUNITY MEMBERS QUESTIONNAIRE SURVEY

Dear Sir/Madam

My name is Ms. Sindisiwe Nyide. I am a Doctor of Philosophy (PhD) student in the School of Geography, Archeology and Environmental Studies, Faculty of Science, at the University of Witwatersrand, Johannesburg. As part of my studies, I must undertake a research project. I am investigating the role of institutional frameworks in post-disaster management. This research project aims to investigate the ways and avenues in which effective management of disasters at the post-disaster phase can be an important tool to promote adaptive capacity and resilience of the most vulnerable groups in both urban and rural communities and then bring about sustainable development.

As part of this project, I would like to invite you to take part in answering the questionnaire survey. You were selected as a person who resides in the area and might have been affected by floods that affected the area between 2008/09 and 2017/18 financial years. The survey will take about 30 minutes. I would like to record the survey using the call recorder and take pictures, where applicable. Taking into cognisance the current COVID-19 pandemic, the fieldwork will be conducted when the COVID-19 Disaster Management Regulations and Directions permit and it is safe to do so.

Please note that participation is voluntary; you will not receive direct benefits from participating in this research. Whenever you are uncomfortable proceeding, you have a right to withdraw or request another time, and there are no disadvantages or penalties for not participating. You also have a right not to answer the questions you are uncomfortable with. If you feel distressed and require support, you will be referred to the Department of Social Development. The Social worker is Mr Mokena; the contact number is +27(0) [redacted]. The information you provide will be confidential and anonymous, as I will not be asking for your name. The information you provide me will be held securely and not disclosed to anyone else. I will be using your pseudonym or code to represent your participation in my final research report. If you agree to be part of the questionnaire survey, I will request you to sign the consent form.

If you have any queries during or afterwards of this research, please do not hesitate to contact me on the details provided below. This study will be written up as a research report, which can be accessed online through the University library website. If you require a summary of the research, I will be happy to send it to you. If you have any concerns or complaints regarding the ethical procedures of this study, you are welcome to contact the University Human Research Ethics Committee (Non-Medical), telephone: +27(0) 11 717 1408, e-mail: hrec-non-medical.researchoffice@wits.ac.za

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Appendix G: Consent Form- Disaster Management Officials

CONSENT FORM FOR PARTICIPANTS:

DISASTER MANAGEMENT OFFICIALS

Title of Project: The Role of Institutional Frameworks in Post-Disaster Management in KwaZulu Natal Province, South Africa: A Study of Mphela Township and Ncakubana.

Name of Researcher: Ms Sindisiwe Nyide (PhD Candidate)

I……agree to participate in this project. The research has been explained to me, and I understand what my participation will entail. I will take part in answering the interview questions. I will circle the appropriate options below: Yes if I agree and No if I disagree. The interview will take about 30 minutes.

- I agree that my participation will remain anonymous YES NO
- I agree that the interview may be audio recorded, where applicable and that the recordings will be used only for research purposes. YES NO
- I agree that the researcher may use my responses as anonymous quotes in her research report. YES NO
- I agree that the researcher may take photos of the post-disaster projects I have been involved in, but not my face. YES NO

…… (Signature)

…… (Date)

For further information about the research and the anonymity of your participation, please do not hesitate to contact me:

Sindisiwe Nyide, cell: +27(0) 83 717 0908, e-mail: 2181993@students.wits.ac.za
Professor Stefan Grab (Supervisor), tel: +27(0) 11 717 6512, e-mail Stefan.Grab@wits.ac.za
Prof. Mulala Simatele (Supervisor), tel: +27(0) 11 717 6515, e-mail mulala.simatele@wits.ac.za

Appendix H: Consent Form- Councilors

CONSENT FORM FOR PARTICIPANTS- GREATER KOKSTAD AND UBUHLEBEZWE LOCAL MUNICIPALITIES WARD 01 AND WARD 05 COUNCILLORS

Title of Project: The Role of Institutional Frameworks in Post-Disaster Management in KwaZulu Natal Province, South Africa: A Study of Mphela Township and Ncakubana.

Name of Researcher: Ms Sindisiwe Nyide (PhD Candidate)

I……agree to participate in this project. The research has been explained to me, and I understand what my participation will entail. I will take part in answering the interview questions. I will circle the appropriate options below: Yes if I agree and No if I disagree. The interview will take about 30 minutes.

- I agree that my participation will remain anonymous YES NO
- I agree that the interview may be audio recorded, where applicable and that the recordings will be used only for research purposes. YES NO
- I agree that the researcher may use my responses as anonymous quotes in her research report. YES NO
- I agree that the researcher may take photos of the post-disaster projects I have been involved in, but not my face. YES NO

…… (Signature)

…… (Date)

For further information about the research and the anonymity of your participation, please do not hesitate to contact me:

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Prof. Mulala Simatele (Supervisor), tel: +27(0) 11 717 6515, e-mail mulala.simatele@wits.ac.za

Appendix I: Consent Form- Community Members Focus Group Interview

CONSENT FORM FOR PARTICIPANTS:
COMMUNITY MEMBERS FOCUS GROUP INTERVIEW

Title of Project: The Role of Institutional Frameworks in Post-Disaster Management in KwaZulu Natal Province, South Africa: A Study of Mphela Township and Ncakubana.

Name of Researcher: Ms Sindisiwe Nyide (PhD Candidate)

I……agree to participate in this project. The research has been explained to me, and I understand what my participation will entail. I would take part in answering the Focus Group interview questions. I will circle the appropriate options below: Yes if I agree and No if I disagree. The interview will take about 02 hours.

- I agree that my participation will remain anonymous YES NO
- I agree that the Focus Group interview may be audio recorded, where applicable and that the recordings will be used only for research purposes. YES NO
- I agree that the researcher may use my responses as anonymous quotes in her research report. YES NO
- I agree that the researcher may take photos, but not show my face. YES NO

…… (Signature)

…… (Date)

For further information about the research and the anonymity of your participation, please do not hesitate to contact me:

Ms. Sindisiwe Nyide, cell: +27(0) 83 717 0908, e-mail: 2181993@students.wits.ac.za
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Professor Mulala Simatele (Supervisor), tel: +27(0) 11 717 6515, e-mail mulala.simatele@wits.ac.za

Appendix J: Consent Form- Harry Gwala District Municipality Advisory Forum Members

CONSENT FORM FOR PARTICIPANTS:
HARRY GWALA DISASTER MANAGEMENT ADVISORY FORUM MEMBERS

Title of Project: The Role of Institutional Frameworks in Post-Disaster Management in KwaZulu Natal Province, South Africa: A Study of Mphela Township and Ncakubana.

Name of Researcher: Ms Sindisiwe Nyide (PhD Candidate)

I……agree to participate in this project. The research has been explained to me, and I understand what my participation will entail. I will take part in answering the questionnaire survey. I will circle the appropriate options below: Yes if I agree and No if I disagree. The survey will take about 30 minutes.

- I agree that my participation will remain anonymous YES NO
- I agree that the questionnaire survey may be audio recorded, where applicable and that the recordings will be used only for research purposes. YES NO
- I agree that the researcher may use my responses as anonymous quotes in her research report. YES NO
- I agree that the researcher may take photos of the post-disaster projects I have been involved in, but not my face. YES NO

…… (Signature)

…… (Date)

For further information about the research and the anonymity of your participation, please do not hesitate to contact me:

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Appendix K: Consent Form- Community Members Questionnaire Survey

CONSENT FORM FOR PARTICIPANTS:

COMMUNITY MEMBERS

Title of Project: The Role of Institutional Frameworks in Post-Disaster Management in KwaZulu Natal Province, South Africa: A Study of Mphela Township and Ncakubana.

Name of Researcher: Ms Sindisiwe Nyide (PhD Candidate)

I……agree to participate in this project. The research has been explained to me, and I understand what my participation will entail. I will take part in answering the questionnaire survey. I will circle the appropriate options below: Yes if I agree and No if I disagree. The survey will take about 30 minutes.

- I agree that my participation will remain anonymous YES NO
- I agree that the questionnaire survey may be audio recorded, where applicable and that the recordings will be used only for research purposes. YES NO
- I agree that the researcher may use my responses as anonymous quotes in her research report. YES NO
- I agree that the researcher may take photos of the house I stay, but not my face. YES NO

…… (Signature)

…… (Date)

For further information about the research and the anonymity of your participation, please do not hesitate to contact me:

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Appendix L: Disaster Management Officials: Interview Schedule

STRUCTURED INTERVIEW
DISASTER MANAGEMENT OFFICIALS

A. BACKGROUND INFORMATION

1. What is your gender?

1.Male		2.Female		3. Other	

2. Which sphere of government do you work for?

1.Local Municipality		2.District Municipality		3.Provincial		4.Other: Specify	

3. In which province are you located?

1.

4. Do you participate in the Advisory Forum in your institution?

1.Yes		2.No		3.Sometimes	

5. For how long have you worked in the organisation?

1.0 to less than 1 year		2.More than 1 to 5 years		3.More than 5 to 10 years		4.More than 10 years	

INFORMATION

6. Which disasters have most affected your area?

1.Floods		2.Drought		3.Fires		4.Other: Specify	

7. What is your response to the following statements?

No.	Statements	Yes	No	Do not know
1.	There are acts and policies specific to disasters			
2.	There are policies specific to disaster-vulnerable groups			
3.	There is synergy in legislation and policies in all three spheres of government			
4.	The legislation and policies used are updated			

8. What are the policies the institution is implementing post-disasters?

9. Are there specific policies on floods in your institution, if yes, please specify.

10. Are there policies focusing specifically on disaster-vulnerable groups the institution is using, if yes, please specify.

11. Does your institution have a specific Memorandum of Understanding specific for post-disaster with other organisations, if yes please specify.

12. What challenges have you encountered when implementing disaster management acts and policies, particularly post-disaster in your area of responsibility?

13. Please indicate whether there are funding arrangements in place for post-disaster activities.

1.Yes		2.No		3.Sometimes		4.Other: Specify	

14. What are available resources your institution has to deal with post-disaster activities?

15. Are the resources in your institution for dealing with disasters adequate, please elaborate.

16. What are your skills and experience in disaster management?

17. In your experience, what are common challenges you have encountered during the post-disaster phase?

18. What opportunities have you identified post-disasters in your area of responsibility?

19. What projects are in place to assist vulnerable groups post-disasters in your institution?

20. What measures can be put in place to assist vulnerable groups in your organisation with disaster capacity and resilience?

THANK YOU FOR YOUR TIME TO PARTICIPATE IN THE INTERVIEW

Appendix M: Councilors: Interview Schedule

STRUCTURED INTERVIEW:
GREATER KOKSTAD AND UBUHLEBEZWE LOCAL MUNICIPALITIES'
MUNICIPAL MAYORAL COMMITTEE MEMBERS

A. BACKGROUND INFORMATION

1. What is your gender?

1.Male		2.Female		3.Other	

2. For how long have you been on the Municipal Mayoral Committee of this Municipality?

1.0 to less than 1 year		2.More than 1 to 5 years		3.More than 5 to 10 years		4.More than 10 years	

B. INFORMATION

3. Which disasters have most affected the area?

1.Floods		2.Drought		3.Fires		4.Other: Specify	

4. Which sector is mostly affected by floods in the area?

1.Businesses		2.Households		3.Infrastructure		4.Other: Speci	

5. What were the disaster impacts in the previous flood disasters in your area?

6. Do Mayoral Committee meetings discuss post-disaster matters?

1.Yes		2.No		3.Do not know	

7. What community strategies does your office have in place to deal with disasters?

8. What resources are available in your office to deal with disasters?

9. What measures has the political office put in place to assist vulnerable groups post-disasters?

10. Are there specific projects implemented post-disasters, if yes please specify.

11. What is your response to the following questions?

No.	Statements	Yes		No		Do not know	
1.	Do you think the community has the skills to deal wit disasters?						
2.	Has the community received disaster managemer related trainings?						
3.	Are the personnel equipped to assist vulnerab groups post-disaster?						

12. What challenges are experienced post-disaster?

13. What opportunities have you identified post-disasters to assist disaster-vulnerable groups?

14. Do you think disaster-vulnerable groups are prioritised, particularly post-disasters?

15. What measures can be put in place to assist disaster-vulnerable groups in your community to have disaster capacity and disaster resilience?

THANK YOU FOR YOUR TIME TO PARTICIPATE IN THE INTERVIEW

Annexure N: Community Members Focus Group Interview

FOCUS GROUP INTERVIEW:
COMMUNITY MEMBERS

A. BACKGROUND INFORMATION

1. Please indicate your gender, age, and race.

2. Tell us how many years have you been living in the area.

3. I would like to see the show of hands who participate in community groups.

4. How involved are you in political matters of the community?

5. What would you say is your main source of income?

B. INTRODUCTORY QUESTIONS

6. How many flood disaster incidents have affected you from 2008/09 to 2018/19?

7. Besides floods, what other disaster incidents have you experienced in the area?

8. How frequently have you been affected by disaster incidents?

9. What would you say is the main source of information in the area?

10. Do community meetings discuss disaster management-related matters?

11. What is your take regarding the prioritisation of vulnerable groups post-disasters?

12. Are there specific projects that are post-disaster specific in the area?

C. KEY QUESTIONS

13. Please indicate the legislation and policies you are aware of that deal with disasters.

14. How has the Municipality assisted you to have the capacity and resilience to deal with disasters?

15. Please indicate the strategies the community has put in place to be disaster resilient.

16. What resources are in place to assist the community to have the capacity to deal with disasters and be disaster resilient?

17. What are some of the disasters encountered by the community during disasters?

18. What benefits do you perceive may occur post-disasters?

19. What do you think can be done to improve community capacity to deal with disasters and be disaster resilient?

20. What measures can be implemented to assist vulnerable groups in the community to have disaster capacity and disaster resilience?

D. CLOSING QUESTIONS

21. Is there any other information you think we have missed in our discussion?

THANK YOU FOR YOUR TIME TO PARTICIPATE IN THE FOCUS GROUP INTERVIEW

Appendix O: Harry Gwala District Municipality Questionnaire Survey

QUESTIONNAIRE SURVEY:
HARRY GWALA DISTRICT MUNICIPALITY ADVISORY FORUM

A. BACKGROUND INFORMATION

1. Which organisation do you represent in the Harry Gwala District Municipality Advisory Forum?

1. Local Municipality		2.District Municipality		3.Provincial		4.Other: Specify	

2. How long have you been the Harry Gwala District Disaster Management Advisory Forum member?

1.0 to less than1 year		2.More than 2 to 5 years		3.More than 5 to 10 years		4.More than 10 years	

3. How often do you attend Harry Gwala District Disaster Management Advisory Forum meetings?

1.Once a year		2.Two times a year		3.Three times a year		4.Four times a year	

4. Are you part of any Harry Gwala District Disaster Management Technical Task Team?

1.Yes		2.No		3.Other: Specify	

5. Do you participate in the Local Municipalities Advisory Forum?

1.Yes		2.No		3.Sometimes	

B. INFORMATION

6. Which disaster is your department mainly responsible for?

1.Floods		2.Drought		3.Fires		4.Other: Specify	

7. What are the key policies you consult and implement for post-disaster activities?

1.Disaster Management Act		2.Disaster Management Framework		3.Departmental specific Act		4.Other(s): Specify	

8. What is your response to the following statements, regarding the legislation in your organisation?

No.	Statements	Yes	No	Do not know
1.	There is legislation specific to vulnerable groups?			
2.	There is legislation or policy specific to floods?			
3.	There is synergy in legislation and policies in all three spheres of government			
4.	The legislation and policies used are updated?			

9. Where do you acquire resources to address post-disasters in your organisation?

1.Internally		2.Externally		3.Outsouced		4.None	

10. Does your organisation budget for post-disaster activities?

1.Yes		2.No		3.Sometimes		3Other: Specify	

11. What was your role during post-disaster activities?

1.Impact and needs assessment		2.Relief distribution		3.Project implementation		4.Other: Specify	

12. What challenges have you experienced post-disasters?

1.Administrative		2.Funding		3.Other: Specify		4.None	

13. Are there opportunities that exist post-disasters?

1.Yes		2.No		3.Do not know	

14. What is your response to the following statements?

No.	Statements	Agree	Disagree	Do not know
1.	The Advisory Forum is an adequate platform to assist vulnerable groups post-disasters			
2.	Vulnerable groups are prioritized post-disasters			
3.	There are measures in place to focus on vulnerable groups			

15. What measures can be put in place to assist vulnerable groups in your area of responsibility to have disaster capacity and disaster resilience?

THANK YOU FOR YOUR TIME TO PARTICIPATE IN THE QUESTIONNAIRE SURVEY

Appendix P: Community Members Questionnaire Survey

QUESTIONNAIRE SURVEY:
COMMUNITY MEMBERS

A: BACKGROUND INFORMATION

1. What is the name of your area?

1.Mphela Location		2.Ncakubana	

2. What is your gender?

1.Male		2.Female		3.Other	

3. What is your vulnerability?

1.Elder		2.Female		3.Disabled		4.Child	

4. What is your home language?

1.English		2.IsiZulu		3.IsiXhosa		4.Other	

5. What is your religion?

1.Christianity		2.Judaism		3.Islam		4.Other	

6. What is your marital status?

1.Single		2.Married		3.Divorced		4.Widowed	

7. How old are you?

1.10 to 18 years		2.18 to 35 years		3.35 to 60 years		4.60 years and above	

8. What is your highest level of education?

1.Primary school		2.High school		3.Tertiary		4.Other: Specify	

9. How would you describe your health status?

1.Good		2.Bad		3.Do not know		4.Confidential	

10. What is your main source of income?

1.Salary		2.Grant		3.Other: Specify		4.None	

11. What is your employment type?

1.Self employed		2.Full time employed		3.Part-time employed		4.None	

12. How many years have you been living in this area?

1.0 to less than 1 year		2.More than 1 to 5 years		3.More than 5 to 10 years		4.More than 10 years	

13. What is the type of homfe structure?

1.Corrugated iro		2.Mud		3.Bricks		4.Other: Specify	

B. INFORMATION

14. Are you part of any social group in the community?

1.Yes		2.No		3.No comment	

15. Are you a member of any political party in your area?

1.Yes		2.No		3.No comment	

16. Do you participate in service delivery meetings in your area?

1.Yes		2.No		3.Sometimes	

17. Are you satisfied with the assistance provided by the local councilor post-disasters?

1.Yes		2.No		3.Not sure		4.Other: specify	

18. How is the land pollution in the area?

1.Severe		2.Not bad		3.Do not know		4.Other	

19. How is your network coverage in the area?

1.Good		2.Bad		3.Depends: Specify		4.Do not know	

20. How do you access Wi-Fi?

1.Home		2.Government business facilities		3.Private business facilities		4.None	

21. What communication systems do you mostly rely on?

1.Television		2.Radio		3.Newspaper		4.Internet		5.Word of mouth	

22. What is your response to the following questions?

No.	Statements	Yes	No	Do not know
1.	Are you aware of any acts and policies guiding disasters?			
2.	Do you know any by-laws relating to disasters?			
3.	Do you know the Police Station in the area?			
4.	Are there hospitals or clinics around the area?			
5.	Are there other critical facilities in the area? Specify			
6.	Do you know Non-Government Organisations in the area?			
7.	Are there any schools and universities in your area?			
8.	Have you developed the capacity and resilience to cope with disasters?			

23. Which disasters have most affected the area?

1.Floods		2.Drought		3.Fires		4.Other: Specify	

24. Which disaster has affected you the most?

1.Floods		2.Drought		3.Fires		4.Other: Specify	

25. Which sector is mostly affected by floods in the area?

1.Businesses		2.Households		3.Infrastructure		4.Other: Specify	

26. How has the impact of disasters affected you?

1.Severely		2.Slightly		3.Do not know	

27. How frequently have you been affected by disasters?

1.Every year		2.Once in five years		3.Once in ten years		4.Once in more than 10 years	

28. Are you aware of any role that your Municipality played whey you were affected by floods?

1.Yes		2.No		3.Do not know	

29. What capacity measures can be put in place to assist vulnerable groups and ensure disaster-resilient communities?

THANK YOU FOR YOUR TIME TO PARTICIPATE IN THE QUESTIONNAIRE SURVEY