College of Law and Management Studies
School of Management, Information Technology and Governance

EVALUATION OF DISASTER RISK REDUCTION INITIATIVES AT ETHEKWINI MUNICIPALITY'S DISASTER MANAGEMENT UNIT

By
Nompumelelo Theodorah Mabaso
951030565

A dissertation submitted in partial fulfilment of the requirements for the Degree of Master of Public Administration

Supervisor: Prof. M. Subban

2019

DECLARATION

I, Nompumelelo Theodorah Mabaso solemnly declare that:

i. This research study unless indicated otherwise, is my original work.

ii. This dissertation has not been submitted for any degree or examination at any other institution.

iii. This dissertation does not contain other persons' information, photos, designs, and tables unless the source is specified and acknowledged.

iv. There are no writings from other persons' work unless sources are specified and/ or quoted as follows:

    a. Reference common material attributing to re-written arguments; and

    b. The use of quotation marks and proper referencing when using direct words.

Signed ……………………………………

ACKNOWLEDGEMENTS

It wasn't easy but it was worth it! God bless you all!

"Education is our passport to the future,
for tomorrow belongs to the people who prepare for it today".

Malcom X

DEDICATION

This dissertation is dedicated to:

My late grandparents, Evangelist Ernesto M. Makamu Mabaso and Grace maNdlovu Makamu Mabaso for their contribution in my upbringing, raising me like a princess with love and the fear of God, the Almighty.

My lovely family: Mfundo, Nonkazimulo, Gugulethu, and Mbalenhle and especially my mom Enneyah Bongie Mabaso, for their support, inspiration, encouragement and unintentional disturbances that made me relaxed during my study.

My joy, my pride, my son, Wandile Ayabonga Zulu for his love, care, hugs and kisses even when I was under pressure.

My extended family: aunts, nephews and nieces for indirectly pushing me towards my goal.

My friends, who made it easy by understanding that our time was also shared with my studies.

ABSTRACT

In recent times eThekwini Municipality has experienced various kinds of disasters such as storms, fires and floods or heavy rains. This exposes communities' especially vulnerable communities to extreme risks including death, loss of property, loss of income and environmental degradation. Policy-makers, disaster management experts, specialists or practitioners, authorities, societies and other relevant partners in the disaster management field under these circumstances need to take precautionary and responsive measures to protect, prevent, detect, mitigate and minimize the threat of disasters to its communities and people and its surroundings.

The locus for the study was to determine, appraise and evaluate the Disaster Risk Reduction initiatives, approaches and methods that are employed at eThekwini Municipality. It was conducted within the Disaster Management Department, which assisted the researcher to evaluate the skill and capacity of the Unit and its partners to respond to emergencies, and curb and reduce hazards. The research used a qualitative approach in the form of face-to-face interviews as the primary data collection instrument as well as analysis of documents and articles as secondary data. Probability and non-probability sampling was done by means of expert and purposive sampling. Although the study targeted fifteen participants, the number of the final sample constituted eleven interviewees. These were made up of five eThekwini Municipality Disaster Management officials, two donor agencies and four councillors. Therefore, sampling was based on their seniority, expertise, knowledgeability and political exposure in the field under study. These instruments gave the researcher an understanding of the study and allowed triangulation of the outcomes with the key questions and objectives.

The findings revealed that there are several DRR strategies and actions currently employed by the Municipality's Disaster Management Unit such as the utilisation of a fully-fledged 'state-of-the-art' operational centre; ward-based volunteer programmes, public awareness, education and training, compliance with planning regulations and early warning systems (EWS). These also include the use of science and technology initiatives. Moreover there is a need for more DRR strategies and for early warnings to meaningfully reduce the susceptibility of societies to risks. The study revealed that there are a few notable challenges with some of these programmes, particularly where divergence in opinions exist between the Municipality and other stakeholders, especially in respect of prevention and response. It emerged from the study that:

- There is a need for the improvement, strengthening and activation of the existing EMDMU volunteer programme across the eThekwini Municipal area;
- More funding should be allocated for financing and filling of the 84 vacant posts as an urgent matter for the effective and efficiency delivery of disaster risk reduction strategies;
- Collaboration of relevant departments should be intensified and the interdepartmental committee should consider permanent solutions that reduce the level of disaster and vulnerability; and
- Science and technology and the utilisation of experts and professionals would assist in the creation of other mitigation.

CONTENTS

CHAPTER ONE

INTRODUCTION AND OVERVIEW OF THE STUDY

CHAPTER TWO

THEORETICAL AND CONCEPTUAL APPROACH TO DISASTER RISK REDUCTION, PUBLIC ADMINISTRATION AND MUNICIPAL SERVICE DELIVERY PERSPECTIVES

CHAPTER THREE

INTERNATIONAL AND LOCAL PRACTICES OF MULTI-SECTORAL AND MULTI-DISCIPLINARY ACTION IN DISASTERS REDUCTION

CHAPTER FOUR
RESEARCH METHODOLOGY

CHAPTER FIVE
DATA PRESENTATION AND ANALYSIS

CHAPTER SIX
CONCLUSION AND RECOMMENDATIONS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

COGTA	Cooperative Government and Traditional Affairs
CPA	Civil Protection Act No. 67 of 1977
CSR	Corporate Social Responsibility
DEAT	Department of Environmental Affairs and Tourism
DM	Disaster Management
DMA	Disaster Management Act
DMECU	Disaster Management Emergency and Control Unit
DMF	Disaster Management Framework
DOC	Disaster Operational Centres
DRR	Disaster Risk Reduction
DRM	Disaster Risk Management
DRR/M	Disaster Risk Reduction and Management
DME	Department of Minerals and Energy
DMO	Disaster Management Official
DMU	Disaster Management Unit
DO	Donor Agent
DSD	Department of Social Development
DWAF	Department of Water Affairs and Forestry
EIA	Environmental Impact Assessment
EM	eThekwini Municipality
EMA	eThekwini Municipal Area
EMC	eThekwini Municipal Councillor
EMDMU	eThekwini Municipal Disaster Management Unit
EMMAC	Emergency Mobilising and Communication Centre
EWS	Early Warning Systems
HFA	Hyogo Framework for Action 2005-2015
IDMC	Interdepartmental Disaster Management Committee
IDP	Integrated Development Plan
IDNR	International Decade for Natural Disaster Reduction
IFRC	International Federation of Red Cross and Red Crescent Societies
IPPC	Intergovernmental Panel on Climate Change

ISDR	International Strategy for Disaster Reduction
KZN	KwaZulu-Natal
LDCs	Less Developed Countries
MDG	Municipal Disaster Grant
MDMC	Municipality Disaster Management Centre
MDRG	Municipal Disaster Risk Governance
MEC	Member of the Executive Committee
MSA	Municipal Systems Act
NGO's	Non-Governmental Organizations
NDMC	National Disaster Management Centre
NDMF	National Disaster Management Framework
PAR	Pressure and Release Model
PDG	Provincial Disaster Grant
PDMAF	Provincial Disaster Management Advisory Forum
PDMC	Provincial Disaster Management Centre
PIDMC	Provincial Interdepartmental Disaster Management Committee
PPP	Public-Private Participation
SA	South Africa
SALGA	South African Local Government Association
SAWS	South African Weather Service
UKZN	University of KwaZulu-Natal
UNDP	United Nations Development Programme
UNICEF	United Nations International Children's Emergency Fund
UNISDR	United Nation International Strategy for Disaster Reduction
VBA	Value, Balance and Accountability
WMO	World Meteorological Organisation

CHAPTER ONE

INTRODUCTION AND OVERVIEW OF THE STUDY

1.1 INTRODUCTION

Disasters, especially natural hazards are a serious threat both locally and internationally, and are considered as one of the major problems of viable development. Their effects are varied, and include death, wounds and ailments; or aspects that result in the devastation of property and other possessions. Catastrophes may also cause socio-economic distraction, with damage to substructure and other services, as well as to the environment (Twigg, 2015:001). Coetzee and van Niekerk (2012:4) point out that the 21st Century has noted a rise in disaster losses in the modern era. This has necessitated the call for a comprehensive management tool to reduce the damage caused by these hazards on humankind. United Nation International Strategy for Disaster Reduction, (UNISDR, 2004:17) states that the evolution of the disaster management field in the Southern African region over the past few years has witnessed an increasingly extensive and broader comprehension of why tragedies occur, and is complemented by other cohesive, comprehensive methodologies to lessen their effect on humanity. The current model shifts from civil protection (Civil Protection Act No. 67 of 1977) to 'disaster risk' reduction, carrying with it the realisation that managing disasters is foremost in successfully reducing the vulnerability of these societies when in danger, maintains Vermaak, (2004:16). Purmanund, (2005:18) defines disaster risk reduction as a shared responsibility of the three spheres of government in relation to public administration linking it to a combined, multi-stakeholder, interdisciplinary method intended to reduce hazards related to deathtraps, crisis and vulnerabilities. Within the local government perspective, it is incorporated into the Integrated Development Plan (IDP), and is central to development planning in the strategic plan of a municipality.

In eThekwini Municipality, there are three types of tragedies that have happened in recent years: these include heavy rains/floods causing damages to the beachfront, fire in the Bayhead (Transnet storage) and the storms of 2010/11, which left many people homeless. The City's response to these disasters was varied, thus seeking clarity towards their risk reduction strategies.

This study focused on the ability of the Disaster Management Unit (DMU) of eThekwini Municipality, including communities to prevent, prepare, and respond swiftly to calamities with urgency in the advent of a disaster. Disaster Risk Reduction (DRR) as a combined comprehensive risk approach involves tackling susceptibility, assessing risks and managing hazards. These aspects involve measures to prevent, mitigate, prepare, respond and recover from disasters and are deemed as critical determinants for sustained development, maintains van Niekerk, (2011:246). This approach, in effect provided a clearer comprehension of the eThekwini Municipality's Disaster Management Unit's (EMDMU) policies, strategies and capacity to deal with crisis such as floods, storms (e.g. Katarina) and fires, which are most prevalent in the informal settlement areas. The study covered the three forms of disasters prevailing in the municipality to operationalise DRR into action, whilst also taking into consideration disaster victims' relief and rehabilitation efforts.

1.2 BACKGROUND TO THE RESEARCH PROBLEM

Studies have been conducted on disaster management with some researchers concentrating on climate change, and others on global warming and the impacts thereof. Other studies conducted focus on one variable: floods or fires affecting mostly communities living in the informal settlements. These studies conducted have concluded that in the event of any disaster, the communities, especially the poor communities suffer the greatest impact asserts Ndzaruzaniye, Lipper, Fiott, Flavell and Clover, (2014:9). Strategies that include intensive training should be considered so that communities are empowered to prevent disasters before they occur.

Disasters have imposed a huge expense on people, goods and physical resources, as well as environment deterioration. Disasters have both bad and good effects causing damages to property and other economic destructions. The literature study has shown that it is necessary to develop disaster risk management systems before a disaster occurs. These strategies should focus on plans and actions for prevention, mitigation, preparedness and recovering from the effects of disasters highlights Ngcamu (2011:1). The central discussion here is that the damage left by disasters is huge, and it affects both physical and psychological situations. The disaster situation is usually severe requiring a pro-active approach with proper strategies and plans to reduce its occurrence, and impact, protecting communities against vulnerabilities.

In reducing exposure to hazard risks associated with chemical escape and large fires, the Municipality published a booklet dealing with information on emergencies covering 'bulk chemical facilities, pipelines, and road and rail accidents of hazardous material'. According to the booklet of the eThekwini Municipality Community Response guide for emergencies, this is necessary and warranted due to the fact that industrial and residential areas are within a close range. A quick and speedy response to emergencies is very crucial from both the society and the state. This booklet acts as a guide that empowers citizens and municipal officials on how to respond to a crisis in a swift manner as and when the need arises. These include amongst others, evacuations and 24/7 emergency calls. Whether this system is effective, remains questionable considering the experience with the Bayhead warehouse fire, and co-operation from all stakeholders concerned in ensuring precautionary measures towards the safety of the eThekwini residents and businesses, Permanund, (2005:43). The implementation of disaster reduction strategies and procedures serves a dual purpose: firstly, it significantly focuses on enabling communities to become resistant to risks, and secondly, safeguarding against growing exposures posed by development efforts.

In an article on flood disaster management in South Africa published by INTEC in 2012, the former President Jacob Zuma wrote that response to disaster management was manageable at the national level, but was challenging at the level of district municipalities because of the shortages of skills and lack of disaster management structures at the local level. Strategies must be implemented to reduce vulnerability and risks involved. The Municipality undertook a study a few years ago on developing early warning systems to minimize disasters such as cyclones and floods, which has since been released. The system is aimed at forecasting in relation to analysing global weather patterns and making predictions. This initiative is intended to assist the municipality to detect, reduce and mitigate disaster risks associated with these variables. Effectiveness and efficiency of this initiative as a DRR strategy by the Municipality was explored further in this study, together with other municipal disaster management sector plans, as outlined in the IDP of the municipality, eThekwini Municipality Integrated Development Plan Annual Review, (2016/17:529-538). Van Niekerk (2011:16) in a study on whether disaster management is an academic rhetoric or practical reality concluded that it is a practical reality, and should be used as a channel to reduce disaster risks to all spheres of government, and not only to one government entity. It is therefore, equally important for the City, its sectors and the other spheres of government which play critical part in ensuring the protection of the municipal area and of citizens against any catastrophes.

1.3 SIGNIFICANCE OF THE STUDY

The intention of this study was to evaluate and critique systems, policies and strategies including the capacity, skills and structure of the incumbents in reducing the risks that are associated with disasters. The study intended to add value to the improvement of the DMU of the Municipality to perform excellently and proficiently, and to respond with the required relief that restores human dignity and pride. It is hoped that the study contributes to the field of public administration regarding municipal policies on promoting a collective and integrated approach to addressing disaster management in the eThekwini Municipality. Other important aspects include canvassing of external resources for disaster mitigation, readiness to respond, property rehabilitation and sustainability in the medium to long-term plan.

The following are cited as significant reasons for embarking on the study:

- Improving policy inducing eThekwini Municipality Disaster Management Unit (EMDMU) to function proactively;
- Reviewing the Disaster Management Unit (DMU) and Disaster Operation Centre (DOC) and its efforts to function effectively and efficiently with new proposed strategies; and
- Providing recommendations on improving relief and rehabilitation measure for victims.

1.4 KEY TERMS AND DEFINITIONS

Some pertinent concepts are briefly explained and discussed below to further provide an understanding of the phenomena in relation to disaster management.

Capacity – is defined as an integration of all powers, qualities and assets possessed by a particular person, or organisation to reach set objectives by the Intergovernmental Panel on Climate Change (IPCC), (2012:3).

Disaster – major changes in the ordinary running of a society or public setting caused by dangerous visible occurrences affecting susceptible social environments, resulting in extensive hostile physical, psychological, financial or ecological impacts requiring prompt crisis intervention to fulfill important societal needs that may need outside help to recover, as suggested by the IPCC, (2012:31).

Disaster Risk – is the possibility of death, illness, hunger, damage to property and other facilities occurring in a specific community forthcoming over time due to potential tragedies or disasters (Twigg, 2015:23).

Disaster Risk Management – refers to the methodical practice to design, implement and evaluate approaches, plans, actions and strategies to enhance comprehension of disaster risk. DRM promotes continual growths in disaster readiness, reaction and rehabilitation methods with a clear determination of improving society's safety, welfare, and satisfaction, resilient and maintainable progress (IPCC, 2012:35).

Disaster Risk Reduction –refers to the ideas and processes of minimising disaster hazards over organised actions that analyse and control the underlying causes of disasters, including reducing vulnerability of humans and possessions to risks, through better land use management and readiness for hostile occasions (UNISDR, 2009:10).

DRR and Climate Change – should not be viewed as a hazard, but it affects DRR due to increasing atmospheric conditions and meteorological threats, as well as the increase in societal exposure to these physical dangers, submits Van Niekerk, (2011:6).

Disaster Risk Municipal Governance –explains the role of the state in committing resources towards the implementation of disaster reduction plans, programs and strategies. This suggests that the state is responsible for the provision of an efficient and effective organisational framework that capacitates the management and reduction of disaster risks, according to Twigg, (2015:17).

Hazard – the UNISDR (2009:21) defines hazard as a possibly destructive natural occurrence, problem or societal action that may result in death or harm, destroyed buildings, socio-economic disorder or conservational dilapidation. Risks may involve underlying circumstances which might signify imminent danger and could have various roots: indigenous (geographical, hydro climatological and biotic) or prompted by people's practices (ecological deterioration and technical risks). There can be one chronological hazard or multi-structural hazards by source and impact, each categorized by its locus, strength, occurrence and likelihood.

Preparedness – refers to actions**,** methods and procedures engaged prior for ensuring an urgent reaction to risks impact**.** Readiness includes early warnings signs and people's evacuation on time, in the case of emergency, highlights Ngcamu, (2011:12).

Vulnerability – refers to loss or circumstances caused by terrestrial, societal, financial and conservational elements or procedures, which increases exposure of a society to risks effect. (UNISDR, 2009:15).

1.5 KEY LEGISLATION RELATED TO THE STUDY

The study was informed by local and international legislations that are pertinent to disaster risk management and disaster risk reduction. These key legislations are outlined below:

1.5.1 Constitution of the Republic of South Africa, 1996

The Constitution of the Republic of South Africa, 1996 is important to this study as a decisive law in (a) establishing the municipality's compliance to the law of environmental protection as described in Chapter 2, (Bill of Rights). This includes the ability to implement strategies against any pollution and ecological degradation threatening society's health and safety; (b) determining the funding structure of DM in the municipality, as well as the capacity of the municipality to deliver. This mandate takes into consideration that Schedule 4 Part A of the Constitution significantly lists DM as a competence for the other two government spheres. It lays the foundation and necessity for the municipality to move towards a disaster 'risk-free' environment, and how the three government spheres should concurrently work together to provide funding for DRR strategies.

1.5.2 White Paper on Disaster Management 1999

The significance of this key legislation to that the study includes the formation and functioning of a municipal disaster operational centre, analysis of state funding for DM activities, and the involvement of various stakeholders in creating awareness of DRR approaches. It addresses issues of training, stakeholder involvement and participation, as well as the protection of the vulnerable sectors of local government.

1.5.3 Local Government Municipal Systems Act, 32 of 2000

Section 26 of this Act compels the municipality and its entity to develop a disaster risk management plan that is central to the IDP. The Local Government Municipal Systems Act is relevant to the study, as it addresses the issue of disaster management policies, plans and regulation with a municipality that promotes an effective and efficient response to emergencies.

1.5.4 National Disaster Management Act (RSA), 57 of 2002

The Act is crucial to the study as it acknowledges uniformity and a multi-sectoral approach to circumventing and reducing risks as depicted in Chapter Five of the Disaster Management Act. The legislation also significantly gives effect to the formation of a municipal disaster management framework and centre, both ensuring a combined and constant method to

disaster management in its zone with distinctive attention on avoidance and alleviation strategies.

1.5.4 National Disaster Management Framework (RSA), 2005

The legislation is effected by the DM Act which provides consistent and direct efforts that form the basis for the formation of disaster management frameworks in the KZN Province and the Municipality. The importance of the framework is that it guides DRR activities at all the levels of government and is imperative due to developing trends directing towards climate change and global warming at disturbing levels.

1.5.5 Disaster Management Amendment Bill (RSA), 2014

The above three legislations highlight the significance and the obligation of municipalities to be proactive in the management of disaster risk and reduction. In the event where the municipality is unable to handle severe incidents, provincial or national governments may be requested to intervene. Amendment 17 of Section 52 indicates that it is the obligation of the municipal disaster management centres to co-ordinate and implements disaster relief and detector programmes pre-and post-disasters. It is imperative that their offices are fully furnished and resourced to effectively implement procedures and systems that would assist the municipality in reducing common and prevalent risks.

1.5.6 Integrated Development Plan

The Integrated Development Plan (IDP), is a strategic instrument with plans and objectives for the transformation of municipalities to facilitate and manage service delivery within their area. The eThekwini Municipality's IDP is a five-year strategic plan of the municipality and the 2030 vision of being /Africa's most caring and livable City. The IDP provides a situational analysis of safety (ecological and disaster management, fire and emergency) within the Municipality, including the proposed strategies in reducing those risks through relevant legislation, policies and capacity building as documented in the eThekwini Municipality IDP Annual Review, (2017:76-83). The IDP also give effects to the 2030 Agenda for Sustainable Development, the NDP, Provincial Growth and Development Strategy (PGDS) and management of disasters in alignment with other spheres of government through Plan 1: develop and sustain our spatial, natural and built environment.

1.5.7 Local Government Municipal Finance Management Act. 56 of 2003

The Local Government Municipal Finance Management Act, 2003 is the pertinent legislation that operationalises the state budgets, outlines and addresses the allocation of service delivery funds from National to Provincial governments and from Provincial to Local government, indicating how they can be accounted for. The Acts in relation to this study is that it allows the municipality to allocate funds to DRR as one of the service delivery objectives. The focus is also to canvass external resources, including partnership with private institutions and businesses in joint efforts to address DRR initiatives.

1.5.8 Hyogo Framework for Action (HFA) 2005-2015

DRR design, application and assessment necessitate all-inclusive designs and contexts not only limited to specific kinds of intervention in the phases, submits Twigg, (2015:12). 'The Hyogo Framework for Action 2005-2015' with a set of five specific priorities for action has been the most influential framework and generally applied by administrations and civic organisations at both national and local levels, submits Twigg, (2015:12). It is the first plan in explaining; describing and detailing the role of various role-players and sectors in decreasing disaster-based losses and is crucial to the study.

1.5.9 Sendai Framework for Disaster Risk Reduction 2015-2030

The Sendai Framework by the United Nations is an expansion of the Hyogo Framework, consisting of agreed principles and international goals and objectives. According to Twigg, (2015:12), Sendai acknowledges that national and provincial governments have the principle role of reducing disaster risks, but also that that should be a joint duty between municipalities, businesses, other role-players and stakeholders, and is thus deemed applicable for this study. The framework has five crucial areas that were highlighted in the study, as seen in Chapter 5 through the presentation of data and analysis of the study. The five themes or categories respond to the priorities of the Sendai Framework for DRR. These crucial areas are to understand catastrophe risk, strengthen catastrophe risk governance, invest in DRR for resilience, and enhance catastrophe readiness for rapid reaction and to "build back better" in rebuilding, restoration and re-establishment, as well as recognising the role played by stakeholders in disaster risk management and reduction.

1.5.10 Sustainable Development

DRR is a critical part for socio-economic development, and is very crucial in the sustainability of development for the future. Goal number 11 of the Sustainable Development Goals (SDGs) recognises that cities and human settlements must be made inclusive, non-toxic, resistant and maintainable. The Agenda provides an important strategic approach from medium to long-term planning. The target is that by 2030, deaths, economic sufferings and any losses due to disasters, including 'water-related disasters' would be substantially reduced, focusing on the protection of the impoverished and those in risk situations.

1.5.11 Paris Agreement on climate change 2016

This is an official memorandum of understanding and international accord formulated in 2016 that guides the process for international action on climate and ecological changes, in order to reduce hazards of gas emission through funding by wealthier states to developing nations. It is significant to the study based on its approach in canvassing for DRR resources.

1.6 RESEARCH PROBLEMS AND OBJECTIVES

The rationale for the survey was to assess DRR measures and systems used in the Municipality and to determine the capacity, skills and resources of the Disaster Management Unit in managing, coordinating and preparing for disasters before they occur.

The premise is that DRR measures have not been fully developed and utilised in the Municipality to reduce disasters. The following are the research questions and objectives that the study sought to explore and answer.

1.6.1 Key questions explored through the study included the following:

- What current bureaucratic systems (structure, personnel, capitals, capacity, skills and equipment) assist the municipality to overcome a crisis in times of emergencies?
- Which are the major threats and hazards affecting communities within the eThekwini Municipal Area?
- What DRR plans and' strategies are there to prepare the eThekwini DM Unit during tragedy?
- Are the various sectors and role-players playing a meaningful role pre-and post-disasters?

- What are the municipality's financial commitments and that of external donors in preparedness and response to a crisis?
- What are the recommendations to the municipality to address any gaps?

1.6.2 Objectives

The objectives in the study are to:

- Determine the current bureaucratic systems (structure, personnel, resources, capacity, skills and equipment) that would assist the municipality to overcome crisis in times of emergencies;
- Highlight the major threats and hazards affecting communities within the eThekwini Municipal Area;
- Critically analyses disaster risk reduction policies and strategies within the Municipality during tragedy;
- Identify and discuss the role and duties played by various sectors and role-players pre- and post-crisis in relation to their roles and commitment;
- Determine and discuss the municipality financial commitments and that of external donors in preparedness and responding to crisis; and
- Assess the imbalance in the application of disaster management plans, and make recommendations to the municipality to address the gaps.

The above objectives addressed the issue of the plans, systems and approaches in place within the Municipality to overcome disaster emergencies. The focus was on determining the threats and hazards affecting the eThekwini municipal area, as well as the policies, strategies and initiatives used by the Municipality to reduce disasters. This included the role of other stakeholders and role-players in the reduction of disaster risk. Financing of disaster risk initiatives was also identified as a critical component in improving prevention, preparedness, response, recovery and rehabilitation measures pre- and post-disaster. All the objectives were addressed in many areas throughout the study.

1.7 METHODOLOGY

The study used a qualitative research design to evaluate the performance of the DMU through the use of interviews, and the strategies and programs the unit has in place to handle hazards and their mitigation. The research was based on a case study strategy with the review of

internal policies and reports to determine a link between documentation and practice. The philosophical viewpoint was pragmatism, which is defined as a method that assesses systems or views in relation to the success of their applied interventions. It is a practical approach to problems and affairs and was relevant to the study because it centred on the problem or issue and its action arises out of the outcomes.

1.8 OUTLINE OF CHAPTERS

This structure of the dissertation is as follows:

Chapter 1: Introduction and overview of the study

The initial chapter provided the background and rationale for the study phenomenon, including definitions and meanings of pertinent concepts relating to DRR. It also discussed the key legislation related to the study as well as the key questions and objectives the study sought to answer and achieve.

Chapter 2: Theoretical and conceptual approach to Disaster Risk Reduction, Public Administration and Municipal Service Delivery perspectives

This chapter focuses on the outline and discussion of the legal framework, the evolution and theories of disaster management, disaster risk management and disaster risk reduction. The chapter also describes the three spheres of government in relation to DRR, the causes and patterns of recurring hazards and global approaches in identifying early warning signs. A focus on the positioning of risk reduction strategies within the context of enhancing service delivery both from an institutional perspective, and that of society at large, is noted.

Chapter 3: International and local practices of multi-sectoral and multi-disciplinary action to reduce disasters

This literature review chapter is centered on the background to disaster management, local and global strategies and laws used in curbing prevalent local disasters. The chapter explores the structure or organogram of the DMU, the skills and capacity of DOC staff and the efficiency of the operational centre, including financial capacity of the department and its partners to undertake responsibilities in relation to DRR.

Chapter 4: Research Methodology

This chapter locates the research paradigm involved in the study, the collection of data and the methods used to collect and capture it. The chapter narrates the action that was taken and the techniques used to collect and process information obtained from the interviews, including reference to the use thematic and content analysis. It also discusses the primary and secondary sources utilised during research.

Chapter 5: Data presentation and analysis

The chapter covers a discussion on the current challenges the municipality faces when responding to a crisis, and how these challenges may be addressed. Presentation and analysis of data and factual evidence collected are significant aspects to enhancing the study. These are discussed in relation to important conceptual and contextual aspects of the research area of disaster risk reduction. Common trends are identified in the content analysis to establish significant relationship amongst responses from participants' views.

Chapter 6: Conclusion and Recommendations

In this chapter a summary of the completed study is provided, including the results and findings. The chapter also presents identified gaps, and propose recommendations for due consideration with a view to further research envisaged in the area of DRR enhancing municipal service delivery within eThekwini Municipality in particular, and in the local government context in general.

CHAPTER TWO

THEORETICAL AND CONCEPTUAL APPROACH TO DISASTER RISK REDUCTION, PUBLIC ADMINISTRATION AND MUNICIPAL SERVICE DELIVERY PERSPECTIVES

2. INTRODUCTION

This chapter explores the catastrophic effects of disaster risk administration and reduction within the context of public administration. It highlights the theoretical framework underpinning the study, and alludes to the concept of public administration and the role of the State (Local Government) in Disaster Risk Reduction (DRR). It would also be crucial to explore the hazards under discussion: floods, storms and fires, to highlight what they are, their impact and why there is necessity for Early Warning Systems (EWS) per hazard. In addition, the chapter provides a critique of disaster management strategies and plans in the South African context. Global conclusions on EWS and hazards experienced are presented. The focus is on the positioning of risk reduction strategies within the context of enhancing service delivery both from an institutional perspective, and society at large, as a focal point in the chapter. The chapter concludes with a summary of the significant aspects raised in discussion.

2.1 INTERRELATIONSHIP BETWEEN MUNICIPAL SERVICE DELIVERY, PUBLIC ADMINISTRATION AND DISASTER MANAGEMENT

Van der Waldt, (2009:15) contends that the theoretical and conceptual basis for both Public Administration (PA) and disaster risk reduction (DRR) have many similarities, and the underpinnings for PA must continuously characterise and augment the investigation of DRR. However some assert that DRR must continually adapt, restore and enhance themselves through sourcing from various eminent theories, strategies, aproaches, methods and essentials of other relevant disciplines such as Environmental Studies and Public Management and /or Administration as an evolving science. It is maintained that DRR should be incorporated into these given the integrated aspect of disaster management and its necessity for addressing service delivery challenges.

The study of Public Administration includes governance, politics, administrative duties and all other public management services related to service delivery as a whole. The interrelationship in this context is that public officers should be skilled, educated, well-trained and empowered to provide services to the community with efficiency and effectiveness in all public institutions from national, provincial to local spheres of government and their departments focusing on the communities they are called to serve. Disasters, natural or prompted by political or socio-economical conditions affects all people, especially the poor, who are most vulnerable with little or no infrastructure and possesssions, according to Wisner, (2003:3) in van der Waldt, (2009:8).

Local government's responsibility is to ensure that their structural planning, regulations, policies and laws does not contribute to exposing other segment of the society to susceptibility and prone to hazards. For example the past dispensation regional and structural planning was crafted in such a way that it separated people according to their race groups and the poor people particularly the Black population were re-located to undeveloped areas making them most vulnerable to such hazards as storms, floods and low levels of food security. This resulted in the formation of many rural and semi-urban municipalities after the new dispensation, suggests Vermaak, (2004:556).

The majority of rural and semi-urban municipalities are still faced with several challenges relating to municipal service delivery. These challenges are noted by Steiner and Kaiser, (2018:395) as staff shortages, because skilled personnel avoid working in underdeveloped municipalities. This results in the official's inability to deliver emergency services at the right time and place. For an effective DRR, it is important to include well-trained rapid response staff (medial practitioners, police, firemen and many other proffessions) and foot soldiers that are able to cascade information as soon as possible. They also help in evacuating victims and in carrying out other rapid rescue programs like assessing the situation and managing the delivery of disaster relief supplies. Lack of financial capacity to handle, prepare and respond to disasters or to deliver any relevant and required service, was identified as another challenge. Many municipalities in South Africa depend on grant funding by either national or provincial governments to deliver disaster management services. Unavailability of grant funding hampers the ability of the munilipality to prepare and respond to disasters, including restoring and recovering after catastrophic events, unless the municipality has the ability to raise its own resources internal or through external assistance. Sometimes a challenge could

be in the form of interefering, ignorant politicians that might lack political will in administration issues, and this poses a risk to the provision of quality goods and services, therefore hindering the role of PA and DRR of ensuring a safe, secure and healthy environment for society as stipulated in the Disaster Management Act, 57 of 2002 and incorporated into the Local Government Integrated Development Plans. It would then be critical to acknowledge the contribution of PA to DRR study and the implementation of strategies to be recommended in the inclusion and integrating of the knowledge for effective DRR.

Catastrophes should be considered a public administration issue and DRR as a political issue, argues Twigg, (2015:67). Public administration constitutes ideas, laws, systems and methods for practice and it includes interrelationships between government, public and business. In the event of DRR, successful administration involves prioritising governance of DRR and investing more on its resources to ensure a successful multi-stakeholder involvement and DRR practice. During the 2017 floods, eThekwini Municipality was not able to handle the enormity of the storm damage, displacements and losses caused. This study shows that though the Municipality's operation centre is regarded as the best in the country, it could take a limited number of calls only, and this prevented other victims to log their calls or report their incidents. The Municipality also does not have a warehouse that stores disaster relief material or food supplies, blankets and mattresses that could be immediately made available when a major disaster struck. This means the only relief equipment is stored in one storeroom that could only, serve not more than 500 people and this could be regarded as poor planning in a municipality with an average of approximately 4.2million people. However the 2018/2019 floods indicated some improvement in the coordination of resources for disaster risk reduction and more recent efforts are becoming part of the current strategic thinking on DRR.

This may be attributed to improved disaster planning based on the study of risk assessment conducted by the Municipality which prioritised prevalent disasters in the municipality, ensuring that the Municipality was more prepared as opposed to previous disasters. Collaboration of stakeholders and other role-players was noted through the involvement of national, provincial and local governments and departments, including willing participation of politicians throughout the event in the form of the State President, Members of the Executive Committee (MECs) and Councillors. The inter-departmental cooperation between

municipal departments, politicians and officials and other external sponsors resulted in immediate evacuation and relocation of victims to safe shelters by means of community halls and other, as well as the provision of food supplies and other relief measures necessary for response and recovery. It is therefore critical to highlight the need for uninterrupted service delivery when disaster happens, and this requires the understanding of both pertinent aspects of the public administration and disaster risk reduction concepts, discussed below.

2.1.1 Development of Public Administration and the Disaster Risk Reduction

According to Brown and Roux (2003:68) cited in Ngcamu (2011:69), public administration refers to the administrative arm of the state, civil society and government, which are responsible with the establishment, co-ordination, execution, valuation and amendment of the policies of the state, with one such legislation known as the Disaster Management Act 57 of 2002 (DMA). Public administration is related to the study of all subjects having an effect in the modern administration and management systems of government institutions and their relation to society. In the mid-1999s, the term 'disaster management' was largely utilised in the country, referring to the principles guiding the handling of catastrophic conditions.

In the previous dispensation in South Africa, legislation for the management of disasters and risks was very complex due to the hierarchy in decision-making. It had an unclear demarcation of power and unsuitable procedures for declaration of disasters. For example, the Civil Protection Act No. 67 of 1977 (CPA) authorised the then Provincial Affairs and Constitutional Development Minister to pronounce a national crisis but was silent on the instructions to be actioned by other ministers relevant to the prevailing situation. Based on the Cape Flats floods and life-threatening adversities exposing poor people to risks, South Africa acknowledged that the systems promoted by the Civil Protection Act were insufficient. Provincial and Local spheres, formerly known as the Department of Constitutional Affairs, was tasked with the management of the CPA. Given the CPA insufficiency, there was a resolution by Cabinet to create a National Disaster Management Committee (NDMC) in 1996. The committee, however, was not functional. Failure of the NDMC to function resulted in the formation of a Task Team that was instrumental in the establishment of the Inter-Ministerial Committee for Disaster Management (IMC) and the Inter-ministerial Disaster Management Committee (IDMC), aimed at disseminating information and designing approaches.

Following on, the IMC was responsible for producing a Green Paper on disaster management approved by Cabinet and the Department of Constitutional Development in 1997 and 1998 respectively. The major purpose of the Green Paper was to do an analysis of the disaster management approaches, and how South Africa could continue to be pre-emptive and preventive in the management of disasters to protect the citizenry ensuring uninterrupted service delivery. This was done through a Disaster Management Task Council consisting of 33 specialists sourced from various departments, with the instruction of soliciting opinions of all participants interested in catastrophe management which led to the launch of the Green Paper in 1998. This legislation recommended that prevention and preparing for disasters should be central to any development of national legislation. The legislation subsequently highlighted two main points as follows:

- Established South African administration backing for the International Decade for Natural Disaster Reduction (IDNDR) viewpoint, that catastrophes triggered naturally are entrenched in compound social, financial and ecological procedures; and

- Noted that disaster reduction is productive in prevention, mitigation and response to risks.

The Green Paper conceded that the legislative framework regulating emergency and rescue services of both public and private sectors is lacking. The White Paper on DM was established and launched in 1999. It advocated risk reduction approaches to the management of disasters, including, for example, financial losses and environmental protection risks. Contrasting with past laws, which mainly focused on aid and rescue means, the White Paper emphasises the significance of the prevention of person, financial and infrastructure loss, as well as to avoid devastation of the environment. The White Paper on DM according to Van Niekerk, (2004:116), specifies that "in relation with global styles and developments, and our state's purposes of a competent and operative administration of the state's resources, preference is given in this modern tactic to prevention". The author has argued that more consideration should be given to the initiation of preventative measures aiming to save souls and protect possessions.

The South African Disaster Management Act no. 57, propagated in 2003, has been universally commended as an innovative model of state regulation promoting disaster risk reduction. This was in an era of intensifying disaster risks in the country. The development of

the state's disaster management laws was considerably motivated by worldwide progress on disaster management and the need for disaster risk reduction strategies. These efforts also include the United Nations Development Programme (UNDP) Disaster Management Training programme in the early mid-1990s, as well as the International Decade for Natural Disaster Reduction (IDNDR), and the International Strategy for Disaster Reduction (UNISDR) from year 2000 inwardly. The DMA allocates to the NDMC the duty of addressing occurring disasters with the Chief Executive Officer as a political head reporting to cabinet and society. In the case of a catastrophe, only the Minister may pronounce a catastrophe, while administration co-ordinates and manages imminent disasters.

Van der Waldt, (2009:16) argues that the DMA also addresses the deficiencies of the previous legislation, such that the DMA now includes the funding of after-disaster recovery and restoration, as outlined in Section 56 and Section 57 of the Act. This is to accelerate the transfer of monies to the victims of catastrophes and crisis aid groups. The Policy Framework for Disaster Risk Management (DRM), GN654 of 2005's Key Performance Area 3, DRR indicates that in relation to financial provisions, this KPA could be divided into the DRM plan and DRM application. The Act suggests that all organs of the state should establish disaster management frameworks that direct DRM actions, which include designing and implementation of DRR projects and programs. It is usually standard procedure that central administration is a major player in implementing such activities. This is because of national government's responsibility of ensuring the safety and well-being of their communities. This is being done through providing DRR measures (such as sustainable EWS, rapid response and transit / temporal accommodation and medical centres); investing in government infrastructure and amenities (highways and education centres) against natural threats; regulating business sector activities, mass mobilisation promoting disaster readiness and trade and business uninterruptedness as well as coordinating inter-sectoral involvement and DRR networks.

An example of the country of Cuba in Twigg, (2015:74), reflected qualities of successful DRR system and planning, in that it is known for its well-structured national defense force. It has an efficient Early Warning System (EWS) informed by specialised and skilled emergency teams, political support and land use and structurally regulated communities that believe in government's capacity and the will to respond to widespread catastrophes. This is done through teaching and empowerment programmes aimed also at reducing socio-economic

imbalances that contribute to susceptibility of people. Successful EWS is also supported by investment on community services like education, health and infrastructure. This was evident through the six major storms that struck the country amidst the period 1996 and 2002, when only 16 mortalities occurred, services were hardly interrupted and recovery was quicker through the collaboration of multi-sectors, multi-stakeholder and government institutions and departments. In reflection on this era, several strategies have been considered to address disasters that occur in the recent years.

In South Africa decentralisation of DM and DRR has shifted to local government through the promulgation of the DMA. This is found to be more effective in it encourages the interrelationship between national, provincial and local spheres of governments, and assists in mainstreaming DRR in all structures of the state with more responsibility to municipalities. The reason for this decentralisation is attributed to the fact that local government is closest to the communities and could be in a position to enhance community participation by various stakeholders through different forums. For example, in the health sector, forums and committees such as clinics advisory boards and health committees, could be used to develop proactive actions and approaches for efficient DRR. Subban and Sahadeho, (2017:64) suggest that such approaches should include development, educating and capacitating of health practitioners and human resources with updated disaster management initiatives for ongoing DRR support.

2.2 ROLE OF THE STATE

Disaster Management has become central to the South African government's strategic focus in addressing service delivery. In South Africa, DRM and DRR are implemented as government responsibility, meaning an action of National, Provincial or Local sphere of government. In the context of public administration, the management of disasters is coordinated through a multi-stakeholder and interdisciplinary strategy intended for the reduction of hazards related to deathtraps, crisis and vulnerability of communities. The intention is to bring service delivery to normality at the earliest. Disaster management is seen as a significant aspect of risk strategy to be merged into the Integrated Development Plan (IDP) at the local sphere of government and is central to development planning in the strategic plan of a municipality.

In relation to the strategic focus raised in the above discussion, the Hyogo Framework for Action (HFA), Africa Regional Strategy for Disaster Risk Reduction and its Plan of Action, as well as the South African National Disaster Management Policy Framework (NDMF) and regulation, highlight the significance of political willingness for disaster risk reduction and the application of appropriate official systems for DRM. In order for disaster risk management to be effective, implementation of municipal disaster risk reduction procedures remains an ongoing important part of good municipal disaster risk governance (in discussion in the next paragraph below). Based on the above, it is obvious that DRR in the South African setting can at the macro level be likened to the intentions of the National Disaster Management Framework (NDMF). The question that arises, is how does municipal risk governance enhance service delivery?

Catasrophes are caused by people's actions and decisions. For instance, constructing a new road may draw persons to stay in an area that is less likely exposed to floods. Municipal Disaster Risk Governance (MDRG) may enhance service delivery by means of improved state guarantee to implement catastrophe reduction rules, laws, regulations and numerous activities assisting in the management and reduction of metereological-related hazards. MDRG is affordable and cheaper to apply particularly in charitable support For instance in Shamano, (2010:60) it is stated that.sending a text to an agriculturalist informing him when and what to grow in an event of imminent famine, requires less expenditure in sharing that information. This saving ensures that there is sufficient resources and capacity to avert, prepare, manage and recuperate from tragedies. MDRG includes methods and procedures for residents to present their concerns using their authorised priviledges and responsibilities. This means that the public in general, should be alerted to any disaster threats exposure and be empowered to prepare cautiously. In SA, the South African Weather Services (SAWS) is the main communicator of impending and approaching hazards. Information is transmitted to their stakeholders including municipalities. These municipalities have also a responsibility of cascading such hazardous threats to their constituencies through their means of communication channels such as radios, bulk messaging, Twitter or Whatsapp messaging as is the case with the eThekwini Municipality. According to Bang, (2013:77), disaster risk governance involves land-use management and planning; catastrophe risk assessment instruments; and assisting public entities to assume the duty of controlling catastrophe threats and recuperation by mandating institutional obligations; including exposed communities in construction and application of communal-based activities.

Critical governance matters in catastrophe risk reduction are directed by the following values and ideas:

> Uplifting catastrophe threat administration as a significant legislation;

> Creating political assurance that promote catastrophe risk administration as an intersectoral obligation;

> Allocating responsibility for catastrophe fatalities and effects;

> Putting required resources for catastrophe threat diminishing;

> Ensuring the application of catastrophe threat administration and elimination; and

> Including all stakeholders and roleplayers enhancing the involvement of community and business in disaster risk.

This effectively means that it is crucial for government to have disaster management legislation, political support, allocation of required resources and a clear definition of all roleplayers and stakeholders in the management of disaster risk reduction. These initiatives serve as values and ideas that direct and guide municipal disaster risk governance.

2.2.1 Inter-governmental Relations in Disaster Risk Reduction

The Constitution of the Republic of South Africa, 1996, mandates the state through all its government spheres to safeguard the welfare (human and ecological) and security of its people as outlined in Section 41 and Section 152 of the same Act. In consideration of the above, managing risks is the prime obligation of the state and its administration.

In terms of Schedule 4, Part A of the Constitution of the Republic of South Africa, 1996, disaster management is a key performance area of both National and Provincial spheres. These spheres have a legislative responsibility to officially implement disaster management as their core function. This also includes the role played by the municipalities in disaster risk control. Section 156(4) of the Constitution caters for this provision of disaster management duties to municipalities that would have the ability and resources to manage it.

Based on the above, DRM is an essential component within the South African context given the spate of disasters that are taking place in various institutional settings impacting on service delivery. The state's disaster management law not only follows these legal

responsibilities, but also intends to afford the right to lifespan, parity, self-respect, location, possessions, healthcare, foodstuff, aquatic and social security as outlined in the Bill of Rights found in Chapter 2 of the Constitution. The proposition is that DRM and DRR are not only a reaction to catastrophic situations, but is also seen as a government-driven process that ensures the safety and protection of residents during disaster.

2.2.1.1 Role of National Government

Like many other developing countries, South Africa is faced with increased altitudes of risks, due to its exposure to a broad series of tragedies including blaze, severe storms, cyclones and floods that frequently activate extensive adversity and ruin of resources and people's lives, argues Botha and Van Niekerk, (2013:85). To counteract this, the DMA provides for the formulation of disaster management bodies in all spheres of the State. This regulation locates the duty for the institution and control of Disaster Management Centres (DMCs) and Disaster Management systems to district (Category C) and metros (Category A) municipalities. The formulation of the National Disaster Management Centre (NDMC) was critical in serving as a channel and depository of data pertaining to catastrophes, risks, vulnerabilities, disaster threats and perils. The risk profile of South Africa and the progress made in honouring the South African commitment to DRR since the adaptation of the Sendai Framework for DRR 2015-2030, is tabled below.

South Africa as a global partner for DRR has to ensure that the resolutions of the Sendai Conference are implemented in a manner that seeks to address impending disasters and vulnerability. It is necessary for the country, as a stakeholder on the international platform, to report on the progress made in its institutions. In his report (on behalf of South Africa) on the execution of the Sendai Framework for DRR 2015-2030, made at the Global Platform for DRR (2017), the then Minister Des Van Rooyen as part of the NDMC, emphasised the need for building resilience in communities and safeguarding infrastructure through the following South African- applied initiatives in ensuring that:

➢ It promotes a principle of circumvention and fosters a joint apprehension of hazards.

➢ DRR structures and forums for sharing information now includes traditional leaders, women, young people, physically challenged persons, the aged, indigenous people and civil society.

- ➤ Annual commemoration of the International Day for DRR during the month of October, and the employment of education, training, advocacy and awareness as some of the tools to create a culture of risk avoidance at all levels.

- ➤ Through its recent legislative review, it heeded a call from the Sendai framework for mainstreaming gender, age, disability and cultural perspectives in disaster management plans, laws and methods.

- ➤ Incorporation of the Sendai framework for DRR elements into the laws and regulations legislating women, children and persons with disability as a report prerequisite in the development practice of catastrophe threat supervision.

- ➤ Promote DRR through policy initiatives such as the integrated urban development framework, which is South Africa's national urban policy. This is done to ensure consolidation and reconciliation of suburban authority, weather and complex development planning, as well as coherent structures, amenities and capitals for service delivery and development.

- ➤ All organs of state present actions that highlight their investment strategy to DRR and climate change adaptation, with bionetwork and societal strategies or initiatives.

- ➤ The development of early warning systems through collaborative efforts with the scientific community for flash floods, field fires, and severe weather scenarios.

The provisions as stated above by the DMA indicate that there must be a connection of disaster duties and programmes from the national government to provincial and local governments. The following is a discussion on the role and contribution of both the provincial and local spheres of government in the elimination of disaster risks.

2.2.1.2 Role of Provincial Government

The Constitution of the Republic of South Africa, Section 125 stipulates that provincial government assumes the roles of 'facilitator' and 'coordinator' in implementing state administration policies in the province. Provinces must thus, concentrate on the functionality of policy and strategy and highlight the objectives and budget for managing perils, as required. The parliamentary portfolio committee's role on the management of catastrophes is to offer guidance on state administration disaster management legislation in relation to that of

the relevant provincial administration. The portfolio committee would also give tactical disaster management guidance to the provincial administration in relation to national legislation.

Furthermore, every provincial administration should draft a Provincial Disaster Management Framework guided by Section 28 of the DMA. This framework should be steady and refer to the requirements of the NDMF. Moreover, Chapter 4, Section 29 of the DMA makes provision for the creation of a Provincial Disaster Management Centre. The PDMC's aims and duties are the same as those of the NDMC. The Provincial Disaster Management Advisory Forum (PDMAF) and the Provincial Interdepartmental Committee on Disaster Management (PIDMC) as promulgated by Section 37 of the Disaster Management Act are not lawfully guaranteed though the NDMF says that the non-existence of such structures could hinder the operations of disaster management in provincial government. In the Province of KwaZulu-Natal, the Disaster Management Centre is under the Member of the Executive Committee (MEC) for Cooperative Government and Traditional Affairs (COGTA), and is responsible for coordination of disaster management activities together with municipalities. In the case of approaching disaster or its occurrence, the PDMC provides assistance and direction to the Municipal Disaster Management Centres (MDMCs) within its jurisdiction. Moreover, PDMC mobilizes provincial infrastructural requirements, funding and capitals to aid local government manage threats. Added to the above, the PDMC also monitors the incorporation of disaster risk management plans into the Integrated Development Plan (IDP) process of the municipality, which would ensure that the budget provides for DRM. The study confirmed the participation of the provincial government by means of the Inter-governmental disaster management advisory forum which is activated soon after disaster occurs to discuss response approach as well as implementation strategies assigning duties of each role-player and stakeholder involved.

2.2.1.3 Role of Local Government
Local government is the most significant sphere of the state in this study where catastrophes occur regularly. In this context, the South African Disaster Management Act (No.57 of 2002), the Disaster Management Framework, (2005) and the Disaster Management Bill, (2013), all highlight the role and the duties of municipalities in pro-actively addressing disaster threats. The DMA provides a mandate to the local sphere in a suitable municipal disaster risk

management framework to establish disaster risk management plans, including contingency and emergency measures that are considered useful on the occurrence of a catastrophe.

Wilkinson, (2009:21) conceded that in Mexico, though the Mexican policy position is to incorporate DRR within all spheres of the state, this is only in writing. Local government in Mexico has constrained ability particularly in rural areas to sustain DRR. They often receive funding, grants or 'bail-outs' from national and provincial administrations. This has created a case of dependency on upper spheres including other external sponsors current and post-disasters and the fact that politicians such as councilors and public representatives are changed post elections. There is limited pressure on the state to mitigate risks associated with catastrophes since communities are faced with serious daily challenges of accessing better municipal services such as medical care, learning, clean and safe water to drink, as well as increasing levels of unemployment and corruption. Successful DRR in this case lies with outside aid.

In South Africa, for those municipalities who are unable to deal with the scale of an occurrence, support may be required from district (for local municipalities), provincial (for district and metropolitan municipalities) and lastly, national disaster management structures. It is crucial to note, nevertheless, that the obligation for the organisation of alleviation and aid activities pre-and-post-disasters depends on the municipal disaster management structures suggest Botha, Van Niekerk, Wentink and Tshana, (2011:39). It is imperative that municipal disaster management centres have suitably qualified staff and are properly resourced to be pro-active in dealing with disasters, and in the implementation of interventions that aim to reduce the risks of any threats in the country. In eThekwini Municipality services and provision have not been hugely affected during the recent flooding and storms of 2012 to 2019, that is according to interviewed officials. Business continues as usual even in the case of major repairs, the process of restoration for business continuity does not take long. With communities rehabilitation and restoration of infrastructure and homes does take longer than expected. This could be related to the non-committal attitude of other stakeholders, role-players and partners that are expected to play different roles as partners in DRR strategy.

Besides municipal core functions, the municipality is in addition, expected under Schedules 4 and 5, Part B of the Constitution, to deliver services that are more associated with DM (i.e. air contamination, land use management and regulation, construction policies, fire-fighting services, Integrated Development Planning, local health care, and water and sanitation

services). This means that municipalities are the main sphere of government for implementing DRM and DRR effectively, argues Van Niekerk and Vermaak, (2004:561). Municipalities should guarantee that the operational systems, tactics, approaches, laws, activities and tasks are embodied at societal level. This is made possible through developing and implementing strategies, municipal regulations and laws such as the IDP, as one of the medium to long-term strategies for progression and disaster risk reduction.

Each municipality, urban or rural, has a unique disaster risk profile, and is thus faced with various types of hazards of a diverse scale. However, many municipalities in South Africa are still focused on responsive action to catastrophes and threats. This is mainly based on poor consciousness, means or political will power. Section 42 of the DMA provides that "... each category A and category C municipalities should respectively ensure for the formation and implementation of a disaster management framework aiming to provide a homogeneous and consistent tactic to the management of catastrophes in its jurisdiction". Similar to the provincial disaster management arrangements, each urban or rural municipality should form an MDMF and a Municipal Disaster Management Centre (MDMC), but could also formulate a Municipal Disaster Management Advisory Forum (MDMAF) and a Municipal Interdepartmental Disaster Management Committee (MIDMC). All of the above should be as dictated by the DMA, the National Disaster Management Framework, the applicable Provincial Disaster Management Framework and the systems formulated in other government spheres. The impact of all this is to intensify all sectors of the community towards readiness for a threat without forming an avoidable reliance on the state. An integrated approach will guarantee more interaction, intercommunication and sharing of resources between various municipalities, while a uniform approach proposes that though the challenges of metropolitans might differ, there are comparable and compatible themes that can reveal a joint reaction to the adversity, highlight Coetzee and Van Niekerk, (2012:09).

Based on the institutional arrangements of municipalities, the DMA is very particular on the inter-communication within metros (Category A), districts (Category C) and local (Category B) DMCs. For example, there must be consultation between Category B and Category C municipalities within their jurisdictional area before they establish and then manage, their MDMCs. Besides cooperation with other line units within their area of responsibility, it is imperative for the municipality to cooperate with both National and Provincial administration to guarantee that DRM and DRR duties are implemented competently.

According to ISDR (2010:IX), the identified main roles of municipalities in the implementation of DRR are located with the following emphasis:

➢ The main role-players in the coordination and sustainability of an inter-sectoral stage to support DRR for a particular risk;

➢ The effective engagement of local societies with DRR activities and linking their anxieties with administration priorities;

➢ The strengthening of their own organisational capabilities as well as municipal implementation of viable DRR action; and

➢ The development and implementation of groundbreaking mechanisms and methods for DRR, which could be reproduced elsewhere or maximised countrywide.

The above points emphasise the point that Local Government/Municipal service delivery is an important aspect of public administration in the implementation of reduction strategies for disaster risk. This also includes municipal collaboration and cooperation with both National and Provincial governments hence municipalities are expected to have disaster management and disaster risk reduction strategies in place to ensure that service delivery is uninterrupted and normalised as quickly as possible when disasters take place.

2.3 CONTEXTUALISATION OF DISASTER MANAGEMENT, DISASTER RISK MANAGEMENT AND DISASTER RISK REDUCTION

In order to have better comprehension of disaster management and disaster risk management, the inter-relationship between the two must be scrutinised. The topic of disaster and risk reduction derives its significance from previous subscriptions and preceding actions in the disaster management arenas, where customarily the emphasis has been on readiness for reaction. Before continuing furthermore, it is imperative to offer some discussion on the ordinary perceptions of disaster risk reduction and disaster risk management

The question that arises is how disaster management is defined in the context of Public Administration?

Disaster Management (DM) as defined by the United Nations Development Programme (UNDP), (2004:21) cited in van Niekerk, (2011(b):239) focuses on the body of disaster

legislation and managerial resolutions, as well as operating actions that relate to the different steps of a catastrophe at every stage.

2.3.1 Disaster Management as defined by the National Disaster Management Act 57 of 2002

The Disaster Management Act expresses disaster management as a constant and cohesive inter-sectoral, interdisciplinary procedure of preparation and application of actions aiming to:

➢ Prevent or lessen disaster threat;

➢ Moderate sternness or magnitudes of disaster;

➢ Offer emergency readiness;

➢ Offer a quick and emergency reaction to catastrophes, and

➢ Offer post-disaster rehabilitation and restoration.

This implies that the approach to the management of disasters should be inclusive of all sectors of the society, as well as of other stakeholders and discipline-experts, employing prevention, mitigation, responsive and recovery measures to resist disasters.

2.3.2 Disaster Risk Management

The International Strategy on Disaster Risk (2004:3) explains DRM as the systematised procedure of utilising organisational recommendations, structure, operative abilities and capabilities to apply approaches, plans and surviving aptitudes of the people and societies, to reduce the effects of ordinary risks and linked ecological and technical adversities. This includes all forms of actions, containing physical and non-systematic procedures to circumvent or to reduce the terrible effects of risks. This definition implies the necessity for institutional systems, methods and procedures that are applied to help avert risks and hazards associated with natural and environmental conditions. It also involves the protection of society and infrastructure against exposure to disaster. DRM is also aimed at increasing the probability that a family, society, village, town or any zone would be able to foresee, withstand and rehabilitate itself from the damages endured through a risk or other hazard, without external support.

DRM is used interchangeably with DRR, but there is no 'same size' methodology to DRM. There are many strategies and frameworks that have been successfully applied to lessen calamity threat. According to UNISDR (2017:4), DRM includes programmes linked to:

➢ **Prevention** – those actions and methods to circumvent current and additional disaster risk, for example, moving unprotected persons and possessions far from a risk-zone area;

➢ **Mitigation** – the decreasing or curbing of the hostile effects of catastrophes, for example, building torrent barriers, growing plants to alleviate slopes and applying firm land use management and creating building codes;

➢ **Transfer** – the practice of officially or unofficially transferring the monetary penalties of specific hazards from the owner to a third party wherein a family, society, business or government power would acquire funds from the insurer or underwriter post-disaster, in return for continuing or reimbursing social or monetary paybacks paid to the other party, for example, insurance and

➢ **Preparedness** – the understanding and capabilities of regimes, specialized reaction and rescue institutions, societies and persons to efficiently forestall, react to and recuperate from the effects of probable, looming or existing risk actions or situations; for example, putting in place early warning systems, identifying eviction methods and arranging emergency materials.

2.3.3 Disaster Risk Reduction

The focus of disaster and risk reduction draws its significance from prior ideas and former applications in the discipline of disaster management, where the emphasis was previously on readiness for reaction. It is very crucial at this stage to create a general knowledge of the primary principles underpinning DRR and DM in the South African perspective. Disaster risk reduction introduces another dimension to international strategy to disaster management and risk. It could be viewed as an orderly formation and implementation of systems, methods, approaches and plans to lessen the susceptibilities and risk of hazards through a community, to thwart (prevent) or to moderate (mitigate and prepare) hostile effects of disasters, in a broader perspective of maintainable growth, ISDR, (2015:25).

Disaster reduction approaches encompass susceptibility and hazard valuation, which includes several organizational capabilities and operative skills. The evaluation of susceptibility of vulnerable amenities, socio-economic substructure, the utilisation of the early warning systems (EWS) including, implementation of various kinds of systematic, mechanical and other expert skills are fundamental components of disaster risk reduction. It is thus naturally multi-disciplinary in nature, and an obligation of all functions of the state. The disaster management cycle in Figure 2.1 represents several points of a catastrophe. It illustrates the activities that take place before a disaster occurs in A and the events that unfold after disaster has occurred in B resulting in a continuum. The necessity of EWS (modern or traditional) could act as a precaution for approaching hazards to enable the institution or a society to prepare for relevant mitigation and prevention measures pre-disaster. Based on the application of EWS, post-disaster rescue or emergency interventions could be done in a manner that prevents or lessens the effects. EWS also safeguard against future catastrophes. This includes rehabilitation and reconstruction of lives and properties.

Management of disasters in its global state requires the combination of disaster events before and after disasters occur to protect people's lives and possessions from probable catastrophes. Africa could have minimised catastrophes and saved many lives and possessions over the past years to date if the application of DRR (strategies) was not regarded as a basic theory of disaster management but a more proactive approach.

Figure 2.1: The disaster management cycle (continuum)
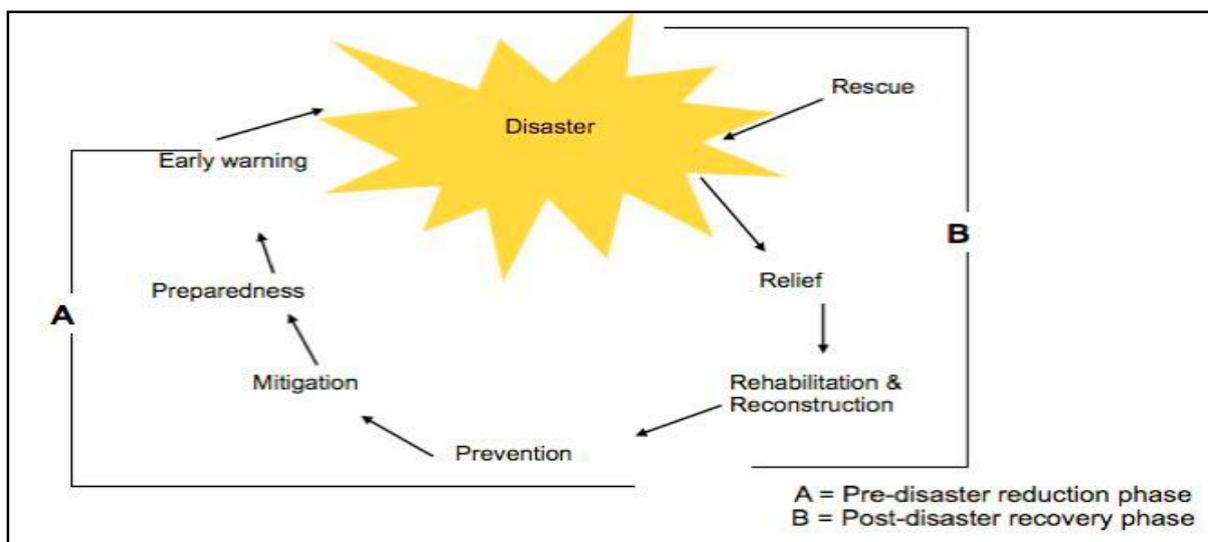
Source: Van Niekerk, (2011:238)

Quick responses and intervention should always be a primary focus in disasters. The increasing measure of threats show that more precautions should be taken to lessen the threat of socio-economic hazards. In the near future, the focus of disaster and risk management should be to acquire productive efforts, by which an integrated and inter-sectoral participation of experts, other professions and society as a whole collaborate in order to reduce the risk of disaster. To achieve this objective, it would necessitate both a political endorsement, as well as societal acknowledgement to encourage community participation in the collective effort of protection and safety.

2.3.4 Components of Disaster Risk Reduction

Traditionally, handling disasters focused on emergency and quick reaction, but in the 21st Century, it is progressively accepted that catastrophes are unnatural (irrespective of what the related risk is) and that it is only by dropping and handling states of risks, disclosure and susceptibility, that one can avoid loss and lessen the effects of catastrophes. Van Niekerk, (2011(b):236) proposes that this could be achieved through decreasing susceptibility and helplessness specifically linked to weak financial and city expansion alternatives and exercises, environmental dilapidation, destitution, and disparity and weather change that produces and aggravates situations of threat, subjection and susceptibility. Handling these fundamental drivers would decrease catastrophic threats, decrease the effect of atmospheric change and subsequently, retain sustainable growth, (UNISDR, 2015:75). DRR could be seen as the methodical growth and implementation of rules, approaches, plans and systems to reduce susceptibility and disaster risks through the principle of avoiding (preventing) or limiting (mitigating and preparing) opposing effects of threats, through a large framework of viable progress, (ISDR, 2004:5).

There is always a need for government policy, laws and regulation review, as well as institutional changes to adapt to atmospheric challenges. This includes introduction of new scientific and technological methods that seek to empower organisations to prepare and react to tragedies in a sustainable manner. This is in accordance with the preferences of the Hyogo Framework for Action 2005-2015:

➢ **Ensuring that DRR should be the focus of both national and local institutions** – for example, including DRR at all government levels, and local government in particular. Government must apply initiatives and programmes aimed at reducing exposure to catastrophe of its community and society.

- ➢ **Risk identification, assessment and monitoring, including enhancing early warnings** – this could be done through keeping abreast of disaster information, as well as the implementation of threats, susceptibility and capabilities valuation locally.

- ➢ **Building a custom of security, elasticity and strength using information, invention and training** – by being a part of global platforms for DRM and DRR wherein knowledge and new strategies for reducing and handling disasters are promoted, dialogued and shared. This also includes innovative ideas and skills empowerment.

- ➢ **Reducing the fundamental and causal risk elements** – through supporting and encouraging societal-based risk reduction programmes, initiatives and projects, that may reduce the causal factors of disaster and

- ➢ **Strengthening risk preparedness for prompt reaction at every level** - for example, by having emergency and rescue teams in all government levels to enable an effective response to hazards.

It can be said that administrations should finance the gathering, managing and distribution of hazard information, including catastrophe cost and impact figures, danger replicas, disclosure records and susceptibility information. Concurrently, there is a need to place ethics and devices in action to ensure honesty and transparency so that handlers will frequently have updated information, not merely access to the information they need. They also need to be mindful of its fundamental conventions and boundaries.

In accelerating service delivery, DRR constitutes five main drivers: "Safety and Good Administration; Financial and Social Expansion, with a particular attention on Poorness Decline; Nutrition and Aquatic Safety; Conservational Durability and Weather Variation Adjustment; and a variety of Disaster Risk Management strategies" submits Piper, (2015:2). This coalition is validated in the DRR diagram, Figure 2.2 below. It contends that, if a coordination and alignment of these five corresponding DRR sections could efficiently work jointly, they could then lessen both the probability of a huge catastrophe taking place, and also its effect on the environment and society. Should a disaster take place, this ought to change swiftly from the Rapid Reaction into the Restoration phase. The strategies or initiatives are themselves categorised into 10 main crucial points. The 10 crucial points includes advocacy, policy and legislation; DRR funding; organizational structures and

coordination mechanisms and community risk assessment and implementation of risk reduction initiatives. Others include RRIs and poverty reduction initiatives (PRIs); DRM planning at all level; capacity building training and research information management. The remaining aspects deemed significant are early warning systems and possible evacuation; public awareness and education and DRM and DRR monitoring and evaluation (M&E) as fundamental points for due consideration adapted from Piper, (2015:2).

These above initiatives should preferably be considered in the risk reduction phase of the DRM cycle, which is predominantly before probable danger occurs. Utilising this type of DRR structure, suggests that the state administration would be liable for the development of DRR and DRM plans from the highest sphere to the lowest sphere of administration subsequent to a community risk assessment (CRA). The plans under discussion would then, constitute a variety of RRIs and Destitution Alleviation Strategies (PRIs). These in application, are implemented at the municipal level through Non-Governmental Organisations and other participating role-players and stakeholders formally known as Community-Based Disaster Risk Management (CBDRM) strategies and initiatives.

Figure 2.2: Disaster Risk Reduction
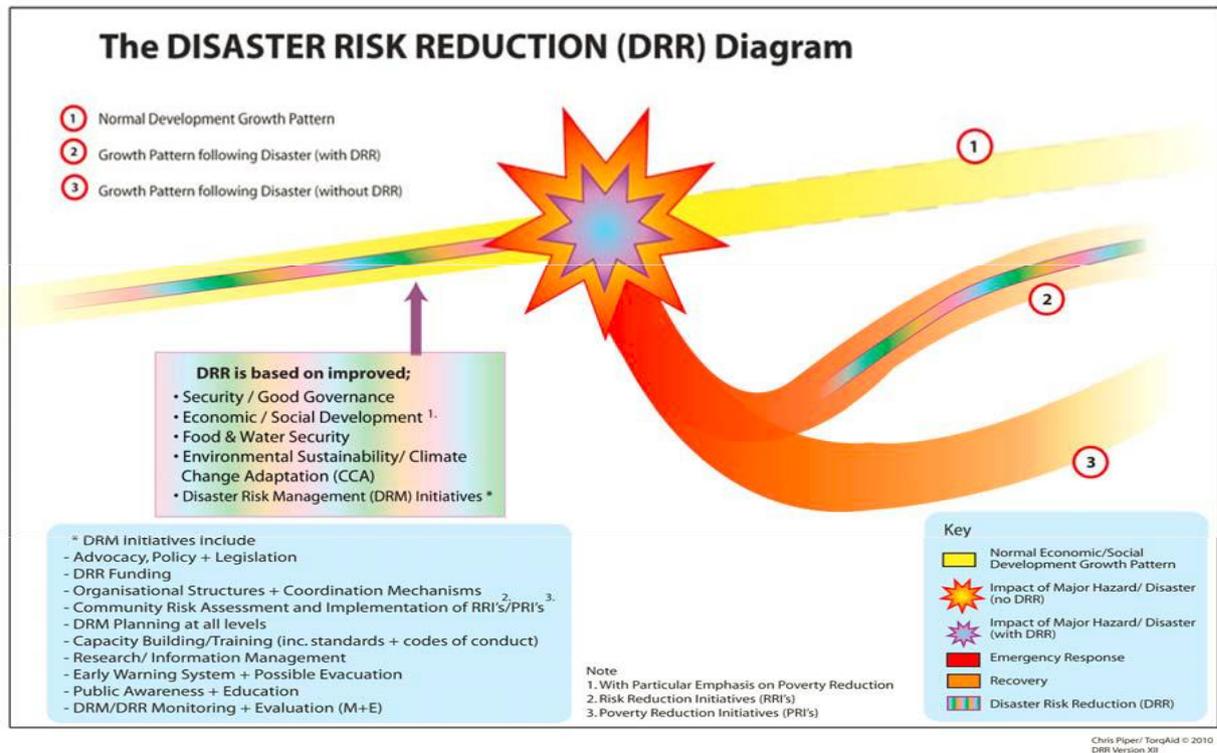
Source: Piper, (2015:2)

2.4 THEORIES UNDERPINNING THE STUDY

The following theories informed the study:

2.4.1 Disaster Theory 1: The Pressure Release (Crunch) Model

Advocated by Blaikie, Cannon, Davis & Wisner (2004: 35), the Pressure and Release Model (PAR) focuses on 3 important factors i.e. *underlying or causal* (low income and unstable economy), the lively practice or *dynamic pressure* (e.g. urbanization and population growth) and *unsafe conditions* (e.g. poor housing built by river banks/flood plain). The model depicts disasters as man-made and social conditions that are preventable (e.g. fires, flooding and storms), and asserts that they are as a result of inequality and physical exposure to risks in society. This model suggests that social imbalances have an effect on the aptitude of societies to respond and recuperate from hazardous events, and that disaster protection approaches have socially isolated the people at risk. Communities who live near river banks are prone to floods than those living inland away from the rivers. It states that a disaster happens only when a hazard affects vulnerability i.e. a natural phenomenon that has not triggered an event is not a disaster, but is only so when it affects people and their environment. The model raises

the question of whether communities and individuals have the capacity to reduce their risks to vulnerability by changing their social conditions.

In the example of a cyclone, should a heavy, strong wind rise, the destruction and death would have devastating effects. Poorly built structures are prone to vulnerability with heavy hazards such as cyclones that could cause a catastrophe. Contrastingly, should an identical storm or cyclone occur in a place with storm-resistant housing, the susceptibility level is far less, and calamity could be circumvented.

2.4.1(a) Causal Factors

When disasters occur, general and broadcasting explanations usually emphasise their 'naturalness' as in the term 'natural perils. The natural threat that activated a disaster tends to look devastating, with huge headlines such as 'Nature's Deadly Fury' refer to example in Figure 2.3 (The Post, October 11, 2017), and the visuals are dominated by pictures of people's possessions and properties wrecked by this natural force. According to Blaikie, Cannon, Davies and Wisner (2004:16), this is a very fractional and inadequate way of understanding the disasters, especially those caused by natural risks.

Figure 2.3: Natural Disaster

Source: The Post Newspaper, October 11, 2017

The PAR model is focused on the notion that explaining disasters needs to link the effects of a threat on humans with a number of social elements and procedures that cause susceptibility.

The most common root causes that give rise to susceptibility and risk affecting apportionment and sharing of capitals, are economic, demographic and political aspects.

These causal factors show the application and sharing of authority in a community. Persons who are economically marginalised (living in informal settlements) or who stay in ecologically marginalized situations (floodplain coastline, remote and jungle environment) tend to be of peripheral importance to those who hold economic and political power. This builds three commonly strengthening causes of susceptibility. If people gain incomes and assets that are unsecured and unfulfilling, their actions are expected to create more levels of susceptibility. Another important aspect is that they are probably of little importance for management interventions aimed at dealing with risk moderation. The third consideration is that people who are financially and politically negligible are most likely to discontinue believing their own approaches for self-preservation and lose assurance in their own indigenous understanding. Although they could still believe in their own capabilities, the raw supplies required or the labour time needed may have vanished due to their financial and politically marginal, small or unclear access to resources.

Prevalent fires in the informal settlements, particularly that repeatedly occurring at Kennedy Road in the greater Durban area of eThekwini, are regarded as one of the worst known frequent disasters. This has resulted in the formation of the Abahlali Basemjondolo activist group, a body which addresses the neglected issues of informal settlement dwellers, including electricity and property or human settlement issues. Though some of the people in these settlements are holding well-paying jobs and can afford a decent living, they are repressed by their current living conditions and circumstances, and thus have assumed the status of being poor like the rest of their counterparts, that is according to Ngcamu, (2011:353). Some of the provided interventions such as the transit camps have become permanent accommodation instead of temporary homes, as intended by the municipality. Persons secured by their fortune are oblivious to the demise of the impoverished and the most exposed when their houses and living standards are destroyed by meteorological natural weather patterns.

2.4.1(b) Dynamic Pressures

Dynamic pressures are procedures and actions that interpret the impacts of causal factors both temporal and spatial into hazardous situations or 'unsafe conditions'. These hazardous situations include speedy urbanisation, and certain structural modification programmes. Rural-urban aspects are another dynamic pressure that rises in several Less Developed

Countries (LDCs) responding to the financial and social disparities observed. Such immigration could be followed by the loss of land, and may lead to the loss of local information that might assist to avert disasters, as well as a loss of the capacity for coping in the aftermath of disaster. The Pressure Model indicates that advancement of susceptibility plays a vital role in comprehending community susceptibility and the causes of that vulnerability to catastrophe. The model suggests that the key to reduction of community threats is through addressing numerous developmental, social and political challenges, thus reversing the pressure in order to have a safe and sound community. In order to reverse these risks according to the model, there should be an application of specific catastrophe risk diminishing initiatives. As it has been mentioned and judging from this model, a main element inducing susceptibility in any society is the presence of risks. The following discussion elaborates more on these risks and hazards, their natures and underlying forces.

2.4.1.1 Causes, patterns and impact of recurring hazards

It is commonly known, that there are several disasters that result in catastrophes with devastating effects that are known to plague the Province of KwaZulu-Natal. It is, nevertheless, due to several purposes that the study does not intend to deliberate on every single hazard but only those affecting eThekwini. Since floods, storms and fires, which are classified as natural hydro-meteorological hazards are the most prevalent and shattering disasters in eThekwini Municipality, it is befitting to discuss these disastrous weather patterns more extensively in the context of the study.

2.4.1.2 Floods

Floods are the well-known ecological threats of humankind locally and international, next to sickness and road accidents. This is due to the pervasive topographical spreading of stream floodplains and sea-level coastlines and their enduring desirability for settling people. Yearly, floods have killed thousands of lives and untimely disturb approximately millions of people globally, generally resulting in destitution and homeless. Floods are related to many other conservational and ecological procedures and can be difficult to categorise. They are results of hurricanes and tidal waves like the tsunami, but floods also cause several outbreaks, plague and landslips. Though deaths and destitution related to floods are focused on less developing countries, many developed nations that invested hugely in flooding resistance and crisis strategies that have undergone hefty commercial damage. The rate of flooding threats relies on different features, for example, the water penetration and speed, extent of the deluge and

the weight carried with the calamity. The incidence of deluge and flood effects seems to be growing globally. It is hard to classify main tendencies in the structural sources of floods. The understanding is that growing losses are attributed to further comprehensive observation, an increasing populace and those in danger by way of sustained floodplain attack.

2.4.1.3 Categories of floods

- **River floods** – are a high level of rainwater overflowing the river valleys, although they are naturally or falsely constructed. Such an occurrence is not a risk except if it threatens people's lives and properties. River overflows and flooding is a regular and unavoidable phase of life. Other floods happen in seasons and results in excessive water rapidly filling riverbanks. Pouring rain from humid whirlwinds such as tornadoes and storms may also result in river floods, such as the 2011 storm Katarina in the eThekwini region, as well as storm Sifiso, which affected many parts of KwaZulu-Natal and eThekwini Municipality. Properties and homes were destroyed, leaving many people devastated and homeless, particularly those from the informal settlements who are too destitute to rebuild and restore their possessions.

- **Coastline overflows** –are breezes produced from humid hurricanes and rainstorms or strong seaside conditions that direct oceanic water inshore and produce consequential overflowing in coastline areas or in stream estuaries and tidal plain. Coastal flooding in KwaZulu-Natal South Coast has, in 2008, broken a record of 1964 heavy rains, when it killed four individuals, included 2 children, and dislocated approximately one thousand people. The victims were housed in municipal places like halls and other centres nearby, and far from their familiar surroundings. The rainfall was 382mm compared to the 337mm of 1964 reported by *Mail & Guardian, (19 June, 2008).*

- **City overflows** – occur in developing urban areas have created places that are prone to rainwater such as parking bays, streets, highways, infrastructure and structures. Development raises overflow a few times more over what would happen on normal ground. Throughout the period of urban and city floods, roads may convert to rapid moving waterways, and households and structures may endure destruction.

- **Flash flooding** – occurs when a large quantity of rain falls within a short space of time (in dried out rivers and swamps, river basins, and metropolitan zones), or when a large quantity of water is abruptly freed by dams or the discharge of river blockages.

In Venda and Gazankulu, in 2000, flash floods washed away highways, pathways and bridges, devastating harvests, native flocks and houses, affecting mostly the underprivileged rural societies. Water and sewer systems were shattered, leaving millions of people without hygienic water; and entree to Kruger National Park was closed. The overflowing Limpopo River killed approximately 100 people by drowning, falling infrastructure and misfortunes, highlights Napier and Rubin, (2002:96).

2.4.1.4 Causes of flooding

➤ **Physical cause** – is the most usual source of overflows. Physical cause differ from the half-expected periodic rains over extensive topographical parts, which produce the yearly seasonal flooding in humid zones, to nearly unsystematic convectional hurricanes over minor valleys. They are also caused by lengthy rainfall over large drainage basins and are linked with tropical whirlwinds.

➤ **Human cause** – is where disasters are caused by settling in a flood-prone place where rivers and streams could easily flood infrastructure and buildings, causing destruction and homelessness. eThekwini is surrounded by a myriad number of informal settlements situated at the danger zone areas, some by the river banks, floodplains and over hills.

2.4.1.5 Fires

According to rainfall patterns website, workingonfire.org, South Africa has two fire seasons, 'the dry summer months in the Western Cape and the dry winter months throughout South Africa'. Approximately 70% of the bio-networks that cover the Republic of South Africa are fire-adjusted. It is necessary for ecosystems to scorch so that they preserve their environmental durability. Reduction is better than treatment, thus focusing on fire promotes a hands-on attitude that would encompass employing correct regulations in place to administer the management of fires, creation of awareness, as well as educating society on fire safe and security measures, promoting and applying recommended fires, gas and petroleum load prevention. The secondary sources revealed that there are different types of fires and the following are few types of fires that were identified:

➤ **Wild fires** – are generally provoked by whirlwind, or falling rocks and outbursts in the hills, yet most are induced by persons inconsiderate, with open blazes and

unsympathetic to the penalties of their negligence. In June 2017, at Knysna, about 8000 persons had to be evacuated from 26 fire sites, which had already killed nine people. This was reported as the largest fire of this kind.

➤ **Industrial fires – also known as Class B fires,** are a form of manufacturing tragedy concerning a blaze in a manufacturing location. Such fires, habitually but not continuously, contain combustibles and other hazardous substances and liquids, including flammable material used. For example, Figure 2.4 is an example of the fire that broke out in the Bayhead (Transnet storage) in eThekwini propelled firefighters to work overtime trying to clear the huge blazes from the warehouse, which was confirmed to have wax panels inside, it took firefighters long to clear the fire and evacuation process took more time than it was expected.

Figure 2.4: Durban Bayhead Warehouse – fire

Source: News24, March 24, 2017 adapted by #DurbanFire

➤ **Shack fires –** also categorised as **Class A fire**, is explained as regular flammables and is considered to be the most recurrent, unplanned fire encountered nationally. They are usually human induced accidental fires resulting in disaster. These fires can be put out by water based or foam fire extinguishers. Shack fires are also propelled by denial to access to electricity, densely crowded structures due to lack of land and poorly built houses that is easily flammable.

The impact that is left by fires in general is usually massive in that it leaves wound and death, homelessness and poverty as well as a loss of livelihood.

2.4.1.6 Storms and tropical cyclones

Storms and tropical cyclones are some of the causes of disasters, and the damage caused by storms is known to be severe. Measures to reduce the effects and impact of storms and cyclones in humans and environment should be taken into consideration during delivery of services. A storm is an upsurge beyond typical ocean level, occurring after strong gale force winds. See Figure 2.5 below.

Figure 2.5: Bluff and port entrance to Durban, South Africa

Source: Hunter, (2007) posted 2013:01:22

Storms cause widespread overflowing of shoreline zones. The extent of oceanic water overflowing could be beside the seashore for hundreds of kilometers, with water pushing a number of kilometers internally if the land is at sea-level, as reported by the Climate Council (2015:2). Due to atmospheric changes, hurricanes are frequently taking place in more dynamic, damp loaded weather patterns. Disastrous hurricanes and tropical cyclones have enormous societal expenses and effects, such as health, ecological and economic effects.

Studies have revealed that at the end of heavy cyclones, those who survived show a 25% rise in the inception of despair post the storm episode. Spiritual anxiety can demoralize the adaptability of persons and societies, through adding physical, psychological and economic problems against retrieval struggles, says Martin, (2015:14). Severe meteorological conditions including heavy storms, torrent and strong rain, left 8 persons dead and created serious damage to infrastructure in KwaZulu-Natal, in October 2017. In Durban alone, motorists remained deserted, as many streets and highways were flooded, for example; the N2 road which overflew after the breaking of the close riverbank. Approximately R25million in costs for damages were caused by a storm in the King Edward Hospital and other areas,

causing large-scale destruction of property, which includes transportation, car parks and collapsing buildings.

2.4.2 Integrating municipal governance with disaster risk management and disaster risk reduction

It is important for assessing the organisation's role, structure, resources, capacity, programs and strategies in implementing DRR. This approach takes into consideration partnerships and inter-organizational co-ordination throughout the wider scope of DRR. It also includes the relationship that links different kinds of organisations and sectors, including societies do that they become massively widespread and multi-faceted with the role and responsibility, finance, training and other interventions necessary as part of a pro-active approach. The next section focused on partnerships, governance and stakeholders.

2.4.2.1 Partnerships and Networks

There is no one institution that can be able to handle all factors of DRR on its own. The measurement, regularity and density of tragedies in all forms could be handled through using a variety of ideas, expertise, approaches, devices and means. Hazard elimination strategies should be an inter-disciplinary collaboration of partnership, enable institutions to exchange knowledge, work together effectively, successfully delivering assignments and inspire authorities in decision-making. According to Twigg, (2015:68) DRR networks may include partnership of various forms, and these include the state and civic people associations (humanitarian relief workers, NGOs) and institutions, specialists (like scientists, developers, engineers, crisis planners) and society at large, researchers and experts (meteorologists), benefactors and recipients. The author asserts that collaborations should intensify the effect of strategies through making them more maintainable and reliable. Creating partnerships could result in effective utilisation of capitals. Relations with outside bodies, associations and institutions empowers societies with new and further knowledge about disasters, DRR and adaptation. Alliances are not easy to establish, as they need more effort, engagement, continuous interaction, openness, confidence, dedication and organisational backing.

2.4.2.2 Role of partnership and inter-organisational co-ordination

According to Haddow, Bullock and Coppola (2013:230), previously there has been an increase in the number of humanitarian organisations playing a major role in disaster reaction and rehabilitation by closing openings left by government agencies. The following are some

of the partners of local government in response to disasters and assisting victims to recover. Their activities also include the reduction of the effect of threats wherever probable:

> **Non-Governmental Organisations** – these are voluntary organizations that exist and mobilise for voluntary assessment and trauma counselling of disaster victims, including providing medical health care and provision of temporary accommodation. They usually target remote places that are not easily accessible and are generally neglected by government aid agencies. Examples of these are the faith-based organisations, community-based organizations and business organisations, which play a major role in pre- and post- disaster.

> **Red Cross** – this is one of the most well-known organisations specializing in disaster response and relief. Amongst other initiatives, Red Cross is known to provide basic needs, formal training in first aid and other preventive and health methodologies, all amounting to millions of rands. The Red Cross also recognises four ideas of action as very important. The first aspect being that of decreasing the susceptibility of families and societies in pro-disaster places and enhancing their capacity to handle the impacts of catastrophes. Consolidating the capacity of general communities in catastrophe readiness and after ruin reaction is a further important aspect. The next aspect focuses on defining the duty and directive for the public in state catastrophe strategies. Lastly, instituting links within the region, strengthening its united effect in disaster readiness and reaction at the global level is considered a key aspect.

These aspects may all be realised through predicting of risks, assessing threats and susceptibility of groups, persons or societies, assessing municipal power and ability to respond to perils, responding to the formation of links, the assessment of national disaster plans and the society's capability to mitigate and respond to disaster.

> **UNICEF** – in events of perils or war, UNICEF is well-positioned to offer a responsive role as aide to direct targeted sectors. This immediate action is extremely vital since young mothers and children are the most at risk where assistance is required, as indicated by Haddow, Bullock and Coppola (2013:229). UNICEF upholds that charitable support must comprise programmes and projects intended explicitly for child sufferers, by means of immunization, sanitation, schooling,

training, health, food and nutrition, including recovery and rehabilitation programmes for children.

2.4.3 Multi-sectoral approach to Disaster Risk Reduction (Value, Balance and Accountability Integrative model)

DRR is a part of sustainable development; therefore, it should involve every segment of society, government, non-governmental organizations, the professionals and the businesses. It requires a people-centred and multi-sectoral approach, such as a Public-Private Partnership (PPP). PPP is necessary for a combined shared trust between these institutions. The hypothetical debate carries notions that advance queries that focus on the prospect of partnerships based on the new Sendai Framework, as well as company community investment in the Value, Balance and Accountability (VBA) Integrative model. The strength of this model is related to the pursuit of improved DRM and DRR in society, including businesses and private institutions primarily acting in their own backyard and thereafter pursuing external partnerships, which can be recognized through PPP activities. PPP increases competence, lessens expenses and is significant in the sharing of skills, knowledge, expertise and resources, which improve community resilience to disasters through contributing to DRM and mitigation. Catastrophes have compelled the private sector to reconsider their roles and obligations in terms of corporate social responsibility (CSR), by extending humanitarian activities in the case of disasters. The model seeks to answer the role of stakeholders and the question of internal capacity, and that of external agents in acquiring financial aid for disaster reduction.

2.4.3.1 Public-Private Partnership and Corporate Social Responsibility

Disasters have compelled the private sector to re-evaluate its objectives and take into consideration charitable programmes with regard to approach and social responsibility. Communities suffer huge financial losses, as a result of physical, natural or artificial catastrophes. The state has a responsibility to protect the country against any financial effects and the economic meltdown cause by such catastrophic events. The private sector can assist the state or government with resources and expert or technical knowledge in DRM and DRR, while searching prospects to enhance its effect in the community through answerable activities and partnerships that can exploit both institutions' basic proficiencies, improve disaster prevention, intensify consciousness of company product and give directly to DRM and alleviation Lang, Mastella, De Souza and Boff, (2012:37) in Eyerkaufer, Lima and

Goncalves, (2016:278). The dialogue on the likelihood of Public-Private Partnership (PPP) comes from a renowned requirement for larger inter-sectoral cooperation in DRM and DRR procedures. Tachizawa (2014:52) in Eyerkaufer, (2016:279) submits the physical term that differentiates institutions, specifically, a three level sector. While segment one refers to a cluster of vertical and horizontal administration of constitutional institution that provides communal overhaul, segment two refers to trade, that is, corporate institutions that are driven by turnover and yield. The third sector refers to no-gain, community-driven, corporate civic society organisations identified as NGOs. This section focuses on the second sector PPP in DRM and DRR.

2.4.3.2 Disaster Risk Reduction Private Sector Partnership

"The commercial sector or business is analysed as the impeccable promoter for resistant thought due to its direct liaison with customers, clienteles and dealers, and could direct community request towards risk-prone produce and amenities. A modern partnership strategy concerning the state and business founded on reliability will form disaster resistant societies" UNISDR, (2016:84).

There is a common concern for government and business to collaborate, as business depends on the durability of public sub-structure and utilities to trade, and administrations and societies rely on tough commercial methods for a steady and viable economy. Priority 3 of the Sendai Framework set out a guideline on government and business funding in disaster risk prevention and alleviation. It identified organisational and non-organisational processes as critical to boost financial, socially, healthy and traditional resistance of people, societies, states and their resources, as well as the environs. It states that these can be directives for invention, development and creation of employment, declaring that such interventions are economical and influential in saving a life, preventing and reducing loss and ensuring successful repossession and restoration.

2.4.3.2(a) Business case for Disaster Risk Reduction

The corporate case for DRR is to improve resistance, decrease calamity loss and lessen instability of income.

> ➤ Adversities have direct and indirect influences on the private sector, depicted in the table below:

Table 2.1: Influences of disaster adversities in the private sector

Direct Loss	Completed or incomplete devastation of properties and stock
Indirect Loss	Corporate interruptions, supply chain effects, effects on customers, associates and dealers
Wider Impacts	Low trade returns, opponents poaching customers, pricier insurance, adverse impacts on appearance
Macroeconomic effects	High interest tariffs, staff deficiencies, low demand of products and overhauls.

Source : UNISDR, (2015 :5)

DRR contributes worth to the private sector by ensuring business stability, effectiveness and maintainability through providing for steady situations, protection of workers and their societies and protection of long-term reserves.

2.4.3.2 (b) Five commercial sector ideas for a resistant prospect

Adapted from UNISDR, (2016:4-7)

➢ **Idea 1:** Solid PPP-led DRR and adaptability at the municipal and state level by means of multi-sector platforms and PPP governance. This vision's first implementation in 2015 and beyond is through a catastrophe resistant record, which is based on the UNISDR's *My Town* resistant action aimed at providing a single integrated perception of a town's entire disaster elasticity position, and the networks concerning the numerous various facets of disaster pliability, while also identifying gaps in strategies and requirements.

➢ **Idea 2:** Resistance in the built environment is propelled by the public sector's rising lowest ideals, and allowing the private sector to labor willingly towards best practice. The private sector possesses, saves, constructs, runs and preserves most substructure hyphen and the built environs. There is a huge possibility for the corporate sector's volunteer involvement to be joined successfully with public sector efforts. This might

be the result of a permitting setting constructed by means of a grouping of criteria, accréditations, rules, enticements, submissions, reporting and other methods. Implementation is through Green Star Communities.

> **Idea 3:** All economic savings and bookkeeping choices, communal and corporate, are exposed to hazard. The vision must be financially desirable, and obligatory, for financiers and asset owners (from government to enterprises to entities) to improve the elasticity of their belongings. Corporate would participate in the expansion of a homogeneous technique of measuring, recording, and interconnecting hazard threat. This includes monetary disclosure guidelines. The probable implementation is at least once in hundred initiative, which was guaranteed by both corporate and state organisations at the 2014 New York Climate Conference to fund the study, groundwork and trial administrations.

> **Idea 4:** A state and business enterprise that is profound to elasticity drive one another towards resistant citizens. The businesses can disturb civic opinion towards pliability through company laws and the schooling of their personnel. High civic perceptions for supply chain and business stability administration will persuade financial backing and form trade desire for goods and amenities that enhance elasticity, which in turn, would inspire more invention. In Paris, private companies, in implementing the Sendai Framework, join forces with a public institution to advance continuous public administration tactics to alleviate flooding risks of the River Seine.

> **Idea 5**: Distinction and exposure of hazards discovered, and their preemptive supervision, is since a typical corporate exercise. Disaster threats supported and controlled by businesses must be incorporated into the complete image of threat conceded by societies and nations. Corporate social reporting devices can be employed for this drive. A permitting setting, through an amalgamation of principles, accreditations, enticements, and other interventions, can hasten this procedure.

2.4.3.3 Private-Public Partnership and Social Responsibility

Social business investment is perceived by the stance, activities and attitudes of those institutions that willingly donate to societal well-being as a constant procedure and to the developing through the liaison with their participants and non-participants, explain Schwartz and Carrol, (2007:17). The notion of collaboration stems from the knowledge and skill

transfer, practice and primary capability between public and private institutions. CSR raises enthusiasm for training partnerships. The term 'partnership' used here refers to the relationship between state and corporate institutions, starting therefore, from the idea that directs the longer period agreements between the state and company inventiveness that includes financial benefits.

There are various instances where Public-Private and CSR strategies are encouraged in DRR, Eyerkaufer, Lima and Goncalves, (2016:276) mention strategies like (a) the donation or cheap sale of building material by hardware shops as a way of encouraging property owners protect their homes, and (b) allow usage of company space for emergency shelter or dispensation shelters or provide technological support at no charge. The government of Indonesia together with the business sector in 2008 used the Bali Hotels as emergency shelters to those who could not move to safe places in time before the tsunami. In the United Kingdom, eateries offered meal coupons to dislocated persons, whilst supermarkets extended their working hours to ensure grocery and food accessibility at odd hours, explains Williams, (2009:25). Though businesses become involved in disaster relief response, they are however, not committed to long periods of disaster reduction, particularly in less developing states, their interventions are based on susceptibility and the need that arose during a disaster.

2.5 DISASTER MANAGEMENT AND DISASTER RISK REDUCTION STRATEGIES

Disaster risk reduction strategies aim at eliminating threats and circumvent incoming threats, enable maintainability, that include the state's key objectives of preventing and reducing peril threats as well as engaging the community at large and state parastatals. The folowing are some of the DRR strategies (with more discussion in Chapter Three of this dissertation) from early warning systems to communication strategies:

2.5.1 Early Warning Systems

There is no generally approved explanation of Early Warning System (EWS). In this study, EWS would be discussed as a method of collecting data that enables identifying and controlling of pending threats so that arrangements can be made to lessen the undesirable impacts of these risks. EWS are therefore, the processes and activities by which data is provided beforehand concerning the incidence of a catastrophe. EWS mean communal products, and powers, that should be seen supplying persons under threat with support to

lessen future perils. Samarajiva and Waidyanatha (2009: 59) explain that EW must consist of collecting data, developing information and knowledge, methods of cascading and deeds activating devices. For any effective EWS, it should be able to activate quick and emergency reaction and intervention before reaching the crunch area. EWS should have the ability to protect lives, before endangering lives, and must be ready to safeguard impending capability to survive, as well as to ensure the well-being of the existing community.

UNISDR (2009:5) defined EWS as:

> "The set of capabilities necessary to produce and distribute appropriate and significant warning facts to assist persons, societies and institutions endangered by a threat to get ready and to perform properly and adequately in time to decrease the likelihood of injury, death, destruction of property and nature, as well as losing source of income".

EWS is a vital element of any state's disaster risk management approach, which enables administrations at national to municipal levels and its societies, to commit and act appropriately with necessary interventions to save lives and properties, constructing elasticity in readiness of catastrophes World Meteorological Organisation, WMO, (2009).

The 3rd International Summit on Early Warnings (EWC-III, 2006) re-affirmed the resolution of the 2nd International Conference on EWs that operational EWS consists of:

➢ **Risk information:** Hazards are examined, evidence is included in the warning communications;

➢ **Observing and cautionary measures:** Threats are perceived, measured, and predicted and threat cautions are created;

➢ **Spreading:** Forewarnings are delivered and circulated in a well-timed manner to establishments and the community threatened; and

➢ **Rapid reaction ability:** society-centred crisis strategies are initiated in reaction to cautions, to lessen possible effects on lives and lifestyles.

The above elements should be reinforced by proper laws, regulation, acts, policy, institutional management and collaboration devices, as well as response devices to advance the system in

the long-run and apportion provision of means. Application of these elements will require the commitment of all stakeholders from top to municipal level. Numerous 'best' practice exercises internationally have proven that EWS must be established as a multiple risk, cross-sector, interdisciplinary and multiple-phase strategy. Should a single element fail or lack somehow, that may trigger the whole strategy to fail. It is the responsibility of the state to ensure that there are good public administration practices with the issuing notices and cautions about impending disasters. This duty must be explained across the board to prevent overlapping of boundaries between the public and private sectors including other agencies. This, is done though policies and other relevant legislation in all government levels, includes budget, plans, coordinating and operating devices. Figure 2.6 below indicates a mature inter-linked and efficient communique protocol between all factors and processes (UNISDR, 2015:7).

Figure 2.6: WMO Schematic of four operational components of effective EWS

Source: United Nations International Strategy for Disaster Risk, (2015:7)

2.5.1.1 Preparedness strategies

Preparedness is defined as the capacity to make predictions, reacting to and coping with the impacts of a catastrophe. EWS is explained by nine key factors in the disaster preparedness framework as follows:

Table 2.2: EWS preparedness strategies

Assessing Vulnerability	Planning	Institutional Framework
Gathering important data on disaster threats, place of catastrophe, form of relief or intervention needed and topography of the area.	Agreements and written plan of actions by all role-players and stakeholders for implementation	Management and operational structures in place for responding to impacting hazards.
Information Systems	**Resource Base**	**Warning Systems**
Proper information collection and communication systems are required contributing to the formulation of readiness and prevention plans, and proper reaction	Stable and reliable resource bases assist volunteers to provide emergency support to disaster victims. These include, transit camps, medication, foodstuff, funds and communication strategies.	Produces data on hazards, society activities and cascade it to all stakeholders through media and other forms.
Response Mechanism	**Public Education and Training**	**Rehearsals**
Structured reaction to various kinds of disasters to avoid duplications	Community and stakeholder education and training pre-disaster so that they are well capacitated to handle disasters should they occur. It involves incorporating to public institutions (like schools) as a discipline.	Evacuation and safety drills are essential to this process. This allows for detection of any gaps and finding ways to address them.

Source: Adapted from. Kent, (1994:30)

The above nine components of EWS as a strategy outline a process of annual assessment of vulnerability, disaster readiness involving gathering essential disaster information, proper planning with written agreements, effective and efficient institutional structures, active information, including, resource and warning systems in place to ensure reliable and informed reaction to disasters. This also covers continuous education and trainings of

individuals, communities and stakeholders in managing disasters, as well as evacuation measures during, before and after disaster.

2.5.1.2 Importance of Early Warning Systems

The purpose of an Early Warning System is the empowerment of people and societies who are susceptible to risks. An early warning system should be able to respond and act at the right time in a swift way lessening the impact of harm, death, destruction of possessions or nearby situation. EWS goods could have: a 'short to medium-term weather forecast including the prediction of wet and dry atmospheric weather patterns.

The main purpose of EWS is to formulate pre-emptive and quick readiness, preventive and reactive interventions created to lessen the bad effects of risks. The rapid reaction ability necessitates that all role-players and stakeholders have knowledge and understanding of threats and their possible effects (further discussion is found in Chapter Three of this dissertation). Emergency and immediate steps and processes must be created from all government levels to the society level together with their defined roles. A critical factor in this procedure is teaching awareness to those vulnerable, so that they may understand the threats and their effects.

2.5.2 Role of South African Weather Service

The South African Weather Service (SAWS) has an important role in DRR programmes in the country. Authorised by its regulation, the South African Weather Service Act no.8 of 2001, SAWS is the only source of extremely climate-associated cautions in South Africa. This ensures that there is one influential opinion in this regard. The SAWS has created networks for spreading of advice and cautions to the NDMC, the PDMC and MDMC within. Government staff, NGOs and academic institutions responsible for emergency forecasting and its links concerning tragedy and expansion, are trained and workshopped through capability enhancement programmes. Bullock, Haddow, Coppola, Ergin, Westerman and Yeletaysi, (2006:219) claims that the capability of responding to perils by different states could be associated with numerous elements, including disaster tendencies, domestic and international financial means, proper administration of the state and available technical, educational and personnel resources. It is common knowledge that the responding capacity of one country is inadequate in the face of a huge volume of catastrophes, and external aid should be requested.

2.5.3 Role of Science and Technology

People are adversely affected by flooding buildings that fall during or after flooding. There are new architectural drawings that are developed by experts for properties to resist any atmospheric and weather-related disasters. This technology is already used in India to minimise susceptibility of properties and human settlements. A report in the in Mail and Guardian dated June year (2009:14-20), states that "an alliance amongst citizens great power computing centres in Africa could aid advance catastrophe reaction periods and trail waves". One of the collaborators is the Cape Town based High Performance Computing Centre capacitated to download data in a fraction of seven flashes and flow through the cable transported above the African continent. Alternatively, the Egypt National Authority for Remote Sensing and Space Sciences, drives a collection post at Aswan, 100 000km from South of Africa, Arabia and Southern Europe.

2.5.4 Role of social media in disseminating disaster information

Social Media could function as an appropriate source of facts, message and interaction during catastrophes. Audio-photo-video-sharing including most electronic devices and applications could expedite reciprocal correspondence and message interchange amongst and between persons, viewers, peoples and establishments during distress. Social media, defined as anything that uses the Internet like Facebook, Instagram, Skype, Twitter and many forms of digital forms of communication and these may be used to share developing knowledge about new disaster strategies to prompt quicker response and interventions. Social network groupings such as Facebook and Whatsapp groups create active and efficient platforms to share data and link specialists and experts from different states, backgrounds, schools of thought and exposure across the world.

Social media may also refer to using SMS and Text message or MixIt or ShareIt to communicate warnings. SMS messaging is generally utilised by persons engulfed by tragedies for sharing knowledge on occurrences; categorising aid, machinery and capitals; pursuit of mechanical, material and monetary aid; holding supporting institutions accountable for their response or non-response and inspiring open discussion regarding incidents and possible solutions and interventions. This motivates persons whose views or inputs are not considered, and open the voice of the voiceless. Usage of social media is an added unplanned self-support measure illustrating catastrophe and its impact, since it empowers the sharing of information to local communities and their response before getting aid from outside. Social

media can also be accessed through computers and smartphones, and this usually provides for backup when other communication systems fail or are non-operational during a catastrophe. This was evident in the Haiti earthquake, where health practitioners were relying on social media to identify areas of interventions and swift responses required to assist displaced communities and households.

2.6 CONCLUSION

This chapter emphasised the importance of public administration and the role of government in disaster management, disaster risk management and disaster risk reduction including how the inter-relationship for addressing service delivery challenges has evolved in recent years. The relevant theoretical and conceptual frameworks were incorporated into the discussion to help explain further the studied phenomenon and the policies, frameworks and regulations that govern its implementation. Vulnerability, exposure and partnerships were discussed to emphasise that DRR is a multi-sectoral function involving many stakeholders such as NGOs, business and the society, as well as the role they play in the provision of emergency assistance, disaster preparedness, and recovery and intervention measures. The causes, patterns and impact of three variables, floods, fires and storms were analysed in detail to highlight the importance of DRR initiatives. One such initiative is the early warning system, as one of the prevention initiatives in DRR, and the role that is played by media, social networks and technology as other strategies in reducing disasters. The threat of catastrophes is common to society. It is a danger to all citizens who become vulnerable. To address these complicated issues necessitates a multidisciplinary strategy and emphasis. Focus should be redirected to catastrophe risk concerns.

CHAPTER THREE

INTERNATIONAL AND LOCAL PRACTICES OF MULTI-SECTORAL AND

MULTI-DISCIPLINARY ACTION IN DISASTERS REDUCTION

3. INTRODUCTION

This chapter focuses on the background to disaster management, global and local strategies and, models used in curbing prevalent local disasters. The chapter explores the structure or organogram of the DMU, skills and capacity of DOC staff and efficiency of the operational centre, including financial capacity of the department and its partners to undertake responsibilities in relation to DRR. Chapter Two discussed in detail the involvement of different sectors and stakeholders in reducing disaster risks, as well as the role of government, NGOs and other sectors this chapter revisits the background of DRR based on its institutionalisation in organisations. The Early Warning System as a strategy was also examined, and explored as a disaster risk reduction initiative in this chapter.

3.1 BACKGROUND AND THE INSTITUTIONALISATION OF DISASTER RISK REDUCTION

As discussed in the previous chapter numerous types of challenges acting solely or as a group could cause catastrophes that are either natural, technical (industrial fires) or human induced in nature. Catastrophes seem to have extreme effects internationally and locally necessitating outside aid, more specifically in poor DRR capacitated countries with weak policies and fragmented communication systems. More wealthy countries are better capacitated to prepare for emergencies through their laws, policies and early warning and data strategies as well as risk transfer and very advanced rapid health care methods. For DRR to be effective there should be a broad implementation of policy, strategy and practice to lessen susceptibility and threat to the whole community. This means that DRR initiatives should also be able to respond to lasting conditions created by disasters. Governments should prepare and plan in advance for disasters. Sufficient disaster funding is a critical factor in this regard, and this money could be acquired through grant funding and loans. For example a state would finance its DRR strategies by means of loans and grants from international financial state organs such as the World Bank and Development Banks. National governments may redistribute funding

to provinces and local governments to support disaster reduction initiatives. The following section explained disaster risk reduction as an integrated disaster management approach covering laws, plans, and officially established and operative measures in an organisation.

3.1.1 Policies and strategies

Policies should cover catastrophe significance, susceptibility, threat and resistance and compel institutions to address those concerns. They must direct the organisation's vision towards addressing the issues in accordance with its development plans, and such policies are much more effective and viable in big corporations and institutions. They set out specific goals and objectives to address the issue over a particular time, Sakijege, Sartohadi, Marfai, Kassenga and Kasala (2014:29) submit that management is usually reluctant to review its organisational strategy and policy unless they are certain that it is crucial, or after realising the influence of existing ones. However in many organisations policy revisions are done regularly to measure their impact in the long-term or for identification of new strategies. There has been a development of a series of international policies like the Hyogo Framework of Action, the Sendai Framework for risk reduction, and SADC disaster risk reduction framework as global policy priorities for states with a major focus on alleviating catastrophe threats. Such policies also play a major role in the implementation of risk reduction initiatives for both the long and short-term response.

3.1.2 Preparation and operative strategies

Many organisations execute geographic and departmental strategies externally. Some do so internally to direct their effort and put strategies in place for approximately five years. The Millennium Development Goals, Sustainable Development Goals, RSA National Development Plan, Provincial Government's Provincial Growth and Development Strategy and the Local Government's Integrated Development Plan are a few important strategies that address the long-term strategic path and roadmap. The strategies must cover the valuation of main threats, susceptibilities, and dangers. Strategies must highlight the applicable threat diminishing initiatives as well as precise conclusions on what threats to address, including the manner in which this would be done.

3.1.3 Human Resource Capability

A five-year Review of the Millennium Declaration in September 2005 acknowledged that government is trailing behind all other Millennium Development Goal pointers, highlighting that capacity development is one of the main problems confronting less developed states and

their extended partners. A capacitated and liable administration, advocated by active non-governmental organisations and an involved private sector, is essential for the maintainable prevention of calamity threats. Devoid of skilled and practical state bodies, not much outside funding can help in reducing threats, including promoting maintainable restoration. This means that government institutions should be well prepared, armed and more skilled with updated training, to ensure effective implementation of DRR policies and strategies. This can be achieved through own and external resources that would assist reducing disaster risk. Efforts are required to extend budgets and employ more people to manage the growing anxieties associated with the frequency of disasters. The assertion here is that for every capable organisation, there must be a well-capacitated individual who would be responsible for the championing and driving of DRR activities. This is not only the responsibility of a single agency but a united effort of skilled people, experts, advocacy groups and society at large, highlights Twigg, (2015(a):6).

3.1.4 Information-sharing and Communication

Ground workers usually are oblivious to how crucial their information and awareness might be to other people. Organisations must promote insightful methods by giving their workers freedom to document, and share their thoughts, ideas, practices and skills with others. People sharing the same objectives, vision, passion and specialised expertise play a crucial role in creating more consciousness of DRR's worth and inspiring inventive methods internal and amongst institutions, explains Le Roux, (2013:68).

> **Specialised teaching and principles**

Specialised teaching and learning are critical parts of skills development in every institution. Continuous or long-term education is required, such as consistent internal teachings, seminars and conferences as the best avenues for capacity building and empowerment, as compared to one-day workshops.

> **External learning resources**

There are a growing number of scientific study hubs internationally focusing on multi-discipline and pragmatic studies, although there is also a growing need for the working together of both logical and pandemic researchers, submits Reitz, (2017:93). Likewise, DRR information, operation and data centres have increased to create robust, resilience and vibrant

societies of action. Automated data and bulletins on disaster risk reduction are easily accessible and cost-free.

3.1.5 Commercial Stability

Howe, (2011:715) asserts that institutions must be able to guard their assets from catastrophes, meaning that they have to ensure commercial stability. Business must have exigency strategies so that they can be able to sustain their operations, tasks and actions during crises, by making sure that their employees and properties are secured, employees are able to come to work and that all their systems including data capturing and sharing are working effectively well, with proper rehabilitation strategies in the case of emergency.

3.1.6 Disaster Risk Insurance (Risk Transfer Partnership)

Risk insurance has been publicised as one of the expansion agenda's 'next best things', endorsed as a way to expedite savings by shifting possibilities, improving post-disaster reaction and incentivizing risk decline. For insurance, to be active and maintainable and for it to function for the most susceptible, the growth and DRR segments are required to engage with it. Micro insurance is intended to guard persons with little earnings. However, the confirmation for its efficiency when it comes to meteorological conditions- and climate-related threats is restricted and not everyone profits from it similarly. It does play a part in handling these hazards but the consistency and value of merchandise. How it fits with other disaster reaction techniques and the duties of those participating in such creativities must be clarified. The state should try to create a programme or contemplate encouraging all to guarantee public possessions (such as public structures and channels) and a critical sub-structure (such as power plants), as well as the tradition of insurance and aid to grow private catastrophe risk insurance markets.

3.2 IMPLEMENTATION OF 'BEST' PRACTICES

In recent history according to the 2015/2016 financial year, the South Africa National Disaster Management Centre reported variable degree, scale and impact of disasters in various provinces within the republic, such provinces as KwaZulu-Natal, Eastern Cape, North West, Limpopo, Northern Cape and Western Cape. According to the NDMC, these catastrophic occurrences have timeously validated the nation's continuous susceptibility to hazards. Government has invested more than R264 million in providing crisis relief to afflicted zones. An additional funding of more than R1 billion from National Treasury was

distributed to affected municipalities to assist them in restoration and recovery after calamity. These funds are made available through special grants called provincial disaster grant (PDG) and municipal disaster grant (MDG) within a medium-term expenditure framework budget process or an adjustment budget. Considering these figures and other disaster-related costs, it compels one to move towards sustainable measures to integrate DRR strategies and initiatives within the strategic plans of government in all spheres.

These occurrences also emphasise the major role played by sectoral department in disaster reduction. During this phase, several sectors sustained major destruction of substructure, which means that for the successful management of disaster, sector departments have a crucial role to play and must be actively involved to guarantee that their departmental programmes, systems and plans are contributing to catastrophe perils reduction. For example, each state organ should be able to finance the application of disaster management initiatives as outlined in their strategic plan. The following is a summary of sector department involvement in disaster risk reduction activities ensuring an important multi-sectoral approach to disaster risk management:

As Adapted from the NDMC annual report (2015/2016) the following key sector department aspects has relevance:

➢ Department of Cooperative Governance and Traditional Affairs (COGTA) is liable for risk valuation at national and provincial government levels through the National and Provincial Disaster Management Centres and is also compelled for the declaration of a disaster;
➢ Department of Agriculture, Rural Development and Land Reform gives assistance during droughts, deluges, overflows, fires, as well as epidemics and severe climatic environments like cyclones;
➢ Department of Water Affairs and Forestry (DWAF) is accountable for managing state water resource, in addition to irrigation of agricultural farmland, urban water stream, and the supervision of raindrops patterns, dams, lakes and reserve levels;
➢ Department of Health utilises health pointers (such as levels of malnutrition and disease) to evaluate health-related disasters in societies, such as cholera, malaria and HIV/Aids;

- Department of Minerals and Energy (DME) conducts risk assessment in relation to radioactive materials, pollution and hazardous waste, as well as mining safety. It also supervises the atomic energy plant at Koeberg in the Western Cape;

- Department of Environmental Affairs and Tourism (DEAT) deals with pollution, hazardous waste and radioactive materials;

- Department of Social Development (DSD)' role is to decrease starvation by developing poverty relief initiatives and, in so doing, add to risk assessment that would reduce susceptibility of people to catastrophes;

- Department of Human settlement measures threats related to squatter camps, compliance to grading, delivery of substructure, and other features of development (e.g. housing densities, soil stability, slope angles and Hood lines);

- South African Weather Service provides climatological information and early warning systems for dryness, major meteorological situations conditions, deluges, hurricanes, storms and other climate related information; and

- South African Bureau of Standards aims to develop standards of risk assessment for application at local government level.

Following the preceding discussion it makes sure that all these state departments, including municipal departments should uphold risk valuation within its jurisdictional area. Preferably, information distribution must be horizontal and vertical through every sphere of government where all hazard-prone areas are measured through 'hazard-mapping' methods.

3.2.1 Role of Indigenous Knowledge in averting a disaster

The Citizens living in areas prone to hazards develop approaches to protect themselves and their livings. A study by Hilhorst, Baart, van der Haar and Leeflink (2015:518) highlight that these initiatives are relating to citizen' own expertise, experience and resource, including their exposure and understanding of their surroundings and their practice in past disaster occurrences. The information, exposure, gifts and technological expertise that they have are known as indigenous, ethnic or customary information. Use of this traditional information in the event of a disaster or other hazard is broadly known as an indigenous surviving approach or surviving system especially when implemented in dire situations. This knowledge is derived from the relations of a society and its surroundings wherein they habit. According to Muyambo, Bahta and Jordan, (2017:420), traditional practices are gained from life experience, staying in a particular place for a long time and are transferred from generation to

generations in view of modern or fresh knowledge or experimentations including responding to outside adjustment. Studying people's perception and their reaction to hazards could generate practical interventions building on the power of their present approaches. It is crucial for response and aid staff to consider the magnitude of such ethnical or original expertise, talents and systems and to provide them with full backing.

A study by Kelman, Mercer and Gaillard, (2012:15) on indigenous knowledge and DRR concluded that due to colonisation and poor record keeping, indigenous knowledge has been neglected in the formulation of adaptation strategies for DRR. Failure to understand how Africans have been able to survive and adapt for decades before colonialism is one of the reasons for ignoring indigenous knowledge as one of the DRR strategies. The notion that indigenous and ethnic expertise, methods and technology are naturally inferior to modern transformational systems is unfounded. The idea that traditional methods are much better than contemporary methods should be dismissed, rather implement what is applicable or relevant in that particular situation or a combination of both methods and approaches where suitable may be pursued, if not possible, find a way to integrate them. Hilhorst, Baart, van der Haar and Leeftink, (2015:506) in the literature on the importance of indigenous knowledge highlighted significant points on the part played by indigenous knowledge in empowering local communities on DRR measures. For example, when Asian countries were struck by the Tsunami around 2004, and local communities were able to survive based on their indigenous expertise of their location while visitors who lacked such knowledge died. This then confirms that the inclusion of indigenous knowledge in DRR practices and strategies is critical to the understanding and survival of disasters.

3.2.2 Communication Strategies

Communication is a very crucial instrument in disaster management. The aim is to communicate accurate, understandable and full information as immediate as possible. Abarquez and Murshed, 2004 cited in Skinner & Rampersad, (2014:137) explain communication as a lively practice with a dual objective, which could foster education, progressive adjustment and empowerment. For example, in the event of a storm, cyclone, flood or any form of disaster, there should be effective communication and rapid flow of information. It involves ciphering, deciphering and analysis and a way of sharing intentions, perspectives, data, facts and beliefs should be a forecast of meteorological conditions. In KwaZulu-Natal, the KZN Weather Services, local and community radio stations, newspapers,

departments and municipal notifications and announcements serve as very strategic tools of communication, that of 'informer to a receiver.'

Studies on the role of communication, communication strategies and community preparedness during in-crisis situation indicate that persons are unwilling to act towards lessening their disaster threats lest they are certain which precise activities to take and whether those methods will be successful and they are assertive in their capacity to sustain them. Nonetheless, it is noted that communities react to disaster risk approaches done by experts due to the fact that they can rely on the knowledge provided and the experts supplying it, Mathbor, (2017:357). Confidence is extremely significant. Community mistrust of legislators and administrators can weaken or threaten communication approaches; if misplaced, confidence is hard to establish. Each disaster risk reduction activity must significantly embrace as part of the strategies, communication and alertness as a dominant continuous component, suggests Skinner and Rampersad, (2014:135).

3.2.3 Science and Technology Practice

There has been growing progress in technical acknowledgement of ordinary perils and techniques to supervise them. This has seriously improved specialists' capability to predict the locality, scheduling and brutality of actions. Twigg, (2015(a):108) argues that all projections and cautioning methods depend on technical information of a particular type. However specialists' ability to foretell differs with the threat considered. For instance, in the event of geographical risks (tremors, volcanos, avalanches, tidal wave), it is likely to recognize where these perils occur, but could be hard to specify when. Climatologists have since enhanced expertise on short-term forecasting of tropical storms, projecting their time and direction, and their periodic prediction is becoming more dependable and reliable due to research, UNISDR, (2016).

Shamano, (2010:47) stated that a variety of tools could be suitable for specific perils, areas and prerequisites. Satellite imagery, GIS maps, high-tech systems for reception and spreading information, programmed devices and further observing strategies and wireless and television transmissions are among the most suitable tools at both provincial and state stages. At societal level, there may be hands-on recording of threats and susceptible families, physical stream level, rain measures, symbols directing emigration ways and the utilisation of loudspeakers to caution people. In most instances, exposed societies would themselves

supervise imminent hazards; people staying near floodplain streams usually deploy persons to watch rising river levels during persistent rains, Tang and Zou, (2009:11).

3.2.4 Relocation and disaster accommodation as a response strategy

In most instances, relocation or emigration is the main reaction to cautions. Authorized relocation actions must be built around persons' situational abilities and prospects to relocate (poor consideration to this was amongst the contributing causes of Storm Katrina catastrophe in New Orleans, 2005, explain Srinivas and Nakagawa, (2008:10). Specific care must be directed to assisting exposed persons evade: the aged, physically challenged and expecting females, mothers with little kids could be unable to relocate swiftly and simple, and might require help. Wilson, (2012:23) argues that relocations are usually voluntarily, in reaction to forewarnings and guidance from the officials. In some cases it might be obligatory or extorted relocation of occupants likely viewed as the last option, which could rescue many in local communities. The need exists to form evacuation and disaster communal accommodation so that when disaster occurs people are aware of the safest paths to take. Each accommodation should be intended for particular threats, because a specific area or way could offer protection for a certain kind of risk but fail in another. Most people lose their lives in catastrophes because they take too long to vacate until it is impossible to flee their unsafe homes that they considered to be safe, Kihila, (2017:312). Rescue avenues could be pathways, streets and open grounds whilst crisis actions could involve pick-up places like civic structures where persons can convene then transited to designated communal accommodation. Disaster shelters may be community halls, house of worships and temporal accommodation built solely for that purpose.

3.3 INTERNATIONAL PRACTICES IN DISASTER RISK MANAGEMENT

Haddow, Bullock and Coppola, (2006:221) assert that a catastrophe may need the participation of the international society of respondents when a country's ability to react has been deterred. Several international accords highlight the necessity and the relations of ecological management and disaster risk reduction and recognize duties to minimise disaster threats. The international disaster risk management practices are examined and DRM contextualisation is based on institutions such as the United Nations.

3.3.1 United Nations International Strategy for Disaster Reduction

The UNISDR objective is connected to the four prerogatives for action as outlined in the Sendai Framework. UNISDR manages intercontinental struggles in DRR and direct, track and provides regular feedback on advancement of the application of the Sendai Framework. It updates and joins persons through a provision of applied systems and devices such as the website known as the PreventionWeb, terms, issuances on best actions, nation profile and the Global Assessment Report on DRR which is an influential periodic study of international catastrophe threats and tendencies. One of its fundamental responsibilities is championing **The Making Cities Resilient: 'My City is getting ready!'** campaign which is aimed at addressing concerns of local authority and city threat through a current participation of more than 2600 municipalities over a Ten-point essentials schedule for making cities disaster resilient (attached as Appendix J) serving as a model for municipal programmes.

3.3.2 International Strategy for Disaster Reduction

The United Nations approved its ISDR in 2001 in order to endorse the importance of disaster reduction and hazard minimisation as segment of its crucial responsibility. The ISDR has been playing a crucial part in the promotion of peril responsiveness, preparation and investigation in all sectors of the society. This initiative strives to allow universal pliability to the impacts of environmental risks in order to lessen physical, financial and social damages, by means of escalating community consciousness and acquiring assurance from government. It could also be through encouraging multi-disciplinary and multi-sectoral partnerships and extending risk reduction network in every stage. Lastly, it could be through strengthening scientific research on the roots of natural hazards and the impacts of natural disasters associated technical and ecological tragedies on people Cronin, (2008:10).

Haddow and Bullock, (2006:224) corroborate that the above-mentioned approaches are implemented from the UN state headquarters and administrations targeting the most susceptible societies. Moderation and readiness plans are carried out at every part of the community through open alertness crusades, advocacy, guaranteed support from state administration, multi-sectoral collaboration and correspondence and practical information transmission.

3.3.3 Sendai Framework for Disaster Risk Reduction 2015-2030

Sendai acknowledges the key responsibility of government in lessening catastrophe threats and that there must be joint attempts amidst municipalities, businesses, corporate and other segments. The Sendai Framework for DRR makes particular reference to the duty of foot-soldiers and volunteer groups in its values and preferences, as lively players, and pillars that can well recognize society in jeopardy and improve its state through concerted means. The framework indicates that to accomplish the segregating component that would be allowing for lively involvement of charitable organisations in DRR approaches and policies, it is essential in ensuring that they have sufficient training, which is applicable at the national, provincial and international levels.

3.4 IMPLEMENTATION OF HAZARD EARLY WARNING SYSTEMS

Figure 3.1: Bangladesh Cyclone Preparedness Example

<div style="border:1px solid black; padding:10px;">

Bangladesh Cyclone Preparedness Programme

Over one million people from low lying coastal places were evacuated to safe places by emergency foot soldiers together with their municipal authorities before the struck of a forecasted storm. Atleast 2500 families received money grants of 5,000 taka (about $67) to aid them in preparedness of or react to the cyclone. The Bangladesh weather services issued a warning that coastline places would be attacked by a 3.6m heavy storm/cyclone. Red Crescent groups cascaded these warnings in societies through loudhailers and also assisted households to secured places in storm shelters. Cyclone Preparedness Program Volunteers mobilised were exceeding 50000, coupled with American Red Cross's investment by means of repairing telecommunication system, supporting training of HF/VHF operators and providing material essential for pre-warning such as signal flags, sirens, megaphones, batteries, flashlights, t-shirts, boots, hardhats, raincoats, umbrellas and life jackets. This funding is from Red Cross Red Crescent's 'Forecast-based financing' mechanism, an innovation supported by German Red Cross and Government created to assist households in meeting their basic needs when disaster attacks.

</div>

Source: Rogers and Tsirkunov, (2011:20) American Red Cross

3.4.1 What makes an effective Early Warning System?

Early Warning Systems (EWS) are known as a crucial life preservation mechanism for torrents, droughts, hurricanes, forest blazes, and other risks. This is qualified by improved supervision, controlling and prediction of atmospheric, hydrological or oceanographic risks and additional efficient crisis readiness. The purpose of EWS is to allow persons and societies endangered by perils to function efficiently and adequately to alleviate probability of life loss, harm, and destruction to possession and surrounding. Practice has proven that for EWS to be functional the following four elements are crucial. These elements are significant to detect, monitor and forecast all risks; scrutinizes hazards concerned. The third aspect is the broadcasting of well-timed cautions – that must have state mandate and power. Finally as the fourth aspect involve triggering crisis strategy for readiness and reaction.

The above-mentioned elements necessitate coordination through various institutions nationwide down to community level for the EWS to be successful. If one element fails to function or there is poor management the entire system would fail. Issuing cautions is a duty of the state. There must be a clarification and reflection of duties and functions of several civic and business contributors in the state regulative structure, designing, financial, management and operative tools for the application of early warning systems.

3.4.2 Good Practices of Early Warning Systems

According to the World Meteorological Organisation (WMO) best practices were recognised in seven EWS for weather-related and hydrology risks for bigger metropolitan cities. These included the Bangladesh Cyclone Preparedness Programme; the Cuba Tropical Cyclone EWS; the French Vigilance System; the Warning Management of the Deutscher Wetterdienst; the Multi-hazard EWS of the US National Weather Service; the Multi-hazard EWS in Japan and the Shanghai Multi-Hazard Emergency Preparedness Programme, as examples of best application for bigger metropolitan cities.

Through a past of frequent catastrophes, many lesser revenue republics like Bangladesh and Cuba have progressed in eliminating death hazards by creating successful EWS for torrid storms, hurricane tide and deluging. In Cuba, protecting lives has been made a top state primary concern, by financing considerably the creation of the Cuban Tropical Cyclone Early Warning System. In Bangladesh, ensuing fiery storms, hurricane tides in 1970 and 1991, which resulted in approximately 300000 and 140000 fatalities respectively, the state worked in collaboration with the Red Crescent Societies of Bangladesh (as illustrated above in Figure

3.1). They applied a Storm Readiness Project and efficiency was validated by decreased mortality rate of lower than 3500 in the November 2007 hurricane Sidr. In France, succeeding the shattering December 1999 hurricane Lothar, the national "Vigilance" warning system was established as a segment of reviewed crisis preparation and reaction systems. This system was then advanced to contain hotness/well-being cautions, post a penetrating hot weather season in 2003 that resulted in above 15000 mortalities, and to contain stream overflowing hazard forewarnings after a hefty deluge in 2007 as outlined in the WMO, 2015.

To take advantage of these state achievements and enable exchange of practices, a universal approach harmonized by World Meteorological Organisation recorded 'good practices' from EWS in the mentioned cities and to establish rules on the essential official and organizational provisions. These lessons have been compiled and printed to a paperback known as 'Institutional Partnerships in Multi-Hazard Early Warning Systems' (MHEWS) and would be utilised in teaching top management officers from hydro meteorological and Disaster Risk Management (DRM) institutions. It also includes consolidating abilities of National Multi-hazard Systems to back DRM and MHEWS by organised DRR and adjustment republic/continental capability expansion ventures, that is according to Rogers and Tsirkunov, (2011:201).

A comprehensive combination of the seven good practices generated ten propositions shared by everyone, regardless of any political, socio-economic, and official background in every state. The ten assumptions are discussed below as follows:

➢ There is a solid **political acknowledgement** of the results of EWS mirrored in coordinated government disaster risk management rules, laws, preparation, regulation and costing.

➢ Operative EWS are constructed upon **four common effective elements** mentioned above: (a) detect, monitor and forecast risks; (b) scrutinising hazards and integration of peril data in disaster preparation and forewarnings; (c) publicising well-timed and 'influential' cautions; and (d) public design and readiness with the capacity to trigger crisis strategies to prepare and react, synchronised through organisations at all state ranks.

➢ **Role definition** – the duties and tasks and management systems of EWS partners are well clarified and recorded in government strategies, regulation, orders, partnerships

and agreements involving also practical, technological institutions like the National Meteorological and Hydrological Services.

➢ **Human and Capital provision** – the capacity of EWS is backed by sufficient manpower, monetary and tools provision in all government ranks and the mechanism is intended for lasting viability.

➢ **Assessing risks** – risk, disclosure and susceptibility knowledge are utilised to effect hazard valuation in various stages, as crucial contribution in crisis preparation and establishment of caution notices.

➢ **Suitable Cautions –** caution notices are: (a) direct, reliable and contains hazard data; (b) created in line with hazard stage to crisis readiness and reaction activities, (for example, the use of pigment and banners, in (Figure 3.2) acknowledged by those in power and the people and (c) delivered from a solo or (joint), documented and powerful point

Figure 3.2: Symbols used for cautions
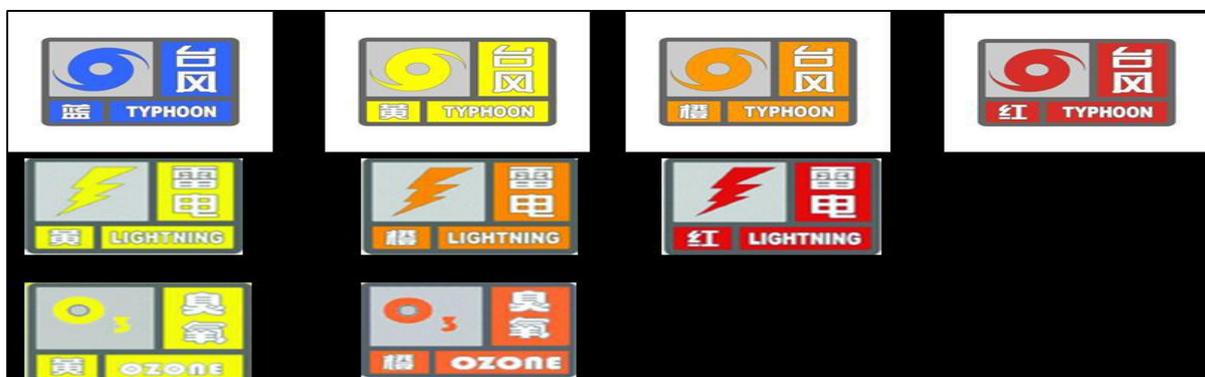
Source: Shanghai model Tang and Zou, (2009:201)

➢ **Well-timed broadcasting –** forewarning broadcasting systems could get the executive, EWS partners and people in danger in a timeously and dependable manner.

➢ **Incorporation into reaction scheduling –** crisis reaction strategies are established with an analysis of peril stages, features of vulnerable societies and different contributors and role-players.

> **Assimilation in pertinent informative projects** – peril and crisis teachings incorporated into different official and unofficial teaching schedule with systematic trainings and examinations to guarantee effective preparedness; and

> **Response -** quick response and expansion systems are set at every EWS phase to give regular assessment as well as ensuring systems upgrade periodically.

Adapted from World Meteorological Organisation, 2015

Experience from these best actions could be customised by nations in need of a multiple threat peril control. Precise plans and application of approaches would differ in relation to their background, ethos, belief, social, financial, organisational composition, and ability and provided resources for viability of the method.

3.5 RISK REDUCTION POST-DISASTER

Aid, restoration and rescue approaches must add to strategic growth and decrease of susceptibility, they must not restructure current threat but improve conditions. This may be simplified through the following summary of basic values listed in the Hyogo Framework for Action discussed in Olowu, (2010:303).

> Early interventions in disaster cycle to lessen susceptibility;
> incorporate development values into relief operations (e.g. build up local capacities, adopt participatory approaches);
> Relief interventions should not only address instant requirements but also the restoration and reconstruction of lives and livings;
> Using catastrophe aid for the development of substructure that is valuable post-crisis; and
> Taking the chance to persuade optimistic social and economic transformation, not just a return to the *status quo*.

Restoration initiatives must therefore focus on restoring and improving adversity targets' human, social, economic and ecological settings. Salvaging strives to guarantee that charitable efforts add to long-lasting independency and resistant, constructing on charitable life-sparing support by aiding public activities and setting basics for rehabilitation and expansion, Twigg, (2015:329).

3.6 CHALLENGES TO DISASTER RISK MANAGEMENT AT LOCAL GOVERNMENT LEVEL

A study of disaster risk management status assessment at municipalities in South Africa compiled by the African Centre for disaster studies at North West University in 2011, conducted on behalf of SALGA concluded that the following challenges continue to exist in the local government sector, as highlighted in Botha, Van Niekerk, Wentik, Tshana, Maartens, Forbes, Annadale, Coetzee and Raju, (2011:97):

➢ **Financial constraints**

Poor sufficient costing and finance is highlighted as a principal challenge. With inadequate capital, funding the requirements of skillful, experienced and proficient personnel, capacity workshops, assets, properties, volunteers, risk mitigation programmes, sufficient disaster assistance materials, after-crisis restoration and reintegration actions essential for making sure that disaster risk management is executed to heights suggested in government laws. An additional main challenge is insufficient funding after a catastrophe. There is a common understanding that the state is slacking to financially support disaster-stricken municipalities therefore ruining their capacity to timeously and adequately aid catastrophe sufferers.

➢ **Material shortage**

For local government to be quick in crisis response, suitable and satisfactorily tools are required. Studies indicate that cars, rapid crisis reaction material, restoration material, technical tools and managerial tools were acknowledged as critical in implementation of regular catastrophe administrative duties.

➢ **Shortage of qualified and skillful staffs**

Local government is struggling with incompetent personnel that are unqualified and less skilled to execute catastrophe threat administrative functions.

➢ **Lack of political will by officials and politicians**

Some politicians and officials are unwilling and not committed to perform and support disaster risk management initiatives.

3.7 DISASTER RISK MANAGEMENT-REDUCTION AT ETHEKWINI MUNICIPALITY

Figure 3.3: Newspaper Article online

Permission is restricted to Durban Beaches due to extreme weather conditions

Permission is restricted owing to overflowing oceans and far-reaching property destruction subsequent to hefty showers that have occurred. Clearing-up actions began yesterday. Mr Thembinkosi Ngcobo, the Parks and Recreation's Head of Department in The Municipality reports that there is a large volume of wreckage and debris and other biological substance inside the sea currently. This is from the Umgababa to Dakota beach in the city. South and North beaches in Durban city centre pass Umhlanga to Umdloti beaches are closed except for the Ushaka Marine that is open for public use. Mr Ngcobo declares that the conditions will take some time to improve. However, for those who use the beach frequently they will be informed over the week when permission to access beaches is granted. The head of Disaster Management Department in the City reports that crews from his unit are closely observing water altitudes in canals and creeks since the damage is so severe that beaches had to close. Many houses especially the KwaMashu area are either affected or at risk of flooding through water intensities. This propelled some people to be housed in local community halls. The storm damage caused a considerable damage to city roads: Blamet, Blamey and South Coast Roads which makes it problematic for drivers to use these roads. The Provincial Rapid Rescue Health Service speaker, Mr Robert McKenzie reported that disaster services were very vigilant and crews have been deployed across the province to relocate persons from sea-level and floodplain places to safe accommodation.

Wednesday 27 July 2016 09:00

Source: Dladla, (2016) adapted from Daily newsletter online

3.7.1 Background

eThekwini Municipality is situated on the eastern district of South Africa in the Province of KwaZulu-Natal (KZN). The Municipal area is about 2297m^2 constituted of 4 million persons as indicated in Statistics South Africa (2018). The Municipality is constituted of 110 wards that include rural, semi-rural and urban settings from Tongaat in the north, then Fredville and Cato Ridge in the west to Umkomaas in the south and with Durban central showing in the ward-based index map in Figure 3.4 below, discussed in the eThekwini Municipality IDP,(2016/17:65). Consisting of a diverse community, the Municipality is faced with different societal, financial, ecological and administration issues. With the Municipality being a coastline, it has a huge industrial hub and is at risk and susceptible to a variety of technical, natural, manufactured and conservational catastrophes as is illustrated in the above article on Figure 3.3. Skinner and Rampersad, (2014:137) argues that these catastrophes threaten the strategic expansion intentions of the Municipality. It is necessary that catastrophe administration goals are considered throughout the preparation procedures, therefore resulting in the application of disaster risk management actions aimed at decreasing the impacts of catastrophes. In this respect societies are taught and skilled on the significance of catastrophe administration and official disaster /crisis fatalities are as well-stretched out to citizens.

Figure 3.4: Ward-based Index Map
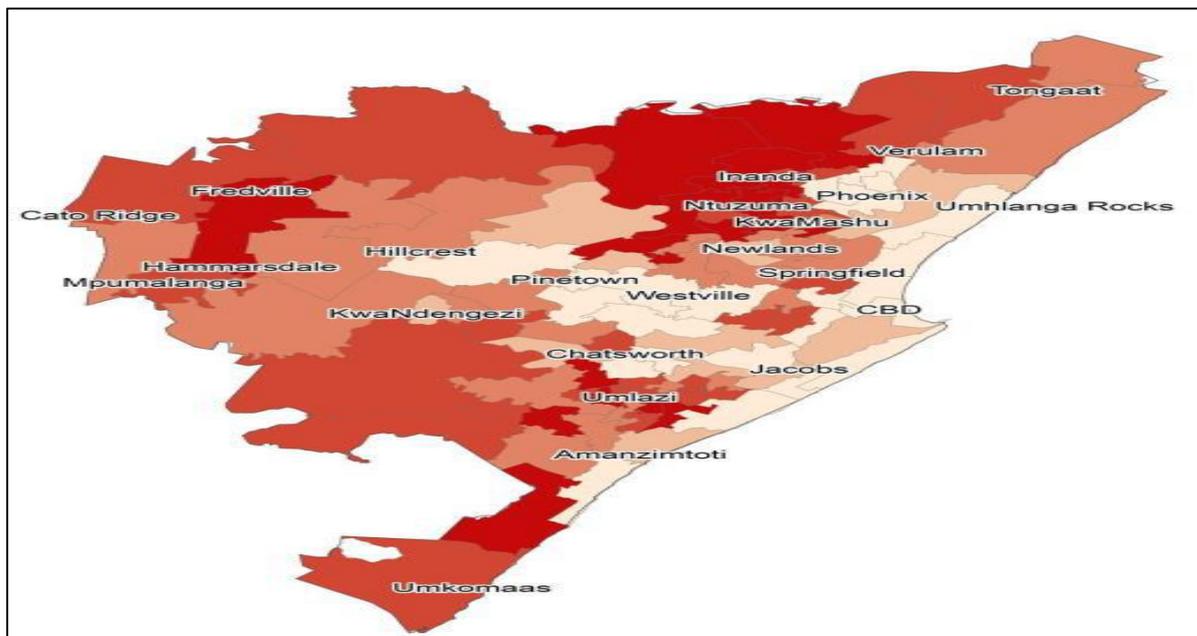
Source: eThekwini IDP 2016/2017

3.7.2 History of Hazards

As mentioned earlier eThekwini Municipality's exposure to hazards dates back from as early as 1856 when the first Durban flood was documented. The city was engulfed by devastation and all commercial activities were halted. Compared to current setting preparing for disasters it was found to be a daunting task because there were limited or no strategies to address disasters when they occur whereas currently there are weather submissions, 14 day predicting, civic notifications and other catastrophe administration initiatives that are applied before and after tragedy.

According to the interviewees, there are three other noted past disaster incidents that took place within the Municipality: the storms of 2010/11in KwaZulu-Natal which resulted in loss of property, fatalities and damage of electricity networks, eThekwini Municipal Area (EMA) was declared by National Minister as a disaster area; the flooding that took place and causes damage by the beachfront in Figure 3.3 above; and lastly the fire that took place in one of the Transnet storages in Bayhead. Though these may differ in nature, they necessitated strong interventions.

In the case of the storms of 2010/11, a political decision (coupled with disaster funding from the National government) was taken by the Municipality through an adjustment budget to rehabilitate and restore every house and infrastructure affected during storm Katarina. In the case of weakly built houses or shacks, the decision was to build flood and storm resistance strong houses in order to reduce the people's exposure to vulnerability so that they are able to cope with future extreme events. During that phase the affected people were accommodated in community halls, churches and also relocated to safer locations away from the flood-prone areas. This action lessened the number of fatalities from 16 in 2010/11 to 3 in 2015/16 financial year. It is evident that there was a coordinated response to disaster recovery. National, provincial, and local governments and other agencies collaborated. While the disaster management of the municipality provided immediate and emergency services and relief to victims, the human settlement department relocated affected victims to safety and temporal accommodation and with a standing council decision to rehabilitate and restore destructed houses and damaged infrastructure, all municipal departments played a major role in restoration. Irrespective of the coordinated efforts implementation took long time. Infrastructure repairs were done during the 2011/12 financial year, and homes were rebuilt and repaired in the 2013/14 financial year following the storms and floods that took place

during the same year. The indication is that the Municipality was not prepared for the 2010/11 floods and storm Katarina as there was no prior notification given on the impending disaster and its huge effects that was also highlighted in Chapter 2.5.1. The lesson learnt from this catastrophe is that an improvement in communication systems, early warning systems and interdepartmental coordination can play a major role in disaster preparedness, response, recovery and rehabilitation. The improvements are clearly noted in the events leading to the rising of the sea levels casing flooding of the beachfront and other beach damages. A prior notice of approaching storms and possible flooding was given in advance and people were warned to stay away from the beaches. Response, recovery and restoration were done in a short space of time though the Municipality should consider further precautions for long-term measures such as building barrier walls to prevent future destructions thus reducing disaster risk.

The occurrence of a chemical fire at the Durban Bayhead Warehouse on the 24th of March 2017 and a petrol fire at the Engine refinery on the 19th of November 2009 when a storage tank was struck by lightning. Both the warehouse and refinery are within close proximity of residential suburbs of Merebank, Wentworth, Austerville and Bluff areas. Many communities were affected and they did not know what to do to be protected against chemical fires as a major threat and hazard to their lives and well-being, Dludla, (2016:41). Though there were no injuries reported from local communities, evacuation of people took too long and such occurrences could be avoided through education, training, public awareness and more specifically proper risk assessment and reduction. This included planning regulations which could be utilised in preventing the usage of perilous places (like flood-prone or uneven hills) for human settlement or viable economic expansion and to place dangerous manufacturing base and actions far from residential areas. It is also crucial to have clear access and exit ways in the case of a hazard and evacuation notices should be issued either before disaster occurs or immediately after it has occurred with clear directions to safety and other risks involved should evacuation instructions are not followed. Below is a sample of a notice to vacate during a hazard or to return home after interventions have been completed.

Figure 3.5: Notice of evacuation Sample

NOTIFICATION OF EVACUATION

The Emergency Operation Centre/Disaster Operations Centre has just dispense warning of a unsafe materials occurrence in the _____area. The affected area encompasses _____ (road names) _____ [metres / kilometres] from the _____facility. Residents in the affected area are instructed to evacuate immediately. If you have your own means of transport then proceed to the designated reception shelters at_____. Keep unnecessary cars off the road. Additional information will be provided at the reception shelter /s. Kindly evacuate instantly. Should you not have access to transport then make your way to the Public Assembly Area located at_____where the authorities will assist with transportation to a Reception Shelter. Should you require assistance then you must phone 031-361 0000.

Transportation arrangements will be communicated over this radio station immediately after each emergency update notification.

ALL CLEAR

The Emergency Operations Centre / Disaster Operations Centre have announced that the hazardous materials incident at the_____facility has been handled.. All occupants and tenants who have exited could go back to their family units. If you have been taking refuge in your house, you can now open doors and windows and let in fresh air.

Adapted from the eThekwini IDP 2015/16 Disaster Management Unit – operations

A lesson may be learnt from the international experience of the Bangladesh cyclone preparedness programme to include as part of the department initiatives, early warning strategy. Strategies like the use of megaphone, sirens and loudhailers to inform and direct the people either before or/ and during a disaster in order to minimise its impact. Lessons may also be learnt by investing more in a multi-hazard early warning system as an initiative of disaster risk reduction instead of directing more finance to response and recovery.

3.8 DISASTER MANAGEMENT UNIT AS PART OF THE CASE STUDY

The Disaster Management department of the eThekwini Municipality was formed in line with the Disaster Management Act, the National Disaster Management Framework and the Municipal Systems Act, which requires local government to establish disaster management centres within their jurisdiction. As per the provisions of section 25 and 26 of the Municipal Systems Act 32 of 2000, (MSA), the Act regulates that relevant catastrophe strategy should be an essential element of the Integrated Development Plan (IDP). The Municipality's IDP programme 4.3 and 4.4: Safety from catastrophes and the reduction of disaster risk underneath plan four which aims to foster a "socially equitable environment" specifies the Municipal's plan to promoting a "safe, healthy and secure environment' with reduced disaster impact, IDP annual review, (2016:276). In compliance with these regulations the DMA and MSA, the established Disaster Management unit has a complete personnel complement of 9 employees with 84 unfunded posts in the official staff hierarchy. The committed Catastrophe Administration personnel structure is as indicated below:

eThekwini Disaster Management Staff Compliment

1x Head of Centre	Accountable for the effective functioning of the Centre
1x Acting Deputy Head	Responsible for peril management and crisis plan
1x Disaster Manager	Responsible for DM operations and execution
3x Disaster Senior Coordinators	1. Operations and Event Management 2. Training and Capacity building 3. Operations and Emergency planning
2 x Disaster Coordinators	1. Operations and Emergency planning 2. Operations and Capacity building
1x Secretary	Administration

Source: Author's perspective

These personnel operate from a Municipal Disaster Management Centre [MDMC] that is situated in Durban and a satellite centre situated at the Pinetown Fire Station in St. John's Avenue.

3.8.1 Skills and Capacity of Disaster Operation Centre Staff

The Municipality has a decent work correlation with in-house and outside units in relation to performing catastrophe control duties. These are well-trained and skilled individuals in the field of disaster management. The unit also consists of 300 disaster volunteers sourced from different wards in the Municipality that support the disaster operation centre. These recruits are taught numerous skills, like First Aid, Emergency assistance, simple catastrophe management, fire protection, public speaking, house call care and counselling (eThekwini IDP and disaster management plan).

3.8.2 Efficiency of Municipal Disaster Management Centres

The Disaster Management Centre intends to avert or lessen the threat of catastrophes, alleviate the sternness of tragedies, strategize and plan for emergent calamity, new happenings or adversities, react speedily and efficiently to catastrophes. The aim is to apply after-catastrophe rescue and restoration by observing, incorporating, and organising catastrophe hazard administrative actions of all main actors. Implementing disaster risk reduction initiatives is a multi-sectoral duty involving staff, line departments, pertinent outside key actors/stakeholders and society involvement. The centre is operational by means of the Emergency Mobilising and Communication Centre (EMACC), CCTV, Technical Services and Disaster Management departments.

The DOC is a completely operational facility, control and management hub that allows different sector involvement in handling a huge occurrence or a tragedy. It has a net set-up which enables links and incorporation of CCTV, notices, event journal, and other methods show on an audiovisual screen. This comprises accessing more than 300 CCTV cameras and 52 broadcasting stations and on call combination of various disaster facilities broadcasting stations working with and automated into the CISCO phones. Added schemes contain a NICE IP vocal sound journal which notes all audio messages, as well as wireless communiqué. The centre is the depository for disaster strategies, in both hard and soft forms.

The Disaster Management Section coordinates and manages huge occurrences and catastrophes which could ensue with the eThekwini Municipal Area (EMA). Previous reaction on disasters confirms that the council is prepared and competence to handle huge catastrophe through the disaster operations centre with the support of the crisis call centre and CCTV functional chamber and the involvement of either in-house or outside units where relevant. Every line department and or unit participating have detailed reaction and/or

restoration duties, tasks and purposes, including the subsequent general conditions: Heads of departments should make sure that catastrophe threat administration actions are combined and upheld in their own units, with particular reference to these below:

➢ Compiling preemptive departmental catastrophe threat controlling plans to sustain disaster risk reduction;

➢ Compiling responsive departmental catastrophe administration strategies to guarantee service continuance throughout crisis/calamity circumstances;

➢ Submission of departmental tragedy managing plans to the Head of Disaster Management and make sure of consistent assessment of those programmes, and

➢ Making available a representative at the Disaster Operations Centre should its provision be motivated.

Financial capacity

Disaster risk management and reduction functions are executed per line department which is liable for its own catastrophe restoration budget. When destruction expenses are above the ability of each line unit to cover from their operational costs, a presentation is made to the Municipal Executive Committee for finance allocation by the city financial officer or for submission to the provincial or national finance officers for finance provision.

3.9 CONCLUSION

In this chapter, it is noted that, to have an effective disaster risk reduction strategy, main official players and participants would have to collaborate and acknowledge their functions and duties. These comprise national, provincial, municipal administrations, applicable state departments and agencies as well as cooperative and participating societies. Government institutions should be well-informed, prepared, armed and more skilled with trained experts to ensure the implementation of DRR policies, strategies from local or domestic and international best practices. This is achieved through the incorporation of DRR plans and actions in the strategic development plans of these institutions, particularly the Integrated Development Plan in municipalities. The strategy as mentioned should contain the hazard identification, crisis readiness, organizational empowerment training, risk mitigation and catastrophe risk financing aspects. It should incorporate disaster planning, hazard mapping, disaster response training and strengthened disaster preparedness planning. Through knowledge and technology transfer, understanding and consideration of indigenous

knowledge, local ownership and community participation of risk reduction is enhanced, which supports long-term disaster risk management capacity building.

The focus of this chapter was on the background and institutionalisation of DRR, local and global trends or best practices for DRR, which included as discussion a multi-hazard early warning strategy, communication and other strategies that address the management of disaster and disaster risk measures. A brief summary of the eThekwini municipality's disaster management department and examples of past experiences within the Municipality also formed the basis of discussion for this chapter. The proposition suggested by the chapter is that there is a need for a multi-sectoral and multidisciplinary approach to disaster reduction and that it would be imperative to learn from both local and international trends.

4. INTRODUCTION

The focus of this chapter is on the research methods and procedures that were employed in the study. The methodology commences with the research design which outlines the strategy used to conduct the research. The chapter locates the research paradigm involved in the study, the collection of data and the methods used to collect and capture it. It discusses semi-structured interviews as the primary source of collecting data whilst newspapers, books, journals, articles, legislation and other studies conducted were used as secondary sources. The various role-players comprise the municipal staff, a Non-Governmental Organisation as a donor agency, and councillors within the Municipality. It narrates the action that was taken and the techniques used to collect and process data from the interviews including reference to the use of thematic and content analysis then concludes with ethical considerations and study limitations.

4.1 RESEARCH AIM AND PROBLEM STATEMENT

Research commences with the identification of a phenomenon or an issue. Sekaran, (1992:4) describes research as a methodical and structured approach to probe a particular phenomenon that requires an intervention. The initial phase would be to identify a situation and explains the aims and objectives of the study that the researcher set out to accomplish. The aim of the study was to evaluate Disaster Risk Reduction measures and systems used in the Municipality and to determine the capacity, skills and resources of the Disaster Management Unit in managing, coordinating and preparing for disasters before they occur. The methodology included the research objectives identified early in the study as part of addressing the research question.

4.2 RESEARCH OBJECTIVES

The following objectives were identified as relevant to the study:

> ➢ Determine the current bureaucratic systems (structure, personnel, resources, capacity, skills and equipment) that would assist the municipality to overcome crisis in times of emergencies;

- ➢ Highlight the major threats and hazards affecting communities within the eThekwini Municipal Area;

- ➢ Critically analyses disaster risk reduction policies and strategies within the Municipality during tragedy;

- ➢ Identify and discuss the role and duties played by various sectors and role-players pre- and post-crisis in relation to their roles and commitment;

- ➢ Determine and discuss the municipality financial commitments and that of external donors in preparedness and responding to crisis and

- ➢ Assess the imbalance in the application of disaster management plans, and make recommendations to the municipality to address the gaps.

4.3 RESEARCH DESIGN

According to Bluhm, Harman, Lee and Mitchell (2011:1867), research questions define the type of research design best suitable in a study, and this can be qualitative, quantitative or a mixed methods research design. Bhattacherjee, (2012:35) defines research design as a "blueprint" for empirical research designed to respond to explicit research problems or trying to address particular theories. Three procedures: come into play here which includes the information gathering method, the tool formation procedure, and the sample procedure. The study methodology adopted was a twofold approach: a study of literature and a qualitative research intervention (as depicted below in Table 4.1) to determine the Municipality's readiness for handling disasters, and whether interventions produce positive feedback from disaster victims.

Table 4.1: Methods of data collection relevant to study

Type	Method	Techniques
Library Research and Online searching	Analysis of historical records Analysis of documents Review of municipal documents and policies	Recording of notes, newspaper cuttings, content analysis
Field Research	Mail interview schedule Personal Interviews	Interactional recording, use of a phone voice recorder.

Source: Author's perspective

The study followed an exploratory qualitative research design to evaluate the performance of the Disaster Management Unit (DMU) through the use of semi-structured individual interviews. The same design was also used to assess the strategies and programs the unit has in place that deals with hazards and their mitigation. It was based on a case study strategy wherein internal policies and reports were reviewed to determine a link between documentation and practice. A qualitative research design permitted the researcher to collect data from respondents in a natural setting. This was done through the participation of the officials, councillors and donor agencies within their work environment.

First, a telephonic call was made to participants, followed by an email requesting the interview and based on confirmation face-to-face interviews were done. Semi-structured questionnaires were sent to some participants at their own requests prior to the interview. The interviews were then recorded by the use of a phone voice recorder with the prior permission of the participants. This close interaction, observation of behaviour and interviewing participants is a distinctive feature of qualitative research. There are many reasons why the researcher chose to conduct a qualitative study. Among these was the freedom it affords a researcher in testing and the collation of data through the identified participants. The need to explore the nature of the research questions in-depth was another advantage of conducting a qualitative study. Data collected was transcribed, analysed and captured for the study. The following discussion is an approach or paradigm that was employed during the research.

4.3.1 Research Approach and paradigm

Creswell, (2015:5) asserts that the research approach includes theoretical suppositions and unique systems or processes. The author states that in preparation for research, investigators should reflect on the ideological viewpoint suppositions which they carry into the study. The methodology that is linked to this viewpoint, and the precise approaches and processes of the study that convert procedures into application are also important points to consider. Figure 4.1 below depicts that interrelation.

Figure 4.1: A Framework for Research—Interconnection of Worldviews, Design, and Research Methods

Philosophical Worldviews	RESEARCH APPROACHES	Designs
		Quantitative (e.g. Experiments)
Postpositivist	Qualitative	Qualitative (e.g. Ethnographies)
Constructivist	Quantitative	Mixed Methods (e.g. Explanatory Sequential
Transformative	Mixed Methods	
Pragmatic		
	Research Methods	
	Questions	
	Data Collection	
	Data Analysis	
	Interpretation	
	Validation	
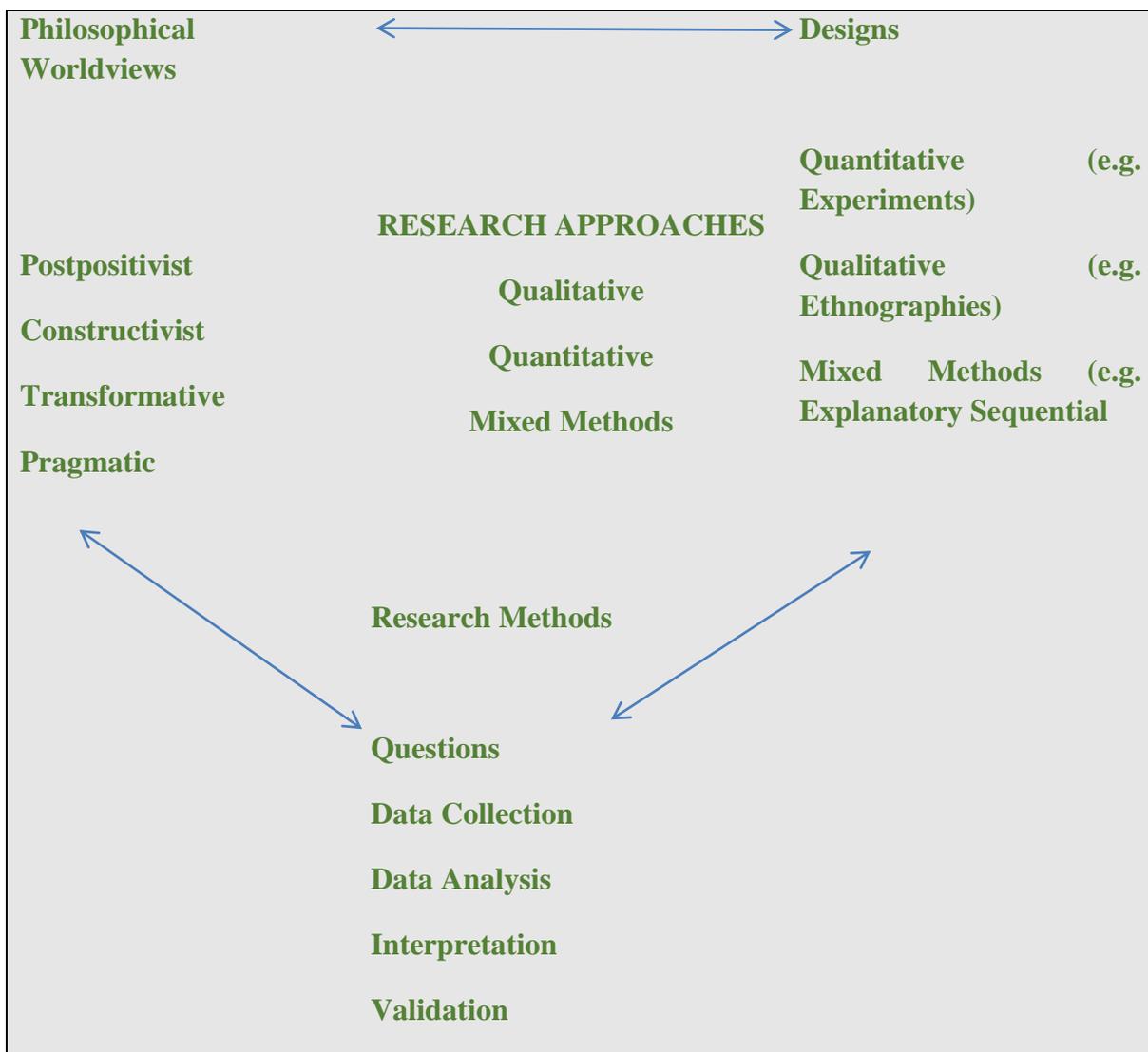
Source: Creswell, (2015:5)

The study sought to explore the extent to which the Municipality is capacitated and prepared to identify warning signs of approaching hazards so that the impact can be minimised or avoided. Creswell (2009:5) proposes that the philosophical worldview influences the process of research and it is crucial to recognise it. Creswell (2014:6) mentions four worldviews, upheld by custom in a study. These worldviews are constructivism, transformative, post-positivism and pragmatism.

Pragmatic approach was employed for this study as it is problem-centered and its worldview rises out of 'actions', conditions and outcomes. This assumption is based on disaster occurrences within the city, the action that is taken by the eThekwini Municipality to address them and the future plans and risks taken by the Municipality in ensuring a huge reduction of disasters. This approach is not committed to any one system of philosophy and reality; instead, it uses a pluralistic approach of qualitative and quantitative aspects to derive knowledge; collecting and analysing data about the studied problem. It allows the researcher the ability and freedom to choose the procedures, systems and processes of research that best meet their requirements and objectives. For this study, the pragmatic approach was used in a qualitative aspect. Pragmatism in this study was based on practical action rather than theoretical concerns. The assumption is that evaluating a notion or concept should be based on how it successfully interprets and envisages a problem than how it precisely explains impartial realism.

Pragmatists view supposition as a device for forecast, intervention and action, rather than that of describing, representing, or mirror realism or truth. They argue that most theoretical subjects like science are often considered through their practicality and achievements. They believe that for an idea to work it needs to be applied or based on general practice and or tested in human experiences as explained by Gutek (2014:76). In this case, to evaluate the strategies, plans, methods or approaches employed by the municipality to reduce disasters is to look at the disaster management department's ability to manage past disasters as well as their pro-active approach in reducing future disasters. Pragmatists believe in a saying that "knowledge itself is power", which is a quotation from Bacon Francis in Reitz, (2017:185) meaning that knowing the cause results in action against it. It is this belief that propels pragmatists to study how previous challenges were tackled and what programmes could be put in place to avoid a repetition of such challenges. In summary using a pragmatic approach assisted the researcher in analysing whether the disaster reduction initiatives written down

either as policy positions or otherwise are put into practice as expected. This was done through the collation of source documents, views from officials, views from councillors and views from external agencies as well as the practicality of those views in the reduction of disasters within the Municipality.

4.3.2 Case Study Method

A case study is a tool of investigation found in numerous studies, especially wherein the researcher is required to evaluate a phenomena, action, practice or persons through a comprehensive and detailed study or inquiry. Cases are based on time and action restrictions, and the inquirer gathers all relevant data by means of various data gathering processes over a continued phase, explains Stake, 1995; Yin, 2009, 2012 in Creswell (2015:14). Case studies are phenomenological research, meaning they are inquiries whereby the researcher gives an account of experiences about an issue as was shared by the individuals themselves. This type of investigation has solid philosophical foundations and normally includes doing interviews Giorgi, 2009; Moustakas, 1994 in Creswell (2015:14).

Case studies are appropriate when researchers investigate genuine lifetime events which they have no control over. However, they do give the investigator a better comprehension of the situation or incident. Since academics have established that doing a case study entails a deeper examination that would assist a researcher to acquire latest and or unknown information of the aspects under review, it is generally expected for the case study to allow opinions from respondents. This study used DMU or Disaster Management and Emergency Control Unit as the main case study that is embedded with various analytical components including disaster managers, Red Cross and SASSA as donor agencies and councillors. Yin (2009:50), asserts that one case study could be distinguished by two or more unit of analysis, the case setting and unit of analysis was eThekwini Municipality Disaster Management and Emergency Control Unit, donor agencies and councillors. EMDMECU is liable and accountable for control and management of DRR within the Municipality, whilst donor agencies and councillors are enablers. The following sections on site, case and participant identification alluded on this issue.

4.3.3 Site, Case and Participant Selection

Creswell (2007:147) reveals that finding participants or study place is a critical component of the study. The researcher sought permission to study and build relations with respondents so that they give appropriate information. A discussion of the study place and respondents follows.

4.3.3.1 Site Selection

The eThekwini Municipality renders a modernised and fully furnished rapid response facility providing different kinds of services that are directed at decreasing fatality, wound, as well as lessening detrimental monetary and societal ramifications arising from hazards including storms, fires and floods. This study is significant in establishing whether the DRR strategy of the Municipality is suitable in minimising the effect of catastrophes and to ascertain whether the department is well skilled and capacitated to manage catastrophes.

4.3.3.2 Case Selection

As mentioned in earlier chapters of the study, eThekwini Municipality is a coastal city and is one of the largest economic hubs with a huge industrial base that exposes it to susceptibility. This vulnerability is related to issues like air pollution, climate change: floods and storms, rising water/sea levels and fires and affects the impoverished and dislocated people. The study is centered on the Municipality's DMECU in KwaZulu-Natal in the Republic of South Africa. The role of the unit or department is to implement systems that curb disaster risks within the city and its municipal area and serves as a resource for data-related to disaster risk reduction in the Municipality.

4.3.3.3 Participant Selection

The study constituted of three stakeholder segments:

OFFICIALS

➢ Three senior managers from the Disaster Management Unit were identified and targeted for their expertise in the department to acquire information on the most prevalent hazards, strategies, programs and responses they employ during hazards. Their participation assisted in explaining how they mitigate risks before they occur

➢ In addition, instead of four, two Disaster Operational Centre coordinators were interviewed. The duo helped understand their daily operations and how the centre

copes with pressures from society during disasters including the responsiveness of the centre

- ➢ Deputy City Manager for Security and Emergency cluster was included in relation to preparedness of the municipality relating to DRR and DRM strategies. He was unavailable even after numerous attempts to interview him
- ➢ An official (Head of expenditure) from expenditure unit to interrogate budget obligations and allowance to the Disaster Management Unit/Centre was included**.** However, he was unavailable to participate.

Nine municipal officials were selected from the Municipality. This was done based on their expertise and skills. Appointments for interviews were made both telephonically and by email. All nine officials indicated interest however five were available for the interview, which translated to approximately 60% of participants.

DONORS

- • Two donor agencies (one NGO and one private business) were included to explore the kind of partnerships they have with the municipality and whether it is effective to reduce hazards including bringing in relief.

COUNCILLORS

- • Four Politicians from 2 different parties were selected randomly to engage the views on whether the municipality is able or unable to deal with crisis. The parties were formally requested by telephone to participate, and later interviewed through a recorded interview. Councillors from both parties participated in the research.

Table 4.2: Selection of participants

RESPONDENTS	REASON FOR CHOICE	TARGETED
Senior Managers, Heads of Departments and Coordinators as Municipal Representatives	Experts in the field thus provide a professional understanding of the studied phenomenon, its impact and the risk reduced.	09
Donor Agencies	Their role in mobilising resources to responding to disaster after it has occurred.	02
Councillors	As policy-makers, informants and leaders and for the crucial role they play in both the municipality and community.	04

The target in Table 4.2 makes up a sample complement of 15 people within and outside the municipality, purposively selected individuals (representing the larger sectors) because of their seniority, expertise, knowledge and also political position in the field under study. Creswell (2008:12) mentions that it is crucial for an investigator to involve participants that are willing to share knowledge with openness and honesty. The selected individuals were eager to assist in that regard. For the benefit of a balanced view and of thematic analysis, councillors were identified as critical stakeholders representing both the perspective of the Municipality from the policy side as well as the public opinion from the side of being people's representatives. This idea is shown in the following section on sampling.

4.3.4 Sampling Design and Population

Before beginning the actual field study, the researcher must map out a programme of action in that site. Sampling is one of the most critical aspects in the extraction from the population group. Sampling is defined by scholars as choosing a targeted subsection of a population. For the aim of this research it was not possible to include the whole DMU, therefore a subset or

sample of persons who took part was used. They represented the entire population of the eThekwini Municipality's Disaster Management Unit, with the councillors representing policymakers. This is endorsed by Sekaran and Bougie (2010:67), that sampling assist in determining the sufficient number of participants from its total targeted population. In this case probability and non-probability sampling was done by means of expert (knowledgeable persons) and purposive sampling. Sampling gives a manageable number of participants thus making research practical and possible to conduct. The use of purposive sampling is significant to the worthiness of information collected as the inquirer should always safeguard that the respondents are reliable. Table 4.3 below depicts the target population and sample size in the study.

Table 4.3: Sampling Population for the Study

Stakeholder Segment	Target Population	Sample size from target population
Disaster Management & Emergency Control Unit	**09**	**05**
Donor Agencies	**02**	**02**
Councillors	**04**	**04**
TOTAL	**15**	**11**

4.3.4 Institutional Domain and Public Domain

The institutional domain was made of the following persons:

➢ Municipal officials from DMECU
➢ SASSA
➢ Councillors
➢ Red Cross
➢ Councillors

4.4 DATA COLLECTION

Creswell (2007:146) envisions data gathering as a sequence of visualising data collection in a set of interconnected actions intended for gathering truthful information to respond to research questions. Figure 4.2 shows how the qualitative researcher engages in a series of activities in the process of collecting data.

Figure 4.2: Data Collection Activities
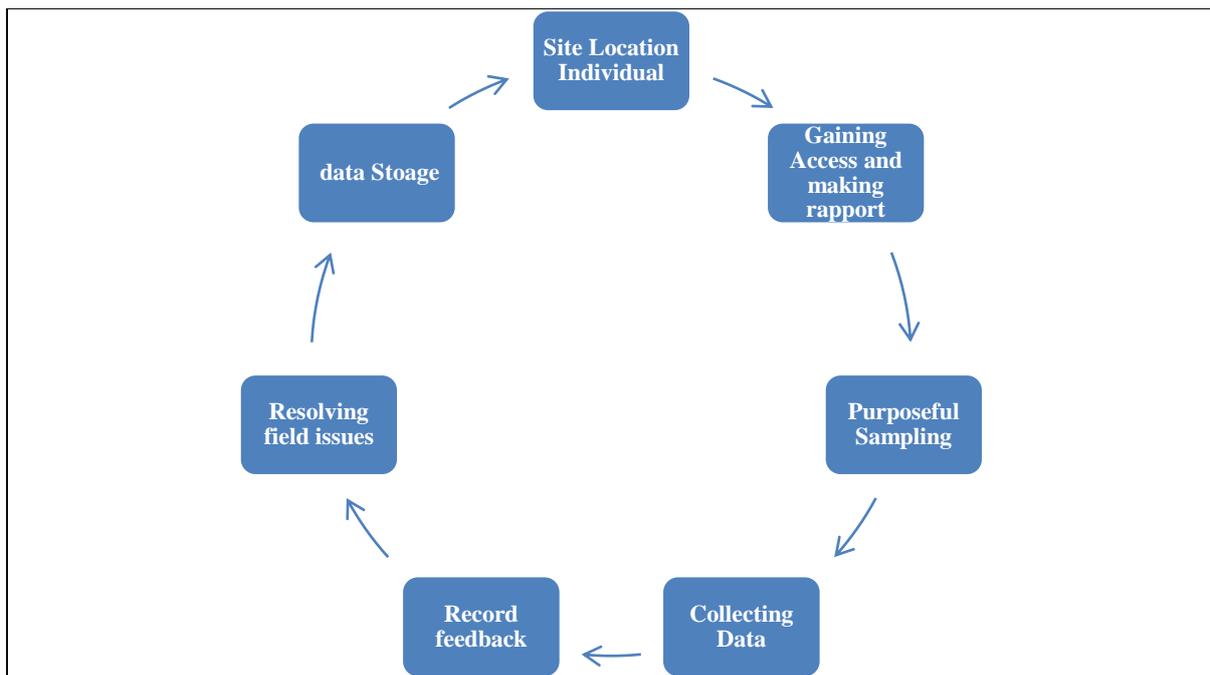
Source: Creswell, (2007:147)

In defining the procedure for the collection of data as displayed above, the initial step would be for the researcher to identify a site or people under study then gain entry and form relations with the department. In this case, the investigator acquired 2 letters from 2 institutions permitting them to collect data: (a) a letter from the study area called a Gatekeeper's letter provided for in Annexure B, and (b) a letter from the University granting and approving the study topic and proposal called Ethical Clearance as Annexure A. Respondents were required to sign an informed consent form confirming that they were willing (voluntary) to participate without any force or coercion and to agree to being audio-recorded (see Annexure D).

In a case study, a number of sources may be extended to include photographs, videotapes and voice recorders. The researcher in this instant used interview, photographs, newspapers, radio and documents as information gathering devices. These tools provided the researcher with more inclusive information that assisted in analysis. Data was easily captured during interviews through the use of a telephone voice recorder. This was incorporated in the consent form as a formal request to participants for the interviewer to use a phone voice recorder. This could have been declined by the respondents should they not be at ease with the process however, it was not the case with the study. Mechanisms used for collecting data are discussed below.

4.4.1 Interviews

Constructing an interview schedule as a research instrument was essential to ensure the best results for the study. An interview schedule assists the researcher in getting answers to the questions the study seeks to address. All the answers were noted and recorded in writing by the researcher in a journal; however the interviews were also recorded to ensure accuracy of capture. Each participant per stakeholder was given a letter Annexure B describing the aim of the study and one Annexure D letter the participant gave the researcher a signed consent for participating in the research. As mentioned above, there were three interview schedules prepared: (a) for the DMECU officials (Annexure E), (b) for the Donor Agency (Annexure F) and (c) for the Councillors (Annexure G). Interviews are an important part of data collection in a case study, Yin (2009:106) reveals that the investigator has two major tasks during the interview which includes to avoid biasness in questioning, and follow case study procedures during the question and answer sessions.

In the context of this study, semi-structured questions with open-ended responses were used for the interviews. This is supported by Turner III (2010:756), who revealed that such interviews are well-structured and based on the expression of the questions posed. Allowing open-ended responses permitted the respondents to offer more information relevant to the study and also allows the investigator to probe the participants. With this tool the participants are afforded the opportunity of fully expressing their opinions and sharing their experiences. It was important for the investigator to employ a sequential approach in collecting primary data, which involves steps from data collection through data analysis and data interpretation. The researcher interviewed five officials from DMU, which consisted of four Managers, and one Coordinator, four councillors and two donor agencies. The officials are regarded as the

main source of data, possessing pertinent information on disaster risk management and disaster risk reduction especially pertaining to eThekwini Municipality.

However due to the participants' other commitments it was difficult to obtain interview dates and the researcher respected their work diaries. Individual interviews took place after subsequent weeks with many dates in between. The councillors were the most difficult participants to engage. It took some time for the researcher to access respondents on time because they kept changing their appointments due to their busy schedules. As such the researcher had to work within timelines of participants' availabilities. The interviews in general were found to be more reliable and honest because it was easy to engage respondents. Choosing to conduct interviews helped the interviewer to gather all required and essential knowledge and information the subject under investigation. The use of further documents helped in identifying legislation, laws and regulations pertinent to the study, and the information collected was used in correlation to the practical aspects raised in the interviews.

4.4.2 Study Area

The research focused only on the metropolitan municipality in KwaZulu-Natal, known as eThekwini Municipality.

4.5 RESEARCH METHODOLOGY

4.5.1 Data Analysis

Creswell, (2009:199) asserts that data analysis involves classifying items, people, occurrences and goods that describes them. Through analysis of data, the investigator acquired data which could be interpreted in various ways. After data has been collected from the interviews, the investigator must analyse it and assess thematic trends of the various responses from participants. The researcher normally uses themes to gather data and this assists to avoid a biased analysis. Data was organised and prepared by converting or turning it into transcripts or icon data (as in pictures and photos) for analysis thereby reduced to themes for discussion. This case study followed data analysis based on the themes used during the interview phase. The responses were transcribed, categorised and analysed. All respondents are protected by the anonymity and confidentiality clause. The researcher personally transcribed and analysed data.

4.5.2 Thematic Analysis

Thematic analysis is a method used by researchers doing a qualitative study to identify themes by means of codes. Identifying themes assists the researcher in managing and reducing data by classifying similar information from different respondents. This process should be properly managed to avoid manipulation of data analysis. Themes selected in the research arise from interview responses and should be aligned to the topic. This means the investigator should be well acquainted with the transcripts to confirm developing themes and sequence as outlined above. Data from transcripts should be accurate and reliable. Thematic analysis for this study emanated from sectoral interviews.

4.5.3 Ethical Considerations

Babbie, (1991:465) defines ethics as an art of human behaviour and manner with the purpose of appreciating and protecting people's pride, and promote integrity, sincerity and certainty. It is necessary for the researcher to uphold ethics when conducting a research as this helps in fulfilling the duty of maintaining personal behaviour and ethical responsibility. Ethical considerations ensure that respondents' particulars and details are protected and kept confidential without exposing anyone's identity. In compliance with the UKZN Higher Degrees Committee and Research Division, the study observed ethics in the manner discussed below:

4.5.4 Confidentiality

To uphold the rule of individual confidentiality, the researcher should report in a manner that protects the identity of others. Revealing sources or details of the respondent is highly discouraged in research. Data gathered from the study is stored in a password protected phone hard drive for the reason of protecting the main informers. Respondents were referred to with codes where necessary, for example, DMO for disaster management official, DA for donor agency and EMC for eThekwini Municipal Councillor.

4.5.5 Anonymity

Confidentiality and anonymity are closely related. Anonymity means that the particulars of respondents must not be revealed. The identities of people giving information should be concealed. According to Cohen and Areil, (2011:356), over-riding and contravening this law should be authorised by the respondents themselves. As mentioned above, this study used pseudonyms in the form of codes to report information gathered from participants not revealing the source.

4.5.6 Informed consent

It is necessary for scientific research for the investigator to obtain permission from the sources of data before engaging them. The researcher sourced and entered into an agreement with the respondents to assist in the study that was investigated. All respondents gave written consent to participate as per the informed consent form that they had to sign before the investigation. The contents of the form emphasised that participation was voluntary, and there were no monetary benefits. The forms were signed without any coercion.

4.5.7 Issues of reliability and validity of data

In qualitative studies, the value of the conclusions of research relies on the reliability of the study outcomes and their suitability to other situations. Flora and Flora, (2014:198) suggests that reliability and validity of research are fundamental for the understanding of factual indications. In this study, reliability and validity of data were upheld through recording of responses to increase accuracy, truthfulness and consistency of information collected. This avoids the researcher's personal bias and improves on the results obtained. Since municipal councillors, officials or experts in the field were participants in the research, the results could be more credible and believable.

4.5.8 Dependability

Gunawan (2015:4) asserts that research procedures involve the maintenance of data strength. The approach is to store and re-examine data periodical. The researcher recorded interviews, interpreted and scrutinised them. The investigator therefore validated the audio recording with the notes to ensure data reliability. The stored voice recording could be reviewed at a later stage by the researcher to verify specific data in comparison with the transcripts.

4.5.9 Transferability

Gunawan, (2015:5) recommends that it is crucial in a study to offer expressive information in order for those interested about the studied topic to verify the relevance of its outcomes and conclusions or recommendations. The use of a semi-structured interview schedule as a data gathering instrument confirms this approach.

4.5.10 Confirmability

This approach is about verifying study outcomes through other research, for example participants are allowed to review the study findings to establish if the outcomes agree with the respondents. In the case of this study, research findings would be presented to the eThekwini Municipality DMU. The Municipality is allowed to compare findings with similar studies in order for the DMU to be able to implement informed recommendations.

4.5.11 Limitations of the study

There was a delay in completing the interviews as most participants were not readily available because of their schedules; on several occasions, they cancelled pre-arranged appointments. The unavailability of the head of DMU/DMECU and the Chairperson of the portfolio committee as crucial stakeholders limited the study information as their views would have been useful to the study. However, this does not mean that information provided by the other participants was not important as they are also associated with aspects relating to DRR.

4.6 CONCLUSION

This chapter explored the research design and methodology followed for the study. It set out how the study was approached including the design and philosophical worldviews underpinning it. The research adopted a qualitative design with a case study involving various units of analysis. Sampling and data analysis methods were outlined enabling the reader to comprehend the rationale for the study. The chapter was completed with an explanation of ethical issues and research constraints or limitations. The subsequent chapter focuses on the presentation and analysis of data.

CHAPTER FIVE

DATA PRESENTATION AND ANALYSIS

5 INTRODUCTION

Chapter Four deliberated on the study design, methodology and other elements of the study which included sampling, ethical consideration through to the limitations of the study. Chapter Five focuses on a brief highlight of the Municipality's Disaster Management Unit (DMU) or Disaster Management and Emergency Control Unit (DMECU) followed by aligning the research questions, study objectives, philosophical worldview and theoretical framework. This chapter is a presentation and analysis of data gathered for the study of the evaluation of Disaster Risk Reduction initiatives in the eThekwini Municipality's Disaster Management Unit.

5.1 CASE STUDY

EThekwini Municipality DMECU plays a crucial role in the implementation of suitable strategies to reduce disaster risks in the city and its municipal area of jurisdiction. The strategic responsibility of the unit is to construct a sustainable system of all role-players and stakeholders (as discussed in the dissertation) to expedite DRR. The municipality manages a new fully functional emergency and control service which offers numerous services aiming to reduce fatalities, damage and to minimize hostile economic and social repercussions from catastrophic risks such as fires and floods to other forms of disasters. During the period 2015/16 financial year, rapid response or emergency services responded to 8142 fires and 4990 special services, that is, according to the eThekwini Municipality IDP 2016/17. Unfortunately, 50 lives were lost during this period, while direct loss was estimated to be R287 825 207. It is paramount that preventing and reducing catastrophes is still the most critical objective of the DMECU. This is attained through an application of various programmes, actions and strategies that the Municipality should commit ensuring a safe and secure environment for all its citizens. The following discussion is a presentation on the case study of the evaluation of disaster risk reduction initiatives as employed by the Municipality. As mentioned in Chapter Four, this study used a qualitative research method. Presentation and analysis are based on documentations in the form of a bibliometric analysis of relevant literature in the field of disaster managements and interviews conducted with a sample of participants from the Municipality.

The study was divided into five categories, which sought to answer the question. Those are identified as:

> Institutional arrangement of Disaster Management Unit assisting in overcoming crisis;
> Major threats and hazards;
> Disaster Risk Reduction policies and strategies in place;
> Role of stakeholders and role-players, and
> Municipal financial commitments and external donors.

The above themes were derived from the study objectives explained in Chapter Four and were crucial in collecting relevant information for the study. The discussion below in this chapter focuses on these related themes and presents the results as they apply to the Municipality in question.

5.1.1 Institutional arrangements

The National Disaster Management Policy Framework and Disaster Management Act calls for the formation of specific institutional measures and systems that would assist disaster risk management and disaster risk reduction. Government institutions fulfill their regulated obligations of ensuring a safe and disaster free environment. One of the crucial aspects of achieving that is to ensure that there are proper institutional structures and systems in place. Figure 5.1 depicts the DMU/DMECU structural institutional arrangement in managing and reducing disaster risks.

Figure 5.1: Structural institutional arrangements to manage and reduce risks
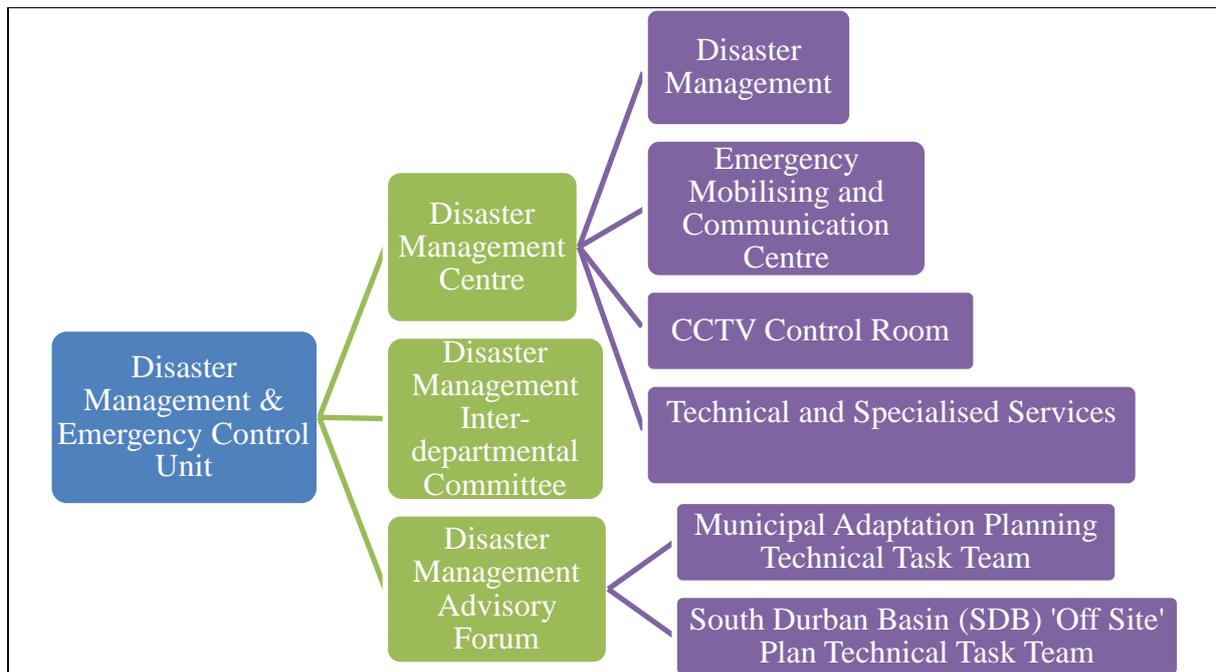
Source: Author's perspective

The figure above shows the structural formation of the DMU/DMECU. According to the IDP the unit was formed in 2011 for the purpose of providing rapid response and disaster prevention services on a 24/7 basis. DMU/DMECU is operating from the Municipal Disaster Management Centre (MDMC) situated in Durban and a back-up operations centre in Pinetown. The centre provides emergency services such as call receiving and immediately forwarding life threatening circumstances for fire, Metro Police, CCTV crime surveillance and traffic monitoring, including disaster management operations programs, risk assessment and reduction programs, eThekwini Municipality IDP, (2017/18:85). During the interview DMO2 stated that the centre provides a 24 hours, 7 days a week emergency service and is fully functional with a state-of-the art CISCO call centre system regarded as the best in the country. This viewpoint was also supported by EMC3, who stated that the call handling system has improved and the central 031361 0000 number saves the community the trouble of calling all required services on their own accord. There must also be a more efficient and improved service in response to disastrous situations.

DMU/DMECU constitutes of Disaster Management, Emergency Mobilizing and Communication Centre (EMACC), CCTV Control Room, Technical and Specialised Services and Administration departments briefly responsible for the following essential services:

Disaster Management or Disaster Operations Centre (DOC) – permits a multi-sectoral and multi-disciplinary involvement in the management of massive hazard/occurrence or a catastrophe using an infrastructural network that links all DMU sections or functional departments.

- **EMACC** - provides the service of taking potential emergency and life-threatening calls from residents. These calls are facilitated through to alert and advise relevant municipal departments to respond as swiftly as possible. It was established from the interviews that the call centre system is flooded on a weekly basis by emergency calls pertaining to fire incidents especially from informal settlements, and that the efficiency of the centre dictates that a call should be picked up within 3 rings. DA1 confirms that they normally receive weekly cases of fire interventions wherein they are expected to provide support for the basics. The EMCAs also commended the taking of calls and the behaviour of the staff within the call centre.

- **CCTV Control Room** – is a closed circuit television system used for monitoring cameras that are placed in different areas within the City based on identified high crime incidents. DMO3 stated that there are 376 cameras spread across the Municipality and these surveillance cameras are able to pick up any approaching hazard from crime or robbery incidents, fire or smoke, storms or emerging floods. All the DMOs interviewed confirm that footage from the CCTV system is admissible as evidence in court.

These sections within the DMU each have sectional managers who are responsible for managing sub-units. The Managers report directly to the Head of Department DMU/DMECU who reports to the Deputy City Manager for Health, Safety and Security Cluster. The interviews revealed that the staff compliment constitutes the Head of Department, the acting deputy head, 4 managers and 4 disaster management coordinators, yet the organogram reflects 84 unfunded posts to be filled, that is according to DMO1, DMO2, DMO3 and DMO4. This staff is supported by 10 CCTV operators and 300 volunteers that are ward-based. According to DMOs interviewed, the unit staff is highly skilled academically with knowledge and capacity to manage disasters as some of them are able to cope under stressful conditions where there is a major incident like the 2010/11 storm and flood disaster. DMO1 and DMO3 and DMO4 mentioned that there are continuous training programmes such as security courses, telephone management courses, first-aid course employed as compulsory

and refresher courses; DMO2 stated that though EMDMU is short-staffed as compared to the 80 practitioners in Cape Town, it has the necessary capacity required to manage pre- and post- disasters. However it was established during the interviews that staff-shortage is a reality challenge during beneficiary/victim data capturing, field visits and effective emergency preparedness and response during a disaster especially when declared by the National Minister for Cooperative Governance and Traditional Affairs, (COGTA), EMC1, EMC2, EMC3. It was also discovered from the interviews with the EMCs that the ward-based volunteers are unknown, incapacitated and unstructured in terms of hierarchy and their level of functioning is very low.

Instead of the Municipal Disaster Management Inter-Departmental Committee the municipality uses a Strategic Coordinating Committee (SCC) to manage issues related to business catastrophe. According to eThekwini Municipality IDP, (2017/18:87) the Municipality established a Disaster Management Advisory Forum chaired by the City Manager and this meets on a quarterly basis. The forum is constituted of all the Deputy City Managers, several Unit Heads and Senior Managers and/or other staff selected for their expertise and practical abilities and knowledge. The Forum assists the Municipality to prioritise and contributes to disaster risk reduction initiatives/strategies for all clusters. Two Technical Task Teams were created under this forum: Adaptation Planning Technical Task Team and the South Durban Basin (SDB) 'off site' Emergency Plan Technical Task Team that are handling all emergency plans related to climate change/weather predictions, environmental impact assessment (EIA) and major hazard industries (MHI).

5.1.2 Major threats and hazards

A disaster risk assessment process with the help of an independent consultant started in 2014. This was done by the municipality for the purpose of determining the type and level of risk through examining possible threats and assessing present situations of susceptibility that could be posing a potential risk or danger to persons, property, livings and the land on which they rely IDP, (2015/16:71). The risks are assessed based on the natural characteristics of hazards, i.e. their locality, strength, regularity, likelihood and a scrutiny of the physical, socio-economic and ecological dimensions of susceptibility and the surviving capacities applicable to the risk situations. The process that is followed in identifying and managing risks is based on Enterprise Risk Management as depicted in Figure 5.2 on the proceeding page:

Figure 5.2: Enterprise Risk Management
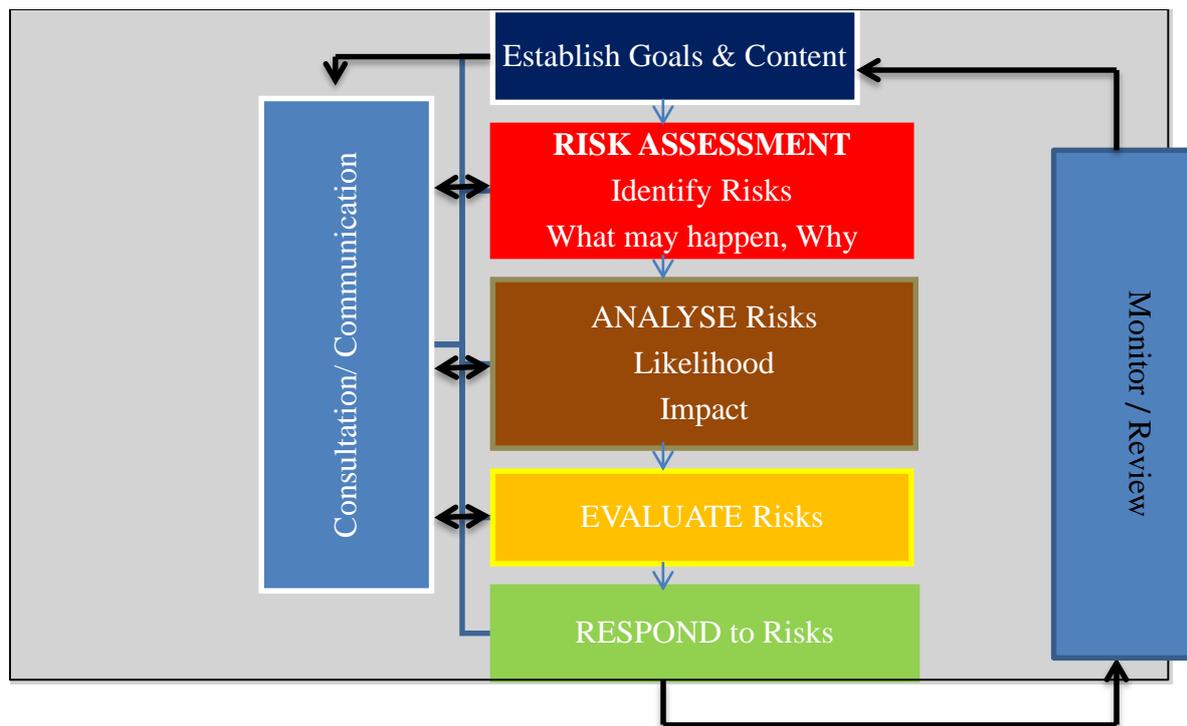
Source: Secondary data by author

Figure 5.2 indicates the approach that was used by eThekwini Municipality as an institution to assess the risks. The model that was used is in accordance with the National Disaster Management Framework for the classification of hazards. Profiling was done through individual and group workshop consultations for the collection of professional and indigenous knowledge; desk-top analysis using statistics/indicators, reports and basic information; and lastly based on the GIS database. This risk assessment study by the municipality resulted in the prioritisation of 10 risks out 54 risks that were identified, and they are itemised in Table 5.1 as follows:

Table 5.1: Risk Prioritisation

No	Risk	Combined
1	Civil Unrest – Crime	1.87
2	Hydro-meteorological Hazards – Severe Storms	1.80
3	Hydro-meteorological Hazards – Floods	1.80
4	Disease/ Health – Disease Human	1.67
5	Fire Hazards – Formal & Informal Settlement	1.67
6	Infrastructure Failure/ Service Delivery Failure – Electrical	1.66
7	Hazardous Material – Spill/ Release (Storage & Transportation)	1.63
8	Oceanographic – Storm Surge	1.61
9	Hazardous Material – Spill/Release (Storage & Transportation)	1.59
10	Infrastructure Failure/ Service Delivery Failure – Water	1.56

Source: Disaster Management Unit, eThekwini Municipality (2018)

As noted above, crime, hydro-meteorological hazards and fires are among the top 5 high risk hazards which are taken into consideration with Durban being a coastline zone and the likely influence of climate change. During the interview there was a general understanding by all respondents that storms, floods, fires and HIV Aids are considered as the highest risks that eThekwini faces. It was established that they pose the greatest threats and the worst effects in a community and the municipality as a whole. They usually results in loss of life, loss of shelter and other belongings, loss of infrastructure and poverty. DMO3 stated that crime can be prevented through environmental design and that safer cities department has a huge role to play in this instance. DMO3 also mentioned that an improvement of the current surveillance system in accordance with the Fourth Industrial Revolution (automated cameras), visible policing and the escalation of the programme across the EMA covering all townships and villages could prevent crime incident thus reducing it to a smaller scale, with the idea of extension that is also supported by EMC1, EMC2, EMC3 and EMC4. The Fourth Industrial Revolution has become an important current focal point for the Municipality, not only in preparedness of the infrastructure but also to ensure that a robust risk management plan is in place to address the vulnerabilities and potential hazards in disaster risk reduction preparedness.

With respect to storms and flood risks, the respondents indicated that there are still no recorded DRR initiatives to date, which is serious cause for concern for the Municipality. However the normality is the relocation of people from hazard prone areas such as floodplains and poorly built houses but that process is a very slow one. They however did mention that in the case of such disasters, all emergency services are activated immediately to prevent further damage of property, bodily harm and infrastructure, and that the turnaround time should be within 24 hours. EMC3, DA1 and DA2 emphasised the important of training and educating communities of any evacuation method during a disaster, especially fire disasters and that the municipality through DMECU budget must invest in community awareness workshops targeting primarily vulnerable sectors of communities. All respondents shared the same concern for the industries (factories & flats) lack of compliance with the Municipal bylaws and regulations against pollution, environmental degradation and disaster risk management. This was witnessed through a hazardous fire that broke down in one of the Engine oil refineries in Isipingo recently.

5.1.3 Disaster Risk Reduction policies and strategies in place

In order to comply with the DMA the Municipality has in August 2013 developed and adopted a Municipal Disaster Management Plan that is reviewed annually. The purpose of the plan is to sanction the organisational and institutional arrangements to successfully avoid catastrophes from happening and to moderate the effects of those risks that could not be prevented, including operational processes for risk reduction planning. The plan serves as a managerial and collaboration instrument concerning all relevant departments, units and clusters of Municipal Council. The council also approved a Municipal Disaster Management Framework in 2009 that is abstracted from the four National Key Performance Areas which are incorporated into the institutional capacities for disaster risk management, disaster risk assessment, disaster risk reduction, disaster risk response and recovery, Dludla, (2015:75). The Municipality is pre-emptive in preparation for the prevention of catastrophes. In this regard the engineering department has in the case of abrupt storm gush and expected sea-water level upsurge adopted sea-water level rise predictions as preventative and proactive measures. The engineering department works closely with the DMU/DMECU to develop forecasting methods for reducing disaster. It is presently creating flood risk projecting known as the Flood Early Warning System study that will guard life, belongings, assets and savings in case of a flood eventuality.

Figure 5.3: Sea level rise and slip failure projections for Umdloti Dune

Source: Disaster Management Unit, eThekwini Municipality IDP (2018/2019:201)

Figure 5.3 shows a sea-water level rise and slip failure projections for the Umdloti dune. These sea level rise modelling and predictions are utilised as probable preventive methods for the protection of life and savings, like providing sea corrosion and flood schemes alongside the Durban shoreline that would inform decisions on present and modern substructure and expansion. The study discovered that apart from the two aspects outlined above there are other initiatives and strategies currently employed by the Municipality to minimise disasters, as adapted from the eThekwini Municipality IDP, 2017/18 these include:

- ➢ E-SPONDER, a method used for the management of every facets of a massive event and has the ability of working through multi-entities concurrently and offers an integrated understanding to strengthen inter-institutional collaboration and reaction.
- ➢ Early Warning Strategy which is dependent on the supply from the South African Weather Service. The EWS are cascaded to various pertinent role-players and stakeholders by EMACC through a bulk SMS notification system.
- ➢ Education, Training, Public Awareness and Research achieved through capacity building programmes, public awareness campaigns and research.

DMO5 said that the unit uses the Masakhane Campaign and public meetings as an awareness strategy to reduce disaster. Notwithstanding same, this is a statement refuted by EMCs who claimed that there are no public awareness campaigns taking place in their wards. During a disaster a media room is activated where briefing of a partner radio station is done and then issuing of public notices about approaching disasters takes place. During interviews, it was discovered that though councillors are policy and decision-makers, they lack some knowledge on disaster management policies and programmes employed by the Municipality. However, they do have the political will to support and learn more about disaster risk reduction measures. This is a further major cause for concern for all municipal officials in an integrated strategic effort at disaster management at the Municipality.

5.1.4 Role of stakeholders and role-players

Disaster risk management and risk reduction is everybody's business. All municipal departments are role-players in DRR. Each department has its own response and recovery mechanism that they need to apply. Disaster risk reduction is a responsibility also for external stakeholders such as SAPS, SASSA, EMRS, business and NGOs such as the Red Cross and Gift of the Givers. One of the goals of the DMU/DMECU is to create a sustainable link of

corporate, government and societies to enable DRR. The unit has a good working partnership with these agencies in the management of catastrophe risks as depicted in Figure 5.4 below. There is a well-developed plan the DMU has that outlines the roles and duties of each institution and proper mitigation strategies in case of emergency. NGOs such as the Gift of the Givers, Red Cross and other provide emergency basic needs such as blankets, clothing and food parcels. DA1 and DA2 mentioned during the interviews that during distribution of their assistance, the victims were not satisfied by these short-term measures as they have higher expectations from what they receive especially when they have lost much of their belongings and personal possessions. It was established from the interviews that the role that is played by business in municipal DRR is limited, and still to be clearly defined.

The South African Social Security Agency contributes to DRR by providing victims with food vouchers after a thorough screening of beneficiaries. Emergency Medical Rescue Service (EMRS) contribute by providing medical assistance and advice to affected communities whilst experts and technical specialists provide professional skills, training and specialised advice on the management and mitigation of disaster risks.

Figure 5.4: DMECU Partnership with other agencies in disaster risk management
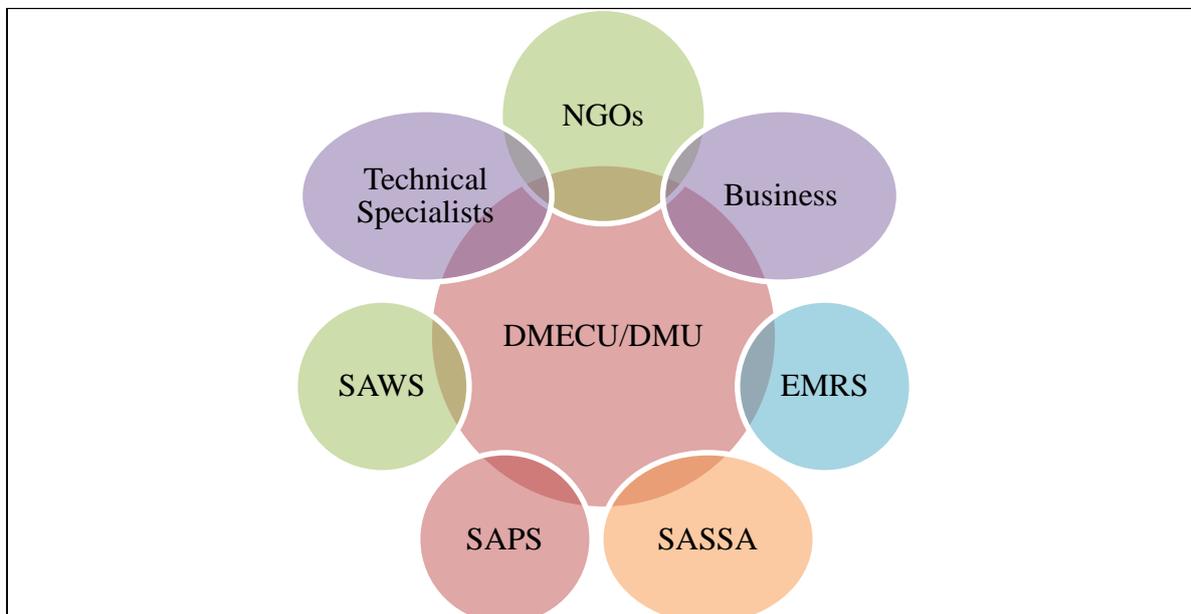
Source: Author's perspective

DMECU's relationship with other agencies is not restricted to the above-mentioned network. The Municipality is part of intergovernmental relations between all spheres of government. COGTA, Department of Transport, Department of Human Settlements and Department of

Water Affairs and Forestry, provincial and national spheres support municipalities through grant funding for the management of disasters. This is especially when a municipality has been declared a disaster zone. During interviews it was ascertained that interdepartmental relations is still an ongoing challenge in the Municipality. Respondents stated that other departments are struggling to fulfill their obligations of developing departmental disaster management and reduction plans, which poses a challenge when disaster strikes or during the development phases for remedies. There is high expectation from communities on the role of internal departments in terms of disaster response and recovery. This is especially the case regarding perceptions in the case of damaged property/ housing especially in the informal settlements and that the Municipality ought to provide alternative shelter in the form of low-cost houses. EMCs stated:

"We are continuously bothered by the people whom their houses have been destroyed by fire, flooding or a heavy storm asking when their houses will be restored or rebuilt".

This is a clear indication that the communities are not well-educated on disaster risk measures, programmes and interventions. It is evident that an orientation of public awareness is fundamental in ensuring a coordinated and integrated effort is considered in disaster management and disaster risk reduction strategies. The awareness programme would also help alleviate some of the vulnerabilities that the communities face amidst disasters.

5.1.5 Municipal financial commitments and external donors

Since the enactment of DMA and the application of the NDMF, disaster risk management funding has been a concern, submits Visser and Van Niekerk, (2009:35). The MFMA clearly stipulates that there must be budget allocated for disaster management, disaster risk management and disaster risk reduction in every sphere of government from national, provincial to local government/municipalities. Funding for disaster risk management in the Municipality is from the operational budget but when a disaster strike and has been declared as an emergency by national government, the municipality receives grant funding for disaster response, maintenance and recovery. It is the responsibility of each municipal department to fund its own catastrophes and rehabilitation programmes, which can place huge demands on the municipality's fiscus. Should the recovery expense cost above the operational budget ability of each unit, then a report should be made to the executive council to request for funding from the city coffers or the city to make a request to provincial and national spheres

for grant funding.to be received. An adjustment budget should be made to accommodate such requests based on extenuating circumstances surrounding the extent of disasters.

It was established from the interviews that critical funding is needed for DMECU human resource including maintenance of the disaster management centre. Access to more funding is needed to be directed to disaster risk reduction than to disaster relief measures because 'prevention is better than cure'. A pro-active approach is more appropriate than a reactive approach. As mentioned in Chapter Four, there were many reported fatalities and damages caused through fire incidents in the Municipality. One of the major priorities of the DMECU is to increase funding for the restructuring of educational programmes to include awareness on major hazards and their reduction.

 eThekwini Municipality's IDP, (2015/16:74) states that communities observe the capacity of the fire and emergency services' response to emergencies as a display of municipal response to their health, safety and security needs. In the case of fire services, the role for the provision of such has escalated its customary obligations of firefighting but to that of public safety. It was then crucial to extend fire response and emergency services to the new fire stations situated in Umkomaas and Verulam. DMO4 also informed the researcher that if there is a reported flood or storm emergency services such as metro police or fire department, it becomes imperative to prepare by adding more personnel for overtime. The Municipality has various strategies of managing catastrophes that are under study as was mentioned earlier in Chapter Two and some of these methods are displayed in Figure 5.5 below. DMO1. DMO3 and DMO4 indicated that EWS, awareness programmes, additional resources and emergency services are the methods used in handling calamities.

Figure 5.5: Methods of managing disasters
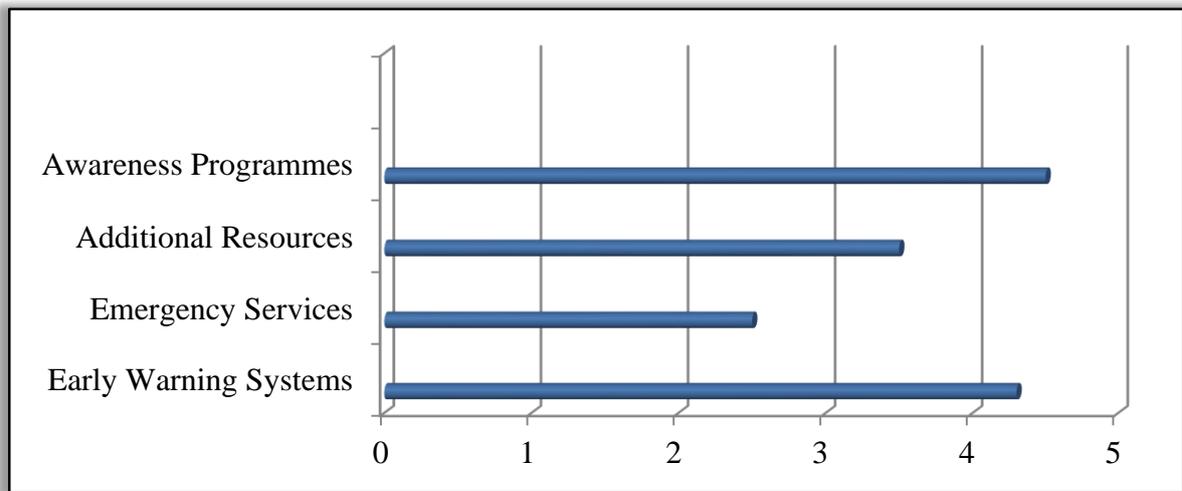
Source: eThekwini (IDP, 2016/2017:73)

The graph depicts that the DMU/DMECU is expanding the disaster risk management strategies to adapt to the demands of disaster risk reduction objectives. Sea level rise predictions and flood early warning system (FEWS) are some of the initiatives funded and implemented by the city strategically as EWS for the effective and efficient reaction to inundating, preventing destruction and saving lives. The South African Weather Services also play a crucial role in this regard in creating awareness of potential hazards and imminent danger in changing weather patterns.

5.2 DATA PRESENTATION OF QUALITATIVE ANALYSIS

This section is a continuation of the examination of the results of the qualitative data gathered by the investigator as previously demonstrated in Chapter Four. Data gathering was done through a sequential approach, which provided the investigator with knowledge of DRR approaches and information concerning all stakeholders and role-players that are part of DRR in the Municipality. This would be a presentation and analysis of data responding to the attainment of the study objectives. Content and thematic analyses are utilised by the investigator to categorise, code and combine explanations behind the answers. It is crucial that the two analyses procedures are explained through the research. Content analysis is used for the interrogation and understanding of the feedback from the respondents, while thematic is analysis used to categorise and delivers data under investigation. The investigator compared and summarise data to understand joint responses and highlight those contrasting responses.

As explained in Chapter Four, interviews were used as information gathering instruments. Eleven respondents took part in the interviews, which includes: five disaster management unit officials, four councillors and two donor agencies and these are separated into three research sectoral participants as shown above.

The following is a section presenting data analysis and results by means of the research themes that emerged. These themes are linked with the philosophical worldview, the theoretical framework that directed research, research objectives and research questions. Sub-division 5.2.1 indicates the merging of study objectives and study questions and subdivision 5.2.2 shows the aligned theoretical framework and philosophical worldview directing and underlying research including the themes developing from the research. In subdivision 5.2.3, data collected from the interviews were analysed, with lastly section 5.2.4 that covers a cross-case analysis of all date gathered from the interviews. This is in accordance with the study objectives.

5.2.1 Merging study objectives

It is necessary to link the objectives of the study and the questions the research sought to address. Research should reflect how each study objective has been achieved as well as how research questions are answered:

Table 5.2: Merging of study objectives

Research Objectives	Addressing of objectives
Determine the current bureaucratic systems (structure, personnel, resources, capacity, skills and equipment) that would assist the municipality to overcome crisis in times of emergencies.	This objective was realised during interviews when respondents stated that they embark on continuous trainings and refresher courses and that the Municipality has an effective 'state-of-the-art' call centre, however, they have a staff shortage of more than 80 vacancies.
Highlight the major threats and hazards affecting communities within the eThekwini Municipal Area.	The objective was fully realised and the conclusion from the study was that fires, floods and storms are amongst the ten major hazards in the Municipality.
Critically analyses disaster risk reduction policies and strategies within the Municipality during tragedy.	The study managed to identify DRR strategies and policies practiced in the study location but the conclusion is that more strategies could be employed.
Identify and discuss the role and duties played by various sectors and role-players pre- and post-crisis in relation to their roles and commitment.	The objective was fully achieved and the conclusion was that a clear definition of the role of these sectors in DRR should be considered.
Determine and discuss the municipality financial commitments and that of external donors in preparedness and responding to crisis.	This objective was achieved, however, it was established that more resources and funds should be directed to supporting DRR initiatives in the study, and that external donors like NGOs play a critical role in the funding and resourcing of DRR activities especially temporal relief.
Assess the imbalance in the application of disaster management plans, and make recommendations to the municipality to address the gaps.	This objective was achieved by assessing the responses from the interviews to establish the gap.

As noted from the above, the study questions replicate the study objectives. All the objectives as outlined in Chapter one of the study have been addressed in various areas throughout the research as it is highlighted in Table 5.2 above. The discussion is based on the relations between the theoretical framework, philosophical worldview and themes developed from the respondents descriptions.

5.2.2 Theoretical framework, Philosophical Worldview and emerging themes

A theoretical framework is a tool that directs research and assist in responding to the study questions and achievement of study objectives. The theoretical framework helped with developing themes throughout the analysis.

5.2.2.1 Theoretical framework and Philosophical Worldview

According to Creswell, (2009:9), the philosophical worldview stays unseen in research yet impacts on research practice and research needs identification. Chapter Four described the Pragmatic Worldview utilised for research.

> *"We have 300 ward-based volunteers that are trained with skills such as first aid, counselling, disaster management knowledge and fire courses because we believe that when a disaster strikes, it strikes a community so they must be empowered to be able to prevent or deal with a disaster before the agencies respond",*(DMO2, DMO3, DMO4, DMO5).

EMC1, EMC2 and EMC3 said:

> *"We have no one to help during a hazard or disaster until the agencies show up, there are no volunteers, we become foot soldiers ourselves with our limited knowledge of disaster management because the perception is that being a councillor means you can do any task otherwise you lose a vote",* (EM1, EM2, EM3).

These statements are contradictory, according to DMO 2, 3, 4, and 5 the DMECU has well trained or skilled ward-based volunteers whereas the councillors stated that there were no volunteers in their wards, and that councillors themselves become foot soldiers during a disaster.

An empowered society is the most productive tool to reducing local risks. It also creates liable persons focused in municipal-driven susceptibility reduction DRR policies. When

humans are exposed to susceptibility, isolated and oppressed, making decisions is a huge problem. The thematic analysis here confirms that the theoretical framework driving the research assimilate with data from the research. It is worth noting that there are different viewpoints from both the DMECU officials and municipal councillors concerning theme 2 of the investigation. According to the DMU/DMECU, they train and empower volunteers to work in their respective wards as disaster management foot soldiers; the councillors stated that the use of their limited understanding of disaster management while waiting for disaster response because there are no volunteers in their wards.

DMO2 stated:

"There is a volunteer programme per ward that is aimed at reinforcing quick responses in terms of emergency assistance, which includes first-aid and awareness creation and where necessary assists with relocations".

DMO3 observed:

"There is a ward-based volunteer programme that is empowered with skills and courses enabling them to deal with disasters before the agency respond".

DMO4 noted:

"There is a Ward based volunteer programme resulting in a total number of 300 volunteers for the purpose of assisting pre-and post-disaster. There is also a good working relationship with ward councillors to ensure that local disasters are reduced".

DMO5 noted:

"I would say the first one is the Volunteer programme, the volunteer program we are recruiting personnel or people within the ward because we feel that when the disaster strikes, it strikes to the community though we want those people to be empowered to know what to do and what department to contact in the event of disasters"

Looking at these quotations, they display a difference in viewpoint related to theme 2 as explained above. With time the trained volunteers get jobs and ignored their unpaid activities. Sometimes with the change of political leadership (councillors) no one introduces them to

new councillors. This becomes an unknown for local communities rendering any assistance as, inactive and useless. Without proper synergy of the volunteer programme with the DMU activities and ward representatives (councillors), the programme is regarded redundant and volunteers cannot step in when a hazard or disaster strikes.

5.2.2.2 Themes emanating from the research

The themes that follow have emerged from interviews and the data that led to themes are presented later in the dissertation. The theoretical framework and Philosophical Worldview assisted the investigator in identifying these themes in a relational manner below:

Themes emanating from the study as identified through theoretical framework and Philosophical Worldview is as follows:

Table 5.3: Themes derived from the research

Number	Theme
1	Shortage of staff is a challenge in implementing disaster response and recovery measures.
2	Trained Ward-based volunteers act before the agencies respond
3	Public awareness programmes are instruments for reducing hazards in a society.
4	Lack of compliance with municipal bylaws and regulations poses a risk
5	Access to funding is a challenge
6	Interdepartmental cooperation is a tool for a coordinated disaster response
7	Science and technology contribute to prevention
8	Continuous training and education improves capacity

With a focus on these themes various data reduction approaches were implemented. In reverse order, a crucial step in analysing data was the alignment of interview questions and data collected to contemplate replies in relation to research objectives. This procedure is reflected in reverse order in Appendix H and I by means of the tables on the next discussion:

Table 5.4: Alignment of interview questions to study objectives

Annexure H	Tables in Appendix	Page
	Table A5-1 Aligning interview questions to research objectives (Disaster Management Unit)	
	Table A5-2 Aligning interview questions to study objectives (Councillors)	
	Table A5-3 Aligning interview questions to study objectives (Donor Agencies)	

Table 5.5: Alignment of data collection tools to research objectives

Annexure I	Tables in Appendix	Page
	Table A5-4 Aligning first study objective and data gathering methods	
	Table A5-5 Aligning second study objective and data collection methods	
	Table A5-6 Aligning third study objectives and data gathering methods	
	Table A5-7 Aligning fourth study objectives and data gathering instruments	
	Table A5-8 Aligning fifth study objectives and data gathering instruments	
	Table A5-9 Aligning sixth study objectives and data gathering instruments	

Preliminary data analysis was done by generating tables Annexure H and Annexure I. After themes emerged, the investigator related these to the theoretical framework. Table 5.5 demonstrates this linkage.

Table 5.6: Theoretical framework and themes emanating from the research

Human Actions			Non-human
Municipality	Councillor	Donor Agencies	
Shortage of staff is a challenge in implementing disaster response and recovery measures.	Continuous training and education improves capacity	Collaboration and multi-sectoral involvement by all partners in DRR	Interdepartmental cooperation is a tool for a coordinated disaster response
	Lack of compliance with municipal bylaws and regulations poses a risk		Land use management and planning
Public awareness programmes are instruments for reducing hazards in a society.		Councillors participation and involvement enhances response and recovery	
	Trained Ward-based volunteers act before the agencies respond		Science and technology contribute to disaster prevention measures
		Access to funding is and remains an ongoing challenge	

It is observed that there is a difference of viewpoints from the DMU/DMECU and other stakeholders concerning theme 3 of research. The DMU claim that they have trained ward-based volunteers that are empowered to detect a hazard and to respond to a disaster before the agencies do, while the councillors stated that they know no disaster management volunteers in their wards; in the event of a disaster they (councillors) become foot soldiers. Another divergence in perspective is when the DMOs state that they have continuous public awareness programmes in various schools and communities that educate people about methods of eliminating disasters while the other stakeholders revealed that there seem to be lack of awareness for disaster preparedness, prevention and response especially in the event of a fire.

> *"Another programme that we have is the awareness programme, we run it through various schools, homes like old age homes, children homes and we also use other platforms such as the Masakhane platforms to give the awareness in terms of ama disaster that we are expecting and how the people should respond and what kind of*

response the Municipality and the agencies offer whenever there's any disasters or incidents in their particular areas" DMO5.

"When we are conducting field response we discover that there is a lot of ignorance and lack of understanding from the community on what is expected from the agency or the Municipality including how to prevent incidents like fires including responding to flood incidents" DA1.

EMC2 stated:

".....there are no programmes based on educating communities on the kind of support that is provided by the Municipality or other agencies, we then become pressured by the victims to provide them with formal houses especially where a disaster like storms, flood or fire occurs in an informal settlement."

5.2.2.3 Analysis of Interview data

This part of the dissertation expands more on the responses of the DMU, Councillors and Donor Agencies (SASSA and Red Cross). It noted that though Councillors are part of the Municipality they are ignorant of the Municipality's DRR initiatives with respect to hazards such as floods, storms and fires. This is a worrying factor since they are expected to be well informed of all municipal activities pertaining also to policy issues. It was established from the interviews that only one councillor was aware of the 'state of the art' emergency and call centre that is used for data capturing and cascading issues of response and recovery to the relevant departments. EMC4 said:

"Yes there is an operational call centre but I'm not sure where it is and whether it has the right equipment that enables DMU to function effectively."

"Though I can't speak for others but I want to say I am only aware that we as councillors experience some challenges in terms of responding to hazards in case of a disaster but I am unaware of any DRR strategies employed by the Municipality, I know that they take victim details and give them food parcels, blankets and foam mattresses" EMC1.

During the interviews and through documentation the researcher ascertained that there is an emergency and disaster management plan that was developed by the Municipality. This plan

assists in defining the roles and functions of different stakeholders in case of an incident including highlighting all risks and relevant mitigation initiatives.

5.3 CONCLUSION

This chapter analysed by means of primary and secondary sources the institutional and structural arrangements of the Municipality's Disaster Management Unit (DMU) /Disaster Management and Emergency Control Unit (DMECU), as well as its core functions and subdivisions within the unit. Partnership, expertise, role-players and other stakeholders that are part of reducing disaster risk in the City were explored to establish their relevance in achieving their set roles. This was followed by the alignment of the research questions, study objectives, philosophical worldview and theoretical framework concerned. In conclusion the chapter presented and analysed data captured for the study of the evaluation of Disaster Risk Reduction initiatives in the eThekwini Municipality's Disaster Management Unit. The findings and conclusions are further discussed in Chapter Six of the study.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6. INTRODUCTION

The chapter provides a summary of the completed study, its results and findings. This study was based on five non-sequential questions that were addressed by means of objectives. Chapter One presented the introduction, background and overview of the study, whilst Chapter Two discussed the theoretical and conceptual approach to DRR, PA and Municipal Service Delivery perspectives. Chapter Three focused on the international and local practices of DRR in reducing disasters. Research methodology, paradigm involved in the study, the collection of data and the methods used to collect and capture it was discussed in details in Chapter Four. Chapter Five covered presentation and analysis of data in relation to important conceptual and contextual aspects of the research area of disaster risk reduction. This chapter presents findings as identified in relation to evaluation of disaster risk reduction initiatives in eThekwini Municipality. The chapter further presented identified gaps, and proposed recommendations for due consideration with a view to future research envisaged. The conclusion is that there are several disaster risk reduction initiatives at eThekwini Municipality mainly coordinated by the Municipal Disaster Management Unit through the Municipal Disaster Management Centre (MDMC) that is well resourced. It was also noted that disaster management structures in place are capacitated and exposed to continuous training however there still a shortage of personnel, incapacity and lack of funding for some initiatives pertaining to response and recovery. The role that is played by the NGOs such as Gift of the Givers and Red Cross has been noted as critical however, it is noted that businesses as partners in DRR is still lacking in providing ongoing support and investing to DRR initiatives. Furthermore, the role played by internal departments (especially the engineering department) and other spheres of government had been identified as important (though with challenges) in driving intervention processes. Storms, floods and fires have been identified among the ten major hazards and risks affecting the Municipality and there are plans including the use of science and technology to implement a proactive approach by means of EWS for preparedness, mitigation and response. The following is a discussion of some of the findings and conclusions.

6.1 EDUCATION AND TRAINING

This research revealed that eThekwini Municipality's DMU has numerous programmes directed at addressing DRR. Volunteer programmes, public awareness, education, compliance with planning regulations and early warning systems have been identified as disaster prevention programmes within the Municipality. There are however, a few challenges with some of these programmes that the study has noted. These are particularly where there are divergence opinions between the Municipality and other stakeholders.

6.2 HUMAN RESOURCE

Research revealed that DMU is short-staffed, which deters the execution and application of the municipal disaster prevention plan for the Municipality. There are a number of unfunded staff vacancies in the DMU organogram whilst the department is only fully operating with approximately 10 staff members, which poses a challenge when the DMU/DMECU has to respond to a disaster. This is a serious problem that was expressed by all interviewees that access to funding is critical to improve efficiency and promptness in disaster response.

6.3 INTERGOVERNMENTAL SUPPORT

This study revealed that the role that is played by other spheres of government is minimal and only restricted to disaster grant funding and support. It also establishes a poor collaboration of internal departments in the interdepartmental committee. The challenge expressed by DMU is that in most cases delays and poor response and recovery are as a result of the line departments that are expected to deliver a service within 'real' time. For example in the case of preventing or reducing disasters in informal settlements situated on hazard zone areas: there must be a strong working relationship between at least the sections in departments that deal with human settlements, electricity and engineering so that informal housing upgrades or relocation can be fast-tracked, to ensure a healthy, safe and secured environment as outlined in the Bill of Rights in Chapter Two of the Constitution of the Republic of South Africa, 1996.

6.4 SCIENCE AND TECHNOLOGY

Science and Technology plays a major role in the reduction of disasters. Skilled, experts and professional knowledge assist in the creation of other disaster strategies such as floods early warning systems, including sea level rise detectors that are developed by the engineering department as disaster mitigation strategies adapting to the Fourth Industrial Revolution. This has an element of addressing Objective Two and Four of the study, while giving answers to Questions Two and Four of the study.

6.5 MAJOR HAZARDS CURBING

Storms, Fires and Floods were identified amongst the top 10 most prevalent disasters in the eThekwini region. Measures to reduce their impact should continuously be a municipal priority relevant to all departments and not a responsibility of one single department within the Municipality. In other words, the management of fires and floods requires concerted and integrated efforts from all sectors within the Municipality.

6.6 POLITICAL WILL

Councillors are not trained, educated or inducted regarding disaster management measures or DRR strategies. The assumption is that as public representatives and policy makers they should be aware of such calamities and the danger associated with same. Officials argue that the change in councillor deployment every five years as a short-term tenure is a major contributor to the lack of trained or well-informed councillors, thus contributing to ignorant communities and lack in the continuous engagement with them. The lack of political will poses ongoing challenges for the municipality in respect of DRR as a significant focal point of addressing gaps in service delivery.

6.7 RECOMMENDATIONS EMERGING FROM THE STUDY

6.7.1 Institutional Arrangement

The research above led to the conclusion that volunteer programmes, public awareness, education, and compliance with planning regulations are instruments for disaster risk reduction strategies implemented by the eThekwini DMU/DMECU. There should be an improvement in the strengthening of a volunteer programme to ensure that it is active in all

wards. This responds to study objectives One and Three as well as providing answers to key questions One and Three as raised earlier in the study

6.7.2 Financial Capacity

To address the concern for funding, the Municipality should allocate more financial resources to DMU for the recruitment of capacitated personnel because without addressing this concern the DMU and the community would continue to suffer poor service delivery in this context. This finding responds to objectives One and Five and also answers question One to Five of the study.

6.7.3 Plans and Strategies

The study findings concluded that persons staying in the informal settlements are staying under danger zone areas with severe situations that cause vulnerability to catastrophes. They are always looking for a better and safer place to live. The municipality through the interdepartmental committee should consider implementing a permanent solution (like prioritising informal settlements that are prone to disasters) to reduce the level of disaster and vulnerability of communities and households and minimise the effects of disasters on the safety of households. This would respond to Objective Four and addresses the important aspect raised in Question Four of the study.

6.7.4 Role-Players and Stakeholders

The engineering department plays a critical role in the creation of reduction strategies in disaster management. It is important that this department, together with DMU, works closely to identify areas of intervention and reduction as proactive measures in the Municipality's strategic focus on the management of disasters in the city. The use of skilled personnel with expertise in science and technology is a critical factor in the application of updated disaster risk reduction initiatives within the Municipality.

6.8 AREAS FOR FUTURE RESEARCH

- Effectiveness of the CCTV programme as a crime disaster reduction strategy in the eThekwini Municipality;
- Assessment of the role of a disaster advisory forum as an important addition to disaster management unit for strategic risk management;
- Community participation as a major concern for more vigorous engagement and resilience in disaster risk reduction within the eThekwini Municipality;

- Role of the engineering department in proactive strategies for disaster risk reduction;

- Continuous training as an empowerment tool for disaster management personnel; and

- Functionality of disaster management ward-based volunteer program as a foundation for informed communities.

.

BIBLIOGRAPHY

American Red Cross, www.preventionweb.net Accessed on: 12 February 2018.

Abarquez, I, and Murshid Z. 2004. Community based disaster risk management: Field practitioners' handbook, Asian disaster preparedness centre (ADPC), www.adpc.net Accessed on: 21 July 2018.

Babbie, E.2004. The Practice of Social Research. Wadsworth: Thomson Learning Inc.

Baker, JL.2012. Climate change, disaster risk and the urban poor: Cities building resilience for a changing world, World Bank Productions, Washington DC.

Bang, HN. 2013. Governance of disaster risk reduction in Cameroon: The need to empower local government. JAMBA: Journal of Disaster Risk Studies. 5(2): 77-87.

Bhattacherjee, A. 2012, Social Sciences Research: Principles, Methods & Practices. Textbook Collection, Book 3, University of South Florida, Available on http://scholarcommons.usf.edu/oa_textbooks/3 p35 Accessed on: 22 November 2017.

Blaikie, P, Cannon, T. Davis, I and Wisner B. 2004. At risk: natural hazards, people's vulnerability and disasters. 2nd ed. London: Routledge.

Bluff and Port entrance to Durban http://ports.co.za/admin/large/image.395,jpg Accessed on: 15 May 2017.

Bluhm, DJ. Harman, W. Lee, TW and Mitchell, TR. 2011. Qualitative research in management: A decade of progress. Journal of Management studies. 48(8): 1866-1891.

Botha, D and Van Niekerk, D. 2013. Views from the frontline: A critical assessment of local risk governance in South Africa. JAMBA: Journal of Disaster Risk Studies. 5(2): 82-92.

Botha, D, Van Niekerk, D, Wentink, G, Tshana, T, Maartens, Y, Forbens, K, Annadale, E, Coetzee, C and Raju, E. 2011. Disaster risk management status assessment at municipalities in South Africa. Pretoria: South African Local Government Association (SALGA).

Bullock, JA Haddow, DG Coppola, Ergin, Westerman and Yeletaysi. 2006. The historical context of emergency management: Introduction to homeland security. 2nd Edition, Burlington, MA: Elsevier, Butterworth-Heinemann.

Cohen, N. and Areil, T. 2011. Field research in conflict environment: Methodological challenges and snowball sampling. Journal of Peace Research. 48(4): 423-435.

Coetzee, C & Van Niekerk, D. 2012, Tracking the Evolution of the Disaster Management Cycle: A General Systems Theory Approach, JAMBA: Journal of Disaster Risk Studies. 4(1): 5-20, published on http://dx.doi.org/10.4102/jamba.v4i1.54, Accessed on: 6 December 2017.

Creswell, JW. 2007. Qualitative inquiry & research design. Thousand Oaks. California: Sage.

Creswell, JW. 2008. Qualitative inquiry & research – choosing among five traditions: Three components involved in a design. Thousand Oaks, California: Sage.

Creswell, JW. 2009. Research design: Qualitative, Quantitative and Mixed methods approaches 3rd ed. London: Sage.

Creswell, JW. 2013. Research design: Qualitative, Quantitative and Mixed methods approaches 4th ed. London: Sage.

Creswell, JW. 2015. Research Design: Qualitative, Quantitative and Mixed methods approaches 4th edition. London: Sage.

Cronin, MS. 2008. Social work in the international context of poverty and social inequality. 18 World Conference of Social Work, 6(2): 1-14.

Dladla, S. (2016) Storms shut Durban beaches. Adapted from Daily newsletter online https://www.iol.co.za Accessed on: 10 February 2017.

Dludla, B.2016. Effectiveness of the eThekwini Municipality disaster risk reduction strategy pertaining to fires at informal settlements: A case of Clare Estate informal settlements, South Africa. https://researchspace.ukzn.ac.za/bitstream/handle/10413/14967/Dludla.Bongiwe-2016 Accessed on: 16 January 2019.

Durban Beach http://www.i love Durban.co.za/category/ history, posted 2013/01/22. http://parts.co.za/admin/large/image395jpg Accessed on: 10 November 2016.

Ejeta, LT, Ardalan A, and Paton D. 2015. An application of behavioural theories to disaster and emergency health preparedness: A systematic review. Version 1 PLoS Currents: Public Library of Science Currents Disasters. 31(1): 16-47. http://dx.doi.org/10.1371/currents.dis31a8995ced321301466db400f135782 Accessed on: 21 February 2018.

Evans, C. 2015. Urbanising nature: A political ecology case study of Sydney Park, State of Australian Cities National Conference, Gold coast, Queensland. Faculty in the Built environment Australia 09-11 December. https://scholargoogle.com.au/ Accessed on: 21 July 2018.

eThekwini Integrated Development Plan: 2016/2017, annual review 2015-2016, www.durban.gov.za Accessed on: 12 February 2018.

eThekwini Integrated Development Plan, 2018/2019 review. Disaster Management Unit 201. www.durban.gov.za Accessed on: 21 July 2018.

EWC-II, 2006. Second International Conference on early warning. Developing Early Warning Systems: From concept to action. Bonn, German 27-29 March. www.ewc2.org Accessed on: 02 December 2017.

Eyerkaufer, ML, Lima, FS and Goncalves, MB. 2016. Public and Private Partnership in disaster risk management. JAMBA: Journal of Disaster Risk Studies. 8(1): 277-287.

Flora, CB and Flora, JL. 2014. Developing entrepreneurial rural communities. Sociological Practice. 8(1):197-207.

Gunawan, J. 2015. Ensuring trustworthiness in qualitative research. Belitung Nursing Journal.1(1): 4-15. 10: ISSN2477-4073 http://www.doi.org/1033546/bnj.4

Gutek, G. 2014. Philosophical, Ideological and Theoretical Perspectives on Education. New Jersey: Pearson. ISBN: 9780132852388.

Haddow, DG and Bullock, JA. 2006. Emergency Management. 2nd Edition, New York. Elsevier Butterworth.

Haddow, G, Bullock, J and Coppola, DP. 2013. Introduction to Emergency Management (paperback), 5th Edition, United Kingdom, ISBN: 9780124104051.

Haddow G, Bullock J and Coppola DP, 2017. Introduction to Emergency Management (paperback), 6th Edition, United Kingdom, ISBN 13:978-0128030646.

Hilhorst, D Baart, J Van der Haar, G and Leeftink, FM. 2015. Is disaster normal for indigenous people? Indigenous knowledge and coping practices: Disaster prevention management.24(4): 506-522. http://dxdoi.org/101108/DPM-02-2018-0002

Hoek, E, Ibe K, Elemike E and Chukwuma S. 2014. Fire extinguishing strength of the combustion product of wood sawdust (ash). Journal of Application Sciences and Environmental Management. 18(3): 553-557.

Howe, PD. 2011. Hurricane preparedness as anticipatory adaptation: A case study of community businesses, Global Environmental Change. 2(1): 711-720. http://dx.doi.org/10.1016/jglomvcha.291.02.001

Hunter, I (2007) posted 2013. Extensive flooding and damage to coastal infrastructure along the KwaZulu-Natal Coast. South African Weather Service. : http://ports.co.za/admin/large/image.395,jpg Accessed: 20 March 2017.

Iloka, GN. 2016. Indigenous knowledge for disaster risk reduction: An African Perspective. JAMBA: Journal of Disaster Risk Studies. 8(1): 272.

Intergovernmental Panel on Climate Change (IPCC), 2012. Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX) Assessment Report 5: 26-35, Cambridge University Press, New York Accessed on: 20 July 2015.

International Strategy for Disaster Reduction (ISDR), 2008, Indigenous Knowledge for Disaster Risk Reduction: Good Practices and lessons Learned from Experiences in the Asia-Pacific.http://www.unisdr.org/eng/about_isdr/isdr-publications/19 Indigenous_Knowledge-DRR/Indigenous_Knowledge-DRR Accessed on: 5 April 2018.

Kaji, M. 2017. Disaster risk reduction Japanese initiatives in the World Agenda, 24(1): 58-73.

Kelman, I, Mercer J and Gaillard JC. 2015. Climate change's role in disaster risk reduction's future: Beyond vulnerability & resilience. International Journal of Disaster Risk Science. 6(1): 21-27.

Kent, R. 1994. Disaster Preparedness Framework. 2nd Edition University of Wisconsin: Disaster Management Centre. DHA Disaster training programme, New York/Geneva: UNDP. http://undmtp.org/english/disaster_preparedness/disaster Accessed on: 14 November 2017.

Kihila, JM. 2017. Fire disaster preparedness and situational analysis in higher learning institutions of Tanzania, JAMBA: Journal of Disaster Risk Studies. 9(1): 311-320.

Kukali, AN and Kabuka EK. 2009. Fire Disasters in Secondary Boarding Schools in Kenya. International Journal of Disaster Management and Risk Reduction. 3(3): 60-71.

Lang, J Mastella, AS De Souza, JB and Boff, ML. 2012, 'Aplicação do modelo VBA de responsabilidade social corporativa a uma instituição de ensino superior', in XXXII Encontro Nacional de Engenharia de Produção, Anais… XXXII ENEGEP, Bento Gonçalves, October 15–18.

Le Roux, T. 2013. An exploration of the role of communication during the in-crisis situation. JAMBA: Journal of Disaster Risk Studies. 5(12): 67-72. http://dx.doi.org/104102/jamba.V512.67

Martin, L. 2015. The Promise of the Maker Movement for Education, J-PEER: Journal of Pre college Engineering Education Research. 5(1): 4-14. https://doi.org/10.771/2157-92881099 Accessed on: 23 March 2018.

Mathbor, GM. 2007. Enhancement of community preparedness for natural disasters. The role of social work in building social capital for sustainable disaster relief and management, London: Sage Journals. 50(3): 357-369. https://doi.og/10.1177/0020872807076049

Muyambo, F, Bahta YR and Jordaan AJ. 2017. The role of indigenous knowledge in drought risk reduction: A case study of communal farmers in South Africa. JAMBA: Journal of disaster risk studies. 9(1): 420-429.

Napier, M and Rubin, M, 2002. Managing environmental and disaster risks affecting informal settlements: Lessons in innovative practice from Southern Africa. Council for Scientific and Industrial Research (CSIR), South Africa 92-104. https://www.researchgate.net>publications/329736250-managing-environmental-and-disaster-risks-affecting-informal- Accessed on: 23 March 2018.

National Disaster Management Centre, Annual Report 2015/2016. www.ndmc.gov.za>Documents Accessed on: 24 February 2017.

Ndzaruzaniye, V Lipper, L Fiott, D Flavell, A and Clover J. 2014. Climate change and Security in Africa's Vulnerability Discussion paper: Africa Climate Change Environment & Security (ACCESS), Research gate 3(9). https://www.researchgate.net/publication/264359896_Climate_Change_and_Security _in_Africa_Vulnerability_Report

News online: Permission restricted to Durban Beaches https://www.iol.co.za Accessed on: 12 April 2018.

Ngcamu, BS. 2011. Disaster risk management in local government: A case study of Foreman and Kennedy road informal settlements eThekwini Municipality, KwaZulu-Natal. Durban University of Technology. VIRTUS Scholar Journal. 8(3): 352-356. Published on http://dx.doi.org/10.22495/cocv8i3c3p1 Accessed on: 12 May 2017.

Ngcamu, BS. 2012. Disaster preparedness by local government: A case study of Foreman and Kennedy road informal settlements in the eThekwini Municipality, KwaZulu-Natal. Durban University of Technology. Department of Public Management and Economics. http://www.disaster.co.za Accessed on: 30 June 2017.

Olowu, D. 2010. The Hyogo Framework for Action and its implications for disaster management and reduction in Africa. JAMBA: Journal of Disaster Risk Studies. 3(1): 303-320.

Paton, D and Johnson, D. 2001. Disasters and Communities: Vulnerability, Resilience and Preparedness. Disaster Prevention and Management. 10(4):270-277. MCB University Press New Zealand.

Paton, D. 2003. Disaster Preparedness: a social cognitive perspective. Disaster Prevention and Management: An International Journal. 12(3): 210-216.

Piper, CHA. 2009, TorqAid Victorian Bushfires Royal Commission Submission http://www.torqaid.com/images/stories/TorqAidBushfireCommissionSubmission.pdf Accessed on: 12 January 2018.

Piper, CHA. 2015. A diagrammatic framework for disaster risk management. https://www.preventionweb.net/files/21008-21008torqaiddiagrammatricframework Accessed on: 12 January 2018.

Post Reporters, 2017. The Post Newspaper: Nature's Deadly Fury, 11 October 2017:1-2. Also available online https://www.pressreader.com/south-africa/post-south africa/20171011/281938838134415

Purmanund, H, 2005. An evaluation of disaster and risk management in the Durban South Basin: with particular reference to community awareness. University of KwaZulu Natal. https://researchspace.ukzn.ac.za Accessed on: 12 January 2018.

Reitz T. 2017. Pragmatic Philosophy and the Social Function of Knowledge. In: Mensburger P, Werlen B, Suarsana L. Knowledge and Action, Knowledge and Space Springer, Chan. Online ISBN 978-3-319-44588-5, eBooks. Accessed on: 16 January 2019.

Rogers, DP and Tsirkunov, V. 2011. Implementing Multi-hazard EWS based on Best Practices in the hydro-meteorological community. Global Assessment Report on disaster risk reduction, ISDR and World Bank 2010. http://www.preventionweb.net/english/hygo/gar/2011/en/bgdocs/Rogers Accessed on: 22 November 2017.

Sakijege, T, Sartohadi J, Marfai MA, Kassenga GR and Kasala SE. 2014. Assessment of adaptation strategies to flooding: A comparative study between informal settlement of Keko Machungwa in Dares Salaam, Tanzania & Sangkrah in Sarakarta. Indonesia. JAMBA: Journal of Disaster Risk Studies. 6(1): 13-32. https://doi.org/104102/jamba.v6i1.13

Samarajiva, R, and Waidyanatha, N. 2009. Two complementary mobile technologies for disaster warning: The Journal of Policy, Regulation and Strategy for Telecommunications. 11(2): 58-65. https://doi.org/10.1108/14636690910941885 Accessed on: 18 February 2017.

Schwarts, MS and Carrol, AB. 2007. Integrating and Unifying Competing and Complementary Frameworks: The Search for a Common Core in the Business and Society. JAMBA: Journal of Disaster Risk Studies. 20(10): 1-39. http://dx.doi.org/10.1177/0007650306297942 Accessed on: 18 November 2017.

Sekaran, U and Bougie, JRG. 2010. Research Methods for Business: A Skill-Building Approach. 5th Edition, New York: John Wiley Publishers, Available on http://pure.uvt.nl/portal/en/publications/research-methods Accessed on 27 June 2018.

Shamano, N. 2010. An investigation into the disaster risk reduction (DRR) efforts in Gutu District, Zimbabwe: A focus on drought early warning systems. University of the Free State. http://www.ufs.ac.za.docs.disaster-management-training-and-education-centre-for-africa Accessed on: 30 June 2017.

Skinner, JC and Rampersad R. 2014. A revision of communication strategies for effective Disaster Risk Reduction: A case study of the South Durban Basin, KwaZulu-Natal, South Africa, JAMBA: Journal of Disaster Risk Studies. 6(1): 132-141 http://doi.org/10.4102/jamba.V6:1,132

South Africa (Republic) 1996. Constitution of the Republic of South Africa. Pretoria: Government Printers.

South Africa (Republic) 1999. Public Finance Management Act, (Act 1 of 1999 as amended). Pretoria: Government Printers.

South Africa (Republic) 2000. Local Government Municipal Systems Act, (Act 32 of 2000). Pretoria: Government Printers.

South Africa (Republic) 2002. Disaster Management Act, (Act 57 of 2002). Pretoria: Government Printers.

South Africa (Republic) 2015. Disaster Management Act, (Act 16 of 2015 amendment). Cape Town: Government Printers.

South Africa (Republic) 2001. Weather Service Act, (Act 8 of 2001). Pretoria: Government Printers.

Srinivas, H and Nakagawa Y. 2008. Environmental implications for disaster preparedness: Lessons learnt from the Indian Ocean Tsunami. Journal Environmental Management 89: 4-13. http://dx.doi.og/10.1016/j.jenvman.2007.01.054

Steiner, R Kaiser C Tapscott C and Navarro C. 2018. "Is local always better? Strengths and limitations of local governance for service delivery". International journal of Public Sector Management. 31(4): 394-409. http://doi.org/10.1108/JPSM-05-2018-226

Subban, M and Sahadeo R, 2017. Disaster risk reduction in perspectives in Health service delivery in South Africa. International Journal of Social Sciences and Human Studies Journal 9(2): 65-79 ISSN: 1309-8063.

Tachizawa, EM. 2014. Towards a theory of multi-tier sustainable supply chains: A systematic literature review. Supply Chain Management 19(5/6), 643-663.

Tachizawa, T. 2014. NGOs and the third sector: Strategies for atuação, 5th Edition. Atlas, São Paulo.

Tang, X and Zou Y. 2009. Overview of Shanghai MHEWS and the role of NMHS, Second Experts' Symposium on MHEWS with focus on the role of NMHS, 5-7 May 2009, Toulouse France. http://www.wmo.int/pages/prog/drr/events/MHEWS 11/201/Shanghai

Terrell, SR. 2012. Mixed-methods research methodologies. The qualitative report journal. 17(1): 254-280.

The Sphere Project, 2004 The Sphere Project: Humanitarian Charter and Minimum Standards in Disaster Relief revised 2010 edition. http://www.sphereproject.org/content/view/476/278/ Accessed on: 9 April 2018.

Thompson, M and Cuba, IG. 2004. Weathering the storm: Lessons in risk reduction from Cuba. Boston, America, http://eird.org/isdr/biblio/pdf/Cuba Accessed on: 2 August 2017.

Turner, D. W. 2010. Qualitative Interview Design: A Practical guide for novice investigators. The qualitative Report. 15(3): 754-760.

Twigg, J. 2015(a). Disaster risk reduction: Good Practice Review 9. http://www.goodpracticereview.org Accessed on: 21 January 2018.

Twigg, J. 2015(b), Disaster Risk Reduction: Mitigation and Preparedness in Development and Emergency Programming. Humanitarian Practice Network, Good Practice Review 9. London: Oversees Development Institute available at http://www.goodpracticereview.org Accessed on: 07 February 2017.

United Nations Development Programme (UNDP), 2004. Reducing disaster risk: A challenge for development. New York.

UNISDR, 2009. Status Report on Disaster Risk Reduction in Sub-Saharan Africa Contributing to the Implementation of the Hyogo framework for action and the Africa Regional Strategy. Available at www.preventionweb.net Accessed on: 21 January 2018.

United Nations International Strategy for Disaster Reduction (UNISDR), 2005. DRR Private sector partnership. Post 2015 Framework-Private Sector Blueprint, Five Private Sector Visions for a Resilient Future. http://www.unisdr.org>files Accessed on: 21 January 2018.

UNISDR, 2015. Sendai Framework for disaster risk reduction 2015-2030. Third World Conference. http://www.wcdrr.org/uploads/sendai Accessed on: 10 April 2018.

UNISDR, 2016. Disaster risk reduction achievements: good practices, tools and initiatives supported by the DIPECHO programme. https://www.unisdr.org/we/inform/publications/52176 Accessed on: 5 December 2018.

Van der Waldt, G. 2009. Public Management and disaster risk reduction: potential interdisciplinary contributions. JAMBA, Journal of Disaster Risk Studies. 2(1): 14-27.

Van Niekerk, D and Vermaak J. 2004. Disaster risk reduction in South Africa. Development Southern Africa. 21(3): 555-574.

Van Niekerk, D Tempelhoff, J Falling, W Thomson, L Jordaan D Coetzee, C and Maartens, Y.2009. The effects of climate change in two flood laden and drought stricken areas in South Africa: Responses to climate change- past, present and future. National Disaster Management Centres.

Van Niekerk, D. 2011(a). USAID from the American People: Introduction to disaster risk reduction. 5-53. Compiled August 2011.

Van Niekerk, D. 2011(b). Disaster risk reduction, disaster risk management and disaster management: Academic rhetoric or practical reality? JAMBA: Journal of Disaster Management. 3(1): 235-248.

Van Niekerk, D. 2012. Disaster risk governance in Africa: A retrospective assessment of progress in against the Hyogo framework for action (2000-2012). JAMBA: Journal of Disaster Prevention and Management, 24: 397-416.

Vermaak, J. 2004, Disaster risk reduction initiatives in South Africa: Development Southern Africa. 9(1): 555-574. Published online: http://dx.doi.org/10.1080/0376835042000265487 Accessed on: 1 July 2017.

Williams, K. 2009. Emergency planning in the UK: The players, the partnerships and the pressures. London: Aon Benfield UCL Hazard Centre. https://www.ucl.ac.uk/hazardcentre/resources/working_papers/working_papers_folder/wp25 Accessed on: 09 December 2017.

Wilkinson, E. 2009. Building a culture of prevention: Challenges to institutionalising disaster risk reduction in development in Mexico. London: UCL Hazard Centre available at http://www.ucl.ac.uk/hazardcentre/resources/workingpapers Accessed on: 07 February 2017.

Wilson, G. 2012. Community resilience and environmental transitions. Routledge: London.

Work on Fire (WOF), http://www.workingonfire.org/fire-in-the-south-african-landscape Accessed on: 15 May 2017.

World Meteorological Organisation (WMO). 2009. Weather, climate and the air we breathe. http://www.public.wmo.int Accessed on: 09 December 2017.

World Meteorological Organization (WMO). 2015. Synthesis of the Status and Trends with the Development of Early Warning Systems. A contribution to Global Assessment Report 2015 (GAR15), Priority for Action (PFA) 2- Core Indicator (CI) 3 Early Warning Systems, Geneva. http://public.wmo.int Accessed on: 12 February 2018.

Xin, J and Huang, C. 2013. Fire risk analysis of residential buildings based on scenario clusters and its application in fire risk management. Fire safety journal. 6(2): 72-78.

Yin, RK. 2009. Case study research, design and methods. 4th ed. London: Sage.

Yin, RK. 2012. Applications of case study research. 3rd ed. Chicago: Sage.

Yin, RK. 2013. Case study research: Design and methods. 5th ed. Los Angeles: Sage.

ANNEXURE A

ETHICAL CLEARANCE CERTIFICATE

UNIVERSITY OF ™
KWAZULU-NATAL
INYUVESI
YAKWAZULU-NATALI

26 February 2018

Ms Nompumelelo Theodorah Mabaso 951030565
School of Management, IT and Governance
Westville Campus

Dear Ms Mabaso

Protocol reference number: HSS/0159/018M
Project Title: Evaluation of Disaster Risk Reduction Initiatives at eThekwini Municipality's Disaster Management Unit

Full Approval – Expedited Application

In response to your application received 23 February 2018, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL.**

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment /modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

Professor Shenuka Singh (Chair)
Humanities & Social Sciences Research Ethics Committee

/pm

cc Supervisor: Professor Mogie Subban
cc. Academic Leader Research: Professor Brian McArthur
cc. School Administrator: Ms Angela Pearce

Humanities & Social Sciences Research Ethics Committee
Professor Shenuka Singh (Chair)
Westville Campus, Govan Mbeki Building
Postal Address: Private Bag X54001, Durban 4000
Telephone: +27 (0) 31 260 3587/8350/4557 Facsimile: +27 (0) 31 260 4609 Email: ximba@ukzn.ac.za / snymanm@ukzn.ac.za / mohuno@ukzn.ac.za
Website: www.ukzn.ac.za

1910 - 2010
100 YEARS OF ACADEMIC EXCELLENCE
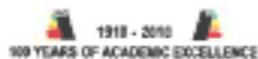
Founding Campuses: ■ Edgewood ■ Howard College ■ Medical School ■ Pietermaritzburg ■ Westville

136

ANNEXURE B

GATEKEEPER'S LETTER

Pod 1, Second Floor, Intuthuko Junction, 750 Mary Thiphe Street, Umkhumbane, Cato Manor, Durban 4001.
Tel: 031 322 4513, Fax: 031 261 3405, Fax to email: 086 265 7180, Email: mile@durban.gov.za, Website:
www.mile.org.za

For attention:
Chair of Ethics Committee
School of Management, IT & Governance
University of KwaZulu-Natal
Westville Campus

3 November 2017

RE: LETTER OF SUPPORT TO NOMPUMELELO MABASO, STUDENT NUMBER 951090565 - GRANTING PERMISSION
TO USE ETHEKWINI MUNICIPALITY AS A CASE STUDY

The Disaster Management Unit and eThekwini Municipal Academy (EMA), have considered a request from Ms
Nompumelelo Mabaso to use eThekwini Municipality as a research study site leading to the awarding of a Masters
in Public Administration entitled: *"Evaluation of Risk Reduction Initiatives at eThekwini Municipality's Disaster
Management Unit"*.

We wish to inform you of the acceptance of her request and hereby assure her of our utmost cooperation towards
achieving her academic goals; the outcome which we believe will help our municipality improve its service delivery.
In return, we stipulate as conditional that she presents the results and recommendations of this study to the
related unit/s on completion of her research study, accompanied by her academic supervisor.

NB: The researcher is reminded of the ethical considerations when undertaking research.

Wishing Ms Mabaso all the best in her studies.

Mr Vincent Ngubane
Head: Disaster Management Unit
eThekwini Municipality
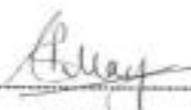
Collin Pillay
Program Manager: MILE
eThekwini Municipality

LETTER FROM LANGUAGE PRACTITIONER

THE WRITING STUDIO
Writing and Editing Practice

Certificate 2019/7

TO WHOM IT MAY CONCERN

9 JULY 2019

This dissertation, entitled **EVALUATION OF DISASTER RISK REDUCTION INITIATIVES AT ETHEKWINI MUNICIPALITY'S DISASTER MANAGEMENT UNIT**, has been edited and reviewed to ensure technically accurate and contextually appropriate use of language for research at this level of study.

Yours sincerely

CM ISRAEL, BA Hons (UDW) MA (UND) MA (US) PhD(UNH)
LANGUAGE EDITOR AND WRITING CONSULTANT
Connieisrael90@gmail.com Mobile 082 4988166

ANNEXURE D

LETTER OF INFORMED CONSENT: INTERVIEWS

UNIVERSITY OF KWAZULU-NATAL
SCHOOL of Management, Information Technology and Governance

Dear Respondent,

Master's in Public Administration Research Project
Researcher: Nompumelelo Theodorah Mabaso (Telephone number: 0738406865)
Email: mpumemabaso4@gmail.com
Supervisor: Prof. M Subban (Office Telephone number 031 260 7763)
Email address: subbanm@ukzn.ac.za

I am Nompumelelo Theodorah Mabaso studying towards a Masters in Public Administration in the School of Management, Information Technology and Governance at the University of KwaZulu-Natal. You are invited to participate in a research project entitled **"Evaluation of Disaster Risk Reduction initiatives at eThekwini Municipality's Disaster Management Unit."** The intended study will assess Disaster Risk Reduction measures and systems used in the Municipality and determine the capacity, skill and resource of the Disaster Management Unit in managing, coordinating and preparing for disaster before they occur. It will further assist to evaluate whether such mechanisms and processes are effective or adequate in addressing disaster risk reduction.

The results of the survey are intended to assist eThekwini Municipality to evaluate the mechanisms and processes that they are currently using in the management and reduction of a disaster.

Your participation in this project is voluntary. You may refuse to participate or withdraw from the project at any time with no negative consequence. There will be no monetary gain from participating in this survey. Confidentiality and anonymity of records identifying you as a participant will be maintained by the School of Management, Information Technology and Governance, UKZN.

For further clarity regarding the study or have any questions or concerns about completing the **interview** or about participating in this study, you may contact me or my supervisor at the numbers listed above.

The interview should take you about 30-40 minutes to complete. I hope you will take the time to complete this survey.

Sincerely

Investigator's signature_____ Date_____

_____

<u>CONSENT</u>

I…………………………………………………………… (Full names of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project.

I understand that I am at liberty to withdraw from the project at any time, should I desire to do so.

SIGNATURE OF PARTICIPANT   DATE

……………………………………………………………………………………

INTERVIEW SCHEDULE FOR DMECU OFFICIALS

RESEARCH TOPIC: Evaluation of Disaster Risk Reduction initiatives at the eThekwini Municipality's Disaster Management Unit

1. **Institutional arrangement of Disaster Management Unit assisting in overcoming crisis**

1.1. Can you explain the organogram of the unit including staff compliment.

………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………

1.2. Do they have the necessary training, skills, knowledge and capacity to manage disasters?

………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………

1.3. Does the Disaster Management Unit have the required instruments and equipment to assist in performing its function productively?

………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………

1.4. Does the Municipality have a Disaster Management/Operation Centre?

………………………………………………………………………………………………

1.5. Is the Centre fully operational and effective?

………………………………………………………………………………………………
………………………………………………………………………………………………

1.6. How many complaints are accepted per day? Why?

……
....

1.7. Are there any problems in capturing data and responding to emergencies within a short response time?

……
……
……
……

1.8. Whose responsibility is it to develop and use forecasting methods?

……
……

1.9. What programs and Disaster Risk Reduction activities does the Disaster Management Unit undertake?

……
……
……
……
……

1.10. Is the community empowered to prevent, prepare and minimize disasters?

……
……
……

2. Major threats and hazards

2.1. Kindly advise on the major disasters that have occurred recently within the municipal area/-community.

……
……
……
……
……

2.2. Do you believe that storms, fires and floods pose the biggest threats and problems?

……

……

……

……

2.3. What is the worst effect of a disaster in the community?

……

……

……

……

2.4. What effect disasters have on the community and Municipality as a whole?

……

……

……

……

2.5. How are these disasters managed (pre-and post) internally?

……

……

……

……

……

2.6. Are there formal procedures to identify hazards before, and to curb them?

……

……

……

……

2.7. What is the turnaround time for responding to disasters with intervention strategies?

……

……

……

2.8. Do the current relief measures provide sufficient restoration, dignity and rehabilitation of the affected communities?

………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………

3. DRR policies and strategies in place

3.1. Kindly explain if Disaster Risk Reduction is a priority for the municipality?

………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………

3.2. Which channels are used to collect emergency and forecast information?

………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………

3.3. What policies and strategies are currently employed by the municipality to minimize disasters?

………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………

3.4. What challenges does the unit face in utilizing both traditional and modern Disaster Risk Reduction initiatives?

………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………

3.5. Which Disaster Risk Reduction initiatives can be incorporated into Disaster Risk Reduction policies?

……

……

3.6. Do you think the community is receptive and content with the initiatives currently employed in the management of disasters?

……

……

……

4. Role of stakeholders and role-players

4.1. Which role-players and stakeholders have partnered with the municipality?

……

……

……

4.2. Whose responsibility is it to coordinate partnerships and intergovernmental structures?

……

……

4.3. Explain the responsibility of stakeholders and role-players in the management and reduction of a disaster.

……

……

……

……

4.4. What is the procedure for providing support?

……

……

……

4.5. What relationship do these structures and sectors have to be pro-active in its approach?

……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………

5. Municipal financial commitments and external donors

5.1. Where does funding come from for Disaster Risk Management/Reduction initiatives?

……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………

5.2. Are there budget allocations for Disaster Risk Management/Reduction initiatives in the Municipality?

……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………

5.3. Does the municipality raise its own funds to curb disasters?

……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………

5.4. Does national and provincial government support DRR activities in the Municipality? Elaborate.

……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………

5.5. Is the Municipality in partnership with any agent to minimize catastrophes in its area?

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

5.6. Briefly explain the category of external donors and their contribution to DRR initiatives

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

5.7. To what extent do external donors contribute to pre- and post- disaster?

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

5.8. Do businesses, NGOs and civic organisations play any role in relation to pre- and post-disasters?

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

5.9. Kindly lay out the accountability procedures for funding in relation to disaster management?

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
………………………………………………………………………………………………....

6. Recommendations

6.1. Are there any future plans to reduce disasters to low or non-occurrence or the impact levels**?**

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

6.2. Which gaps have been identified in terms of addressing and managing disasters in the Municipality?

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

6.3. What can be done to address these gaps?

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

THANK YOU FOR PARTICIPATION

INTERVIEW SCHEDULE FOR DONOR AGENCIES

RESEARCH TOPIC: Evaluation of Disaster Risk Reduction initiatives at the eThekwini Municipality's Disaster Management Unit

1. **Institutional arrangement of Disaster Management Unit assisting in overcoming crisis**

1.1. What is the name of your agency and its principle?

………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………

1.2. Briefly highlight your relationship with the Municipality in question?

………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………

1.3. Is the agency participating in any disaster-related activities?

………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………

.

1.4. What responsibility does the agency play in the management and reduction of a disaster in the Municipality?

………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………

1.5. In your own opinion, do you regard the Municipality as skilled, knowledgeable and capacitated enough to manage disasters? Elaborate.

……………………………………………………………………………………………
……………………………………………………………………………………………
……………………………………………………………………………………………
……………………………………………………………………………………………
……………………………………………………………………………………………
……………………………………………………………………………………………

1.6. Do they have the necessary instruments and equipment required to perform their duties effectively?

……………………………………………………………………………………………
……………………………………………………………………………………………
……………………………………………………………………………………………

1.7. Looking at the communities, would you say they are empowered to prevent, prepare and minimize disasters?

……………………………………………………………………………………………
……………………………………………………………………………………………
……………………………………………………………………………………………
……………………………………………………………………………………………
……………………………………………………………………………………………
……………………………………………………………………………………………

1.8. What programs and Disaster Risk Reduction activities has the agency and the Municipality partnered with?

……………………………………………………………………………………………
……………………………………………………………………………………………
……………………………………………………………………………………………
……………………………………………………………………………………………
……………………………………………………………………………………………

2. Major threats and hazards

2.1. What are the recent occurring disasters that the agency has been exposed to within the Municipality?

……………………………………………………………………………………………
…..……………………………………………………………………………………………..

2.2. Would you say that fires, storms and floods pose the biggest threats and problems in the Municipality?

……

……

2.3. What is the worst effect of a disaster in the community?

……

……

……

……

……

……

2.4. What is the turnaround time for responding to disasters with intervention strategies?

……

……

……

……

2.5. Do the current relief measures provide sufficient restoration, dignity and rehabilitation of the affected communities?

……

……

……

……

3. Disaster Risk Reduction policies and strategies?

3.1. Is the agency aware of the policies that govern Disaster Risk Reduction in the Municipality?

……

……

3.2. Has there ever been a conflict between your disaster intervention policies and strategies and those of the Municipality?

……

……

……

……

3.3. Does the agency regard Disaster Risk Reduction as a priority in the Municipality?

……

……

……

3.4. Which methods are used by the Disaster Management Unit to forecast, curb or respond to a disaster?

……

……

……

……

3.5. What is the role of your agency to the above?

……

……

……

……

3.6. What challenges does the unit face in utilizing both traditional and modern Disaster Risk Reduction initiatives?

……

……

……

……

3.7. Which DRR initiative do you believe can be incorporated into DRR policies?

……

……

……

3.8. Do you think the community is receptive and content with the initiatives currently employed in the management of disasters?

……

……

……………………………………………………………………………………………………
……………………………………………………………………………………………………

4. Role of stakeholders and role-players

4.1. Is the agency a partner with the Municipality for the management and reduction of disasters?
……………………………………………………………………………………………………

4.2. How was the partnership between the agency and the Municipality established?
……………………………………………………………………………………………………
……………………………………………………………………………………………………

4.3. Whose responsibility was it to coordinate this partnership?
……………………………………………………………………………………………………

4.4. Are there any terms of reference for this partnership?
……………………………………………………………………………………………………
……………………………………………………………………………………………………

4.5. What relationship the agency has with the Municipality to be pro-active in its approach to disaster?
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………

4.6. What is the procedure for providing support?
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………

4.7. What form of assistance is provided?
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………

4.8. Has the agency ever encountered any problems in the execution of its duties within the municipality?

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

4.9. To what extent does the agency as an external donor contribute to the empowerment of communities and Municipal staff, pre- and post- disaster?

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

4.10. How does the Municipality account for any assistance provided?

…………………………………………………………………………………………………
…………………………………………………………………………………………………

4.11. What are the successes of your interventions in the management/reduction of disasters?

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

5. Municipal financial commitments and external donors

5.1. Where does funding come from for Disaster Risk Reduction initiatives?

…………………………………………………………………………………………………

5.2. Do you think the Municipality is doing enough to respond to disasters as they occur?

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

5.3. To what extent does your agency as an external donor contribute to pre- and post-disaster?

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

5.4. Kindly lay out the accountability procedures for funding in relation to disaster management?

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

6. Recommendations

6.1. Are there any challenges encountered when making interventions?

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

6.2. Which gaps have been identified in terms of addressing and managing disasters in the Municipality?

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

6.3. What do you think could be done to address these gaps?

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

THANK YOU FOR YOUR PARTICIPATION

ANNEXURE G

INTERVIEW SCHEDULE FOR COUNCILLORS

RESEARCH TOPIC: Evaluation of Disaster Risk Reduction initiatives at the eThekwini Municipality's Disaster Management Unit

POLITICAL PARTY: ……………………………………………………………..

WARD: ……….. /PR ----------------

1. **Institutional arrangement of Disaster Management Unit assisting in overcoming crisis**

1.1. What is the responsibility of the Disaster Management Unit?
……………………………………………………………………………………………
……………………………………………………………………………………………

1.2. How was the unit formed?
……………………………………………………………………………………………
……………………………………………………………………………………………
……………………………………………………………………………………………

1.3. Any idea how the unit is structured?
……………………………………………………………………………………………
……………………………………………………………………………………………
……………………………………………………………………………………………

1.4. Do you believe that the officials of the Disaster Management Unit have necessary training, skills, knowledge and capacity to manage disasters?
……………………………………………………………………………………………
……………………………………………………………………………………………
……………………………………………………………………………………………
……………………………………………………………………………………………

1.5. Looking at the responding time to a disaster, would you say the unit has the required instruments and equipment that assist it to perform its function productively?

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

1.6. From your experience what is the turnaround time of responding to emergencies?

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

1.7. Would you say the Disaster Management/Operational Centre is fully functional and effective?

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

1.8. What programs and Disaster Risk Reduction activities does the Municipality's Disaster Management Unit undertake?

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

1.9. Is the community empowered to prevent, prepare and minimize disasters?

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

1.10. Whose responsibility is it to empower the community?

…………………………………………………………………………………………………
…………………………………………………………………………………………………

1.11. What is the role of the Councillor in disaster management and reduction?

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

2. Major threats and hazards

2.1. Kindly advice on the major disasters that have occurred recently within the municipal area/-community.

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

2.2. Do you believe that storms, fires and floods pose the biggest threats and problems?

…………………………………………………………………………………………………
…………………………………………………………………………………………………

2.3. What is the worst effect of a disaster in the community?

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

2.4. What effect does disasters have on the Municipality as a whole?

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

2.5. Are there formal procedures to identify hazards before, and to curb them?

…………………………………………………………………………………………………
…………………………………………………………………………………………………

2.6. What is the turnaround time for responding to disasters with intervention strategies?

………………………………………………………………………………………………………

………………………………………………………………………………………………………

2.7. Do the current relief measures provide sufficient restoration, dignity and rehabilitation of the affected communities?

………………………………………………………………………………………………………

………………………………………………………………………………………………………

………………………………………………………………………………………………………

2.8. Do these measures meet community expectations?

………………………………………………………………………………………………………

………………………………………………………………………………………………………

………………………………………………………………………………………………………

………………………………………………………………………………………………………

3. DRR policies and strategies in place

3.1. Kindly explain if Disaster Risk Reduction is a priority for the municipality?

………………………………………………………………………………………………………

………………………………………………………………………………………………………

………………………………………………………………………………………………………

3.2. What policies and strategies are currently employed by the municipality to minimize disasters?

………………………………………………………………………………………………………

………………………………………………………………………………………………………

………………………………………………………………………………………………………

………………………………………………………………………………………………………

3.3. Which Disaster Risk Reduction initiatives can be incorporated into Disaster Risk Reduction policies?

………………………………………………………………………………………………………

………………………………………………………………………………………………………

………………………………………………………………………………………………………

………………………………………………………………………………………………………

3.4. What is the role of a Councillor in relation to disaster management and reduction policies and strategies?

……
……
……
……
……

3.5. Do you think the community is receptive and content with the initiatives currently employed in the management of disasters?

……
……
……
……

4. Role of stakeholders and role-players

4.1. Which role-players and stakeholders have partnered with the Municipality?

……
……
……

4.2. Whose responsibility is it to coordinate partnerships and intergovernmental structures?

……
……
……

4.3. Explain their responsibility in the management and reduction of a disaster.

……
……
……
……
……
……
……

4.4. What is the procedure for providing support?

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

4.5. What relationship do these structures and sectors have to be pro-active in its
   approach?

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

5. Municipal financial commitments and external donors

5.1. Where does funding come from for Disaster Risk Management/Reduction?

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

5.2. Are there budget allocations for Disaster Risk Management/Reduction initiatives in
   the municipality?

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

5.3. Does the municipality raise its own funds to curb disasters?

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

5.4. Do national and provincial governments support Disaster Risk Reduction activities in
   the municipality? Elaborate.

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

5.5. Is the municipality in partnership with any agent to minimize catastrophes in its area?

……

……

……

5.6. Briefly explain the category of external donors and their contribution to DRR initiatives

……

……

……

5.7. To what extent do the external donors contribute to pre- and post- disaster?

……

……

……

5.8. Do businesses, NGOs and civic organisations play any role in relation to pre- and post-disasters?

……

……

……

5.9. Kindly lay out the accountability procedures for funding in relationship to disaster management?

……

……

……

……

6. Recommendations

6.1. Are there any challenges when disaster management interventions are made?

……

……

……

……

……

……

6.2. Are there any future plans by the Disaster Management Unit to reduce disasters to low or non-occurrence or the impact levels?

……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………

6.3. Which gaps have been identified in terms of addressing and managing disasters in the Municipality?

……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………

6.4. What do you think could be done to address these gaps?

……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………

THANK YOU FOR PARTICIPATING

ALIGNMENT OF INTERVIEW QUESTIONS TO STUDY OBJECTIVES

Table A5-1: Alignment of interview questions to study objectives (DMU Officials)

Objectives	Interview Questions
Determine the current bureaucratic systems (structure, personnel, resources, capacity, skills and equipment) that would assist the municipality to overcome crisis in times of emergencies.	- Can you explain the organogram of the unit including staff compliment? - Do they have the necessary training, skills, knowledge and capacity to manage disasters? - Does the Disaster Management Unit have the required instruments and equipment to assist in performing its function productively? - Does the Municipality have a Disaster Management/Operation Centre? - Is the Centre fully operational and effective? - How many complaints are accepted per day? Why? - Are there any problems in capturing data and responding to emergencies within a short response time? - Whose responsibility is it to develop and use forecasting methods? - What programs and Disaster Risk Reduction activities does the Disaster Management Unit undertake? - Is the community empowered to prevent, prepare and minimize disasters?
Highlight the major threats and hazards	Kindly advise on the major disasters

affecting communities within the eThekwini Municipal Area	that have occurred recently within the municipal area/-community.
	• Do you believe that storms, fires and floods pose the biggest threats and problems?
	• What is the worst effect of a disaster in the community?
	• What effect disasters have on the community and Municipality as a whole?
	• How are these disasters managed (pre-and post) internally?
	• Are there formal procedures to identify hazards before, and to curb them?
	• What is the turnaround time for responding to disasters with intervention strategies?
	• Do the current relief measures provide sufficient restoration, dignity and rehabilitation of the affected communities?
Critically analyses disaster risk reduction policies and strategies within the Municipality during tragedy	• Kindly explain if Disaster Risk Reduction is a priority for the municipality?
	• Which channels are used to collect emergency and forecast information?
	• What policies and strategies are currently employed by the municipality to minimize disasters?
	• What challenges does the unit face in utilizing both traditional and modern Disaster Risk Reduction initiatives?

	• Which Disaster Risk Reduction initiatives can be incorporated into Disaster Risk Reduction policies? • Do you think the community is receptive and content with the initiatives currently employed in the management of disasters?
Identify and discuss the role and duties played by various sectors and role-players pre- and post-crisis in relation to their roles and commitment.	• Which role-players and stakeholders have partnered with the municipality? • Whose responsibility is it to coordinate partnerships and intergovernmental structures? • Explain the responsibility of stakeholders and role-players in the management and reduction of a disaster. • What is the procedure for providing support? • What relationship do these structures and sectors have to be pro-active in its approach?
Determine and discuss the municipality financial commitments and that of external donors in preparedness and responding to crisis	• Where does funding come from for Disaster Risk Management/Reduction initiatives? • Are there budget allocations for Disaster Risk Management/Reduction initiatives in the Municipality? • Does the municipality raise its own funds to curb disasters? • Does national and provincial government support DRR activities in the Municipality? Elaborate. • Is the Municipality in partnership

	with any agent to minimize catastrophes in its area?
	• Briefly explain the category of external donors and their contribution to DRR initiatives
	• To what extent do external donors contribute to pre- and post- disaster?
	• Do businesses, NGOs and civic organisations play any role in relation to pre- and post-disasters?
	• Kindly lay out the accountability procedures for funding in relation to disaster management?
Assess the imbalance in the application of disaster management plans, and make recommendations to the municipality to address the gaps.	• Are there any future plans to reduce disasters to low or non-occurrence or the impact levels?
	• Which gaps have been identified in terms of addressing and managing disasters in the Municipality?
	• What can be done to address these gaps?

Table A5-2: Alignment of interview questions with research objectives (Councillors)

Objectives	Interview Questions
Determine the current bureaucratic systems (structure, personnel, resources, capacity, skills and equipment) that would assist the municipality to overcome crisis in times of emergencies;	• What is the responsibility of the Disaster Management Unit? • How was the unit formed? • Any idea how the unit is structured? • Do you believe that the officials of the Disaster Management Unit have necessary training, skills, knowledge and capacity to manage disasters? • Looking at the responding time to a disaster, would you say the unit has the required instruments and equipment that assist it to perform its function productively? • From your experience what is the turnaround time of responding to emergencies? • Would you say the Disaster Management/Operational Centre is fully functional and effective? • What programs and Disaster Risk Reduction activities does the Municipality's Disaster Management Unit undertake? • Is the community empowered to prevent, prepare and minimize disasters? • Whose responsibility is it to empower the community? • What is the role of the Councillor in disaster management and reduction?

Highlight the major threats and hazards affecting communities within the eThekwini Municipal Area	• Kindly advice on the major disasters that have occurred recently within the municipal area/-community.
	• Do you believe that storms, fires and floods pose the biggest threats and problems?
	• What is the worst effect of a disaster in the community?
	• What effect does disasters have on the Municipality as a whole?
	• Are there formal procedures to identify hazards before, and to curb them?
	• What is the turnaround time for responding to disasters with intervention strategies?
	• Do the current relief measures provide sufficient restoration, dignity and rehabilitation of the affected communities?
	• Do these measures meet community expectations?
Critically analyses disaster risk reduction policies and strategies within the Municipality during tragedy	• Kindly explain if Disaster Risk Reduction is a priority for the municipality?
	• What policies and strategies are currently employed by the municipality to minimize disasters?
	• Which Disaster Risk Reduction initiatives can be incorporated into Disaster Risk Reduction policies?
	• What is the role of a Councillor in relation to disaster management and

	reduction policies and strategies? • Do you think the community is receptive and content with the initiatives currently employed in the management of disasters?
Identify and discuss the role and duties played by various sectors and role-players pre- and post-crisis in relation to their roles and commitment	• Which role-players and stakeholders have partnered with the Municipality? • Whose responsibility is it to coordinate partnerships and intergovernmental structures? • Explain their responsibility in the management and reduction of a disaster. • What is the procedure for providing support? • What relationship do these structures and sectors have to be pro-active in its approach?
Determine and discuss the municipality financial commitments and that of external donors in preparedness and responding to crisis	• Where does funding come from for Disaster Risk Management/Reduction? • Are there budget allocations for Disaster Risk Management/Reduction initiatives in the municipality? • Does the municipality raise its own funds to curb disasters? • Do national and provincial governments support Disaster Risk Reduction activities in the municipality? Elaborate. • Is the municipality in partnership with any agent to minimize catastrophes in its area?

	- Briefly explain the category of external donors and their contribution to DRR initiatives - To what extent do the external donors contribute to pre- and post- disaster? - Do businesses, NGOs and civic organisations play any role in relation to pre- and post-disasters? - Kindly lay out the accountability procedures for funding in relationship to disaster management?
Assess the imbalance in the application of disaster management plans, and make recommendations to the municipality to address the gaps.	- Are there any challenges when disaster management interventions are made? - Are there any future plans by the Disaster Management Unit to reduce disasters to low or non-occurrence or the impact levels? - Which gaps have been identified in terms of addressing and managing disasters in the Municipality? - What do you think could be done to address these gaps?

Table A5-3: Alignment of interview questions with study objectives (Donor Agencies)

Objectives	Interview Questions
Determine the current bureaucratic systems (structure, personnel, resources, capacity, skills and equipment) that would assist the municipality to overcome crisis in times of emergencies	• What is the name of your agency and its principle? • Briefly highlight your relationship with the Municipality in question? • Is the agency participating in any disaster-related activities? • What responsibility does the agency play in the management and reduction of a disaster in the Municipality? • In your own opinion, do you regard the Municipality as skilled, knowledgeable and capacitated enough to manage disasters? Elaborate. • Do they have the necessary instruments and equipment required to perform their duties effectively? • Looking at the communities, would you say they are empowered to prevent, prepare and minimize disasters? • What programs and Disaster Risk Reduction activities has the agency and the Municipality partnered with?
Highlight the major threats and hazards affecting communities within the eThekwini Municipal Area	• What are the recent occurring disasters that the agency has been exposed to within the Municipality? • Would you say that fires, storms and floods pose the biggest threats and

	• problems in the Municipality? • What is the worst effect of a disaster in the community? • What is the turnaround time for responding to disasters with intervention strategies? • Do the current relief measures provide sufficient restoration, dignity and rehabilitation of the affected communities?
Critically analyses disaster risk reduction policies and strategies within the Municipality during tragedy	• Is the agency aware of the policies that govern Disaster Risk Reduction in the Municipality? • Has there ever been a conflict between your disaster intervention policies and strategies and those of the Municipality? • Does the agency regard Disaster Risk Reduction as a priority in the Municipality? • Which methods are used by the Disaster Management Unit to forecast, curb or respond to a disaster? • What is the role of your agency to the above? • What challenges does the unit face in utilizing both traditional and modern Disaster Risk Reduction initiatives? • Which DRR initiative do you believe can be incorporated into DRR policies?

	• Do you think the community is receptive and content with the initiatives currently employed in the management of disasters?
Identify and discuss the role and duties played by various sectors and role-players pre- and post-crisis in relation to their roles and commitment	• Is the agency a partner with the Municipality for the management and reduction of disasters? • How was the partnership between the agency and the Municipality established? • Whose responsibility was it to coordinate this partnership? • Are there any terms of reference for this partnership? • What relationship the agency has with the Municipality to be pro-active in its approach to disaster? • What is the procedure for providing support? • What form of assistance is provided? • Has the agency ever encountered any problems in the execution of its duties within the municipality? • To what extent does the agency as an external donor contribute to the empowerment of communities and Municipal staff, pre- and post-disaster? • How does the Municipality account for any assistance provided? • What are the successes of your interventions in the management/reduction of disasters?

174

Determine and discuss the municipality financial commitments and that of external donors in preparedness and responding to crisis	• Where does funding come from for Disaster Risk Reduction initiatives? • Do you think the Municipality is doing enough to respond to disasters as they occur? • To what extent does your agency as an external donor contribute to pre- and post- disaster? • Kindly lay out the accountability procedures for funding in relation to disaster management?
Assess the imbalance in the application of disaster management plans, and make recommendations to the municipality to address the gaps.	• Are there any challenges encountered when making interventions? • Which gaps have been identified in terms of addressing and managing disasters in the Municipality? • What do you think could be done to address these gaps?

ALIGNMENT OF DATA COLLECTION TOOLS TO RESEARCH OBJECTIVES

Table 5.4: Alignment of data collection tools to research objectives.

Table A5-4: Alignment of first study objectives and data gathering methods

Study Objectives	Interview Question
Objective 1 Determine the current bureaucratic systems (structure, personnel, resources, capacity, skills and equipment) that would assist the municipality to overcome crisis in times of emergencies	• Do they have the necessary training, skills, knowledge and capacity to manage disasters? • Does the Disaster Management Unit have the required instruments and equipment to assist in performing its function productively? • What is the responsibility of the Disaster Management Unit?

Table A5-5: Alignment of second study objective and data gathering methods

Study Objective	Interview Question
Objective 2 Highlight the major threats and hazards affecting communities within the eThekwini Municipal Area	• Kindly advise on the major disasters that have occurred recently within the municipal area/-community • What effect disasters have on the community and Municipality as a whole?

Table A5-6: Alignment of third study objective and data gathering methods

Study Objective	Interview Question
Objective 3 Critically analyses disaster risk reduction policies and strategies within the Municipality during tragedy	• What policies and strategies are currently employed by the municipality to minimize disasters? • Which Disaster Risk Reduction initiatives can be incorporated into Disaster Risk Reduction policies? • Has there ever been a conflict between your disaster intervention policies and strategies and those of the Municipality?

Table A5-7: Alignment of fourth study objective and data gathering methods

Study Objective	Interview Question
Objective 4 Identify and discuss the role and duties played by various sectors and role-players pre- and post-crisis in relation to their roles and commitment	• Explain the responsibility of stakeholders and role-players in the management and reduction of a disaster • What relationship do these structures and sectors have to be pro-active in its approach? • What responsibility does the agency play in the management and reduction of a disaster in the Municipality? • Do businesses, NGOs and civic organisations play any role in relation to pre- and post-disasters?

Table A5-8: Alignment of fifth study objective and data gathering instruments

Study Objective	Interview Question
Objective 5 Determine and discuss the municipality financial commitments and that of external donors in preparedness and responding to crisis	• Are there budget allocations for Disaster Risk Management/Reduction initiatives in the Municipality? • Briefly explain the category of external donors and their contribution to DRR initiatives • To what extent does your agency as an external donor contribute to pre- and post- disaster?

Table A5-9: Alignment of sixth research objective and data gathering instruments

Study Objective	Interview Question
Objective 6 Assess the imbalance in the application of disaster management plans, and make recommendations to the municipality to address the gaps.	• Which gaps have been identified in terms of addressing and managing disasters in the Municipality? • Are there any challenges encountered when making interventions?

ANNEXURE J

TEN ESSENTIALS FOR MAKING CITIES DISASTER RESILIENT

The Ten Essentials for Making Cities Resilient Checklist

1. Organize for disaster resilience. Put in place an organizational structure with strong leadership and clarity of coordination and responsibilities. Establish Disaster Risk Reduction as a key consideration throughout the City Vision or Strategic Plan.

2. Identify, understand, and use current and future risk scenarios. Maintain up-to-date data on hazards and vulnerabilities. Prepare risk assessments based on participatory processes and use these as the basis for urban development of the city and its long-term planning goals

3. Strengthen financial capacity for resilience. Prepare a financial plan by understanding and assessing the significant economic impacts of disasters. Identify and develop financial mechanisms to support resilience activities.

4. Pursue resilient urban development and design. Carry out risk-informed urban planning and development based on up-to-date risk assessments with particular focus on vulnerable populations. Apply and enforce realistic, risk compliant building regulations

5. Safeguard natural buffers to enhance the protective functions offered by natural ecosystems. Identify, protect and monitor natural ecosystems within and outside the city geography and enhance their use for risk reduction

6. Strengthen institutional capacity for resilience. Understand institutional capacity for risk reduction including those of governmental organizations, private sector, academia, professional and civil society organizations, to help detect and strengthen gaps in resilience capacity.

7. Understand and strengthen societal capacity for resilience. Identify and strengthen social connectedness and culture of mutual help through community and government initiatives and multimedia channels of communication.

8. Increase infrastructure resilience. Develop a strategy for the protection, update and maintenance of critical infrastructure. Develop risk mitigating infrastructure where needed.

9. Ensure effective preparedness and disaster response. Create and regularly update preparedness plans, connect with early warning systems and increase emergency and management capacities. 10. After any disaster, ensure that the needs of the affected population are placed at the centre of reconstruction, with support for them and their community organisations to design and help implement responses, including rebuilding homes and livelihoods.

10. Expedite recovery and build back better. Establish post-disaster recovery, rehabilitation, and reconstruction strategies that are aligned with long-term planning and providing an improved city environment.