

UNIVERSITY OF KWAZULU-NATAL
TOWARDS A TOTAL DISASTER RISK MANAGEMENT FRAMEWORK FOR
IMPLEMENTATION OF DISASTER RISK REDUCTION PROGRAMMES: THE CASE OF
NELSON MANDELA BAY METROPOLITAN MUNICIPALITY

by
MARTHA SIBANDA
214584513

A thesis in fulfilment of the requirements for the degree
of Doctor of Administration

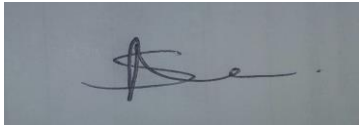
School of Management, IT and Governance
College of Law and Management Studies

Supervisor: Dr Mogie Subban

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DECLARATION STATEMENT

I declare that this thesis, “Towards a Total Disaster Risk Management Framework for implementation of Disaster Risk Reduction Programmes: The case of Nelson Mandela Bay Metropolitan Municipality” is my own work that I have submitted to the University of KwaZulu-Natal, and that all the sources I have used or quoted have been indicated and acknowledged by means of a complete bibliography.

A rectangular box containing a handwritten signature in dark ink on a light grey background. The signature is stylized and appears to consist of a large initial letter followed by a series of loops and a horizontal line.

Signature

22 March 2017

Date

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ABSTRACT

Man-kind for a long time continues to be exposed to many risks and disasters that cause destruction of property, loss of livelihood and lives. South Africa's commitment in Disaster Management (DM) gained momentum immediately after 1996, with development of the Disaster Management (DM) Green paper, and preceded by a series of policies and frameworks whose aim is to contribute to decent Disaster Risk Management(DRM) sustainable services to the citizens, especially the most vulnerable communities. The successful implementation of government policies in South Africa requires well established local government institutions who have been mandated by the constitution to contribute to enhanced service delivery. Thus, clearly formulated guiding frameworks within public administration and management principles must be adhered to consistently. In this regard, the study investigated disaster risk reduction programmes in Nelson Mandela Bay Metropolitan Municipality (NMBMM). A mixed methods approach was adopted in order to answer the main research question that is “to what extent can TDRMF be adapted and incorporated in implementation of Disaster Risk Reduction (DRR) programmes in NMBMM?”.

Quantitative data was collected using a closed-ended questionnaire while qualitative data was collected using an open-ended questionnaire, focus-group discussions, in-depth interviews and observation methods. It is submitted that the Total Disaster Risk Management Framework (TDRMF) can be implemented by the NMBMM to enhance DRR programmes in relation to risk reduction and service delivery. Considering its holistic nature, the framework component strategies are inter-related and complementary. By drawing from the TDRM, the study attempted to understand the enabling mechanisms in place, including: policy, structure, capacity building, and resources developed and institutionalised at the NMBMM to influence effective disaster risk reduction, considering the fact that both local authorities and communities face vast challenges in reducing risks and vulnerability of the residents. Data was collected from households and other DRM stakeholders, including the NMBMM DM staff, private sector, government-line departments and NGOs. One of the key findings was that the municipality faces enormous financial constraints that hinder the development and implementation of sustainable disaster risk reduction programmes. The research recommends greater political will and the development of a stakeholder communication framework that would bridge the existing communication gap among all stakeholders (a critical aspect of multi-level, multi-dimensional and multi-disciplinary

co-operation and collaboration mechanisms), as it relates to collaboration and leverage to manage financial resources. The study concludes that the TDRMF presents a “window of opportunity” for overall DRM implementation in NMBMM in particular, and could be replicated as due consideration for other South African local government municipalities. The study concluded that specifically, the NMBMM should be contextualised within the TDRMF to facilitate and enhance its commitment in designing and implementing disaster risk reduction programmes and initiatives in its quest to ensure that municipal service delivery is enhanced through providing a safer environment for local communities.

LIST OF ACRONYMS

ADRC	:	Asia Disaster Risk Centre
ADRC	:	Asian Disaster Reduction and Response Network
CBDRMA	:	Community-Based Disaster Risk Management Approach
CRED	:	Centre for Research on the Epidemiology of Disasters
CCTV	:	Closed Circuit Television
DRC	:	Disaster Risk Governance
DRM	:	Disaster Risk Management
DRR	:	Disaster Risk Reduction
DM	:	Disaster Management
DMA	:	Disaster Management Act
DMAF	:	Disaster Management Advisory Forum
EWS	:	Early Warning Systems
ECOWAS	:	Economic Community of West African States
ECCAS	:	Economic Community of Central African States
EAC	:	East African Community
FEMA	:	Federal Emergency Management Agency
FFC	:	Financial and Fiscal Commission
GEAR	:	Growth, Employment and Redistribution
HFA	:	Hyogo Framework for Action
UNISDR	:	Inter-Parliamentarian Union/United Nations
IPU	:	International Strategy for Disaster Reduction
IAP	:	International Association for Public Participation
ICT	:	Information Communication Technologies
ICSU	:	International Council for Science Union
ISSC	:	International Social Science Council
ILO	:	International Labour Organization
IDP	:	Integrated Development Plan
IFRC	:	International Federation of Red Cross
IFRC/RCS	:	International Federation of Red Cross and Red Crescent Societies
IS	:	Inferential Statistical

ISSC	:	International Social Science Council
IDDMC	:	Inter-Departmental Disaster Management, Committee
IDNDR	:	International Decade for Natural Disaster Reduction
KPA	:	Key Performance Area
LED	:	Local Economic Development
MTEF	:	Medium-Term Expenditure Framework
NMBMM	:	Nelson Mandela Bay Metropolitan Municipality
MFM	:	Municipal Finance Management Act
MDG	:	Millennium Development Goals
NDP	:	National Development Plan
NGO	:	Non-Governmental Organisation
NDMC	:	National Disaster Management Centre
NDMF	:	National Disaster Management Framework
PAEP	:	Public Awareness Education Programmes
PDMC	:	Provincial Disaster Management Centre
SADC	:	Southern African Development Community
SADA	:	South African Defence Army
SALGA	:	South African Local Government Association
SADC	:	Southern African Development Community
SDG	:	Sustainable Development Goals
SFDRR	:	Sendai Framework for Disaster Risk Reduction
SLAF	:	Sustainable Livelihoods Analysis Framework
SPSS	:	Statistical Package for Social Scientists
TDRMF	:	Total Disaster Risk Management Framework
UN	:	United Nations
UNDP	:	United Nations Development Programme
UNISDR	:	United Nations International Strategy for Disaster Reduction
USAID	:	United States Agency for International Development
UNECA	:	United Nations Economic Commission for Africa

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CHAPTER ONE

INTRODUCTION AND OVERVIEW OF THE STUDY

1.1 INTRODUCTION

There is a global concern to protect planet earth from increasing impacts of both man-made and natural disasters. Current efforts are based on the fact that Disaster Risk Management (DRM) remains a complex area of study because it has not fully matured into a discipline, but is considered an “emerging, applied social science”. However, as an emerging field of study, it benefits from borrowing from other established disciplines. Disaster Risk Management demands good governance practices and sustainable service delivery. However, good governance and service delivery issues are currently highly contested constructs in South Africa, mainly because of the increased service delivery protests since the emergence of democracy. Many South Africans live in a state of “generalised precariousness resilience”, mainly because citizens do not fully take account of social justice and power (Good Governance Learning Network 2014).

This research is therefore within the focus of both disaster risk management and disaster risk reduction implementation, as it relates to good governance and enhanced service delivery through effective and efficient disaster risk reduction programmes. The formulation, implementation and review of disaster risk management public policy lies within the ambit of government processes, as the value of democracy is achieved through practices of public administration by ensuring sustainable service delivery to the citizens, advances Cloete (1993: 112). Moreover, Subban, Pillay, Bhowan and Raga (2007:34) emphasise the meaning of the statement “We belong, We care, We serve!”, which resonates from the Principles of Batho Pele, in which government institutions and parastatals are mandated with ensuring that communities have access to enhanced services. This in turn seeks to ensure that monitoring and evaluation frameworks are followed to maintain standards of services offered.

In recent years, the state of disaster occurrences has obviously increased, based on 21st Century research that indicates that disasters continue to cause extreme difficulties across the globe, as

outlined by the United Nation (2015: 1). In 2015, 198 natural catastrophes occurred, the highest ever recorded in one year, with heat waves that claimed 3,500 lives in Pakistan and India in what was the warmest year on record since 1880. This was as a result of abnormally strong El Niño, and human and financial losses during 2015 due to heavy seasonal rainfalls which claimed over 450 lives and left 250,000 people homeless in Malawi, Zimbabwe and Mozambique (United Nation 2015: 1). To emphasise the challenge, the number of people who lost their lives or went missing due to natural disasters was 26, 000 which highlights an increased number of deaths compared to 2014 (Resilient Cities Report 2016: 4). Thus, disaster risks are increasingly of global concern and their impact in one region could have an enormous impact in another, and *vice versa* (United Nation 2015: 1 & Tobin and Montz 1997: 1).

Natural hazards also continue to cause direct threats to national security because their impact is amplified by rapid growth and unsustainable development practices, both of which increase exposure and vulnerabilities of communities and capital assets (International Social Science Council 2015: 2 & Ismail-Zadeh 2016: 1). These negative occurrences have a direct implication for efforts made towards attaining sustainable development, which requires those responsible to put more effort into reducing risks as a major foundation for sustainable development. The situation in managing hazards, risks and disasters is rather more complex in developing countries; therefore, challenges posed by disaster occurrences have the worst impact in these countries. However, when it comes to reporting and estimation of natural disaster damages in Africa, it remains extremely challenging, as data is often poorly reported or lacking altogether, contends Guha - Sapir, Hoyois and Below 2012: 28 & Kabaka and Stoltenkamp (2013: 1). This is normally as a result of limited capacity for both leadership and resource usage. In this case, the role of state institutions becomes very critical, and is implemented through governance and effective and efficient public management practices. Research also shows that half of the Sub-Saharan African population lives on less than \$1.25 a day, which evidently has a direct impact of rolling back whatever progress is gained in development efforts (World Bank 2016).

There seems to be limited evidence on whether existing policies on disaster risk management and risk reduction have been beneficial in Sub-Saharan countries. Local government institutions are tasked with ensuring that services in all aspects relating to risk management are implemented, for example, reduction of losses of lives and livelihood for all citizens. In this research, South Africa

is not an exception as it faces many localised disasters (floods, fires and drought), some of which have been defined as a national challenge. Additionally, disaster-related challenges in South Africa have been predicted or expected to become complex due to the rising number in population, which leads to human settlements expansion within environmentally delicate areas, especially those declared non-habitable, asserts Khudair (2012). The South African National Disaster Management Framework of 2005 states that South African communities continue to experience growing levels of disaster risks. The country faces exposure to numerous weather hazards such as, cyclones, persistent droughts and severe storms that are capable of triggering widespread social-economic shocks, creating hardship and devastation across communities. Moreover, the country's wide coastline and proximity to shipping routes present numerous marine and coastal threats. Its shared borders with other six southern African neighbours expose the country to human-induced cross-boundary risks, which also include the need for humanitarian assistance in times of emergency (South Africa 2005: 1).

It follows then that the South African National Disaster Management Centre (NDMC) describes disaster-related impacts generally as a challenging phenomenon to the government and communities. The NDMC makes reference to disaster-related impacts that are recorded to cost the country hugely in various ways annually, including widespread negative consequences for the lives of citizens, settlements, infrastructure and other essential services. In 2010 and 2011, the National Treasury reserved R600 million in "ring-fenced" funding for long-term expenditure relating to floods alone. In the same years (2010 and 2011), a conditional grant funding of R185 billion was set aside for immediate disaster needs for both municipalities and provinces across the country. Additionally, a total of R254 million was reserved over the medium-term expenditure framework (MTEF) period for national departments dealing with disaster prevention and mitigation activities across the country (NMBMM 2010 - 2011: 5). This information calls for enhanced efforts in the implementation of the Disaster Management Act 57 of 2002 and other related frameworks.

Municipalities are accountable for developing and implementing disaster risk reduction programmes for efficiency and effectiveness in service delivery efforts in the area of overall disaster management. The Constitution of the Republic of South Africa, 1996 (Schedule 4) on

functional areas of concurrent national and provincial legislative competence, requires that disaster management-related service delivery issues be implemented by the government. Furthermore, in part B, fire-fighting services are a local government responsibility. These Constitutional provisions are rights of the citizens which should be implemented and respected (South Africa 1996: 148). However, in recent years, South Africa continues to face continuous service delivery protests which are linked to poor governance in broader terms, in which blame is directed to all spheres of Government-National, Provincial and Local Government (Allan and Heese 2011). Therefore, the concept of governance cannot be overlooked, as it enables officials and their respective offices to exercise their economic and administrative authority, as well political capacity to manage a nation's affairs. Good governance entails complex mechanisms, processes and institutions through which citizens and groups articulate their interests, exercise their obligations and legal rights, and enable mediation of their differences (United Nations Development Programme [UNDP], cited in Mkhabela 2013: 9).

Through the Integrated Development Plan (IDP), which is the municipalities' key strategic planning and development tool, municipalities are held responsible for offering decent basic services to citizens. As a Constitutional mandate, an IDP is a 5-year plan which is reviewed annually. The reviewing process provides an opportunity to address the real, relevant and prioritised needs and concerns of local communities (Nelson Mandela Bay Metropolitan Municipality 2006–2011: 9). Moreover, basic municipal services require government offices to simply provide decent services to the public (South Africa 2002). In this case, municipal IDP plans are required to develop and implement disaster risk reduction plans/initiatives as part of their strategic initiatives towards enhancing service delivery and promoting safer environments for local communities.

Researchers Van Niekerk and Visser (2010: 1) acknowledge that many international efforts including organisations and bodies, continue “promoting and establishing programmes and strategies for disaster risk reduction i.e. early warning systems, regional response units and food security monitoring”. Some of these bodies include the United Nations, national governments, non-governmental organisations, academic and research institutions, submit Van Niekerk and Visser (2010: 1). This argument links with research compiled by Subban and Theron (2011: 21),

who provided a discussion on the shift prior to 1994, when municipalities' in South Africa main concern was service provision and implementation of regulations. However, after the introduction of the Constitution of the Republic of South Africa, 1996 and related new legislative and policy frameworks for local government, the role of local government significantly expanded and within the current dispensation, "Municipalities were required to be developmental in approach and activities" submits Subban and Theron (2011: 21). These efforts have not translated to risk reduction in South Africa. Thus, vulnerability reduction efforts of the communities to risks has not been achieved, as highlighted in Chapter Five, which was a motivation to undertake this research towards addressing disaster risk reduction and create a concerted effort in addressing and ensuring that an environment is created whereby the vulnerability of communities is protected from the onslaught of potential risks. Sustainable risk reduction across the communities is reduced through developing and implementing relevant programmes and initiatives, which remain mainly a responsibility of the local government in South Africa.

1.2 PRELIMINARY LITERATURE REVIEW

The following section focuses on some of the key aspects that inform the literature review of the study. The importance of a literature review in this research is that it provided a conceptual framework for a critical analysis of the various theories on the current global status of DRM research, and specifically DRR in NMBMM.

1.2.1 Transforming Public Service Delivery through the Batho Pele Principles

This research focused on service delivery, which is a core responsibility of local government institutions in South Africa. The 1997 Batho Pele Principles are outlined by the White Paper on Transforming Public Service Delivery Policy which provides a foundation for offering decent services to the citizens. Eight principles are delineated to which all public sector institutions should adhere in the Republic of South Africa. Service delivery in South Africa received much political attention at the birth of democracy in 1994, so as to eradicate under-development of formerly marginalized parts of the country. In spite of many social-economic policies that were enacted from 1994 to address the social economic development challenges, there is a continued

escalation of service delivery protests in the country at large. Many of the protests are linked to communities' exposure to vulnerable circumstances, such as poor refuse collection, housing delivery and a continuous rise in crime. Subban and Theron (2011: 23) assert that the increased nature of service delivery protests has turned out to be a collective feature of most municipalities in South Africa, and is a reflection of community expectations that are not being met.

The eight Principles of Batho Pele include the following: consulting users of services, that is the citizens; service standards should be set and followed through monitoring and evaluation; there should be an increase in access to services as a citizen's right; services should be provided with courtesy to members of the public; quality and sufficient information should be provided; there has to be openness and transparency; accountability should be practised, and lastly, public finances should be spent wisely, getting the best possible value-for-money. These democratic principles are translated to "people's government", in which citizen participation in decision-making is the focal point. However, this process has not been very easy for it to be acknowledged by citizens. There are those citizens who remain or feel marginalized in a manner in which decisions affecting their lives are made by the government. This has resulted into public outrage with an increase of public service delivery demands, as discussed throughout the research. A concern can be raised therefore on whether the current state of relationship between the government and citizens is disjointed. Singh (2014: 6) indicates that a "broken" relationship between the government and citizens does exist, and that it is mainly characterised by poor public governance and interaction with citizens who are the main service delivery beneficiaries. A top-down approach characterises the existing status, whereby information mainly comes from institutions and most cases the information received by communities, is limited. Moreover, "public sector accountability leans more towards the political principals and parliament. Singh (2014: 6) is of the view that policy formulation and implementation forms a critical part of the public administration process as it demarcates the parameters of public service delivery, aiming to enhance such service delivery by making it more efficient and effective". The Batho Pele Principles is linked to the research questions as its focus is mainly on service delivery.

The essence of what is captured in the above quotation in relation to service delivery within a public administration context resonates with the long-term strategic focus of the Republic of South Africa National Development Plan, 2030 which places emphasis, amongst others, on infrastructure development to advance the delivery agenda. Disaster risk reduction implementation requires government commitment from all angles.

1.2.2 The Africa Union Agenda 2063 of 2013

Many African countries face high levels of disaster exposure and climate change impact that continue to pose many challenges in African communities. The Africa Union Agenda 2063 was adopted on 26th May 2013 with the main goal of building towards prosperous sustainable growth and development. The Agenda consists of seven aspirations; five of them have significance and a direct or indirect focus on sustainable risk reduction, as outlined below:

- To ensure environmentally sustainable growth and address climate change, an issue that is in line with DRM frameworks such as the Sustainable Disaster Risk Reduction (SDRR);
- Political integration across the continent: this objective advocates for integration among African states rather than mere co-operation;
- Democracy, good governance, human rights, justice and the Rule of Law: disaster risk reduction in Africa will demand political will to properly utilise available resources as part of the sustainable development priorities and development planning. Poverty reduction and other socio-economic challenges require good governance;
- Attainment of peace and security: this objective aims to achieve what it calls “silence the guns by 2020” (Africa Union 2014: 34). Africa’s continued instability presents a state of “hopelessness” as the state of humanitarian crises continue to worsen. This implies political commitment to reduction of man-made risk and disasters; and
- People-driven sustainable development: African countries face massive constraints when it comes to DRR and the overall implementation of DRM. This has been demonstrated in the manner in which reports of limited resources and limited capabilities are further

linked to poor response during emergencies' and to disaster emergencies and lack of sustainable recovery and rehabilitation process (Africa Union 2014: 34).

The overall achievement of development objectives envisioned by the African Union Agenda 2063 would contribute to progress made towards (Millennium Development Goals (MDG's) but more commitment is needed in the area of risk reduction, as is highlighted in Chapter Three and throughout the research study. Hence, the next section looks at South Africa's National Development Plan Vision 2030 in the context of DRR.

1.2.3 Contextualising the National Development Plan, 2030 for disaster risk reduction

Sustainable service delivery in risk reduction is very important for a healthy economy and communities of South Africa. In this regard, the National Development Plan (NDP) 2030 of the Republic of South Africa was developed to enhance reduction of inequalities and address escalating poverty in the country. Chapter 5 of the Plan focuses on building environmental sustainability, resilience and a move towards a low-carbon economy, through developing and implementing long-term strategies such as climate adaptation policies. Mitigation and preparedness measures are also advocated for, which collaborate with the Disaster Management Act 57 of 2002 of South Africa and other international DRM frameworks like the Sendai Framework for DRR. Against this background, the government needs to invest in strengthening institutions, especially those closest to the communities, that is, the local government sphere as one of the areas closest to local communities. Stemming from the NDP in the background of DRM, the policies and frameworks in DRM adopted at NMBMM are explored in the research.

1.2.4 Escalating nature of disasters

Disasters are any physical occurrences that affect the normal functioning of society, community or households. Such events have more impact on the most vulnerable communities or economies, often giving rise to the need for external assistance, as the affected communities or countries may not have the capability to restore normality, maintains Lavell, Oppenheimer, Diop, Hess, Lempert, Muir-Wood and Myeong (2012). The National Governors' Association cited in Tierney *et al* (2001: 5) define disasters as those events in a hazard cycle which present themselves through four stages of a disaster cycle: mitigation, preparedness, response and recovery. This argument is supported by the World Health Organization, which defines a disaster as an

unexpected ecologic occurrence of high impact that leaves the affected desperate to seek external support (United Nations International Strategy for Disaster Risk Reduction 2007). An alarming number of 120 countries were affected by natural disasters in 2012, with a record of 357 natural disasters, causing the deaths of more than 9,655 people and a loss to the global economy estimated at US\$157.3 billion, submits Guha-Sapir *et al* (2012: 13). This is clearly an indication of an increase in natural catastrophic events when compared to the year 2010 that had experienced approximately 167 natural disasters (Guha-Sapir *et al* 2012: 13). It can be said that poor and developing countries bear the most impact due to the poor nature of their preparedness and mitigation efforts which makes them the most vulnerable sector of society.

1.2.5 Sustainable Livelihoods Analysis Framework

Livelihood, in simpler terms, refers to subsistence or support for individuals or communities. The sustainable livelihoods approach refers to the framework or principles that help in understanding social-economic vulnerabilities of a community and guide action to address and overcome it. Krantz (2001: 37) states that a sustainable livelihood is characterised by assets (including both material and social resources) and activities required for means of living. It should be in a position to withstand and recover from disaster impacts, shocks and stresses, and maintain or enhance its capabilities and assets, while not undermining the natural resource base. Authors de Stage, Holloway, Mullins, Nchbaleng and Ward (2002: 4) further describe SLAF as “‘people’s capacity to generate and maintain their means of living, enhance their well-being and that of future generations. These capabilities are contingent upon the availability and accessibility options which are ecological, economic and political and which are predicated on equity, ownership of resources and participatory decision-making’”.

The SLAF application in this study was contextually used to analyse and assess NMBMM residents’ coping mechanisms, and nature of vulnerability to social-economic aspects. An example was used to determine the correlation between unemployment, social grants and exposure to risks and disasters. Other issues analysed included are service delivery through refuse collection and housing; how households recover from shocks and stresses, and how vulnerability can be reduced? A further key question included: Did existing DRM policies cater for DRR programmes?

The research further concedes that there are other central frameworks that are significant in analysing livelihoods and their relationships with DRR. A significant focal point here is the United Nations Development Programme (UNDP) Framework and also Policy Guidelines for Integrated Environmental Planning into Land Reform (PGIEP), among others.

1.3 RESEARCH PROBLEM AND OBJECTIVES

As mentioned earlier in the background information, disasters continue to cause loss of lives and destruction to livelihood activities in communities across the globe. The current IDP for NMBMM states that issues relating to disaster risk management must be given attention by developing and implementing necessary comprehensive measures to ensure that challenges facing the municipality in the areas of DRM service delivery are dealt with effectively and efficiently. These include reduction of hazards and risks, such as those associated with fire and other emergency-related risks, and reducing accidents and road fatalities in order to maintain acceptable levels of responses to emergencies (NMBMM 2006 – 2011). A report by the municipality further documented that various challenges continued to face the implementation of disaster risk reduction plans. One example was that by the time of this research, “risk reduction-related projects and initiatives had not been included in IDPs and a municipal standard for conducting comprehensive disaster risk assessments had not been developed” (NMBMM 2011 - 2012: 112). The municipality of NMBMM acknowledges the importance of enhancing co-ordination and integration of stakeholders’ actions through good communication and efficient exchange of relevant and reliable information. However, more effort is spent on response, rather than mitigation and utilisation of primary tools readily available in affected communities. The research then argued that the municipality may be ill-prepared to implement sustainable DRM. This statement is supported by the South African Local Government Association (2011: 97), that “many district municipalities still do not have the most basic disaster risk management structures in place, and that there still seem to be areas of ignorance regarding the basic principles of disaster risk management”.

This research therefore aims to determine if DRR programmes play an important role in the NMBMM as part of risks in service delivery. The research also investigated and documented the

enabling environment, that is, structure and measures for the effective application of TDRMF in DRR in the NMBMM, where both local authorities and communities face formidable challenges in managing risk and disasters. The research investigated the extent into which the TDRMF can be adapted and applied to enhance DRR programmes service delivery. Lastly, the research aimed to identify opportunities and challenges, thus enabling insights from the study to be used by other municipalities across South Africa in managing disaster risk management programmes.

The objectives guided by the research were as follows:

- To understand the multi-level, multi-dimensional and multi-disciplinary cooperation and collaboration mechanisms employed at NMBMM to influence effective disaster risk management;
- To ascertain the extent decisions based on reliable disaster risk information from hazard mapping and vulnerability assessment are employed at NMBMM to influence effective disaster risk management;
- To determine what the NMBMM is doing to enhance coordination and integration of stakeholders' actions through good communication and efficient exchange of relevant and reliable information;
- To understand the enabling mechanisms in place, including policy, structure, capacity building, and resources developed and institutionalized at the NMBMM to influence effective disaster risk management; and
- To ascertain the extent to which the disaster risk management process is implemented at the NMBMM level to the community level to influence effective disaster risk management.

In the context of many service delivery protests linked to disasters risk challenges affecting many communities in South Africa, the main research question answered was: To what extent can the TDRMF be adapted and incorporated in the implementation of DRR programmes in NMBMM? The TDRMF presents holistic component strategies that are inter-related and complementary to one another. In responding to the main posed research question, the following secondary

questions were addressed for purposes of presenting a more complete and comprehensive view on the possible findings:

- How can the multi-level, multi-dimensional and multi-disciplinary co-operation and collaboration mechanisms be employed at NMBMM to influence effective disaster risk management?
- To what extent are decisions based on reliable disaster risk information from hazard mapping and vulnerability assessment at NMBMM in influencing effective disaster risk reduction?
- What is the NMBMM doing to enhance coordination and integration of stakeholders' actions through good communication and efficient exchange of relevant and reliable information?
- What are the enabling mechanisms in place, including policy, structure, capacity building, and resources developed and institutionalized at the NMBMM to influence effective disaster risk reduction?
- How can disaster risk reduction programme and initiative implementation be inclusive of communities in NMBMM in addressing DRR?

1.4. PRINCIPAL THEORY UNDERPINNING THE RESEARCH

Research indicates that disaster risk management is a complex and evolving area of research, and based on this argument, it was important for this research to be grounded on a firm theory, so as to provide a stronger base, as indicated by Van der Waldt (2012: 9). This research used the TDRMF as one important construct to theorise the topic of the study. However, there are also other classical and contemporary theories that have been used to explain the phenomenon of DRM, with one such note on the Chaos Theory. Kiel (1995) states that Chaos Theory has been widely used to present a stable strategy of problem-solving in many disciplines, including public management. During a chaotic situation such as a disaster occurrence, chaos presents an opportunity to government institutions and systems to test their evolutionary potential. This implies that a chaotic disaster situation brings about a state of re-evaluating coping capabilities of vulnerable communities, existing policies and programmes for mitigation, preparedness,

response and recovery (Kiel 1995). This research, however, places emphasis on the TDRMF in particular, which is expounded conceptually and contextually in the study.

The ultimate aim of any DRM theories is to come up with ways of ensuring reduction in disaster impacts. A theory is an idea; henceforth, a theoretical framework becomes an outline of the idea on a certain case, for purposes of explaining societies and social examination, submits Walsham (1995: 76). Accordingly, the same author cautions that "...although a theory can provide a valuable initial guide, a limitation is the danger of the researcher only seeing what the theory suggests, and consequently using the theory in an inflexible way that suppresses potential new ways and avenues of investigation". This research was constructed based on TDRMF which has been discussed in detail in Chapter Two of the research study. The TDRMF emerged in the year 2003 through consultative efforts and is mainly applied by the Asian Disaster Reduction and Response Network (ADRC) and UN/OCHA Kobe office. The TDRMF is in line with the Hyogo Framework for Action (HFA) of 2005 to 2015. It was selected for the study given its emphasis on the need for multi-level, multi-dimensional (cross-sectoral), and multi-disciplinary co-ordination and collaboration among all disaster risk management stakeholders. Van Zyl (2006: 41, 42) states that the framework effectively communicates knowledge and techniques at all levels, and facilitates an enhanced appreciation of governments of the relevance of disaster risk management in achieving sustainable development strategies. The South African Local Government struggles to implement the DMA along these important requirements, making it a strong basis for the research.

The framework has a very holistic approach in which its five component strategies are inter-related and complementary. An exploration on each of the five components is presented in Chapter Two, and they include the following:

- Sustainable DRR should be approached through multi-dimensional, multi-level, and multi-disciplinary co-operation and collaboration processes;
- Hazard mapping and vulnerability assessment should be given priority to make decisions based on reliable disaster risk information;

- Integration and coordination of stakeholders' actions should be enhanced through good communication and efficient exchange of relevant and reliable information;
- Disaster risk reduction requires that all appropriate facilitating mechanisms are in place, including political will, policies, capacity building and structures; and
- In implementing disaster risk management processes, decisions are made by the national government and implemented down to community level (Asian Disaster Reduction Centre 2007).

These objectives are also a replica of the TDRMF which was important to allow for testing some of the key pillars of the framework, in the empirical study. Further justification is provided under the section significance and contribution of the study, and in Chapter Seven.

1.5 RESEARCH DESIGN AND METHODOLOGY

The research adopted both quantitative and qualitative research designs. A mixed methods approach for triangulation purposes was applied to generate information from the respondents. Triangulation represents application of multiple methods to study research questions for most appropriate explanations, admits Schutt (1999: 382). Triangulation enhanced the quality of findings since the data was collected separately, analysed and compared, and conclusions were drawn (Verhoeven 2011: 154). The study applied both quantitative and qualitative methods. Methods refer to techniques acceptable in creating, collecting, coding and organising and analysing data in a specific research effort, a view held by Verhoeven (2011: 17).

Qualitative data was collected from a total of 33 DRM stakeholders in NMBMM. The researcher conducted in-depth interviews with the NGOs management team, government Line- departments (Safety and Security Directorate DM management). Moreover, an open-ended questionnaire was used for the DM officials, while focus group discussions were held with community members. Lastly, the researcher used observation to gather more information. Quantitative data was collected using a closed-ended questionnaire that targeted a total of 300 households at Motherwell and Walmer Townships, and yielded a response rate of 99.7% overall.

The use of the mixed methods approach (Post-Positivist and Constructivist Worldviews) allowed for the inclusion of responses from different target groups. A more detailed discussion of these important research paradigms is presented in Chapter Four of the study.

1.5.1 Population and sampling

The population for the study was residents of NMBMM with samples drawn from Motherwell and Walmer Townships; the NGOs operating within the metro; government departments; private sector and the Security and Safety Directorate. Probability sampling was adopted as it allowed for generalization of the study results. Ethical considerations were observed through the entire research process. For example, respondents were informed of their right to privacy and anonymity, and also the importance of signing the consent form. The research was executed within all ethical procedures.

Table 1.1: Population and Sampling

Organisation	Designation	Instrument	Number Interviewed
Households	Motherwell and Walmer Townships	Closed-ended questionnaire	299
Disaster Management Centre	Disaster Management officials	Open-ended questionnaires;	10
City Management	Director for Safety & Security Directorate	In-depth interview	1
Non-Governmental Organizations (Al-Hamdaad Foundation and Red Cross International)	PE Office Managers	In-depth interview	2
Government Line Departments: <ul style="list-style-type: none"> ▪ South Africa Weather Service ▪ Human Settlements Department 	Departmental Managers	In-depth interview	2
Private sector: <ul style="list-style-type: none"> ▪ Coca-Cola Fortuner ▪ Woolworth stalls 	Branch /Store managers	In-depth interview	2
Community: <ul style="list-style-type: none"> ▪ Walmer Township ▪ Motherwell Township 	NMBMM Community members	Focus Group discussions	8 x 2=16
Total respondents			332

Source: Authors perspective

1.5.2 Data collection instruments

The researcher focused on reliability and validity, and this was warranted by understanding risks relating to reliability and validity of the instrument, as discussed in Chapter Four and guarding against unintentional error and bias. The data collection instruments as set out in the research are as follows:

1.5.2.1 Questionnaires

Two sets of questionnaires were self-administered in this study, that is, an open-ended questionnaire and a closed questionnaire. The closed questionnaire was administered to households at Motherwell and Walmer Townships and the open-ended questionnaire was administered to DM officials.

1.5.2.2 Focus Group Interviews

Focus group interviews were conducted with the community members from Walmer and Motherwell. The focus group is made up of people who voluntarily gave feedback on or judgement about a particular subject, which affects their lives, submits Salkind (2009: 303).

1.5.2.3 In-depth interviews

In-depth interviews were conducted with DRM stakeholders at NMBMM, namely, the DM officials, Safety and Security Directorate, NGO managers and private sector heads. Respondents were given an opportunity to respond to set questions and their responses were voice recorded.

1.5.2.4 Observation

Observation involves more than mere looking at things or events, but follows a systematic process of identifying and recording issues which are of the researcher's interest (Nieuwenhuis 2016: 90). The researcher observed various issues with regard to the status of DRR implementation at NMBMM, such as community members' non-verbal expression. The researcher also observed and recorded the institutional capacity of the stakeholders consulted in the research.

1.5.3 Data analysis

Quantitative data was analysed using the Statistical Package for the Social Sciences (SPSS). Descriptive analysis included means and standard deviations, where applicable, and frequencies were represented in tables or graphs. Inferential analysis was used to measure relationships using the Chi-Square Tests and Binomial Tests. Reporting a result requires a statistical statement of significance since a p-value is generated from a test statistic. Central hypothesis testing was done through the use of Chi-Square Test Goodness-of-Fit to test variables. The significant results were presented with " $p < 0.0005$ ". In-depth discussion is provided in Chapter Five. In qualitative data analysis, findings were allowed to emerge from dominant, frequent and significant themes. Thus, resultant themes were examined and compared with the relevant literature.

1.6. KEY TERMINOLOGY IN THE STUDY

The research is based on interaction of the following concepts which are further elaborated in Chapter Two and Chapter Three:

Local government: This is the sphere of government closest to the people. Many basic services are delivered by local municipalities and local ward councillors are the politicians closest to communities.

Framework: A framework can be defined as "a frame or structure; for enclosing or supporting anything, or the structure or arrangement of society" (Brown, cited in Van Niekerk 2005: 14). A framework exists to provide clarity on aspects to be given consideration on a particular issue, including direction or arrangement to be followed, according to Anderson and Woodrow (1989: 9). In this study, a framework is defined as a structure that provides key concepts, practices, order and sequence of activities in implementing effective and sustainable disaster risk management and risk reduction.

Governance: A country or an institution, to achieve good governance, must acknowledge that many actors are involved, forming an interdependent network. Therefore, effectiveness of a government institution should be measured from both qualitative and quantitative approaches, as

these approaches allow for a holistic view. Qualitatively measurements would identify impact and outcomes of services rendered to the citizenry, whilst quantitatively, economic dimensions, effectiveness and efficiency are crucial elements, proffers Van der Waldt (2012: 83). Scholars Engel, Westra and Bosselman (2010: 2) state that the conversation around good governance in contemporary society has become a dominant issue, in economic issues as well politics. Good governance in this research was explored by looking at how NMBMM has applied the goodness of DRM policies and frameworks in developing and implementing DRR strategies, programme and project interventions.

Public policy: According to Tobin and Montz (1997: 196, 197), public problems demand public policies, and for this reason, public policies can be developed at any time and by any level of the government, national, provincial and local government. In this research, public policies in DRM are very critical and provide a framework on the implementation of services to the citizenry.

Public Administration: The relevance and context of Public Administration (PA) as an academic discipline dates back to Minnowbrook and Mount Grace conferences in 1968. During this conference, it was agreed that PA was needed for research purposes to identify the best methods to deal with societal problems, maintains Cameron and Milne (cited in Subban and Vyas-Doorgapersad 2014: 499). Public Administration involves all administrative processes implemented by public institutions to an entire society and not segments; therefore, the administration of public affairs becomes part of political life, according to Cloete (1991: 56) & Hanekom and Thornhill (1993: 180). In order for sustainable DRM to be achieved, there have to be strong public institutions that will offer much needed services to the communities to reduce the risks and vulnerabilities associated thereto.

Risk and Risk Assessment: Risk is the probability of dangerous consequences, or expected losses (such as injuries, deaths, property, livelihoods,) due to interactions between human-induced hazards/natural or vulnerable conditions. Risks within social systems should not be ignored as they also make communities vulnerable (Magunda 2010: 3). This research had a strong focus on the need for sustainable risk reduction in NMBMM. Risk assessment in this research implied the means and process of determining the probability, as well as the impact of any identified risks as

a basis of determining how these risks should be addressed in NMBMM.

Vulnerability: This is the extent to which a community, individual, region or a household stands to be affected by negative impact due to an extreme event.

Disaster: This means a sudden, calamitous event that seriously disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the community or society's ability to cope using its own resources.

Disaster Risk Management: Disaster risk management in the context of South Africa is defined by the South African Disaster Management Act (57 of 2002) and cited in Prinsloo and Van der Waldt (2016: 1), as the “continuous and integrated multi-sectoral, multidisciplinary process of planning and implementing of measures aimed at preventing or reducing the risk of disasters, mitigating the severity or consequences of disasters, ensuring emergency preparedness, prompting a rapid and effective response to disasters and facilitating post-disaster recovery and rehabilitation”.

Disaster Risk Reduction (DRR): Risk is probability or the final results of an exposure to one or more hazards, on a vulnerable community or households (John Hopkins and the International Federation of Red Cross and Red Crescent Societies 2008: 30). Risk reduction contributes largely to sustainable development in a developing economy like South Africa (International Bank for Reconstruction and Development/The World Bank 2010: vi). Therefore, in this research, effective service delivery in risk reduction was discussed as a contributing factor for sustainable development.

Resilience: Is the capacity of a system, community or society potentially exposed to hazards to adapt by resisting or changing in order to reach and maintain an acceptable level of functioning and structure. This is determined by the degree to which the social system is capable of organising itself to increase this capacity for learning from past disasters for better future protection and to improve disaster risk reduction measures (UNISDR 2015: 7).

Service delivery: Service delivery is mainly the reason for the establishment of government institutions such as municipalities, with the local government sphere being the closest to the citizenry. Subban and Vyas-Doorgapersad (2014: 500) note that it was not until 1995 that South African public service started the process of shifting towards a more efficient, effective instrument of service delivery for everyone. Various legislative frameworks were enacted in support of service delivery, such as; the White Paper on the Transformation of Public Service Delivery (Republic of South Africa 1995; Notice 1227 of 1995), Constitution of the Republic of 1996; South African Qualifications Act, 1995 (Act No. 58 of 1995), and Public Service Act, 1994 (Subban and Vyas-Doorgapersad 2014: 500). Municipalities are established within the South African Constitution, and there are a total of 283 municipalities. This includes six (6) metropolitan municipalities, forty-six (46) district municipalities, and two hundred and thirty-one (231) local municipalities (Shaidi 2013:1). Fuo (2013: 1) indicated that one of the major objectives of local municipalities is ensuring that communities have access to services in a sustainable, as required by the final Constitution of 1996.

Participatory democracy: Participation happens in different forms, but what is important is the overall goal of participation in decision-making, which is to enable people to claim their rights in the society (Van der Waldt 2004: 4, 7). In South Africa, citizen participation is within the Constitution rights; for example Local Government: Municipal Systems Act 32 of 2000, Chapter 4, Section 16(1) focuses on community participation and the need to build a culture of community participation.

Sustainable development (SD): The World Commission on Environment and Development (1987) cited in Harris (2000: 5) defined sustainable development, as “development which meets the needs of the present without compromising the ability of future generations to meet their own need”. Emas (2015: 2) unpacked this statement arguing that sustainable development is dependent on creating a long-term economic status and environment in a society. In this research, sustainable development was explored in the manner in which policies and frameworks for DRM are effectively developed and efficiently implemented on the ground. Risk reduction contributes in achieving development, and if risk is not reduced within internationally acceptable standards, any gains made and progress are bounced back.

1.7 SIGNIFICANCE AND CONTRIBUTION OF THE STUDY

This study established that NMBMM does have some DRR programmes and their implementation does not adequately fulfil the service delivery mandate. Relevant literature and empirical findings of the research identified that a “fresh approach” is required in matching the comprehension concerning how DRM and risk reduction is perceived in NMBMM. As indicated in the literature, there is limited mention and application of the TDRMF on local level, despite its successes mainly in Asia. The literature and focus of this research study facilitate an enhanced understanding of DRR, as there is need for increased research to assist governments and practitioners to build sustainable approaches in mitigation, response and reconstruction and recovery. Moreover, action research that allows vulnerable communities to have more ownership over their wellbeing is encouraged. Scientific-supported disaster risk research approaches are needed to enhance disaster policy development and management across governments, and most imperative is the overall disaster risk reduction (International Council for Science/International Social Science Council 2015: 2).

The application of the TDRMF in policy and practice, as this study has shown, contributes to the establishment of more effective measures for risk reduction and reducing vulnerabilities amongst local communities. In this regard, Department for International Development (DFID) (2006: 1) maintains that the international community must enhance and renew its effort to support practical Disaster Risk Reduction approaches, at local communities. The research advocated for the adaption and contextualising of the Total Disaster Risk Management (TDRM) Framework techniques for DRM and DRR implementation, so as to bring the much-needed improvement in service delivery. Through empirical research, this study set out to test some of the key pillars of the TDRMF and found that most of the facets are applicable in municipalities across the country. By testing the TDRMF in low-income neighbourhoods, this study successfully demonstrates internationally developed frameworks can be adapted to suit the specific locale. This brings about innovative ways of proactively dealing with the disasters in low income neighbourhoods, such as those covered by this study. On another level, the study has also shown that a “fresh” approach would comprehend timeous identification and addressing of risks, through effective and efficient service delivery in local government municipalities.

The TDRMF facilitates emergency learning, maintaining that there is need for immediate and long-term knowledge, skills and benefits for disaster risk reduction. As shown in the study, skills training, especially at local level, strengthen the ability for the community to be resilient, as well as improve service delivery. The framework advocates that people dealing with disaster risk management should learn the necessary skills that are based on the TDRMF, for example, through understanding of disaster management system, policies, needs and their implementation, as advanced by de Guzman (2003: 111). Skeletal staff running disaster management centres as is the case in NMBMM, need constant training and this calls for due consideration by the Municipality, as emphasised through the study. Staff capacity building together with one of the recommendations put forward in Chapter Six, regarding recruitment and training of volunteers should be done in line with TDRMF.

The TDRMF contributes to a Disaster Risk Reduction Paradigm which covers the prevention of disasters and preparedness for disasters to create disaster resilience, as advocated by Le Roux (2013: 2). Thus, a “fresh” understanding of risks and disasters, their nature and underlying causes, preventing their harmful effects, as well as seeking opportunities from their occurrences, in NMBMM is purported through this research. This then adds new knowledge to existing understandings and interventions surrounding disaster risk management efforts in post-apartheid South Africa. The case study creates a revisit of current strategies for the treatment and management of disasters for the NMBMM in particular and local government in general. Acknowledging that there is already a somewhat considerable policy framework for DRM in South Africa, this study managed to use the TDRMF as the “lens” through which the effectiveness of the current programmes are tested. The findings therefore, contribute to existing efforts to enhance the effectiveness of administrative institutional interventions in implementing the DMA and related frameworks at the community and household levels.

The study contributes towards the role of communication during the in-crisis situation. In the event of an emergency, crisis or a disaster crisis management is an imperative action, and focus is given on how information is significantly communicated or shared amongst different stakeholders. However, this critical component does not always receive the much-needed attention, and is thus repeatedly cited as a major problem (Reid and Van Niekerk, cited in Le

Roux 2013: 1). Le Roux further argued that the concept of communication is interpreted differently by each person involved in crisis management, and this causes confusion or even creates an unclear common operating picture. The study brings new knowledge to the fore on the need for research on the best practices and approaches on how NMBMM can create a sustainable communication platform and medium between its DRM and DRR stakeholders; for example, how the “two-way symmetrical paradigm” advocated by Le Roux (2013: 3) can build long-term beneficial relationships in DRM.

This study emphasised awareness of the constraints currently experienced in DRM globally, and South Africa in particular, and thus, the need for greater insights into monitoring and evaluation of DRR implementation in local government as an imperative to enhanced service delivery and good municipal governance. This aspect is important considering that the implementation and impact of the Disaster Management Act No. 57, of 2002 has not been tested empirically in low income communities, as was found in the NMBMM. Furthermore, this applies to other international DRM frameworks that are arguably implemented voluntarily by government institutions and other stakeholders, due to the lack of a binding agreement in their implementation.

The study furthermore highlights a renewed emphasis on Disaster Risk Reduction through this case study, thereby contributing to the synergistic relationship between Public Management/Administration and Disaster Risk Management, as espoused by Van der Waldt (2009) covered in detail in Chapter Two of this study: for example Figure 2.10 focused on the existing relationship between Public Management and Disaster Risk Reduction; both have the same roots, that is, the same foundational principles.

The outcomes of this study emphasise and contribute to the theory, practice and body of knowledge of DM and DRR in particular. An important goal of the Sendai Disaster Risk Reduction Framework, calls for research on “improving and understanding of disaster risk in all its dimensions of exposure, vulnerability and hazard characteristics, and the strengthening of disaster risk governance” (United Nation 2015: 5). This study advocated for DRR as a multi-level, multi-dimensional and multi-disciplinary co-operation and collaboration activity. Through

an understanding of these linkages, DRR becomes everyone's responsibility in the South African communities, and globally at large.

The study outcomes are relevant to policy-makers, practitioners, as well as communities. As more attention is focussed on this crucial area of service delivery, innovative ways of addressing and reducing vulnerability and risks to local communities and improving the lives of people would be realised.

1.8 STUDY LIMITATIONS

The empirical research was undertaken during the 2015-2016 local government elections which made it difficult to access respondents, extending the time spend on the field. Most community members were also not very welcoming, as they viewed the researcher as an agent of a political party on campaign trail. However, this issue was resolved with the help from the local community leadership and research assistants who were both members of these communities in the study.

1.9 OUTLINE OF CHAPTERS

CHAPTER ONE: Chapter One provides an introduction and overview of the study, including study objectives and research questions. This chapter also highlights some of the key concepts for the study. A brief synopsis of the various chapters that informed the study is also presented.

CHAPTER TWO: Chapter Two focuses on the theoretical foundation of the research. Disaster and risk management are conceptualised within the context of Public Administration, and policy framework in disaster management. Governance and sustainable service delivery are also discussed. The framework that informed the study is presented.

CHAPTER THREE: This chapter focuses on the typography of disaster risk management and its contribution to sustainable development. The chapter also discusses approaches for developing and implementing DRR programmes.

CHAPTER FOUR: The chapter presents the research methodology adopted for the study, as a mixed methods approach with an in-depth discussion of the research methods used for collection of the data is provided. The research design and paradigm is also contextualised for the study, and the research tools used in the methodological approach are also highlighted.

CHAPTER FIVE: This chapter presents an analysis, findings and discussion of the data collated using the mixed methods approach. The findings are also linked to relevant literature to enhance their important benefit in creating new knowledge and also in building on the existing body of research.

CHAPTER SIX: In this chapter, the notion of the TDRMF for DRR programmes towards sustainable service delivery was an important focal point for the municipality. The research advocated for NMBMM to adapt and contextualise its current modus operandi for developing and implementing disaster risk reduction programmes and initiatives as part of its short and medium-term strategic plan by addressing the political will, public-private partnerships (PPPs), capable local leadership, sufficiency of human capital, ongoing research, secure tenure and proactive household planning. Therefore, this chapter highlights a new contribution towards addressing disaster management and risk reduction as significant areas of attention for raising living standards of local communities.

CHAPTER SEVEN: Conclusions and recommendations are presented based on the entire research. The chapter also provides areas for due consideration, and further research on a very pertinent area of priority in the individual and collective safety of communities' lives and well-being.

1.10 CONCLUSION

This chapter provided a general background and introduction to this study and focused on disaster risk reduction programmes. The research approach was a mixed methods. The problem statement was outlined in addition to research objectives and questions. Preliminary literature study was provided, including the escalating nature of disasters, South Africa's National

Development Plan 2030 and the need for transformation of public sector institutions for enhanced service delivery by fully implementing the Batho Pele Principles. Some of the key terminologies for the study were outlined, followed by a delineation of the various chapters. Chapter Two focused on theorising public administration and the policy framework in disaster management, as debated in the discussion that follows.

CHAPTER TWO

THEORISING PUBLIC ADMINISTRATION AND POLICY FRAMEWORK IN DISASTER MANAGEMENT

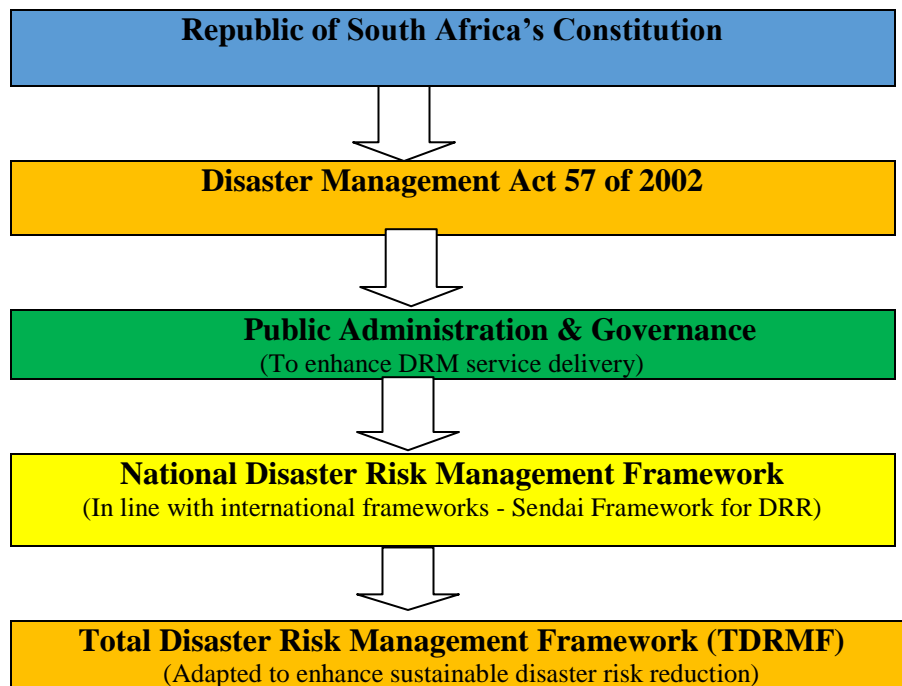
2.1 INTRODUCTION

Disaster risk management is a complex and evolving area of research. This study examines DRR programmes in NMBMM by combining good governance and sustainable service delivery in DRM implementation. This chapter contextualises the research within the paradigm of contemporary Public Administration, and policy frameworks to meet the need for enhanced sustainable service delivery in disaster risk management, which underpins this study. It explores both international and national disaster risk management policies and frameworks that shaped disaster risk reduction. Further analysis is focused on enhancing governance and disaster risk reduction with responsible citizen engagement as focal points.

2.2 CONTEXTUALIZING THE NEED FOR DISASTER RISK MANAGEMENT IN LOCAL GOVERNMENT

Many policies and legislation exist that identify the South African Government as responsible for socio-economic well-being of its citizens. In particular, sustainable disaster risk management and risk reduction service delivery in this research were broadly discussed within the policies and frameworks below.

Figure 2.1: Locating sustainable disaster risk reduction service delivery



Source: Author's perspective

The diagram provides an overall overview of the chapter, and a detailed discussion is provided under each aspect below.

2.2.1 Constitution of the Republic of South Africa, 1996

The Constitution of the Republic of South Africa, 1996 places a legal obligation on the Government to ensure the health (personal and environmental) and safety of its citizens. This is made a legal obligation in terms of Section 41(1) (b), in which all spheres of Government are required to ensure that every citizen and resident's well-being is secure. It is also noted that in section 152(1) (d), local government must make sure that a healthy and safe and environment is maintained in the communities. In the light of the above, and the established understanding of disaster management, the primary responsibility for disaster management in South Africa rests with Government.

South Africa's Constitution is regarded as the most liberal in the world, and it is generally argued that it considers all aspects of development for the benefit of all its citizens <http://www.southafrica.info/about/democracy/constituion.htm#.WCmBnTs0WSo.check>.

In addition, South Africa's political will in relation to DRMC is well demonstrated by the existence of legal enabling statutes. This creates an environment that is reasonably conducive to generating dedicated disaster management organs across the three government spheres (national, provincial and local). The institutional framework, appropriate policy development and legislative codes have resulted from the commitment shared by policy-makers. Their aim is simply to work towards achieving a strong disaster management framework in South Africa.

It is clear that the Constitution of the Republic of South Africa, 1996 provides an overall framework on matters that pertain to the well-being of the communities and for that reason, the state bears the duty to ensure that its citizens enjoy service delivery that protects them. It stands to reason then that the state is crucial in disaster management as it provides most of the resources for implementation of policies, when compared to other interested parties such as the private sector and individuals. The government's role is also exercised through the provisions provided within the legislation (Kabaka 2012: 6). This understanding therefore gives us an indication of the magnitude and importance of the South African Constitution. Chapter 3, Section 40(1) of the Constitution provides that the government is established as national, provincial and local spheres which are distinctive, dependent and inter-related. This implies that these three spheres cannot exist without each other (South Africa 1996: 25).

Part A of Schedule 4 of the Constitution identifies disaster management and related issues such as the environment as functional areas of concurrent national and provincial legislative competencies. This means that both spheres of government have powers and duties to make sure that matters of disaster management are implemented across the country for the benefit of everyone. What is significant, though, is that the local government sphere was not left out in relation to disaster management matters. In part B of Schedule 4 and part A of Schedule 5, the local government has been given powers to deal with a number of functions which relate closely to disaster management. Such matters are fire-fighting services and ambulance services. The literature consulted for this research of the DRMC indicated that the City of Cape Town

authority is in charge of such matters in the Western Cape (South Africa 1996: 148 - 151). Chapter 2 in the Bill of Rights provides for rights to life, equality, and human dignity, absence of poverty, healthcare, food, water and social responsibility. This provision is of major importance as local governments are usually the first to respond to disaster occurrences (South Africa 1996: 148 - 151).

The Municipalities, the DRMC and other government line departments work together to respond to issues relating to disaster management. This is furthermore supported by Section 24 of the Bill of Rights (South Africa 1996: 7), which requires that environmental issues must be given attention so that every citizen may enjoy his or her right to an environment that is free from any dangers. It considers both current and future generations in South Africa. In addition to the above, Section 27(3) indicates that everyone is entitled to emergency medical treatment. The DRMC is in charge of responding to emergency calls (South Africa 1996: 11, 13). This is clearly indicated in Section 156(1), which states that local governments are expected to handle matters of fire-fighting, municipal planning and health services. In addition, Section 156(4) enables both the national and provincial governments to assign such functions to municipalities. The limitation, however, is that only those municipalities that can offer the services effectively and efficiently are answerable. This is because unless a municipality has the administrative capacity, it is not held responsible to meeting such demands (South Africa 1996: 148 - 151). This is, however, the downside of letting the local government be responsible for such activities even if they do not have the capacity and resources to carry them out. It is also important to note that the municipalities do not function alone, and if need be, they are allowed to appeal for any form of assistance from the national and provincial governments. Such assistance would facilitate performance of their duties, as provided under Section 154 of the South African Constitution (South Africa 1996: 87, 88).

The Constitution of the Republic of South Africa, 1996 sets out to clarify different duties and responsibilities of all spheres of government. The implementation of disaster management is made possible through the implementation of the Disaster Management Act 2002 No. 57 of 2002.

2.2.2 Disaster Management Act 2002 No. 57 of 2002

The Disaster Management Act provides for an integrated and co-ordinated disaster management policy that focuses on preventing and reducing the risk of disasters, mitigating the severity of disasters, emergency preparedness, rapid and effective response to disasters and post-disaster recovery. The act defines a disaster as a progressive or sudden, widespread or localised, natural or human-caused occurrence which: (a) causes or threatens to cause; (i) death, injury or disease; (ii) damage to property, infrastructure or the environment or (iii) disruption of the life of a community; and (b) is of a magnitude that exceeds the ability of those affected by the disaster to cope with its effects using only their own resources.

The Disaster Management Act of 2002 (Act No. 57 of 2002) was promulgated into law on 15th of January 2003. In essence, the Act offers an integrated and co-ordinated disaster risk management policy that advocates for proper mitigation efforts, prevention and reduction of the risks through a proactive preparedness and effective response to emergencies and disasters, and ensures sustainable post-disaster recovery (South Africa 2002: 2). An analysis of the Act shows there is an emphasis on a co-ordinated approach to dealing with disasters. In other words, it calls for all stakeholders and various government departments to be part of disaster risk management planning. In addition, the Act is participatory because it considers the role of communities and the private sector in all stages of the disaster risk management process. The Act also calls for the establishment of national, provincial and municipal disaster management centres.

Section 7(1) provides for the national disaster management framework (NDMF) as the main regulation that oversees consistency across all the disaster management stakeholders, from local government to provincial to the national sphere. This is achieved by ensuring transparency in the disaster management policy that is in place in South Africa. In this case, the National Disaster Management Framework was published for public comments in May of 2004 and adopted in June 2005. The NDMF is expected to include in its plans the successive development of provincial and municipal disaster management frameworks and other plans which are designed to guide action across all spheres of government (South Africa 2005). This helps to have a co-ordinated approach, without duplication of duties and misuse of resources.

2.2.3 The National Disaster Management Framework (NDMF) of 2005

South Africa National Disaster Management of 2005 was another positive effort made by South Africa. Disaster management shift from traditional ways of responding to disasters received a major focus, as a result of the well-known severe floods in Cape Town's historically disadvantaged Cape Flats suburb in June 1994. The magnitude of the floods required reforms on how disaster management was handled in the country (South Africa 2005: 1). This process also was characterised by a consultative process which resulted in Green and White Papers on Disaster Management. Multiple stakeholders played a huge part in drafting legislation in 2000. Most important was the fact that the process was linked with the international efforts discussed earlier, such as the international decade for disaster management in DRR.

Therefore, the NDMF of 2005 was finalised and became the main policy framework for disaster risk management in South Africa. According to the framework, South Africa in general faces increased levels of disaster risks. For example, "it is exposed to a wide-range of weather hazards, including severe storms, drought and cyclones that can generate widespread hardship and devastation. In addition, South Africa's extensive coastline and proximity to shipping routes present numerous marine and coastal threats. Similarly, our shared borders with six southern African neighbours present both natural and human-induced cross-boundary risks, as well as humanitarian assistance obligations in times of emergency" (Rambau 2011: 1 & South Africa 2005: 1). The framework acknowledged the challenges that continue to face many communities both in urban and rural areas. Despite the commitment made by the ANC government to improve living conditions of the poor, through quality service delivery, many communities are exposed to chronic disaster vulnerability. This mainly affects people in rural areas and those living in informal settlements. Most challenges include fires and floods, and limited infrastructure.

In addition, as discussed earlier, the promulgation of the Disaster Management Act, 2002 (Act No. 57 of 2002) on 15 January 2003 was a major shift towards commitment in DRM in the country. Amongst other important requirements, it called for the establishment of national, provincial and municipal disaster management centres (South Africa 2002: 2). Furthermore, the Act recognizes the wide-ranging opportunities in South Africa to avoid and reduce disaster losses through the concerted energies and efforts of all spheres of government, civil society and

the private sector. Moreover, uniformity in the approach taken by these various stakeholders is very critical as the NDM framework is the legal instrument specified by the Act. The main purpose is to make sure that uniformity is given special attention by the multiple interest groups involved in DRM. Furthermore, this creates coherent, transparent and inclusive policy applicable to the whole the Republic (section 7(1)). One finding of this research was that DMA requirements have not fully been achieved at NMBMM, as presented in Chapter Five and Chapter Six of the study.

The NDMF's positive approach is in acknowledging the diversity of risks and disasters that occur in Southern Africa, and its emphasis is on safeguarding the well-being of vulnerable communities through sustainable development practices. Disaster risk reduction through prevention and mitigation, are the core principles of DRM implementation in South Africa. Moreover, the framework requires that provincial and municipal disaster management frameworks and plans be developed and implemented as tools for guiding action in all spheres of government (South Africa 2005). Planning at all levels of government should be proactive and should anticipate disaster occurrences most likely to happen in their locality. The NDMF has a clearly defined outline broadly divided into two aspects: four key performance areas (KPAs) and three enablers. The enabler's role is to facilitate, monitor and guide achievement of set objectives in achieving the KPAs. Necessary guidelines are outlined by each KPA and enablers that support the implementation of the framework in all three spheres of government (South Africa 2005: 2, 3).

The four KPAs reiterate the need for a collaborative approach in dealing with disaster risk management. Their main objective is to outline and guide institutions on how to establish the necessary institutional arrangements for implementing disaster risk management within the national, provincial and municipal spheres of government (South Africa 2005: 2). It must be approached through co-operative governance, an aspect that requires participation of all key DM role players or stakeholders in the country. Proper institutional arrangements strengthen the capabilities across all spheres of government to reduce the likelihood and severity of disasters. It places emphasis on the fact that DRM must be treated as a national and a local priority with a strong institutional basis for implementation (South Africa 2005: 2). Among other priorities in

the KPA's, priority one links directly with other international DRM frameworks. For example, the Sendai framework KPA One aim is to "ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation" (UNISDR 2004: 6). Moreover, KPA One of the National Disaster Management Framework directly responds to requirements set out in the DM Act under Sections (1), s7 (2) (a), 7(2) (c–e), s 7(2) (1). For the KPA One to be achieved: there has to be a focus on the establishment of effective arrangements for the development and adoption of an integrated disaster risk management policy in South Africa. A responsibility of the NDMC is ensuring that effective institutional arrangements are in place for the development and approval of integrated disaster risk management policy. Key Performance Area Two mainly looks at disaster risk assessment. This KPA links with sections s 20, s 25(1–2), s 33, s 38(1–2), s 47, and s 53(1–3) of the Act. The aim of this KPA is to ensure a uniform approach to assessing and monitoring disaster risks that will inform disaster risk management planning and disaster risk reduction undertaken by organs of state and other role-players. The KPA provides the importance of disaster risk assessment to guide national, provincial and municipal disaster risk reduction efforts, including disaster risk management planning. This entails gaining clarity on the following; the process involved in carrying out a disaster risk assessment; processes for generating a National Indicative Disaster Risk Profile; requirements for monitoring, updating and disseminating disaster risk information, and lastly, measures to ensure quality control in disaster risk assessment and monitoring (South Africa 2005: 25-38). It links with objective number two of the research, as highlighted in Chapter One. The research found that there currently exists limited commitment in conducting ongoing risk assessment in NMBMM and this is an important area for due consideration for the municipality in addressing service delivery.

Key Performance Area Three focuses on disaster risk reduction which directly links with sections 25, s38 and s53 of the Act. The objective of this KPA is to ensure that plans and measures be put in place to ensure all DRM stakeholders develop and implement integrated DRM plans and risk reduction programmes, in accordance with approved frameworks. DRR efforts have gained huge support internationally, which therefore makes it a focal point for this research. It is apparent that for the objectives of the Act to be achieved, there should be a clear outline and alignment of disaster management frameworks and plans for all spheres of

government, as specified in sections 25, 38 and 52 of the Act. Some of the main aspects of this KPA include ensuring that DRM planning is a strategic priority; giving first priority to DRR programmes and initiatives; outlining with clarity specific disaster risk reduction plans to be implemented on the ground; providing how DRR measures will be integrated in structures and processes, and lastly, showing how DRR implementation and monitoring would be achieved (South Africa 2005: 39 - 43). This KPA formed the basis of this research as it has a strong focus on sustainable DRR implementation at NMBMM. One significant findings was that most stakeholders in NMBMM do not treat DRM with commitment and it can be seen as an add on, rather than one of the main focus areas critical to sustainable service delivery.

Key Performance Area Four focuses on response and recovery, which is also linked to the requirements of the DM Act. For example, the Act requires an integrated and co-ordinated policy that focuses on rapid and effective response to disasters and post-disaster recovery and rehabilitation. This KPA requires that all spheres of government and other parties have appropriate and applicable disaster response and recovery on the ground. These may include warranting that early warning systems are put in place, and that warnings are issued following a uniform approach or framework. It also means then that sufficient services relating to relief measures are implemented when significant events or disasters occur, in an integrated and developmental manner (South Africa 2005: 43).

Enabler 1: Information Management and Communication

According to the DM Act sections 7(2) (i), 16, and 17, there has to be a strong focus on ensuring that information management and communication structures are in place across DM centres. This enabler main objective is to provide guidance on the development of an inclusive information management and communication system (South Africa 2005: 63). Moreover, the focus requires that that integrated communication links with all disaster risk management role players, as access to reliable hazard and risk information by all stakeholders' demands well functional information management systems. The enabler outlines the following important aspects: there has to be an integrated information management and communication system/model; procedure on how data will be collated by institutions to achieve the objectives of the DM Act and those of the NDM framework, and description of the various communication media required to enable the receipt,

dissemination and exchange of information among all stakeholders, for purposes of making appropriate decisions. This enabler supports all the four KPAs. The manner in which information management and communication is addressed in NMBMM was found to be not very effective. There lacks a clear framework that can guide stakeholder engagement.

Enabler 2: Education, training, public awareness and research

This enabler responds to requirements of the DM Act sections 15 and 20(2). The overall goal of the enabler 2 is for the Municipalities and other DRM stakeholders to build a culture of risk avoidance through public education and research. People cannot avoid that which they do not know; therefore communities have the right to be educated on how to stay resilient (South Africa 2005: 70). It requires the NDMC to ensure that structures are in place to cater for national education, training and research needs, and resources analysis. The enabler further outlines the need for promotion of Professional Development (PD) for professionals in disaster risk management and associated fields, establishing DRM training programmes and implementing and promoting an integrated public awareness strategy of risk-avoidance behaviour within communities. It has a strong focus on ensuring that research programmes and provision of quality information and advisory services are available in the country (South Africa 2005: 70). Research found that the current programmes and initiatives relating to Public Awareness Education Programmes (PAEP) in NMBMM need to be enhanced so that they can have a sustainable impact on the ground.

Enabler 3: Funding arrangements for disaster risk management

DRM efforts cannot be achieved without availability of relevant and enough resources. According to the DM Act, sections 7(1) and 7(2) (k) funding arrangements have to be put in place to facilitate DRM implementation. This enabler describes the disaster risk management funding arrangements for organs of state in the national, provincial and local spheres of government (South Africa 2005: 70). It is based on recommendations made by the Financial and Fiscal Commission (FFC) on funding arrangements in its Submission on the Division of Revenue 2003/04. It outlines the some of the following matters: legislative framework governing funding arrangements across all spheres of government; principles and recommended funding setup and ways of funding education, training, public awareness and research, and mechanisms

for funding DR assessment in different spheres of government from a national DRR strategy. In Chapter Five of this research, funding was identified as a major challenge that impedes successful implementation of disaster risk management in South Africa. It is imperative to also provide a summary of linkages between South Africa’s Disaster Management Act 57 of 2002, and the Disaster Management Framework (2005) with Hyogo Framework for Action (HFA) and the Sendai Framework (2005-2015) for Disaster Risk Reduction (2015-2030). The following table provides the corresponding areas across the four documents.

Table 2.1: Summary of Corresponding Areas

DMA Sections	NDMF Sections	Corresponding HFA Sections	Corresponding Sendai Sections
Chapter 1: Interpretation, application and administration of the Act	Key performance Area1: Integrated institutional capacity for DRM	Ensure that DRR is a national and local priority with strong institutional basis for implementation	Priority 1: Understanding disaster risk
Chapter 2: Intergovernmental structures and policy framework	Key Performance Area 2: Disaster risk assessment	Identify, assess and monitor risks, and enhance early warning	Priority 2: Strengthening disaster risk governance to manage disaster risk
Chapter 3: National disaster management	Key Performance Area 3: Disaster risk reduction	Reduce the underlying risk factors	Priority 3: Investing in disaster risk reduction for resilience
Chapter 4: Provincial disaster management	Key Performance Area 4: Response and recovery	Strengthen disaster preparedness for effective response at all levels	Priority 4: Enhancing disaster preparedness for effective response, and to «Build Back Better» in recovery, rehabilitation and reconstruction
Chapter 5: Municipal disaster management	Enabler 1: Information management and Communication	Use knowledge, innovation and education to build a culture of safety and resilience at all levels	n/a
Chapter 6: Funding of post-disaster recovery and rehabilitation	Enabler 2: Education, training, public awareness and research	Use knowledge, innovation and education to build a culture of safety and resilience at all levels	n/a
Chapter 7: Disaster management volunteers	Enabler 3: Funding arrangement for disaster risk management	Ensure that disaster risk reduction is a national and local priority with strong institutional basis for implementation	n/a
Chapter 8: Miscellaneous	n/a	n/a	n/a

Source: South Africa (2002: 2005) & UNISDR (2005), cited in Van Niekerk (2015: 860)

From the table above, one can clearly identify that there is a strong relationship between the four documents. The South African DM Act and the NDMF are broadly developed within the requirements of the HFA and the current Sendai Framework, and this is a commitment towards risk reduction. The current challenge has been around how to best implement DMA within South Africa's local context to promote effective service delivery, and in so doing, address Constitutional imperatives in accordance with the developmental state and agenda of government.

2.2.4 Local Government: Municipal Systems Act No. 32 of 2000

The Municipal Systems Act No.32 of 2000 focus on core principles, mechanisms and processes that facilitate smooth growth towards a more socio-economic public office. Municipalities provide services to citizens; therefore a universal attainment of service delivery has to be achieved. This helps in filling in the gaps left by previous government where the majority of communities were excluded from receiving basic services, and rendering these services to the communities is expected to improve their lives for the better. This Act also provides an enabling framework for the key processes of management and public administration and planning, performance management, resource mobilisation and organisational change, which underpin the notion of developmental local government. Municipal spending, credit control and debt collection are also to be monitored and evaluated within provided frameworks. This cuts down maladministration, and contributes to efficiency and effectiveness for the provision of services, service delivery agreements. This Act mandates the inclusion of applicable disaster risk management plans as core components of municipal Integrated Development Plans (IDPs).

2.2.5 Municipal Finance Management Act No. 56 of 2003

The Municipal Finance Management Act (MFM) came into effect in 2003. The main aim was to provide a comprehensive and reliable management of the financial affairs of municipalities and other institutions in the local sphere of government. It also aimed to institute treasury practices and standards for the local sphere of government, and guidelines for other relevant matters. The overall objective of the Act was to ensure a state of secure and sustainable management of the fiscal and financial affairs of municipalities and municipal entities. This is achieved by providing

an outline on specific requirements and standards so that the following objectives are achieved in a municipality:

- Ensuring transparency, accountability and appropriate lines of responsibility in the fiscal and financial affairs of municipalities and municipal entities;
- The management of their revenues, expenditures, assets and liabilities and the handling of their financial dealings;
- Budgetary and financial planning processes and the co-ordination of those processes with the processes of organs of state in other spheres of government;
- The handling of financial problems in municipalities;
- Supply chain management; and
- Financial matters (South Africa 2000).

From the foregoing discussion, the Act applies to all municipal entities, national and provincial organs of state for purposes of providing the extent of their financial dealings with municipalities. These dealings may include municipal revenue; co-operative government capacity building; outline on matters relating to municipality's debts and responsibilities of mayors. This is a very crucial policy and its implementation is important to avoid wastage of public resources. Sufficient budgeting as per this policy is not yet practical in the NMBMM Disaster Management Centre, as the DM centre complains of insufficient budgets which have caused failures to implement disaster risk reduction identified initiatives. The IDPs do not also indicate the projects and initiatives related to disaster risk reduction to be undertaken in the following financial year. There is need for emphasis on proper budgeting for DRM, as without sufficient funding there would be no achievement of services delivery in DRM.

2.2.6 Disaster Management Legislative Framework in the NMBMM

The NMBMM implementations of DRM are guided by all DRM legislation such as the South African Constitution of 1996; the DM Act No 57 of 2002; the National Disaster Management Framework of 2005; Local Government: Municipal Systems Act No. 32 of 2000, and the Municipal Finance Management Act 56 of 2003. In addition, there are other important frameworks such as the Intergrated Development Plans for DRM, and recently approved disaster

Relief Operations Policy. Nelson Mandela Bay Disaster Management Plan is developed and implemented as per requirements of the DM Act and NDMF. The DM Plan outlines and assists as follows: outlining expected hazards and the vulnerability of the various communities so as to prioritise any potential disasters, it assists in mobilising and establishing the necessary stakeholders, the Inter-Departmental Disaster Management, Committee (IDDMC), the Disaster Management Advisory Forum (DMAF) and local disaster management committees.

Disaster Management policies and frameworks in South Africa must be deliberated from an international perspectives. The following sections focus on a number of major international policies and frameworks that shaped DRM and DRR across the globe; the period between 1990-1999, which was named the “International Decade for Natural Disaster Reduction (IDNDR)”; the period between 2005-2015, which was called “Hyogo Framework for Action 2005-2015”, and the period 015-2030, which is called “Post-Hyogo” or the “Sendai Framework for Sustainable Disaster Risk Reduction”. The section concludes with one relevant international framework, that is, the Total Disaster Risk Management (TDRM) Framework. The research proposes that TDRMF can be used as a base in DRR service delivery by local government institutions in South Africa, as it has been found to have been very easy to implement in a developing continent like Asia, that experiences many disasters.

2.3 DISASTER RISK REDUCTION IN INTERNATIONAL LANDSCAPE

It is evident that disaster risk reduction is becoming an international phenomenon, hence the need for collaboration rather than mere national or local efforts. The Asian Tsunami of 2004 has taught the world that disasters have no borders. This means that policy and planning has shifted to accommodate international experiences. One cannot also fail to acknowledge the international policies and mechanisms that continue to shape disaster risk reduction. There has been a huge shift from the “early years of international disaster relief and how a change in this system was necessitated by a variety of factors and international disasters, which exposed its weakness” concedes Van Niekerk (2008: 355) as a leading researcher in the field of DM. According to Moore (cited in Van Niekerk 2008: 355), before the period of international policies and mechanisms, disasters were events to be waited for and after they struck, that is when immediate

actions–response would be taken. The aim was to make sure that affected communities and householders returned to normality, and this was purely a reactive process.

Through consultative processes, governments that were involved agreed to put in place proper measures that would build a state of proactive from reactive in implementing DRM efforts. For example, there has been shift from emergency management to DRM where, instead of focusing on disaster response, many governments of today and other stakeholders focus more on mitigating or reducing possible risks. According to Van Niekerk (2008), until the 1990s there was no single agency/organisation that specifically focused on issues relating to disasters. It was noted that disasters were becoming more complex and international relief effort could not meet the demands of continuous losses. Against this background, there was need for a more reliable international intervention. This led to the discussion in the international decade on natural disasters being proposed at the Eighth International Congress of Earthquake Engineering, according to Lechat cited in Van Niekerk (2008: 369).

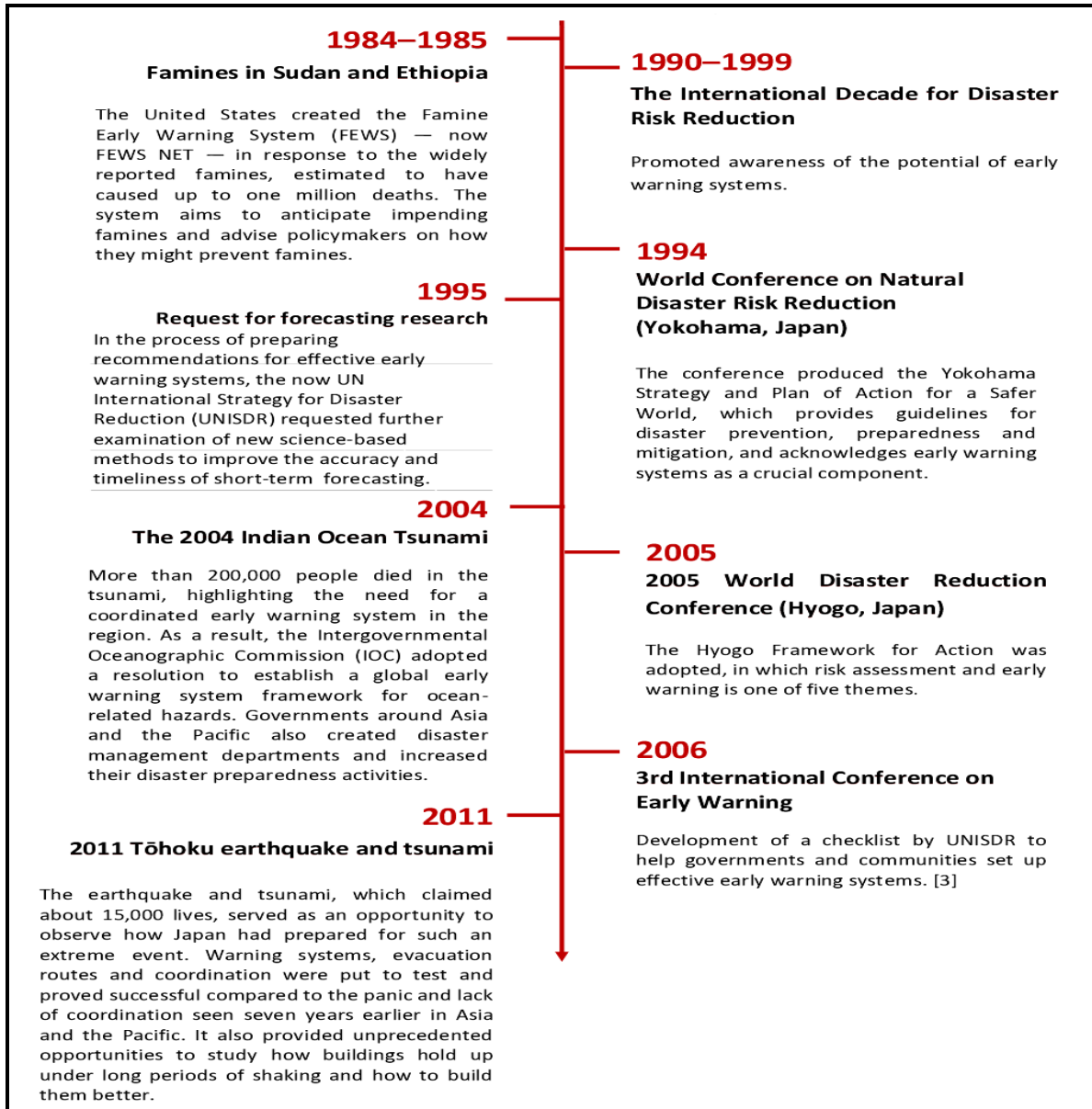
2.3.1 The 1990-1999 International Decade of Natural Disaster Reduction

It was not until 1987 that the United Nations General Assembly adopted Resolution 42/169, which proclaimed the years 1990-1999 as the International Decade for Natural Disaster Reduction (IDNDR). It was during this period that it was acknowledged globally, that “disaster reduction was a social and economic imperative that would take a long time to fulfil” (International Strategy for Disaster Reduction n.d: 1). The aim of the resolution was to mobilize governments, United Nations agencies, regional bodies, private sector and civil society in bringing their efforts together to work towards creating a resilient society, and this effort would be achieved through DRR. The Secretariat of the International Strategy for Disaster Reduction (UNISDR) is found Under-Secretary-General for Humanitarian Affairs, whose roles include international co-ordination of development and implementation of ISDR (ISDR n.d & Van Niekerk 2005: 4).

Most important, the major goal of this decade was to implement the much desired shift from the reactive approach on dealing with disasters to that of pro-active planning and prevention (as cited by Housner, Lechat, Smith in Van Niekerk 2008: 369). Moreover, it was during this period that

efforts to enhance and create public awareness on early warnings were also given more emphasis and increased attention. Due to the nature of increase in disaster occurrences, communities needed to be much more prepared. The following figure provides an outline of some of the events that led to a global call for Early Warnings Systems (EWS).

Figure 2.2: Key events in the development of international policies and frameworks for Early Warning Systems



Source: Pearson (2012)

International frameworks for dealing with DRR are of great importance as disasters continue to leave negative impacts both socially and economically. The figure provides some of the major disaster events that contributed to the need for the adoption of international Early Warning Systems policy frameworks. Subsequent efforts have continued; however, the question remains of whether most governments are willing to invest in programmes and initiatives. In the context

of this research, findings showed that the NMBMM focus is more on CCTV cameras, and very limiting approach. Reducing disaster risk has already been identified as a critical facet of sustainable development by ensuring that plans are in place towards creating healthy, wealthy, secure and resilient nations and cities. These requirements are reflected in plans for the post-2015 Sustainable Development Goals (SDGs) and towards the Africa Agenda for 2063.

2.3.2 Hyogo Framework for Action 2005-2015

It was in 2005 when major efforts were made by governments and development humanitarian organisations committing to adopting new obligations that were agreed upon during the Hyogo Framework for Action (HFA) Conference in Japan. The HFA emphasised the adoption of a framework which contains five key strategic areas, which countries are expected to use as a benchmark to manage disaster and its impacts in the communities (UNISDR 2007: 6). The five strategic areas emphasised that countries should focus on the following priority areas and core indicators (UNISDR 2014: xvii-xviii):

Table 2.2: HFA 2005-2015 priority areas and core indicators

Priority area	Core indicators
<p>Priority 1 Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation.</p>	<p>1.1 National policy and legal framework for disaster risk reduction exists with decentralized responsibilities and capacities at all levels. 1.2 Dedicated and adequate resources are available to implement disaster risk reduction plans and activities at all administrative levels. 1.3 Community Participation and decentralization is ensured through the delegation of authority and resources to local levels. 1.4 A national multi-sectoral platform for disaster risk reduction is functioning.</p>
<p>Priority 2 Identify, assess and monitor disaster risks and enhance early warning.</p>	<p>2.1 National and local risk assessments based on hazard data and vulnerability information are available and include risk assessments for key sectors. 2.2 Systems are in place to monitor, archive and disseminate data on key hazards and vulnerabilities. 2.3 Early warning systems are in place for all major hazards, with outreach to communities. 2.4 National and local risk assessments take account of regional/trans boundary risks, with a view to regional co-operation on risk reduction.</p>
<p>Priority 3 Use knowledge, innovation and</p>	<p>3.1 Relevant information on disasters is available and accessible at all levels, to all stakeholders (through networks, development</p>

<p>education to build a culture of safety and resilience at all levels.</p>	<p>of information sharing systems etc.). 3.2 School curricula, education material and relevant trainings include disaster risk reduction and recovery concepts and practices. 3.3 Research methods and tools for multi-risk assessments and cost benefit analysis are developed and strengthened. 3.4 Countrywide public awareness strategy exists to stimulate a culture of disaster resilience, with outreach to urban and rural communities.</p>
<p>Priority 4 Reduce the underlying risk factors.</p>	<p>4.1 Disaster risk reduction is an integral objective of environment- related policies and plans, including for land use natural resource management and adaptation to climate change. 4.2 Social development policies and plans are being implemented to reduce the vulnerability of populations most at risk. 4.3 Economic and productive sectorial policies and plans have been implemented to reduce the vulnerability of economic activities. 4.4 Planning and management of human settlements incorporate disaster risk reduction elements, including enforcement of building codes. 4.5 Disaster risk reduction measures are integrated into post-disaster recovery and rehabilitation processes. 4.6 Procedures are in place to assess the disaster risk impacts of major development projects, especially infrastructure.</p>
<p>Priority 5 Strengthen disaster preparedness for effective response at all levels.</p>	<p>5.1 Strong policy, technical and institutional capacities and mechanisms for disaster risk management, with a disaster risk reduction perspective are in place. 5.2 Disaster preparedness plans and contingency plans are in place at all administrative levels, and regular training drills and rehearsals are held to test and develop disaster response programmes. 5.3 Financial reserves and contingency mechanisms are in place to support effective response and recovery when required. 5.4 Procedures are in place to exchange relevant information during hazard events and disasters, and to undertake post-event reviews.</p>

Source: UNISDR (2005: 5-6)

From the illustration, there were five priority areas and twenty-three core indicators on which governments across the globe were required to focus. A broad outline was provided for each one so that they could develop plans that fit their context within this broad area. The overall aim is to build resilient communities. South Africa disaster management policy frameworks are in line with HFA, including the IDP plan.

It is also important to note that HFA implementation progress reports were to be submitted annually to the United Nation, by each country. Reporting was important to keep track on successes and failures to assist in improving implementation process. The implementation of HFA was deemed very challenging by some governments and one of the areas pointed included: insufficient level of legal frameworks, as some were deemed as out-dated and had limited focus on DRR. Another challenge was the limited evidence on “shifting the paradigm from a “reactive” approach, to a “proactive” framework. This shift is very important as it is a key way to ensure disaster risk reduction; financial and skilled human resources constraints that affect developing countries in their commitment to implement national legal frameworks, coupled with limited legal expertise in these countries, which negatively hinder mobilization to facilitate the process; limited access to the necessary technical and human resources, and challenges around financing disaster risk reduction programmes and initiatives, especially in developing countries, which also directly affect conducting research on this topic (UNISDR 2011; UNISDR 2007 - 2013 & UNSDR 2014: 4). These challenges were to be addressed in the Sendai Framework for Disaster Risk Reduction which followed the HFA.

In the context of this research, Africa’s progress was deemed very important with regard to meeting the objectives of the HFA in the period 2005-2015. The major challenge in most African countries is the paucity of data. Reports showed that there seemed to be very minimal research collated with regard to African countries progress. Due to the failure to submit reports (UNISDR 2007 - 2013). However, some of the efforts that came out of the HFA framework have been summarised below (UNISDR 2007 - 2013):

- The African Union developed supports and coordinates activities through the Africa Working Group on Disaster Risk Reduction. Programmes and initiatives were reported to have been put in place, such as the “Extended Programme of Action for the Implementation of the Africa Regional Strategy for Disaster Risk Reduction (2006-2015)”. This was supported by the 2010 2nd African Ministerial Conference on Disaster Risk Reduction;

- In terms of African Regional Economic Communities, a good example is that of progress made by the Economic Community of West African States (ECOWAS). Member countries receive all necessary support relating to coping with disaster effects, implementing programmes and initiatives that enhance building community resilience from national levels, and also building beneficial relationships with stakeholders;
- Another block that has made progress is the Economic Community of Central African States (ECCAS). This body of members in central Africa has in place policies relating to DRR and climatology. These policies are in line with requirements of the Africa Programme of Action and the HFA. ECCAS believes that DRR and climate change issues are directly linked and must not be separated;
- The Southern African Development Community (SADC) members agreed on disaster management policy and supported this with an integrated plan of action for DRR measures;
- The Inter-Governmental Authority for Development (IGAD) pushes for moving from responsive measures to a more resilience. All member countries are expected to consider DRR in all their national disaster risk management policies and strategies; and
- The East African Community (EAC) acknowledges that DRR measures and activities have a strong influence in other areas that impact our societies, therefore there is a need to incorporate DRR initiatives in the overall development of a country. Their focus has been on areas such as peace and security, environment and natural resources, and economic development (UNISDR 2007 - 2013). However, the region continues to face many natural risks and man-made disasters, especially in the Somali, Southern Sudan and Burundi.

The HFA 2005 - 2015 ten-year implementation period came to an end in 2015, and subsequently HFA 2, also known as the Sendai Framework for Sustainable Disaster Risk Reduction, was adopted (2015 - 2030). The HFA was the first plan to explain, describe and detail an all-of-

society approach to reduce disaster losses and impacts. However, despite all the documented achievements, there were certain shortcomings that were been identified:

- The voluntarily approach for governments in implementing DRR policies raises questions about the effectiveness of the HFA on the ground. This has led to questions on whether the world should consider legally binding frameworks that carry penalties in the future;
- Another question surrounds the validity of the progress reports submitted to the HFA office, as the HFA had no plans in place on how to monitor or evaluate information submitted. Besides, each government wanted to be seen to be making progress, which might mean the “manipulating” of data;
- HFA failed to give specific country targets, and considering that each government has different levels of resources/economic capability, this is complicated by the lack of a suitable starting point at the beginning of HFA (Overseas Development Institute 2012), an issue that has not been resolved by the Sendai Framework 2015 – 2030; and
- HFA failed to directly make reference to persons with disabilities, yet these groups of people in fact require special attention during disasters. It has been noted that failure to give necessary attention to disabled persons is a common issue/challenge that affects many national and local disaster risk reduction plans. For example, a UNISDR progress report identified that in Fiji, persons living with disabilities were not catered for in the countries disaster evacuation plans, which contributed to their vulnerability (UNISDR 2014).

2.3.3 Disaster Risk Reduction Conference in 2009

The 2009 Global Platform for Disaster Risk Reduction Conference was another concerted effort by the international community. International community role players gathered to document disaster risk reduction experiences and challenges learned since the adoption of the HFA, which ended in 2015. The meeting brought developed and developing countries together with the aim of enhancing their relationships, encouraging the building of strong institutions and creating a

commitment on how they could assist each other to enhance the implementation of the framework sustainable disaster risk reduction as an on-going concern. It was a platform for sharing experiences and building blocks towards global efforts in DRR.

Participating governments and other stakeholders also aimed at deciding on ways in which a favourable environment for disaster risk reduction would be improved at both national and sub-national levels, and among other stakeholders such as civil society and the private sector (United Nations 2009). The main aim was to encourage building strong institutions and legal frameworks to sustain the battle for the disaster risk reduction as an ongoing concern. This would partly be achieved by addressing short comings of the HFA. The forum set targets for disaster risk reduction, stating that there was a need for a shift towards implementing holistic/comprehensive programmes and initiatives of action, rather than working with isolated or pilot actions; this would be facilitated by ensuring that specific targets were outlined. One of the given targets was to work towards ensuring that by the year 2015, there were specific and concrete action plans for safer schools and hospitals in place across most vulnerable communities and cities (United Nations 2009: vi). However, in the South African context, this attempt has failed to achieve the desired outcome.

Another critical area acknowledged during the Global Platform was that there was a big gap between countries in terms of financial resource availability for DRR measures; henceforth, an international call for financial support was made. Financial constraints have been a major setback for many developing countries in the areas of DRR. The situation becomes even worse as many emerging and developing countries have citizens who experience more threats of disasters, yet do not have insurance risk affordable to their poor ones (United Nations 2009: vi). Furthermore, it was also concerned about the gaps that exist between the developed and developing nations in terms of Information Communication Technologies (ICTs) and resources. It was indicated that, when it comes to modern information technologies and resources for disaster risk reduction for poor nations, there still remains a major challenge as compared to developed nations. The above analysis illustrates that the use of ICT in the disaster risk management discipline has not fully been explored, hence its beneficial impact may not even be known in most parts of developing nations. If efforts are invested in such infrastructure, many lives and properties could be

prevented from devastation and death (Rogers and Tsirkunov 2010: 1 & United Nation 2009: 40). Information Communication Technologies play a huge role generally in the discipline of disaster risk management. It is generally accepted that if ICT is well adopted and applied, it could be of great positive impact in mitigation, preparedness, response and recovery.

The implication of the Global Platform was that polices and related planning could now be shared and compared. This is in line with South African DM policy framework. As a member, South Africa can now contextualise the planning to suit its own needs.

2.3.4 Sendai Framework for Disaster Risk Reduction 2015 - 2030

United Nations member countries in Japan, through consultations, came up with the contents of the post-HFA 2015. The post-2015 follow-up action plan is built on the successes and failures of HFA 2005-2015. The following are the propositions of the Sendai Framework for Action:

- Governments and institutions are requested to put more commitment into making all DRR-related policies a first degree priority; failure may lead to not achieving much progress.
- Political commitment would furthermore address documented failures of the previous framework. Another related aspect is to ensure that DRM is a shared responsibility among different spheres of the government, which translates to risk governance and accountability. This commitment links to ensuring that all efforts are towards a people-centred approach (Overseas Development Institute 2012 & UNISDR 2007 - 2013);
- The post-framework requests for well-defined and measurable targets and indicators and to institutionalise monitoring and evaluation (M & E) systems at international, national and local levels, as the previous framework was blamed for having weak monitoring and evaluating systems. These systems are expected to increase the credibility and reliability of the progress reports submitted by individual countries (Overseas Development Institute 2012 & UNISDR 2013); and

- Other relevant bodies are also called to commit in risk reduction efforts, and such bodies are also referred to as DRM stakeholders. These bodies may range from media bodies, businesses, local authorities, and communities both in urban and rural. They generally play critical roles in DRM (UNISDR 2013: 5).

The African continent continues to face many challenges such as droughts and conflicts that lead to disastrous situations, putting civilians under a lot of suffering. To achieve the requirements of Sendai Framework (2015 - 2030) or for practical evidence to be evident in the communities, the African continent needs to develop many practical policies and frameworks. One framework (Total Disaster Risk Management Framework) that has had positive impact in some Asian countries provides a window of opportunity to the African continent to design and implement its policies and frameworks in a much simplified manner on the ground. This research argues that the Total Disaster Risk Management (TDRM) Framework can be adapted to the South African context to improve and facilitate DRM/DRR implementation.

2.4 TOTAL DISASTER RISK MANAGEMENT (TDRM) FRAMEWORK

A pertinent discussion of the framework follows, that locates DRR in the study.

2.4.1 Introduction

The Total Disaster Risk Management (TDRM) Framework emerged in the year 2003 through consultative efforts mainly by the Asian Disaster Reduction and Response Network (ADRC) and UN/OCHA Kobe office. The Asian Disaster Reduction Centre was established in 1998 in Japan and its main goal was to oversee that its 30 member countries put the necessary measures in place towards creating resilient communities. Research points out that the TDRMF is in line with both the Hyogo Framework for Action (HFA) of 2005 and the HFA2, recently named the Sendai Framework for the period 2015–2030, making it a very strong tool for DRM and DRR implementation. The framework places emphasis on the need for multi-level, multi-dimensional (cross-sectoral), multi-disciplinary co-ordination and collaboration among all disaster risk management stakeholders, that is, government spheres, private sector, individuals and communities. Moreover, the framework builds on the achievements of other globally acceptable DRM frameworks such as the International Strategy for Disaster Reduction and International

Decade of Natural Disasters and other related endeavours. It integrates existing knowledge and techniques on disaster reduction and response, and risk management (de Gunza 2002: 3). Inherent to this framework is that it advocates for effective communication of understanding, knowledge and techniques at all levels across government spheres and communities. The framework emphasises the significance of governments' appreciation and commitment to relevance of disaster risk management in achieving sustainable development objectives, suggest de Gunza (2002: 3) & Van Zyl (2006: 41 - 42). The framework approach puts into consideration requirements of other international frameworks, providing a "window of opportunity" for governments as a tool for DM planning and implementation.

2.4.2 Principles of Total Disaster Risk Management Framework

The overall goal of the TDRMF is to offer guidance to all governments so that they may give first priority to DRR. This directly implies that there must be a culture of implementing DRR set priorities across each country. Evidence reported by pioneers of the framework has indicated that the TDRMF is an effective and strategic framework for disaster reduction, based on many years of its positive impact, particularly in Asia. The TDRMF presents unique principles that guide its implementation, including its inclusive approach of all DRM stakeholders and its ability to fit across all phases during DM, as espoused by the Asian Disaster Reduction Centre (2007). These principles were adapted as the secondary research objectives.

Moreover, research also shows that when critically analysing the principles of this framework, it must look beyond the principles and include the three significant pillars as the following typologies:

- Risk Management Flow;
- Disaster Risk Policy; and
- Disaster Risk Strategy (de Guzman 2002).

These three (3) pillars are best elaborated in the well-known four phases of DRM, which are mitigation, preparedness, response and rehabilitation/reconstruction. These phases are discussed in detail in Chapter Three under the literature review. The pillars provide an outline of how

effective DRM implementation can be achieved as they build and rely on one another. Therefore, the research is based on the findings presented in Chapter Five and subsequent recommendations in Chapter Seven, noting that this framework provides a “solid window of opportunity” to NMBMM and other institutions involved with DRM in achieving sustainable DRR goals or targets. The following analysis focuses on the significance of the pillars, namely, Risk Management Flow, Disaster Risk Policy and Disaster Risk Strategy.

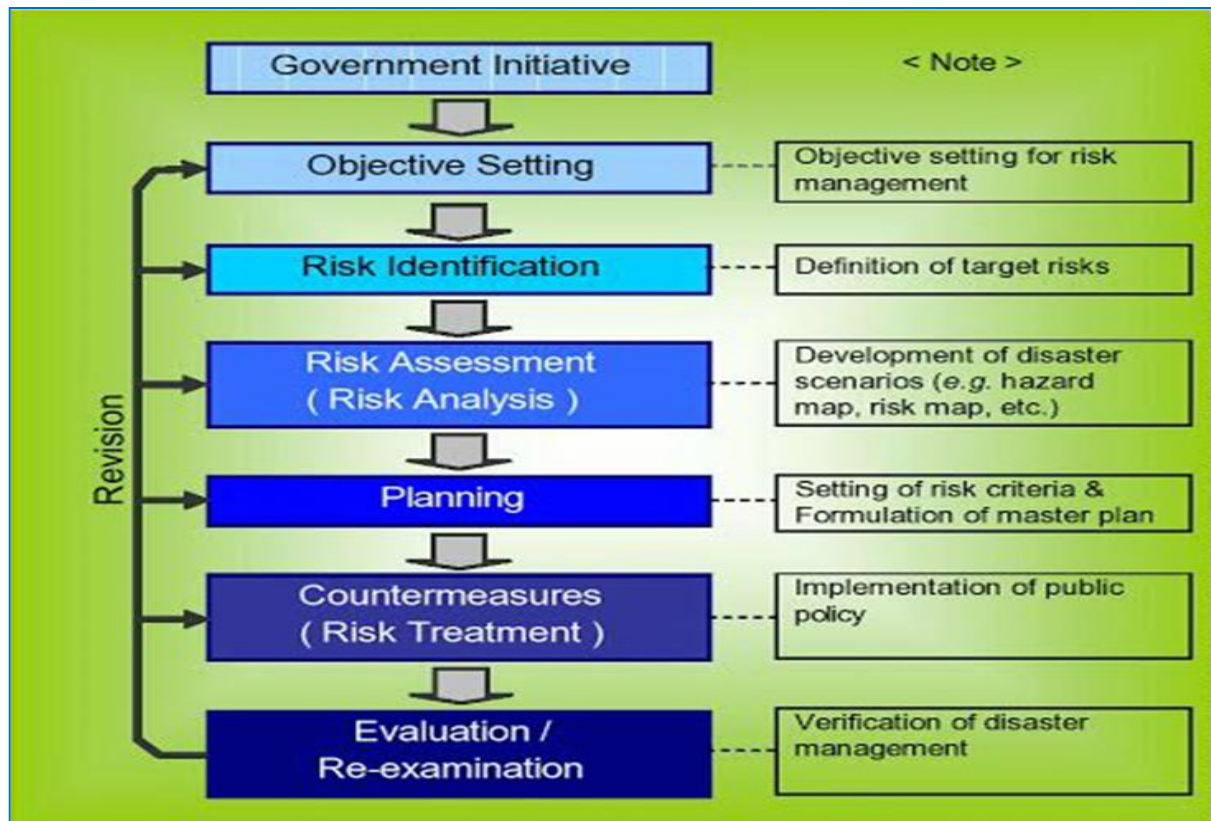
2.4.2.1 Risk Management Flow

Risk management flow is the first pillar that provides a strong base for the framework. Risk management provides steps that need to be followed when implementing an organised DRM implementation effort. Risk management flow entails two elements: *firstly*, DRM is a responsibility of the government, meaning that government institutions must ensure that relevant institutions are in place. *Secondly*, there must be a clear outline of what objectives need to be accomplished and that the objectives must be SMART (specific, measurable, achievable, realistic and attainable). Working SMART helps an institution not to lose focus but to develop objectives that are relevant and attainable. This exercise demands detailed planning as well resource availability to reach target objectives, as outlined by the Asian Disaster Reduction Centre (2005). Moreover, the general body of knowledge also advocates SMART objectives be outlined as core components in every DRM/DRR strategy. The South African Government is in line with this pillar as it has ensured that DRM is a responsibility of the government, thus the development of the DMA and the NDMF.

Risk management flow emphasises the fact that objectives should focus on risk management guidelines, and most importantly, be in accordance with needs of a specific community, that is, to save lives and to reduce negative impact on livelihoods. For the set objectives to be met, a risk management system needs to be followed during implementation and the role of stakeholders should not be undermined (Asian Disaster Reduction Centre 2005). The implications at this level means that national institutions need to develop guiding policies for DRM, collaboration and co-operation of all relevant stakeholders. Moreover, government commitment would largely determine the success or failure of DRM implementation, since governments bear huge responsibility in developing and implementing DRM policies in their communities. An issue that

the NMBMM is still struggling with is mainly due to limited funding from the government and failure of other stakeholders to commit to a collective effort in addressing DRR. The following figure clearly outlines the linkage between all the risk management flow components that build on each other.

Figure 2.3: Risk Management Flow



Source: Asian Disaster Reduction Centre (2005)

As illustrated in the diagram, the Risk Management Flow demands that the government treats DRM as a priority, and for this to happen it has to put in place policies, frameworks and institutional capacity. Through objectives, important decisions are undertaken such as hazard mapping and vulnerability assessment; in this case, IDP plans are developed and implemented on the ground, and lastly, there is the monitoring and evaluation of the programmes and initiatives. The research found that a major aspect missing in NMBMM is the monitoring and evaluation frameworks, deemed a significant aspect of the study. This makes it difficult to determine any success or failure of implemented DRR initiatives.

Risk Management Flow is supplemented with four components that cannot be ignored as they contribute to the success of the whole process of risk management, which includes the following important aspects: Disaster Risk Identification; Disaster Risk Assessment (Risk Analysis); Disaster Risk Planning, and Disaster Risk Treatment. In the context of this research, findings indicated that these components are not fully adhered to, which provides a new approach for DRR NMBMM, as emphasized in the empirical analysis of the study.

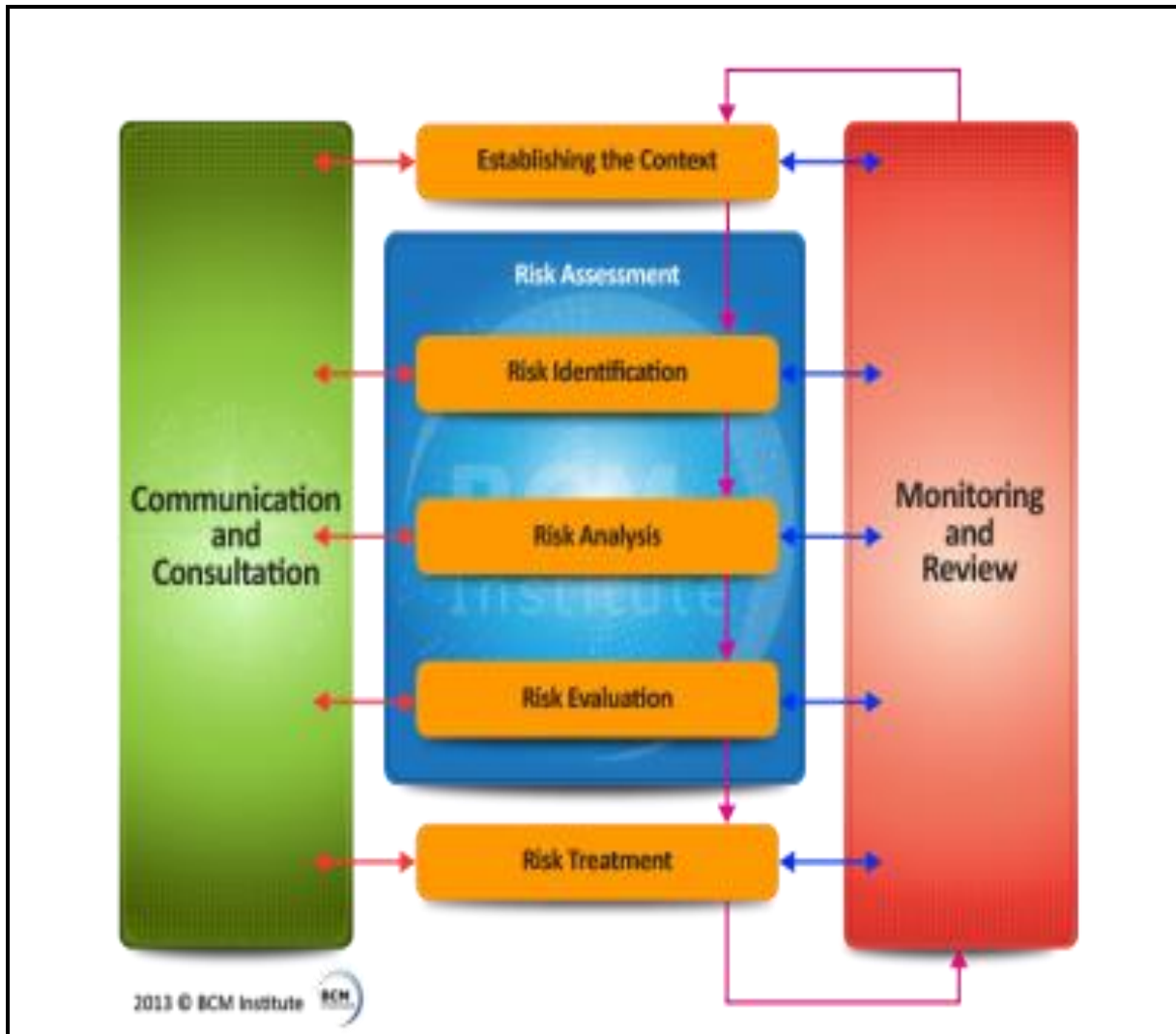
Disaster Risk identification

Dilley and Golnaraghi (2005: 1) define a risk as any condition or event whose occurrence is not certain but which can contribute to negative impact on communities and their livelihoods. Risk analysis and risk assessment are pertinent in DRM and require various scientific calculations of probabilities of occurrence, qualified evaluation team to conduct possible consequences. Vulnerable communities' understanding of risk is also critical, including other types of risk management options (Tobin and Montz 1997: 281). Risk identification is a very practical exercise that demands planning in advance as one way of shifting towards a more proactive approach from over-reliance on post-disaster relief, recovery and reconstruction as the main means of managing disasters (Dilley and Golnaraghi 2005: 1). However, many institutions do not seem to do very well with regard to risk identification for various reasons, including a lack of motivation, limited knowledge and also limited or no financial resources. Some of these issues are presented in Chapter Five. This challenge is common in Least Developed Countries (LDCs) and some developing countries, such as South Africa. A presence of DM policies and frameworks in such countries has not translated to practicability, as seen in South Africa. Therefore, for the shift to materialise, government commitment is crucial.

Some of the possible documented risks identification approaches may include system engineering techniques, the use of checklists, flow charts, judgments based on experience and records, scenario analysis and brainstorming (Shuohui *et al* 2006: 3). Furthermore, identifying possible risks to a project would include, for example, those events that might occur causing a programme or a project to fail. Moreover, the exercise may require isolating most dangerous risks. In such instances, past experiences play key roles in determining possible future

implications. It is also beneficial to consider some measures on how risks from an international context were dealt with, as this may be adapted to contribute to local contexts (Asian Disaster Reduction Centre 2007). Some of the useful risk identification approaches can be seen in the figure that follows:

Figure 2.4: Risks identification approaches



Source: Asian Disaster Reduction Centre (2007)

Risk identification must at least answer the following questions: what is one most concerned about, for example, what threatens one’s community?; what are the threatening scenarios and unwanted incidents?; and what contributed to such threats, and what aspects makes one vulnerable? Therefore, risk identification methods demand expertise, since some risks sometimes involve a great deal of uncertainty and can tend to be overlooked. In addition, this process requires stakeholders’ commitment. Failure to conduct this exercise means an organisation would not be able to prepare how to respond to future challenges. Therefore, a comprehensive identification and recording of risks becomes critical considering that a risk that is not identified

at the onset may contribute to failed programme deliverables. The risk identification process should cover all risks, regardless of whether or not such risks are within the direct control of the institution.

Disaster Risk Analysis

As discussed above, risk is unavoidable and is part of human daily life which makes it the probability of a negative consequence. The sources of a risk are identified, their consequences and likelihood of their chances for occurrence are determined and the concerns and likelihood of each risk source determines the level of risk (Shuohui *et al* 2006: 1). It is important that clarity be established on the relationship that exists among hazards, exposure and vulnerability so as create an enabling disaster prevention mechanism. The risk assessment process entails identifying and documenting loss estimates that can be linked to a disaster occurrence due to natural hazards. When conducting risk analysis, it is encouraged to approach the exercise from both quantitative and qualitative data where possible (Berg 2010: 79). However, one limitation of quantitative risk analysis is the demand for accurate 'hard' data as it leans more towards those aspects of risk that can be most easily measured (Asian Disaster Reduction Centre 2005: 17). During this exercise, one needs to also take note that hazards and vulnerability assessments may sometimes require to be dealt with separately, although both form overall risk analysis (Twigg 2015: 48 - 49 & Asian Disaster Reduction Centre 2005: 17). The following are some useful steps in risk analysis within the context of the study:

Table 2.3: Steps in Risk Analysis

<p>Step 1: Understanding of current situation - this involves identifying current needs and gaps. (For example, identifying the needs of the NMBMM based on existing information and capacities of the communities and institutions).</p>
<p>Step 2: Hazard assessment – enables identification of the nature, location, intensity and likelihood of major hazards prevailing in a specific context. For example, the NMBMM will need to intensify its commitment in hazard assessments, by making it an ongoing activity.</p>
<p>Step 3: Exposure assessment: answers the question of who is at risk and delineate disaster prone areas. In the context of the research, most vulnerable communities, areas and households will need to be identified in NMBMM.</p>
<p>Step 4: Vulnerability analysis - enables determining coping capacity in terms of what resources are available and not available that the community owns. The NMBMM will need to identify the community and household capabilities in terms of resources and skills that can be utilized in DRR. This will encourage citizen participation and at the same time good relationships with the local municipality.</p>
<p>Step 5: Loss/impact analysis - NMBMM will be able to document appropriate estimates on potential losses of vulnerable households, individuals, property, services, livelihoods and environment.</p>
<p>Step 6: Risk profiling and evaluation - this step for NMBMM will entail identification of cost-effective risk reduction options in terms of the socio-economic concerns and capacity for risk reduction.</p>
<p>Step 7: Formulation or revision of DRR strategies and action plans - for example, NMBMM through this step, will be able to determine resource allocation both financial and human, and the ability to enhance existing programmes and initiate new DRR programmes.</p>

Source: Adapted from Asian Disaster Reduction Centre (2005: 17) & UNDP (2010).

Following these steps, the South African National Disaster Management Framework (NDMF, South Africa 2005) states that conducting risk assessment is a responsibility of all organs of state. Fundamentally, each district or metropolitan municipality should conduct and document a municipal level risk assessment, so as to facilitate, inform contingency planning and reduction of

vulnerability, and to identify high risk areas, as cited in van Riet (2009: 7). Disaster risk assessment scenarios are developed based on assessed damage, such as when drawing up programmes, projects, plans, activities and making operational decisions in both government institutions and development organisations. This discussion is most applicable in the context of the South African local government IDP processes in the current dispensation in the country.

Disaster Risk Planning

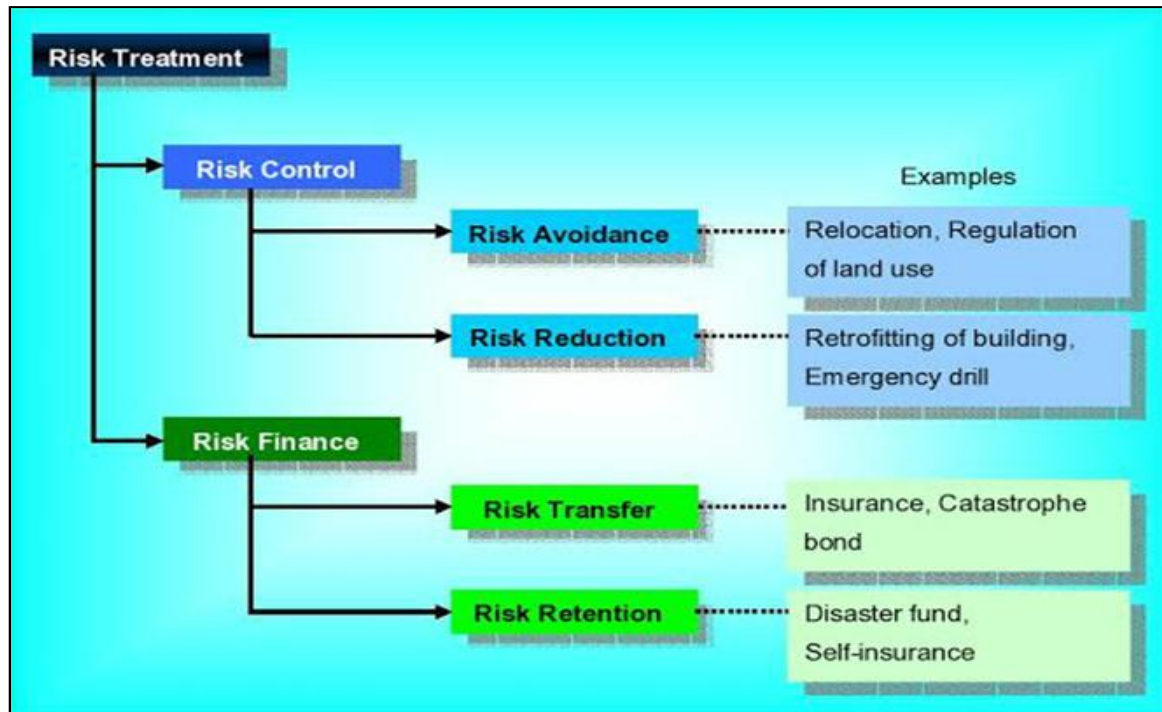
Risk planning enables developing concrete policies and plans on which risk needs to be prioritised. Through such planning, specific and practical objectives are developed, therefore offering guidelines for a risk. An example would be defining which type disaster *e.g. natural or man-made?* Therefore, the relevant counter measures need to be developed, submit Renfroe and Smith (2010: 4). Moreover, targeted risk criteria, project periods, budgets and priorities are established, which lead to formulation of a master plan for DRM “with ample consideration given to such topics as the continuity of contents in a master plan, adequate procedures, review mechanisms, and the assignment of responsibilities’?” (Asian Disaster Reduction Centre n.d: 17). This discussion puts emphasis on the critical importance of giving planning first priority. As planning has generally been accepted as central to any DRM effort, failure to plan translates to negative implications.

Disaster Counter Measures/Risk Treatment

Risk treatment is the process of developing and applying specific cost-effective strategies and action plans to reduce potential adverse cost and increase potential benefits, state Hayford and Ahmed (2013: 13). Another term used to refer to risk treatment is ‘counter measure’ and such efforts are executed in accordance with policies of a specific institution or country. Public policy participation is necessary as a form of risk communication requirement. Stakeholder involvement cannot be underestimated as it contributes to an increased mutual understanding between governments and citizens. Community participation leads to empowerment of ordinary members and ownership of planning processes and other related activities (Asia Disaster Reduction Centre 2005).

In relation to this research, risk treatment strategies and action plans need to be enhanced in NMBMM. The research also identified that citizen participation is limited, hence contributing to lack of responsible citizenship among community members, especially on how they view DRR. Disaster Risk Management Counter measures are therefore understood through both ‘risk control’ and ‘risk finance’.

Figure 2.5: Classification of Risk Treatment with examples



Source: Asian Disaster Reduction Centre (n.d: 19)

The figure above means that when developing and implementing risk treatment, two components have to be considered, that is, risk control and risk finance. Risk control mainly focuses on those measures that ensure that risks are avoided, including those of risk reduction. Hayford and Ahmed (2013: 1) referred to the risk control phase as one that encompasses risk management planning, risk resolution and monitoring, and risk evaluation and corrective provisions. The research found that the certain programmes such as the public awareness education for communities in NMBMM do not present an opportunity for adhering to some of these aspects. Risk finance looks at measures such as risk transfers and retention.

Risk finance is another crucial aspect in managing risk treatment, and includes risk transfer and risk retention. The aim of this component is to ensure that the financial resilience of institutions such as government, businesses, and households is achieved. When affected communities and individuals need assistance, it should be made available. Generally, South African Municipalities face many challenges relating to risk finance. For example, poor communities do not have the capacity to take insurance for their homes or to protect their livelihoods. Holloway (2003: 36) states that resources are seldom made available during an actual “disaster event” to promote ongoing reductions in developmental vulnerability. Moreover,, because disaster-related activities are not viewed as core functions of line departments, important vulnerability reduction opportunities are also not taken up developmentally...mitigation, the most critical element of disaster risk reduction for reducing risk, is thus divorced from both the management of the disaster event, as well as the management of the risk processes that drive local and regional crises’. These challenges include resources for sustainable response and reconstruction phases (risk financing) that the Municipalities such as NMBMM face.

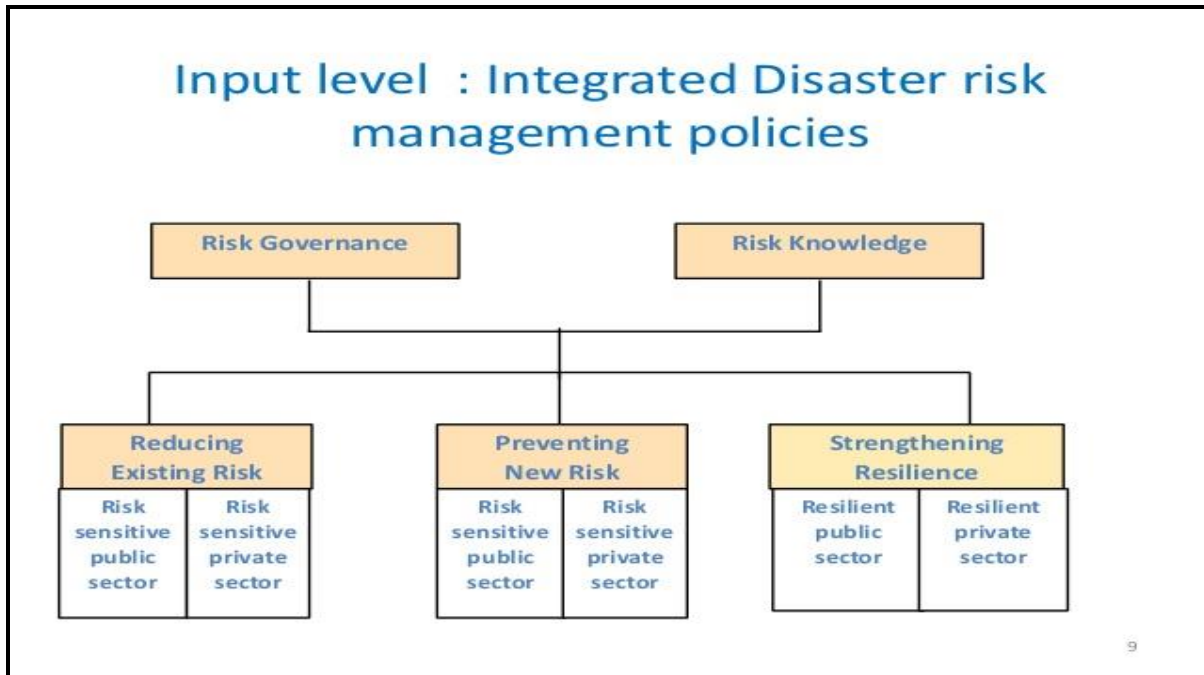
Risk Evaluation/Re-examination

Risk management evaluation is the final component of Risk Management Flow. Evaluation looks at performance and efficacy, a process to identify and document successes and failures. Reports are compiled and documented, and recommendations are hoped to be taken seriously if any. When risk evaluation is carried, there needs to be a constant review of the risk identification and assessment processes in order to take appropriate counter measures against frequent changes in the localities, social structures, environment, geographic features and also other factors (Asian Disaster Reduction Centre n.d: 17). Risk evaluation would also assist in identifying which risks need immediate attention in developing responses for treatment (Hayford and Ahmed 2013: 13). Based on the findings of this research, the municipal manager at NMBM needs to develop a risk evaluation framework, so that it can determine the success, shortfall and recommendations for improving their IDPs, DM Plans and initiative implementation on the ground. It would also assist in getting feedback from beneficiaries of services rendered by the municipality.

2.4.2.2 Disaster Risk Policy

Disaster Risk Reduction policy defines an organisations mandate and comparative advantages, clarifying its focus, principles and priorities for improving the quality and effectiveness of their services in risk reduction (World Food Programme 2012: 2). Planning entails coming up with concrete policies and frameworks that specify the target risks to be managed (e.g. disaster type, area to be protected). Moreover, risk planning ensures that effective counter-measures are in place. Fundamentally, this component aims at establishing that specified risk criteria, budgets, project periods and priorities are established (Asian Disaster Reduction Centre 2007: 17). Institutions should adopt integrated DRM policies and also make it an on-going process, especially those in challenged continents like Africa (UNSDR 2014: 9). The following figure illustrates an integrated disaster risk policy approach, which this research advocates for in terms of its adoption and contextualising in local government institutions implementing DRR.

Figure 2.6: Integrated Disaster Risk policies approach



Source: UNSDR (2014: 9)

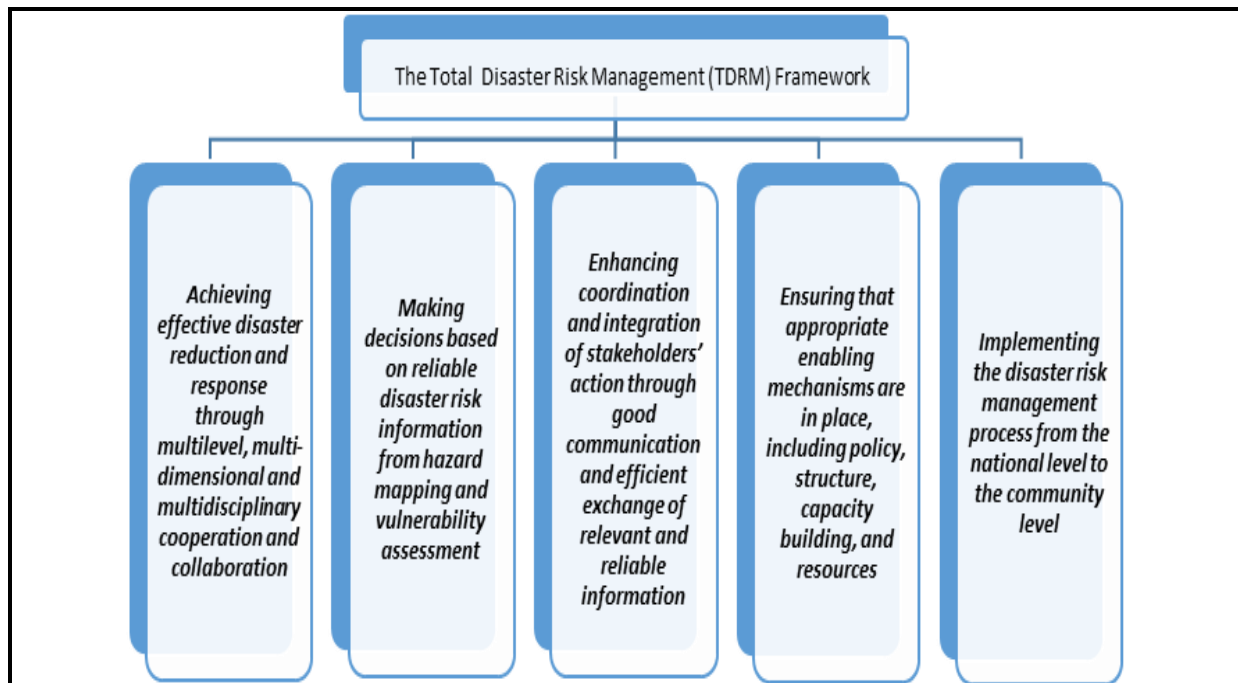
Integrated service delivery is an imperative and in this content, disaster risk management policies, as reflected in the preceding figure, provides a small outline on its components, which are mainly risk governance and risk knowledge. The objectives include reduction of existing

risks, prevention of new risks and strengthening resilience, which are a responsibility of every government institution supported by other stakeholders. Research findings presented in Chapter Five indicate that there is need for enhanced risk governance and risk knowledge, in NMBMM. Both the public and private sector institutions were found to be very reactive in their contribution to DRR. An integrated Disaster Risk policies approach therefore presents a new perspective that NMBMM can contextualise to facilitate their DRR implementations.

2.4.2.3 Disaster Risk Management Strategy

This is the fourth pillar of the TDRMF. It is made up of five implementation strategies. These strategies' main objective is to ensure that effective disaster reduction measures are given holistic and comprehensive attention, and at the same time, bridging the gaps in the different phases of the disaster management cycle. This implies that the Framework emphasizes that governments must do more than responding to disaster events, by considering the broader set of issues associated with disaster risk and its management. It addresses the underlying causes of disasters by focusing on the conditions of disaster risks produced by unsustainable development. It also enables concerned sectors and the community to examine ways to reduce their vulnerability. In view of the holistic nature of the framework, the five fundamental components/strategies are inter-related and complement each other, as demonstrated in the Figure that follows:

Figure 2.7: DRM five implementation strategies



Source: Adapted from Asian Disaster Reduction Centre (2007)

The above components that make up this framework are in line with the international disaster risk management framework. These components are inter-related and complement one another as they facilitate sustainable DRR efforts. These components were translated to the main research objectives for the entire research, and are discussed below in more detail:

Achieving effective disaster reduction and response through multi-disciplinary co-operation and collaboration, multi-level and multi-dimensional

A multi-disciplinary framework or approach looks at drawing appropriately from several disciplines to redefine complex problems outside of normal limitations and reach solutions based on a new understanding. The multi-disciplinary approach ensures that pragmatic processes are followed and decisions are reached through consensus by a multi-disciplinary team. These disciplines work together as a team to bring co-operation as opposed to working in competition for a selfish benefit (Global Dimension in Engineering Education 2014: 8). Van der Waldt (2013: 3) further states that “DRM is demarcated as an integrated multi-sectoral and multi-

disciplinary process for the planning and implementation of measures for risk reduction, disaster recovery and rehabilitation". The TDRMF states that the increasing prevalence of disasters has become a growing concern of various sectors, including governments and non-governmental organizations. de Guzman (2003: 3) thus, recaps the relevance of enhanced awareness to these sectors on the impact of disasters on sustainable development and on the need to enhance local capabilities and capacities to allow for mutual acknowledgement amongst stakeholders, mainly for strengthened collaboration and partnership at all levels.

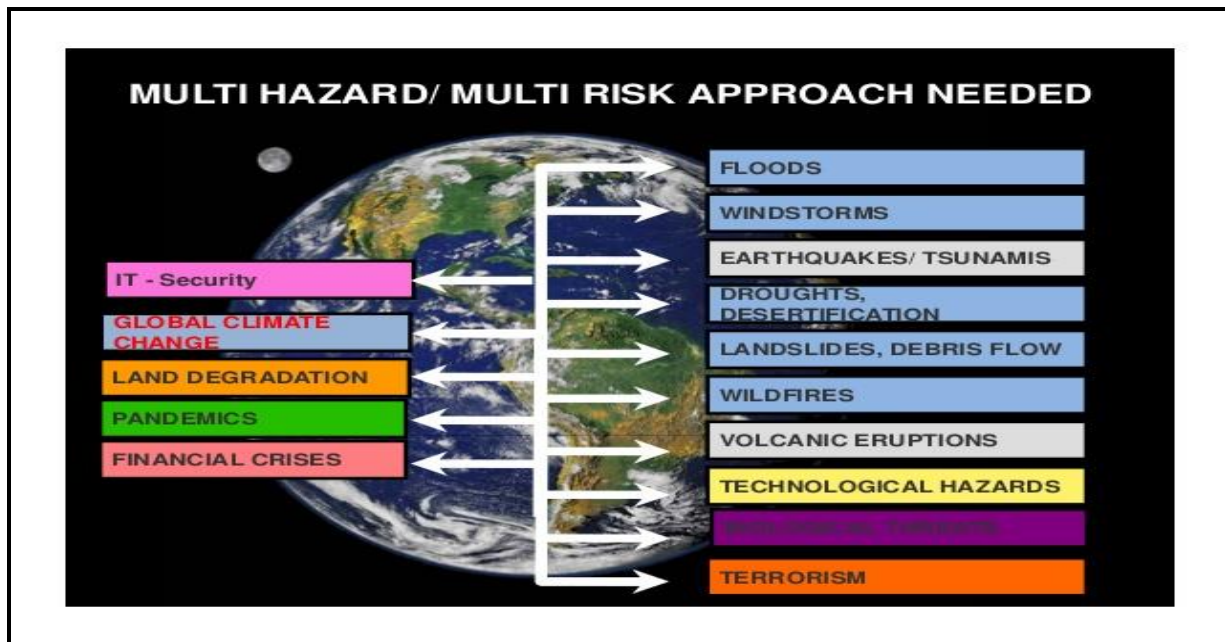
Based on the well-known immensity and complexity of the disaster problems, strong partnerships and commitment in any effort in disaster reduction activities among governments at national and local levels, non-governmental organizations and various sectors of the communities, is essential. Furthermore, other relevant sectors, such as environment, finance, industry, transport, construction, agriculture, education, health, and media among others, in disaster reduction activities, allow for greater understanding of local vulnerabilities and risk to disasters and integration of actions of stakeholders (de Guzman 2003: 3). This implies that no individual or single organisation, whether government or private sector, can address disaster matters by seclusion. Consequently, efforts and commitment in establishing and implementing realistic mechanisms for multi-level, multi-dimensional and multi-disciplinary collaboration and co-operation are important and necessary. Numerous scholars have indicated networking as one of such mechanisms that have the potential to sustain linkages and pull together organizational strengths and capacities, including resources and expertise for disaster reduction activities. Networking and partnerships strategy also complements organisational challenges, especially when they relate to ways of overcoming organizational constraints, such as resources for disaster management (de Guzman 2003: 3).

Some of the possible program activities for this strategy include ensuring that networking is practised to share expertise, information, resources and best practices in disaster reduction (e.g. the Asian Disaster Reduction and Response Network was established for this purposes), and that local capacity should ensure that collaboration and co-operation aim at building capacity of the most vulnerable through proper procedures (de Guzman 2003:11, 12 & Asian Disaster Reduction Centre, 2004). Disaster risk reduction measured in sustainable plans requires the incorporation of

DRR. In the context of development planning, it is a commitment that is in line with the DRR role as a defensive measure against negative impacts in our society. Research has provided evidence that many governments do not tie the two together, and they are therefore, handled separately from national development planning and given a low level of priority in national policies. As a result, only limited financial resources are allocated to it (Asian Disaster Reduction Centre 2007). This is very common in South Africa, where DM is not given much attention by some government departments, and more specifically, at the local government level, which was one of the key findings in this research.

The TDRMF acknowledges the need for facilitating measures that lead to sustainable development. These two issues, that is, DRR and sustainable development, cannot be separated. Sustainable development practices that directly link to DRR may include proper land use, environmental protection, a reduction of carbon emission among many more (van Zyl 2006: 42). This practice would play a major role in developing countries which have been criticised for not giving the necessary attention to DRR measures during planning. In South Africa, despite the fact that relevant policies require DRR be incorporated in all development plans, this has not been easy in most local governments, one example being that of the Nelson Mandela Bay Metropolitan Disaster Management Centre. It can thus be said that disaster risk management requires a multi-hazards/disciplinary approach as indicated below:

Figure 2.8: Multi-hazard/multi-risk approach in TDRMF



Source: Ammann (2010:3)

The multi-risk/multi-hazard approach as shown above indicates that multi-stakeholder partnerships and citizen participation succeed when efforts of people from various fields work together as a team. An example is that of risk communication to vulnerable communities, an issue identified as a major challenge in this research, as discussed in Chapter Five. Early warnings by meteorological departments contribute to reducing the impacts of natural disasters only when the information is transferred through a well-coordinated channel. The TDRMF states that it is vital to improve civil engineering facilities such as embankments, dams, and erosion control facilities through the cooperative efforts of people involved in various activities including soil and farmland management, land use planning, and building design codes (Asian Disaster Reduction Centre n.d: 22).

There is limited research or evidence showing whether this strategy on multi-disciplinary cooperation and collaboration, multi-level and multi-dimensional cooperation has not been adapted and implemented at local government level in South Africa. It is safe for one to conclude that local government in South Africa must be encouraged to rethink, strengthen, initiate and sustain

this strategy. This would require exploring programmes and initiate activities for it. This strategy is one of the key research questions, and is answered in the analysis chapter of the study.

Making decisions based on reliable disaster risk information from hazard mapping and vulnerability assessment

The TDRMF encourages disaster risk management through good decision-making and effective use of limited resources. This entails emphasis on the importance of hazard mapping, vulnerability and risk assessment as a major tool that generates reliable disaster risk information. Such information forms the basis for making major decisions, such as pre-disaster and post-disaster planning for risk reduction and response interventions (de Guzman 2003: 12 & Asian Conference on Disaster Reduction 2003). In order to generate reliable information on risks, TDRM encourages critical involvement of various sectors in disaster reduction. Major stakeholders that need to work alongside the government bodies may include financial institutions and development assistance agencies as they are required to carry risk assessment and risk management that are part of new infrastructure development projects. Ideally, anyone would agree that such commitments by various sectors previously received less attention and that such shift in concerns with disaster reduction and response is a positive development (de Guzman 2002: 12 & Blackman and Crooks 2009: 45).

Challenges noted in many local/vulnerable communities due to exposures such as drought, fires and floods are centred on an understanding of the methods and uses of hazard mapping, vulnerability and risk assessment. The TDRMF requires disaster management stakeholders to apply a holistic framework to achieve disaster reduction, a broader perspective that includes human, socio-cultural, economic, environmental and political dimensions (de Guzman 2003: 12). This requires sectors to be aware of prevalent risks and prevailing vulnerabilities and various methods to assess them (de Guzman 2003:12 & Asian Conference on Disaster Reduction 2003). Most critical is the acknowledgment that policies and practices for DRM have to be based on an understanding of disaster risk in all its dimensions. This includes vulnerability, capacity and exposure of humans, livelihoods and hazards characteristics and the environment, an aspect discussed in Chapter Three in the research. Therefore, a culture of collecting, analysis,

management and use of relevant data and practical information, is very important. Dissemination of information also needs to account for the needs of different categories of users (United Nations 2015: 5). The possible program activities proposed by the framework, and also proposed by this research may include (i) the need to build a culture of hazard mapping, vulnerability and risk assessment at the local and community levels; (ii) stakeholder collaborations and co-operation which should be adapted in risk reduction across the communities, and (iii) collaboration and co-operation which should be adopted and practised to enhance early EWSs (Goodyear 2009: 64 & de Guzman and Unit 2003: 13).

According to the United Nations (2015: 6), risk information should be collected, updated periodically and disseminated appropriately. Information sharing can also be shared much more easily with adoption and application of relevant information communication technologies (ICTs). For example, dissemination of location-based disaster risk information such as risk maps to decision-makers, the general public and vulnerable communities (United Nations 2015: 6) is imperative. This concept is important, especially in cases in which hazard maps related to floods, potential landslide areas, and earthquake have been created by experts, but have not been utilized at the community level. In such instances, it creates a large risk perception gap between experts and local communities. This sections links with research findings that recommend NMBMM to enhance their early warning systems and hazard mapping to capitalize on their benefits. These benefits include distributing reliable disaster-related information so that communities have an accurate understanding of the risks and can take appropriate actions. Risk information also facilitates making decisions on disaster reduction and response interventions at any local municipality. Communities understand their vulnerability better than an outsider or an expert. Therefore, one can argue that a participatory approach in risk information management by all stakeholders would yield sustainability of DRR programmes.

Enhancing coordination and integration of stakeholders' actions through good communication and efficient exchange of relevant and reliable information

The TDRMF acknowledges the importance of information in effective disaster reduction and response. If correct, risk reliable information is communicated timely and has a direct positive impact in mitigating, if not preventing disasters. Also, communicating relevant risk information

to stakeholders could enhance co-ordination and integration of stakeholders' actions in disaster reduction and response (de Guzman and Unit 2003: 12). Therefore, relevant measures must be put in place, such as an efficient and accurate disaster risk information system that enables capturing, storing and dissemination of accurate information when required. A system to achieve set objectives also has to be effectively linked to local early warning systems, local authorities and the media to ensure effective use of disaster risk information for public awareness and education, amongst others. Systems must be easy to operate and up-to-date so as to avoid dissemination of unreliable information (Guzman 2002: 5).

Some possible program activities may include putting in place disaster risk management information systems at various levels, such as at Municipalities and other institutions (Goodyear 2009: 65). Furthermore, it is generally accepted that information is power and people at risk need information just as they have basic needs. Communities have also served as the first responders when a disaster strikes, and improving their knowledge or capacity empowers them to help themselves and one another. Therefore, information needs to be disseminated accurately to vulnerable communities.

Information or evidence on risk communication and efficient exchange of relevant and reliable information among stakeholders in South Africa is not well structured or co-ordinated. Research has shown that in South Africa there is a paucity of reliable information among stakeholders and worse, it is unstructured and poorly co-ordinated, as presented in Chapter Five of this research. There are practical implications, as one can see that vulnerable communities face localised disasters that have challenged them. Therefore, this strategy forms part of the study objectives, with findings on the state of NMBMM disaster management centre discussed in the analysis chapter of the research.

Ensuring that appropriate enabling mechanisms are in place, including policy, structure, capacity building, and resources

This strategy focuses on the legal framework and co-ordination mechanisms. Research indicated that some countries have not established departments or agencies in their national or local governments for dealing with disaster reduction activities (United Nations 2014 & Asian Disaster Reduction Centre 2007). Failure to implement DRM and DRR relevant frameworks and

also establishment of relevant institutions contributes to loss of life, destruction of property and loss of livelihood. Some of these frameworks have been discussed earlier in the chapter. Consequently, when a disaster strikes, there is huge chaos surrounding who should be doing what. More importantly, national legal frameworks contribute to creating an environment of responsibility for all actors (humanitarian, government, militaries and the private sector). By this, it implies that, institutions and individuals prepare to both respond efficiently and appropriately during a disaster (IFRC 2015).

According to IFRC (2015) laws and regulations serve as a foundation for building community resilience. They are essential to reducing existing risks posed by natural hazards, preventing new risks from arising and making people safer. In 2005, the Hyogo Framework for Action highlighted the importance of good legislation to support disaster risk reduction (DRR). Furthermore, the Sendai Framework for Disaster Risk Reduction, adopted in March 2015, calls for a renewed focus on reviewing and strengthening legal frameworks (IFRC 2015). However, South Africa is placed under countries that give DRM ‘medium’ attention when it comes to objectives and mandates of DRM laws (UNDP 2014: 12); much still needs to be done on the ground. The current Checklist developed by IFRC in 2015 provides that selected and “concise list of ten key questions that implementing officials, lawmakers and those supporting them need to consider in order to ensure practical support for DRR. It includes not only dedicated DRM laws, but also other sectoral laws and regulations that are important for building safety and resilience; as well as the environment, land and natural resource management” (IFRC 2015: 4). Below is the content of the Check list which is in line with requirements of the Sendai Framework for Disaster Risk Reduction 2015-2030.

Figure 2.9: Checklist on Law and Disaster Risk Reduction



Source: IFRC (2015: 3)

The Figure above details all basics that if given priority by governments, would make DRR achievable. These key aspects are also the focus in this research and South African local government institutions are encouraged to make use of the check list. For example, the majority of the South African communities are very vulnerable and number three speaks of the need to

increase safety and reduction of vulnerability. Sufficient resources for DRR are a key component in this check list, and DRM policy implementation generally is challenged by lack /minimal budgets and resources in South Africa. As is demonstrated in later chapters of the research, very little or no resources are budgeted for DRR specifically. The Sendai Framework for Disaster Risk Reduction 2015-2030 (adopted in 18 March 2015) recaps also in detail the laws and regulations that can enhance DRR as outlined below:

- *Ensuring that reviewing and promotion of the coherence and development of national and local frameworks of laws, regulations and public policies;*
- *The importance of establishing the necessary mechanisms and incentives to ensure high levels of compliance with existing safety-enhancing provisions of sectoral laws and regulations, including those addressing land use and urban planning, building codes, environmental and resource management, and health and safety standards, and update them, where needed, to ensure an adequate focus on disaster risk management;*
- *Assign with clarity clear roles and tasks to community leaderships within disaster risk management institutions, processes and decision making through relevant legal frameworks;*
- *Undertake comprehensive public and community consultations during the development of such laws and regulations to support their implementation;*
- *Encourage the establishment of necessary mechanisms and incentives to ensure high levels of compliance with existing safety-enhancing provisions of sectoral laws and regulations, including those addressing land use and urban planning, building codes, environmental and resource management, and health and safety standards, and update them, where needed, to ensure an adequate focus on disaster risk management;*
- *Encourage parliamentarians to support the implementation of disaster risk reduction through developing new or amending relevant legislation and setting budget allocations;*
- *Allocate the necessary resources, including finance and logistics, as appropriate, at all levels of administration for the development and the implementation of disaster risk reduction strategies policies, plans, laws and regulations in all relevant sectors;*
- *Review and strengthen national laws and procedures on international cooperation, based on the Guidelines for the domestic facilitation and regulation of international disaster*

relief and initial recovery assistance” (Sendai Framework for Disaster Risk Reduction 2015-2030 (2015:12-13).

The implication is that national governments should create the foundations for a disaster risk management system by, for example, developing basic legislation for natural disasters and establishing a central disaster management committee (Asian Disaster Reduction Centre 2007). An inclusive legal framework for all actors in the country from government institutions, private sector, civil society and communities can increase the number of urgent responses in cases of need. Governments have great power to influence and ensure all actions to be taken, at the same time being a role model to other stakeholders. The South African government has been a good role model from 2002 by putting in place a DM Act, No. 57 which is an indication of commitment to DRM efforts. However, research provides minimal success on the implementation of the same framework in the vulnerable communities. Finally, disaster risk reduction policies and measures need to be developed and institutionalized at national and local levels. The government ought to empower communities to be resilient to natural hazards while ensuring that development efforts do not increase vulnerability to those hazards. Local government in South Africa, especially NMBMM, can adopt and implement what best fits its local context.

Implementing the disaster risk management process from the national level to the community level

The TDRMF postulates that the disaster risk management process is a process for good decision-making and ensuring the best use of limited resources. It applies the standard principles, process and techniques of risk management to disaster management. The process presents a framework and systematic method for identifying, analysing, assessing and managing disaster risks in six systematic steps (ADRC 2005). Research has clearly shown the importance of promoting effective integration of stakeholders in all matters relating to DRR, and the TDRMF gives consideration to stakeholder commitment through multi-level, multi-dimensional and multi-disciplinary co-ordination and collaboration, a critical strategy toward improving disaster reduction and response. Moreover, the Framework acknowledges the need for facilitating

measures that lead to sustainable development. These two issues, that is, DRR and sustainable development, cannot be separated (van Zyl 2006: 42); as further discussed in Chapter Three of this research.

To effectively engage local communities and citizens with disaster risk reduction activities and link their concerns with government priorities, local governments are naturally situated in the best position to raise citizens' awareness of disaster risks and to listen to their concerns. In South Africa, community participation in risk governance is a key aspect of democracy process. Community preparedness measures are sometimes as effective as costly public investments in reducing casualties from disasters, and local governments should play a central role in community education and training (UNISDR 2010). Examples on this strategy may include the case of NGOs and donors in El Salvador who supported municipalities in strengthening community disaster preparedness and community connections with local governments to promote disaster risk reduction. In the project, linking local communities to local governments was considered the key element for making disaster risk reduction programmes sustainable. As a case in point, an NGO in Nepal helped the Chitwan district and village authorities to promote agricultural livelihood protection and disaster risk reduction, through animal protection, drought mitigation and flood preparedness measures (UNISDR 2010). In this research, the concept was applied in local government decision-making processes to ascertain if it applies the standard principles, process and techniques of risk management to disaster management. Focus is to be on a systematic method for identifying, analysing, assessing and managing disaster risks. An understanding of specific frameworks and their related implications applied by the national, provincial, local government and communities must be properly understood by all stakeholders. However, top-down approach in decision-making has been found to enforce decisions or give communities less opportunity to contributing to decisions that impact their lives. This research promoted participatory methods which involve bottom-up approaches in all community interventions, as discussed in Chapter Three.

It is important to also note that there is limited research in Africa, especially in South Africa, on the extent to which this framework has been applied, when compared with Asian countries.

Below is a summarised table on successful case studies of good practices in Disaster Management Phases, and application of the strategy.

Table 2.4: International Best Practices in TDRMF implementation

1. Good practices in Disaster Management Phases	Prevention/ Mitigation	Preparedness	Response	Rehabilitation/ /Reconstruction
	-Vietnam Effectiveness of the Disaster preparedness Programme in: Planting Mangroves to Mitigate Sea Dyke Erosion Flood Control for the Red River.	-Bangladesh: Cyclone preparedness Programmes in Applications and advantages of Hazard Maps.	-Latin America: Effectiveness of Proper Emergency Supply Management System (SUMA).	-India: Post-Disaster Reconstruction and Recovery to raise Issues and Best Practices. -Iran: Demonstrations and Training to Raise Community Awareness and Build Capacity for Safer Housing in Bam.
2. Good Practices in Application Strategy	Establishment of Co-ordination Mechanism and Legal Frameworks for Disaster Reduction	Integration of Disaster education Concept into Development Planning	Improvement of Information Sharing and Management	Promotion of Education and Public Awareness
	-The India (Orissa) Experience: Co-ordination and Collaboration between Government and NGOs for strengthening Disaster Reduction and Response:	-China: Policies and Measures on Flood Disaster Reduction in China since 1998. -Korea Republic: Disaster Impact Assessment System	-Japan:Lessons Learnt from The Great Hanshin-Awaji (Kobe) Earthquake: National Government Countermeasures and Disaster Information Systems. -Effectiveness of Early Warning of Volcanic Eruption with Hazard Maps: The Experience of Mt. Usu in Japan	-Japan: Disasters and Education: Maiko High School in Japan; and Preparing for the Big One in Kathmandu Valley, Nepal.

Source: <http://www.adrc.asia/publications/annual/04/04eng/pdf/2-2.pdf>

The figure provides some examples on successful case studies of good practices in disaster management phases and application of the strategy in DRR implementation. One can argue that these practices are very community oriented, thus their successful nature. However, literature does not provide the frameworks application in Africa, specifically South Africa, making it a good framework for NMBMM to adopt and contextualised. This information contributes to new knowledge around the implementation of DRR in South Africa within a municipal context.

To recap, the need for adoption and contextualizing the framework in NMBMM, below is a further example of the countries that have made a good application of the TDRMF for designing and implementing of DRR purposes.

Table 2.5: Country case study application of TDRMF

Country	Successful stories in implementation of DRR Programmes/projects
Armenia	International Co-operation from Armenia: Emergency Response to the Gujarat Earthquake in 2001. Risk Assessment in Case of Possible Facility Failure: The Experience of Azat Reservoir in Armenia.
Bangladesh	Cyclone Prediction and Forecasting, Weather Warning System and Dissemination Methods: The Bangladesh Perspective and On-Going Disaster Mitigation Practices in Bangladesh
China	Brief Working Instructions for the Typhoon Rananim Emergency in China Disaster Emergency Management in China.
Indonesia	Development of Eco-Bio-Engineering Mitigation System: An Eco-Geological Framework towards Community-Based Prevention of Rain-Induced Landslides in Java.
Lao PDR	Empowering the Community for Disaster Risk Reduction through a Community-Based Disaster Management Project in Champasack District, Champasack Province, Lao PDR.
Malaysia	Mitigation and Management of Flood Disasters in Malaysia
Philippines	Negros Occidental Provincial Disaster Co-ordinating Council and the Creation of the Provincial Disaster Management Team (PDMT) Funding Disaster Management in the Philippines.
Thailand	Creation of Awareness among Villagers and Mobilization of their Participation in Thailand.

Source: http://www.adrc.asia/publications/TDRM2005/TDRM_Good_Practices/GP2005_e.html

The above discussion focused mainly on current DM policy and frameworks. This was in addition to some of the international frameworks that have shaped the field of DM since the early 90s. The section concludes with an analysis of the TDRMF in which provides a best example of how this framework has developed to becoming international tool for DRR. As pointed out earlier, very little empirical research has been conducted on the application and implementation of the TDRMF in sub-Saharan Africa. Therefore, the research asks the pertinent question: what recommendations are needed to build and document a body of knowledge on the African experience? One can sufficiently argue that the TDRMF would provide a basis for researchers and governments in Africa to re-evaluate existing DRR programmes and build on the Framework.

2.5 MAINSTREAMING DISASTER RISK REDUCTION IN PUBLIC MANAGEMENT

The discipline of Public Administration in 1985 was blamed for neglecting emergency management within the mainstream of its activities (Petak 1985: 3). However, recent research has managed to provide that disaster science/management is one of the functional areas of Public Management, an inter-disciplinary contribution of Public Management to DM. Disaster Science is an emerging area as a discipline for public consciousness and public awareness in addressing service delivery challenges, mainly achieved through developing and implementing relevant policies. Public management is one of the disciplines that has fully matured into a discipline with its origin in the 1980s. It borrows from various disciplines such as political science and management, law-making and is an inter-disciplinary discipline, state Van de Walle, Curry, and Gadellaa (2014: 24). According to Jones (2005: 16), Public management is a sub-discipline of management which makes it different from the traditional public administration, where the difference between the two is on their specific focus. Traditional Public administration focuses on “what happens within governments and on the operation of the line functions of government, while public management pays more attention to the operation of government organizations from the perspective of their interaction with the environments in which they operate”(Jones 2005: 16).

Disaster risk reduction has its origin from Public management and environmental studies, which make it an emerging and relatively new area of study, characterised by a minimal body of theory, methodology and knowledge (Luhmann, Cardona and Varley, cited in van der Waldt 2009: 26). This places DRR field as a borrower of information such as theories, approaches, principles and successful practices from other fully established disciplines, including Public Administration. Van der Waldt and Du Toit (1999: 62) indicate that “overlapping and interaction with other disciplines are essential and that the exchange of influences is important” in the discipline of DRR. Moreover, this gap provides a “window of opportunity” for DRR interested parties to borrow as much as possible to address disaster risk issues in the society and importantly to contribute towards a mature discipline (Van der Waldt 2009: 26). According to UNISDR (2013: 6), DRR requires “an all-hazard, risk-based, problem-solving approach should be used in disaster risk reduction to address the multi-factorial and inter-dependent nature of the disaster risk chain and to achieve improved solutions and better optimized use of resources”. There has to be clarity on what exactly can be borrowed or what contribution can be derived from Public management/administration from an inter-disciplinary approach so as to build an individual discipline in DRR, argues Van der Waldt (2009: 26).

On the one hand, the existence and role of government in the society has been there for many years as human being have always tried to come up with institutions and rules on how best to keep order in the society. On the other hand, Public management as an academic discipline is regarded as a relatively “new” discipline when compared to other disciplines. It came to existence as a subject when Woodrow Willson, the 28th United States of America President compiled an article entitled “the study of administration”. In the article, it was argued that there were differences between public administration and the public policy/politics. Woodrow’s work later contributed to the separation of disciplines between “political sciences and public management/administration”. There is, however, dramatic change taking place in the contemporary discipline of Public administration due to the nature and complexity of increasing policy problems faced by governments in the 21st Century, argues Robinson (2015: 4). In studying public management/administration as a discipline, scholars look at it from five broad perspectives (Van der Waldt 2009: 27 – 28; Demir 1993; Vyas-Doorgapersad 2011: 236) as follows:

- **Administration dichotomy approach:** This approach was developed by Woodrow Wilson in his essay in 1887 and many academics have come to make reference to it. It is also called the politics approach and those scholars who hold on it argue that there should be separation between public management/governance and politics. In this research, the question remains on what extent should this separation be, yet these two concepts are inter-related and heavily dependent on each other (Van der Waldt 2009: 27 – 28).
- **The conventional approach:** This approach is also called the functional approach as it stipulates that public management and governance is mainly about operations/clerical or administrative. In this research, this approach fits within local government institutions which are tasked with operations of governance; for example, implementation of the public polies (Van der Waldt 2009: 27 – 28).
- **The generic administrative approach:** This is a generic approach which has been universally accepted and it stipulates that there are generic administrative processes (groups of administrative processes) which should be applied across all public institutions and not in just one. They are made up of the six generic functions, *namely*, organising, financing, personnel administration, policy-making, control and methods and procedures. In this research, these six generic functions are applicable in all government institutions, especially those dealing with DRR matters (Van der Waldt 2009: 27 – 28).
- **The business management approach:** This approach maintains that business management principles which have been very successful in the private sector domain should be adopted in the public sector. They have the potential to enhance service delivery in the public sector. However, some Public management exponents do not agree as they believe that public management and governance core values, which is to provide for the citizens is different from that of business philosophies whose aim is to make profits. Therefore, some aspects can be borrowed and applied in the public management and governance, including; efficacy analysis, budget analysis, cost-effectiveness and productivity analysis (Van der Waldt 2009: 27 – 28)

- **A comprehensive approach:** Those who support this approach argue that civil servants' duties and responsibilities are part of public management and governance. Governance and public management are defined broadly to include all activities of groups of individuals coming to work as a team to achieve a common goal. In this case to offer services to the citizens, is a major focal point (Van der Waldt 2009: 27 – 28).

The five broad perspectives through which the discipline has undergone provides readers with an opportunity to locate Public management from different angles. Moreover, one can also identify that Public management is about interaction between society and government institutions. This advantages DRR to borrow from other disciplines, such as Public management, which makes it an inter-disciplinary contribution and an increased focus on improving municipal service delivery within this context.

2.5.1 Interdisciplinary Contribution: Inter-relationship of Public Administration and Disaster Risk Reduction

An inter-disciplinary approach looks at how more than one academic discipline can work together in combination with another discourse. It involves dialogues between disciplines through crossing boundaries to create new approaches (Global Dimension in Engineering Education 2014: 8). Public management is a social science discipline that is related to several other fields, Economics, Politics, Industrial Psychology and Local Government Management. It provides many foundational elements that can be applied in the domain of DRR. The elements relating to Public management have been outlined in works of academics such as Cloete; Hanekom, Rowland and Bain; Plumptre; Fox, Wissink and Schwella; Stoop and Grabe; Thornhill and Hanekom & Van der Waldt and Du Toit (as cited in van der Waldt 2009: 29 - 31). It follows then, that Public management is about:

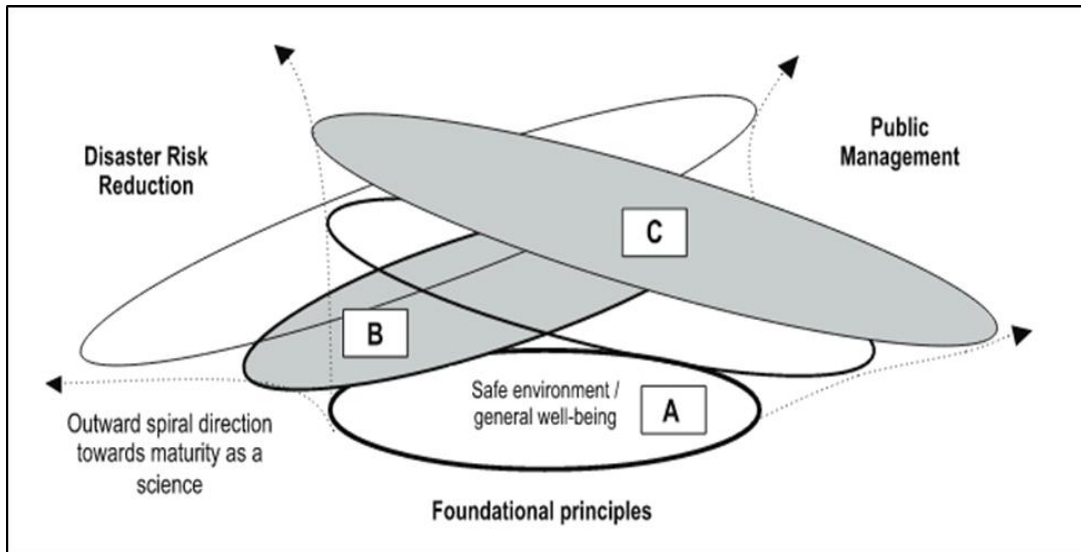
- All functions of management administered by civil servants, ranging from personnel management, organising, controlling, planning financial management and policy-making and implementations;

- Aspects that are linked services rendered by civil servants to citizens/public at large;
- It occurs within the spheres of government that is the national, provincial and local government, implying that the bureaucracy within government involves formulation, implementation and evaluation of government policies;
- It happens within a defined section of a society whereby citizens needs are met satisfactorily by public management; and
- A safe and sound societal environment is met through participation in various roles by civil servants, such as participation in public policy formulation, implementation, monitoring and evaluation (Van der Waldt 2009: 29 - 31).

The above basic fundamentals of the broader subject of Public Management were supported by peripheral aspects incorporated in the study domain of DRR. This involved an important step implemented by the Standards Generating Body of Public Administration and Management (SGB:PAM) in 1998 - 2002 on the 11 functional areas of Public Management, in which disaster studies was included as one of the integral aspects in a significant contribution made by Van der Waldt (2009: 29 - 32). An important aspect is locating this specific research of DM and DRR within the paradigm of Public Administration and Governance which has contemporary significance when theorising DM and DRR within the field of Public Administration and Development.

The roots of public management and DRR are based on their philosophical underpinnings in that both aim at establishing and enhancing the well-being of a society, maintains Van der Waldt (2009: 29 - 32). The above discussion on linkage between the two disciplines of public management/administration and DRR brings one to the existing close correlation between the fundamentals of the two disciplines. In making a strong argument for public management and DRR, the following illustration adds value to the discussion.

Figure 2.10: Outward spiralling towards maturity as a science



Source: Van der Waldt (2009: 22)

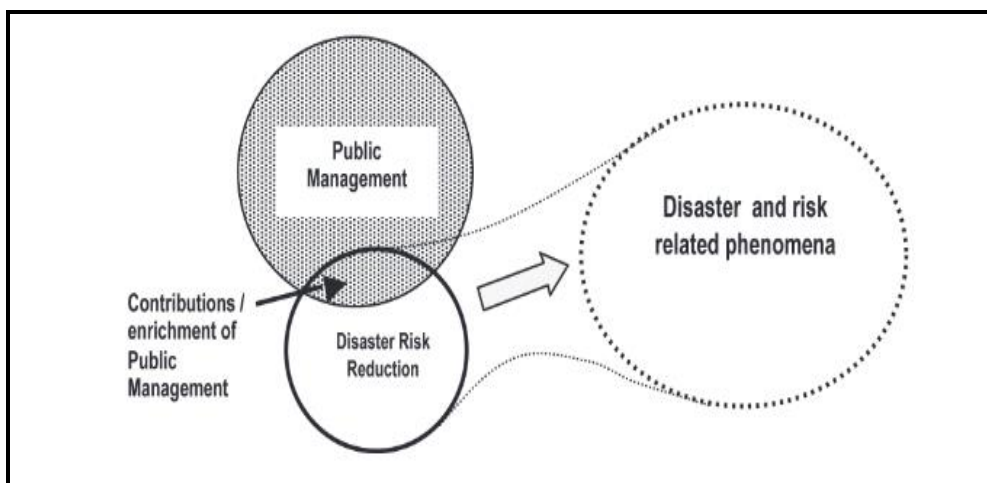
The above illustration and contextualisation is a significant contribution made by Van der Waldt to the discourse of DRR. Outward spiralling towards maturity as a science from the figure demonstrates with clarity that Public Management and Disaster Risk Reduction have both the same roots, which is the *Foundational principles*, or underpinnings, namely, the general well-being and common good of society. The specific focus of Disaster Risk Reduction within this foundation is to ensure a safe and healthy environment for people. From this foundational aspect, each study domain spirals outwards towards full maturity as a science. At the various sections where one sees maturity spiral merging, it involves borrowing, contextualising and adopting of approaches, methodologies, techniques, principles and theories (Van der Waldt 2009: 29 - 31). Van der Waldt (2009: 33) further states that once DRR reaches its maturity, it will still be required to adjust to the evolving environment so it does not lose its credibility. This discussion therefore adds significance, as this research is conducted within the Public Management discourse.

Moreover, disaster risk reduction, considered a contemporary focus area relative to service delivery, is presented with broad opportunities to borrow and enrich itself with body of knowledge from disciplines such as public management, maths, geography, engineering and

social science (Van Der Waldt 2009: 33). Presenting a good opportunity for drawing from various skills and experience of individuals and organisations with expertise in DRR related disciplines; it is possible to develop a collaborative and co-operative initiative (Meheux, and Dominey-Howes 2011: 110). A good example is provided that “the underuse or under-usability of science has contributed to many of the gaps and problems identified by countries in addressing DRM societal challenges. For this reasons, the scientific approach can promote a long-term multi-hazard approach and solution-driven research”, argues Aitsi-Selmi *et al* (2015: 28).

It is also important to acknowledge the inter-disciplinary contributions of Public Management in Disaster Risk Reduction and other risk related phenomena, given their value add to the current focus of the developmental state in the South African context. The figure below presents this relationship.

Figure 2.12 Inter-disciplinary contributions of Public Management



Source: Van der Waldt (2009: 33)

Van der Waldt (2009: 33) maintains that inter-disciplinary contributions of Public Management in the figure above emphasise the major role it plays as a foundation in DRR. It provides an illustration of how the two fields can be studied to bring out new perspectives in the field of DRR. Global Engineer in Sustainable Human Development (2014: 7) further maintains that the inter-disciplinary contribution presents a good opportunity for developing sustainable solutions.

Moreover, various authors raise emphasis on the urgency to address current global challenges, such as Climate change and Civil-unrest and that sustainable solutions should be approached from various angles, such as inter-disciplinary, multi-disciplinary and trans-disciplinary angles (Anup; UNISDR; Obiora and Emeka , cited in Kanene 2016: 1).

2.6 PUBLIC POLICY PERSPECTIVES *VIS-À-VIS* DISASTER MANAGEMENT

2.6.1 Public Policy

There is no single definition of policy and public policy. This is an indication that the field is wide and contested, as well as multi-disciplinary. Some of the earliest writers have referred to concept of policy as the authoritative allocation through the political process of importance to the society, individuals or groups (Easton 1953: 129). Easton placed emphasis on the “political process” and society, which shows that despite the later evolution to emphasis on governance and governability, the political economy remains at the core of policy. Simply put, policy is “whatever governments choose to do or not to do” (Dye 1987: 1). In some instances, where some governments have taken this literally, it has somehow resulted in dictatorship style, characterized by top-bottom decision-making processes. Birkland (2005: 17) defines policy as a law, a regulation, or the set of all laws and regulations that govern societal issue. According to Cloete and Wissink (2000: 3), policy is “a statement of intent”; it outlines the basic principles to be pursued in attaining specific societal goals. Policy has to be interpreted to provide values of society that have mainly come to life in the management resources.

Public policy has been defined by Hanekom (in Cloete and Wissink 2000: 11), as a formally expressed goal that the legislator proposes pursuing with society or with a societal group. Furthermore, Hogwood and Gunn cited (in Cloete and Wissink 2000: 12), state that for a policy to be regarded as ‘public policy’ it must have been developed within the framework of governmental procedures, influences and organisations (Singh 2014: 28). Public policy is made up of all actions taken and implemented by all spheres of government, all levels of public sectors, through a democratic process (Fox, Bayat and Ferreira 2006: 2). This enables a democratic political equality as it enables every citizen to enjoy equal opportunities in influencing the nature, character and contents of the policies, maintains Young (cited in Singh

2014: 28). The role of public policy therefore, is to provide a detailed outline and define important values of society. The success of public policy is embodied in the manner in which pertinent projects and programmes are implemented (Wissink and Cloete 2000).

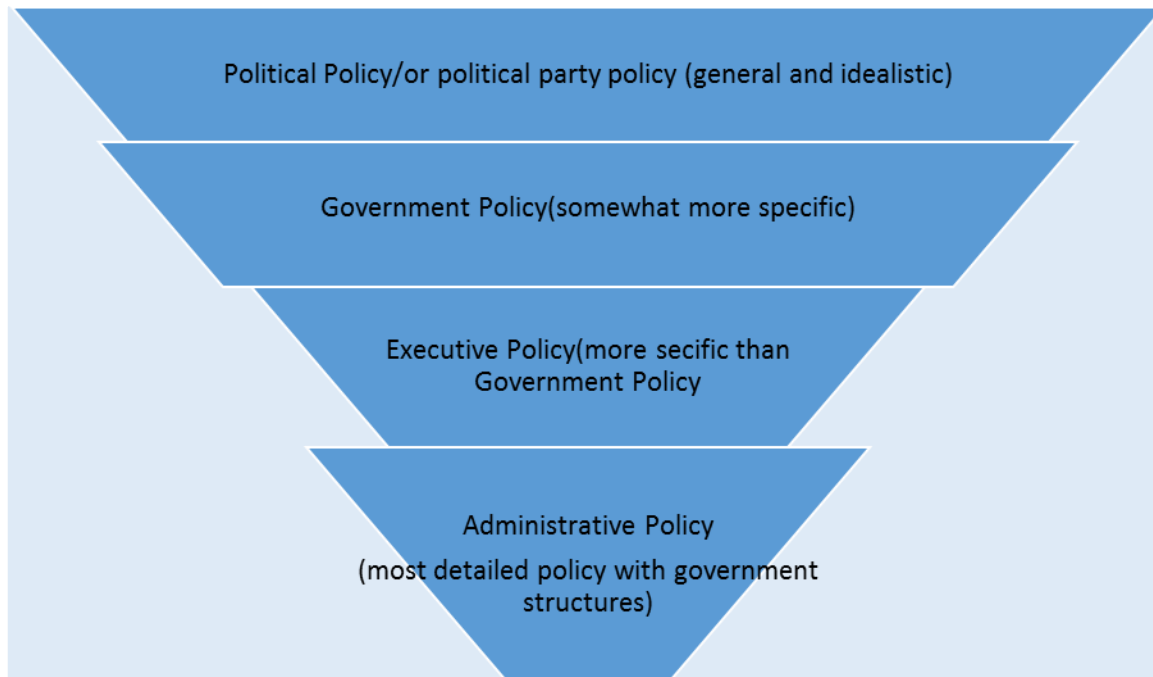
2.6.2 Levels and types of Public Policy

Public policy can be examined through four levels. These levels are considered different but closely related to such an extent that it's difficult to find a difference. The four levels are also stages in policy-making and implementation, and for this reason they are inseparable. There are four levels of public policy, according to Hanekom (1987: 10), as follows:

- *Political policy*: also called political party whose origin is from a political party. Its mandate is advocated by a specific party regarding an issue. (This would include what the ANC as a political party stands for; for example, the Freedom Charter that seeks to ensure that every South African receives government services as a basic human right).
- *Government policy*: also referred as national policy as it usually relates to the political party in power. This policy is regarded as more specific than political policy as it focuses on its mandate, which is on how it wants the society to be steered. (This includes policies discussed in this Chapter, such as the NDMF of 2002 and the National Development Plan Vision 2030, and the Batho Pele Principles as discussed in Chapter One).
- *Executive policy*: also referred as implementation policy as it is more specific than both the government and political policies. It is determined by political-office bearers who seek help from top public officials; it sets priorities and ensures compilation of the budget. (In the context of the study, an example is the declaration of a state of disasters by the president and the premiers, as required by the Disaster Management Act).
- *Administrative policy*: administrative policy has been determined as the most detailed form of policy within government structures. It is very operational and also focuses on the details of issues outlined within a policy (Hanekom 1987: 10). (A good example is

that of Integrated Development Plans for a Municipality, for example, the Disaster Risk Management IDP plans for NMBMM, an operational policy for servicing citizens).

Figure 2.13: Four levels of public policy



Source: Hanekom (1987: 11)

Based on the above figure on public policy levels, policy develops from the top levels that is from political policy, followed by level two which is government policy; the third level is executive policy and the fourth is administrative policy. This implies that in policy types, it starts from the general nature to a more specific nature of the actions.

2.6.3 Theories of Public Policy-Making

A good understanding of public policy requires an understanding of theories behind public policy process. Policies are compared to “seashells” due to their fragility. They have no beginning or an end, advances Starling (cited in Cloete and Wissink 2000: 25). Hanekom (1987: 8) argues that policies focus on the general welfare of a society and not on one specific segment or groups of a society, and this is because they are found within government institutions.

Government institutions bear a huge role in providing services to the citizens without bias or discrimination.

Theories of policy and policy-making are linked to political ideologies also called paradigms (Dunn 1981: 54 - 56). The following are some of the political ideologies that influence public policy-making:

- *Liberal laissez-fair approach or classical* - this approach maintains that the role of the state is to maintain law and order within and from outside attacks, protecting private property and creating a viable environment for free enterprise, and maintaining a minimum interference on citizens. As such, all public policies should be within this framework and 'leave other things alone' to be determined by the market (Cloete and de Coning (2011: 33).
- *Socialism/collectivism approach* - the state is the main controller of the economy through government institutions/departments (Hanekom 1987 & Ranney 1966, cited in Cloete and de Coning 2011: 33). It does not support capitalism and the focus is on equality, justice, an end to exploitation of the poor and transformation of private property as per individual needs (Fox, Bayat and Ferreira 2006: 6).
- *Welfare state* – the state has to promote the achievement of spiritual and high quality standards of life for its citizens. As such, values in each policy process become very critical as they present themselves as goals that are promoted in each policy. Assumptions behind the values and goals for each policy also have to be understood (Cloete and de Coning 2011: 34) – the notion of DRR is one key determinant of promoting the welfare of local citizens.

Policy-making has sometimes been regarded as a complex process. The policy-making process has been attributed the following theories: *Classical theory* - also referred as institutional theory: the government focus is mainly on its own different concerns and interests and takes place through separations of power, through legislature, executive and judicial systems (Woll (1974)

and Lineberry (1977), cited in Cloete and de Coning 2011: 34). *Liberal democratic theory* - this theory argues that the primary party has all the powers to make public policies as well as ensuring their implementation. The party is regarded as greater than other interest groups - private companies and non-governmental organisations (Cloete and Wissink 2000: 26). *Élite theory*: there are two major groups of interest, small élite group and the larger group. The élite group makes the policies and ensures their implementation while the larger group remains mainly as followers. This implies that policies are designed from the top and implemented on the ground by government officials (Cloete and de Coning 2011: 34). Lastly there is *Systems theory*: this theory combines all aspects of other theories of policy-making process discussed above (classical, liberal, and élite). This implies that policy-making processes include different interactions of interest groups/parties (Cloete and de Coning 2011: 34). Policy-making therefore is made up of “debates, proposals, altering the scope of what is envisaged and a conclusion is derives, on the policy to be made” (Fox, Bayat and Ferreira 2006: 12).

As pointed out earlier, governments set objectives and guidelines whose aim is to influence decisions on the well-being of the society. Public policies should be treated with commitment by government institutions (Du Toit, Knipe, Van Niekerk, Van der Waldt and Doyle 2002: 83, 338). Public policy should never be regarded as static, whilst objectives will be fixed or static in terms of time. There is always need to have the policies reviewed often in line with changing societal. According to Roux (2002: 425), some of possible influencing factors for reviewing policies may include the following:

- Circumstances, which include the total environment, as determined by time and place;
- Technological developments;
- Population increase and effect of urbanization;
- Natural disasters and man-made disasters;
- International relations and trends, as well as the effects of globalization;
- Economic and industrial development;
- Public needs and aspirations;
- Party political dynamics;
- Views of interest and pressure groups;

- Research and investigations by commissions and committees; and
- Personal views of public officials and political role players.

Disaster risk management and risk reduction issues present themselves in a complex manner and therefore, related policies and plans must be reviewed as per societal needs in South Africa. This research found that NMBMM DRM IDPs and other important documents need to be reviewed as per community needs. The IDP for DRM was found to be very sketchy as it lacks important details.

2.7 GOVERNMENT AND GOVERNANCE: SOCIO-REALITIES

The significance of public administration, management and the emphasis on utilizing public resources effectively for enhancing service delivery cannot be under estimated. The following explanation processes in which effective and efficient government and governance can be determined, placing emphasis on DRR as part of the significant discussion.

2.7.1 Public Administration

The field of public administration has been in existence for many years and continues to evolve. The emerging new public administration approach focuses more on ways of dealing with current and future challenges of managing the public sector. It provides four standpoints in response to current and previous challenges of public administration: an emphasis on public values; government special role as a guarantor of public values; importance of public management broadly conceived and of service to and for the public; citizenship and democratic collaborative (Bryson, Crosby and Bloomberg 2014: 446). This implies that public administration values go beyond efficiency and effectiveness of the government, but also democratic values. The government is the guarantor of delivering services to its citizens and the citizens, private sector and NGO's must also play their roles in finding solutions to public problems, to enhance services (Bryson, Crosby and Bloomberg 2014: 445). Public administration is also defined by the fact that it is embedded in political culture, but not as a force that also shapes society Kettl cited in Kirlin (2001: 141).

The role of public administration and management therefore centres on how it has influenced the society historically and understanding its use to shape current society and in the future (Kirilin 2001: 140). This demonstrates that the state takes responsibility in administering public services to the society. Fox and Meyer (1995: 104) argue that public administration is charged with the formulation of, implementation, evaluation and modification of government policy. Through implementation, the state works with all spheres of government in supposedly a co-ordinated approach. Monitoring and evaluation is also expected take place at every level, an issue that is found to be lacking in the implementation of DRM programmes in NMBMM.

Public administration and management represents a wide combination of theory and practice aimed at clarifying a conception of government and its relationship with society. It promotes government policy which is more responsive to social needs and establishing management practices in public bureaucracies. Effective utilisation of public resources to enhance service delivery is very important, and this comes through in the manner in which government institutions are administered and managed.

2.7.2 Governance and Disaster Risk Management

Governance on its own is a system of values, policies and institutions through which a society manages its own political, economic and social affairs and makes collective binding decisions. This further involves interaction within and amongst stakeholders - state, civil society and private sector (Olowu and Sako 2002: 37 & Jones, Oven, Manyena and Aryal 2014: 78 - 79). The historical perspective looked at governance as the process by which the government governs persons as a unit that was not subject to governance by others. However, this is no longer feasible due to the global environment characterised by intertwined economies and instantaneous communication. This historical belief that government governs persons leaned more on the theory of sovereignty which assumed that the sovereign governments are a collective unit (Knepper, Sitren and Hayden 2005). There is also need for a relationship, according to Reddel (2002), between the state and the private sector as the private sector/society contribute to enhanced service delivery to citizens. Therefore, one cannot treat each single component of the government individually i.e. whether elections procedures, courts, local governments or cabinets. Any change on a part of the main system affects the whole system as they are all directly

interlinked (Plowden and Jenkins 2006:125). According to Peters cited in Sithole (2014: 15), good governance is an uncommon “commodity although widely used; the concept is however, far from precise and has taken on a number of alternatives”. This makes the necessity for risk management an imperative when engaging with stakeholders. This implies that risk management within municipalities requires strong inter-departmental relationships, as well as with other stakeholders.

An important aspect is to ensure that the sitting government is competent, efficient and effective, as well as the capacity to provide the citizens with the necessary basic public services (Plowden and Jenkins 2006: 8). Public services should not be limited to putting together government institutions, but include the network of institutions and relationships through which citizens express their views, articulate interests, communicate with governments and try to ensure that their demands are considered in public policy. It also covers the political and administrative process of a country as the relationships between politicians, politics and citizens are very important. Therefore, in the South African context, and for the purpose of this research, the role of disaster risk management and reduction is a fundamental strategic focus when dealing with aspects of public governance.

Accountability is very important in government institutions as it minimises wastage of government resources and increases effectiveness and efficiency in service delivery. According to Fox and Meyer (1995: 1), it is the responsibility of a government and its agents towards the public to realise previously set objectives and to account for them in public; the commitment required from a public official to accept public responsibility for his actions or inaction and the role a junior takes on keeping the senior informed on the execution of responsibilities, are key. While one can easily agree with Fox and Meyer, Mahmud and Kabeer’s (2003: 3) view is more appealing. These authors stated that accountability has two key elements, which are the right to make claims and demands of accountability. The definition herein cannot be over-emphasised, particularly in the context of disaster risk management, as the level of accountability rests with government in the protection and preservation of public rights in a public value system of governance.

2.7.3 Enhancing Disaster Risk governance

As pointed out in Chapter One, disaster risk is about that negative potential presented by a situation to a particular community or society over specified future time period. This may contribute to losses in lives, livelihoods, assets and services (UNDP 2015: 7). Certain patterns of political, social and economic development are amongst contributing factors to disaster risk, in addition to vulnerable conditions (UNDP 2015:7). Some governments around the world have managed to give disaster risk management and reduction the attention they demand. Disaster risk governance (DRG) has conceptually been defined by the UNDP (2015: 7) to encompass the manner in which public institutions, private sector, NGOs, civil servants, media, and civil society at community, national and regional levels cooperate in order to manage and reduce disaster and climate related risks. This translates to sufficient levels of capacity and resources for mitigation, prevention, preparedness, response and recovery from disasters. Moreover, the opportunities for citizens to participate in decisions affecting their lives, including exercising their legal rights (UNDP 2015: 7).

It is important to note that a considerable number of governments still lag behind in designing and implementing relevant disaster risk policies, such as under-resourced African governments. This failure has been linked to lack of political will and weak governance (Jones, Owen, Manyena and Aryal 2014: 78). Moreover, Petak (1985: 3) notes, “public administration, as a discipline, has generally neglected to consider emergency management within the mainstream of its activities.” This shows that governments, especially in Sub-Saharan Africa, not only lack in terms of resources to support DM programmes, but there is general lack of political will to develop solid DM policies and programmes. The UNDP (2015: 18) agreed that since the late 1990s, more than 120 countries have managed to put in place legal or policy reforms to enhance DRG. This includes developing more sophisticated national DRM policies, frameworks and legislation. This was a positive move as they focus on DRR, as opposed to traditional response and preparedness objectives. However, these positive moves have not materialised fully to positive results on the ground (UNDP 2015: 18).

South Africa is amongst those countries that have made huge strides in implementing the requirements of HFA such as the DM Act and National Disaster Management Framework. However, research has shown that despite an excellent policy framework, there has been laxity

when it comes to implementation. UNISDR (2011) notes that there is limited commitment given to “processes of governance of disaster risk reduction including policy formulation and the roles of various stakeholders” (cited in Jones, Oven, Manyena and Aryal 2014: 78). Moreover, DRM and DRR governance are clearly stipulated within all international frameworks, for example HFA priority one, which requires that comprehensive legal frameworks and fully functional institutional arrangements for DRR be a priority of each government. This priority further acknowledges that national government bears huge responsibility in ensuring that DRR policies are implemented through offering high standards of basic services to the citizens (UNISDR 2014, cited in Jones *et al* (2014: 78).

As pointed out earlier, governance involves appropriate harnessing of policies, resources, processes and activities towards improvement of people’s lives. Appropriate governance in disaster risk reduction remains very important as such institutions are in the best position to integrate disaster risk legislative arrangements in the broader sustainable development planning and practices of a country. Furthermore, government institutions are capable of taking an inclusive approach for this matter by including other stakeholders such as the voices of the citizens, private sector and civil society (UNDP 2015: 3). Good governance principles also have to be given priority as they contribute positively in achieving inclusive sustainable development, and this may include participation, accountability, transparency, equity and effectiveness. In Chapter Five, some of these important aspects of good governance that did not receive adequate attention are covered, for example, service delivery in some areas.

2.7.4 Responsible Citizen Engagement for Effective Disaster Risk Management

One characteristic of the post-apartheid government has been the positive shift towards encouraging citizen participation. Drawing from the pre-democratic civil society movements, South African public are generally readily poised to demand their spaces in governance. Citizens were granted democracy to demand their rights and to be involved in development projects that affect the spaces in which these communities live. This has created high expectations of the citizens from the government, which has led to high numbers of service delivery protests cutting across all sectors: mining, industrial action, protests in institutions of higher learning.

Public participation strongly demands that “those who are affected by a decision have a right to be involved in the decision-making process” (International Association for Public Participation-IAP 2007: 1). Good governance is to a large extent measured on the levels of community involvement in matters that affect their own lives. Community involvement is an aspect that is taken seriously in post-apartheid South Africa and regarded as one of the strong tools in governance efforts. Historical community theory received a lot of attention from early philosophers such as Aristotle, Hegel, Marx and Kierkegaard, who saw community as meeting basic social requirements for being human and interacting with other humans. In addition to these philosophers, Hegel George expressed the idea that one’s social life existence is felt by fully participating in the social life. Participation is defined in different ways but one significant research is that of the United Nations (1975), which defined community participation as a voluntarily direct involvement of ordinary people in the affairs of development such as planning, governance and overall development programmes at grass-root levels (Williams 2006: 197).

According to the UNDP (2015: 8), participation simply “refers to the inclusion of a broad spectrum of actors in consultative processes, and giving communities and vulnerable groups a voice in government decisions that affect their safety from natural hazards”. However, this source notes that community participation faces many challenges in some countries such as South Africa, where local government is physically removed from and/or oversees a large number of citizens UNDP (2015: 20). Such challenges facing South Africa require immediate attention, as this will contribute to reduction of service delivery strikes, where local government institutions are blamed by communities for poor or lack of services.

The full involvement of the ordinary people in the making of decisions that affect their lives encourages good citizenship so that most importantly, they do not feel marginalised by the policy-makers. In the process, issues of inequality, vulnerability and DRR are addressed. Reports indicate that community participation in DRM has been found to increasingly receive good support by many national governments. For example, HFA progress report in 2015 indicated that a total of 48 percent of countries that submitted their reports on HFA progress, reported a “significant and stable” reliance on community participation in DRR initiatives, and 51 percent reported “partial” reliance on community engagement and partnerships to foster DRR outcomes (Aysan and Lavell, cited in UNDP 2015: 20). Community participation in risk

management processes is very pertinent in this research and understanding of what community participation means in South Africa is important. Community participation presents itself uniquely in each country or community, as it is determined by how local institutional structures supporting it have evolved (UNDP 2015: 20). Research findings are that despite community participation being a very important aspect in the post-apartheid South Africa in NMBMM community participation in DRR matters is very limited.

2. 8 CONCLUSION

This chapter to a large extent concentrated on theorising public administration and policy frameworks in disaster risk management, whilst international and national perspectives were highlighted to emphasise a global approach. Sustainable disaster risk reduction is a global issue that requires commitment from a global perspective. The inter-disciplinary contribution of public management to disaster management was also highlighted as an important aspect. The TDRMF was presented to offer a “window of opportunity” in the implementation of sustainable disaster risk reduction programmes and disaster management, which is a responsibility of the local government in NMBMM. Chapter Three focuses on mainstreaming a typography of literature in disaster risk management and risk reduction, presenting DRR approaches.

CHAPTER THREE

TYPOGRAPHY OF DISASTER RISK MANAGEMENT

3.1 INTRODUCTION

The floods in Germany, Nepal earthquake, Ebola crisis in West Africa, the on-going conflicts in the Africa and Syria, and Hurricane Sandy in the United States, have taken place in different parts of the world, with common impacts where lives were lost, property destroyed and livelihoods lost (International Federation of Red Cross and Red Crescent Societies 2015: 8). These disasters highlight the increasing nature of disasters around the globe which was mentioned in Chapter One. The international community is in agreement on the need to build sustainable resilience in all aspects of society. In most developed continents, progress has been made in disaster risk management efforts, unlike in Africa, where most countries are yet to do more to reduce existing exposure to disasters and risks impacting on community safety and people's lives.

This chapter provides a review of literature focusing on contemporary discussion pertaining to disaster risk management, through an analysis of various areas that are generic and universal, with emphasis on local and some global aspects. A discussion on the main aspects of disaster risk management are also presented to bring into focus an in-depth understanding of disaster management, as a global challenge is contextualized in an area that requires global commitment. Furthermore, disaster risk reduction is examined as a developmental solution, an important aspect considering the general debates around the implications of risk in sustainable development. The chapter also looked at DRM in the context of regional and national levels, that is Southern Africa and the South African context. Typography of disaster risk management is crucial to locate DRM in these regions, and relevant institutions and lastly, disaster risk reduction mechanisms are deliberated and their significance to the study is noted.

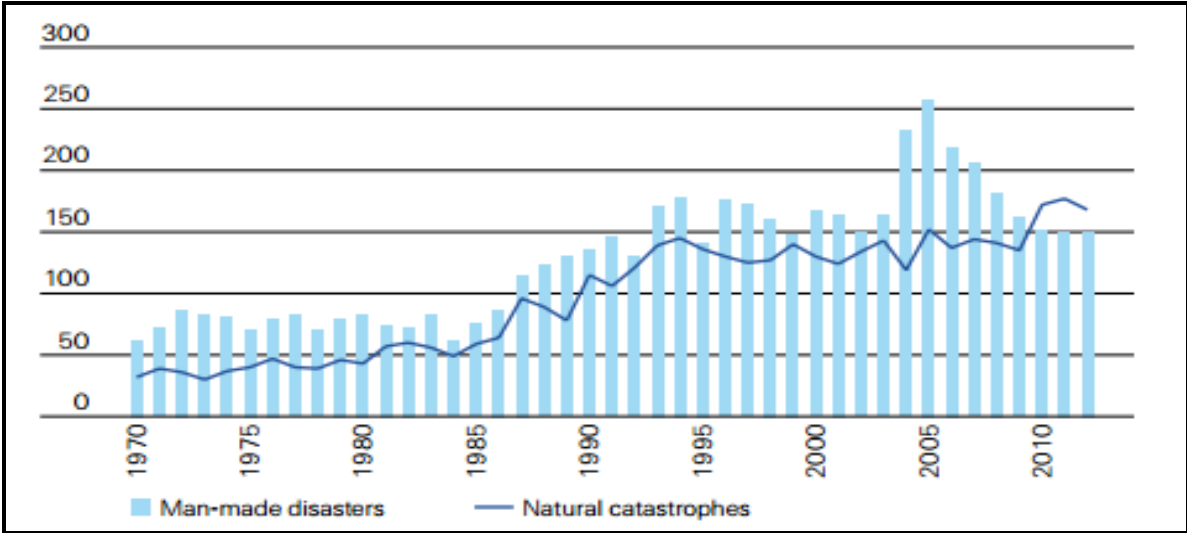
3.2 INTERNATIONAL EXPERIENCE ON DISASTERS

There has been an escalation of disaster occurrences in the 21st Century. In 2015 alone, 346 disasters were reported to have claimed 22 773 people dead, affecting 98.6 million people and costing \$66.5 billion economic damage (Centre for Research on the Epidemiology of Disasters 2016: 1). On 25 April 2015, a major earthquake struck central Nepal, killing more than 8,000 people and destroying a quarter of a million homes (Twigg 2015: 1). In 2013, 361 natural disasters were reported worldwide, triggered by geophysical, meteorological and climatological hazards. These disasters affected 108 countries, resulting in more than 21,600 deaths, affecting 96.5 million people and causing an estimated global economic damage close to US\$119 billion (Guha-Sapir, Hoyois and Below 2013: 13). The statistics indicate an increase in disaster occurrences if compared to the previous year, 2012, that recorded an estimated 357 natural disasters, affecting 120 countries, causing deaths of more than 9, 655 people and a global economic impact estimated at US\$157.3 billion (Guha-Sapir, Hoyois and Below 2012: 13). In the case of the African continent in 2013, the distribution of disaster frequency presented a similar profile to the one seen in previous decade: hydrological disasters represented 77.3% of occurrence, followed by meteorological disasters (13.6%) and climatological (9.1%) disasters (Guha-Sapir, Hoyois and Below 2014: 28). It is also important to note that research has shown that there is a paucity of data in disaster occurrence reporting and recording (Guha-Sapir *et al* 2014: 28). This concern links with Research Objective Two in the study, which seeks to ascertain the availability of accurate and reliable data on disaster risk management in NMBMM. In Chapter Five, the issues of information gathering, recording and dissemination among stakeholders are found to have no uniform procedures and each stakeholder seems to only trust their own research.

Available figures indicate that disasters continue to escalate instead of slowing down, which places communities in danger. ICSU-ISSC (2015: 31) stated that disaster risk conditions in Africa continue to increase as there are high persisting conditions of vulnerability, for example, climate related. The escalating occurrences contribute to slowing down any forms of much needed sustainable development in the communities. Overall, major impacts are experienced in poor continents, for example:

The Centre for Research on the Epidemiology of Disasters/UNISDR 2016: 5) wrote that, “of the 1.35 million people killed by natural hazards over between 1996 - 2015, more than half died in earthquakes, with the remainder due to weather- and climate related hazards. The overwhelming majority of these deaths occurred in low- and middle-income countries. The poorest nations paid the highest price in terms of the numbers killed per disaster and per 100,000 populations” (Centre for Research on the Epidemiology of Disasters/UNISDR 2016: 5). One key commitment is for the governments in poor continents like Africa to prioritise risk reduction efforts. Both international and national DRM Policy frameworks that have been discussed in Chapter Two should be prioritised by Municipalities, and implemented in an effective and efficient manner towards building a safer society. Focus should also be on the impact of DRR programmes from community levels to national levels. The graph below provides a comparative example of man-made and natural disasters which are both on the increase.

Figure 3.1: Comparative example of man-made and natural disasters



Source: Swiss Re Economic Research and Consulting (2013: 2)

From the figures above, one can note that disasters both man-made and natural continue to escalate at a comparable rate. Human actions have a huge impact, for example, by the cutting down of trees and increase of carbon, and in recent years, there has been crisis in humanitarian disasters across the globe.

3.3 CONTEXTUALIZING DISASTER MANAGEMENT

Holloway (2003:33) describes a disaster as any event that negatively affects the normal functioning of a specific society or community, and for this matter seeking or needing outside assistance. Other scholars such as Guha-Sapir, Vos, Below and Ponserre (2012: 7) & Tobin and Montz (1997: 5) agree with this definition of a disaster. It is further argued that when defining the concept disasters, that one ought to look at it as those events determined in time and space impairing sections of a society by causing physical harm and social disruption, maintains Fritz (cited in Lindel 2013: 1). According to IFCRCS (2000: 6), events such as earthquakes, floods, and cyclones must not be regarded as or considered disasters; rather, they become disasters when they overcome strengths of an affected human life, livelihoods and property. It is also crucial to not always regard all negative events as disasters in our society. This statement places emphasis on disaster preparedness whose aim is to prepare communities for and reduce these adverse effects. In Chapter Five, it is identified that general DRM preparedness by NMBMM needs to be improved.

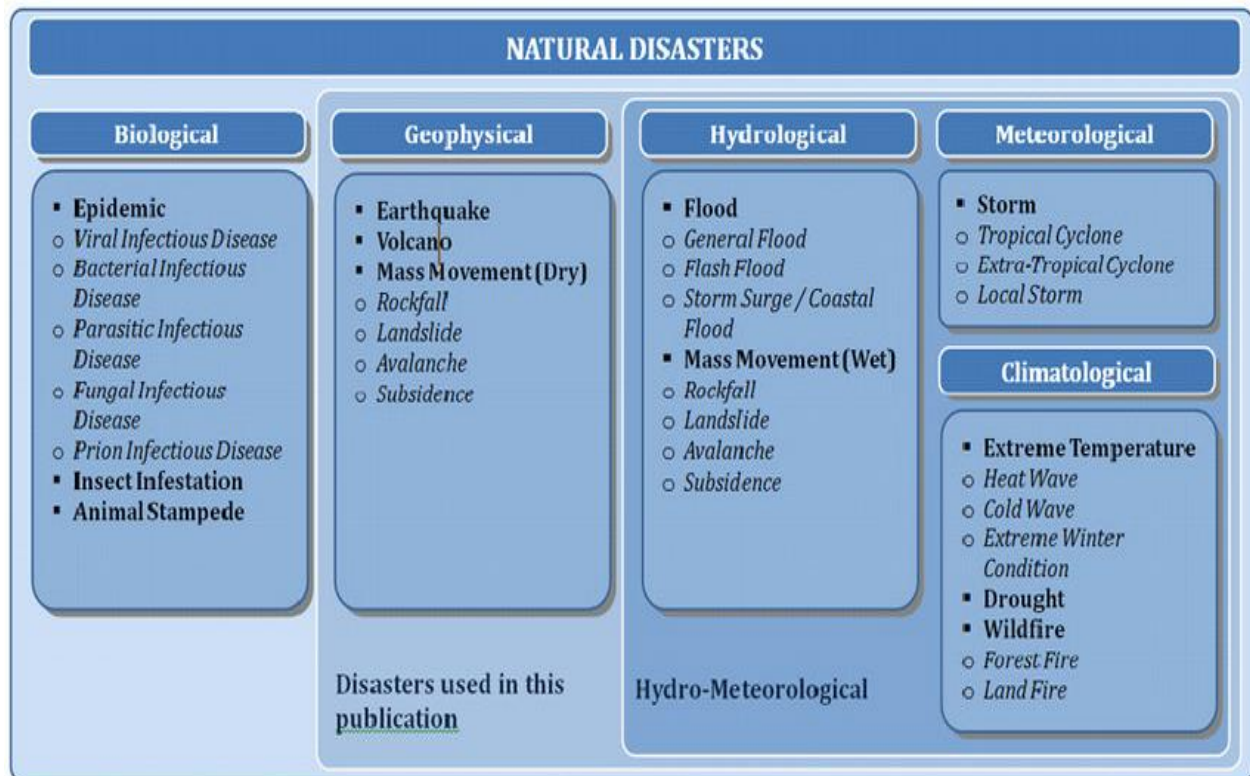
A key approach to consider when looking at disasters is that of Maskrey (1989: 3), which states that a disaster can be regarded as a function of a hazard, which is a causal agent that manifests itself passively, and mainly in vulnerable conditions. The concept of a hazard is discussed in detail later in this chapter. From the above definitions, one can conclude that disasters leave a community overwhelmed and in need of assistance from either government institutions, private sector other donors or well-wishers. Well-co-ordinated stakeholder participation creates a culture of a multi-sectoral, multi-disciplinary approach in general DRM, which relates to Objective Two in the study, that of the need for commitment in NMBMM. When disasters occur, those affected are left desperate as a result of the loss of their loved one, or loss of livelihoods and a general state of hopelessness. Disasters also put a government under strain as it bears the responsibility of protecting the well-being of its communities. In this research, the role and responsibilities of developing and implementing disaster risk reduction strategies and plans is within all spheres of the South African government. The local government institutions are blamed by vulnerable communities for failure to offer decent services to its people. Good-governance practices in the context of enhanced service delivery, which is very important when dealing with local communities, is presented as a key component in DRM, by way of overview in Chapter One.

Contemporary researchers have identified stages in a disaster occurrence, which they regard as a disaster cycle. Kinter, Sterling, Jillian, Waid and Zhu (2009: 2) state that those events in a hazard cycle present themselves through four stages: mitigation, preparedness, response and recovery. These four stages of the disaster management discourse are significant aspects and have been deliberated in detail later in this chapter.

3.3.1 Classification of Disasters

Disasters are broadly divided into two main categories; as either natural (forces of nature) or man-made disasters (disasters linked to human activities i.e. technological disasters - industrial accidents, release of hazardous materials and the collapse of buildings). Quarantelli (2000: 1), maintains that generally disasters have a strong link directly or indirectly to activities of man, becoming “inherently social phenomena”. Some examples of natural disasters include: tropical storms (hurricanes, cyclones); floods; droughts; extreme weather events; hot or cold; volcanoes; earthquakes; landslides and Tsunamis. While man-made disasters include those disasters with a human as a factor such as mudslides from de-forestation, famine, desertification and those disasters that are directly linked to causes by humans including conflict, industrial events- explosions, hazardous materials, pollution and transportation-related occurrences and events. These two main categories in defining disasters are characterised by a state of extremity or “chronic” negative occurrence of an event (Zibulewsky 2001 & Johns Hopkins and the International Federation of Red Cross and Red Crescent Societies Undated). A collective classification of natural disasters follows in the figure:

Figure 3.2: Natural disaster classification



Source: Guha-Sapir *et al* (2013: 10)

From this illustration, it can be said that natural disasters are broadly categorised in five sub-groups: biological disasters; geographical; hydrological, meteorological and climatological disasters.

- *Biological*: are those disasters caused by the exposure and vulnerability of living organisms inclusive of man to toxic substances and germs. Examples include epidemics like Ebola, insect infestation, and animal stampede.
- *Geophysical*: these disasters are caused by events that have origin from solid earth, and examples may include mass movements, earthquakes, and volcanoes;
- *Meteorological*: disaster events as a result of short-lived/small to meso-scale atmospheric processes, such as different types of storms;
- *Hydrological*: disasters that are caused by abnormalities in the standard water cycle and/or overflow of bodies of water caused due to wind set-up, such as mass movements and floods, and

- *Climatological*: includes events produced by long-lived/meso to macro scale processes, such as extreme temperature, drought and wildfire. Climatological impact on mankind is a highly contested challenge in the 21st Century.

The summary is relevant for the research as it will enable identification of some of these natural disasters to which NMBMM residents are exposed. The Municipality should be educated on possible natural disasters that they could face and their impacts, and this is the responsibility of the Municipality in terms of its strategic positioning and the service delivery mandate. Moreover, the understanding of natural disasters should be linked to man-made and induced disasters so that the two are better understood on how best they can be mitigated if necessary. Guha-Sapir, Hoyois and Below (2012: 7) indicate that international organisations that have interest in recording disaster occurrences and its impact on society agree that, for a disaster to be entered into a database, there are specific criteria that must be met. These criteria include at least the following:

- The number of human deaths should be 10 or more people;
- The disaster event must have affected at least more than 100;
- There must have been a declaration of a state of emergency by responsible government institution/s, and
- There should have been an international call for assistance for the affected communities (Guha-Sapir *et al* 2012: 7).

The above criteria, however, were developed mainly by Centre for Research on Epidemiology of Disaster (CRED) and are applied as an international bench mark. However, other institutions and governments are allowed to set out their own criteria. The South African government is guided by the DMA when it comes to declaration of disasters in the country.

In 2012 only, the most affected top five countries included China, United States, Philippines, India and Indonesia - despite some of them being developed countries. “Both five Asian and African countries share the top 10 list in terms of disaster victims. However, in absolute number, the five Asian countries account for 58.7% of victims compared to 17.4% for the five African

countries'' (Guha-Sapir *et al* 2012: 13). When it comes to impact, one finds that there is a general consensus that disasters mainly have a much negative impact in poor or developing continents like Africa and Asia (Guha-Sapir *et al* 2012: 13 and Leaning and Guha 2013: 18 - 34). This is mainly due to a number of reasons which have been mentioned throughout the research, such as, failure to implement DRM policy legislations and frameworks; poor governance and public administrative issues, some countries in Africa do not have functional government, and scarcity of resources. Against this argument, research by International Council for Science (ICSU 2007: 1 -3) found that Sub-Saharan Africa countries main challenges that impact DRM include factors such as inappropriate use of natural resources; some government's failure to commit in terms of policy and institutional frameworks implementations; failure to bridge the knowledge, technology, and capacity gaps; chronic ongoing vulnerability and resilience of socio-ecological systems and their communities; vulnerability and resilience of technological systems effective; transfer of information to policy- and decision-makers; integrated modelling of multiple disasters; limited early warning systems and preparedness; environmental change and degradation, and the fact that Sub-Saharan Africa's population growth is characterised by cycle of poverty (ICSU 2007: 1 - 3).

It is imperative to mention some of the natural and human-induced hazards and disasters that challenge Sub-Saharan African nations, as summarized in the following table:

Table 3.1: Categories of natural and human-induced hazards and disasters in Sub-Saharan Africa

Categories	Examples
Hydro-meteorological Hazards	Floods and flash floods;
	Droughts
	Heat waves
	Wildfires
	Tropical cyclones and hurricanes
	Severe storms
	Dust storms
Geological Hazards	Earthquakes
	Tsunamis
	Volcanoes and explosive crater lakes
	Landslides, mudflows, erosion, and siltation
Biological Hazards	Epidemics
	Pest infestations
Astrophysical Hazards	Space weather and Meteorite impacts
Human-induced Hazards and Disasters	Air and water pollution
	Gas flaring
	Artisanal and small-scale mining
	Toxic waste disposal
	Land degradation
	Conflict-related hazards

Source: ICSU (2007: 1)

The table above provides a broad overview of the categories of natural and human-induced hazards and disasters in Sub-Saharan Africa. The table highlights the aspect of hazards as compared to the previous discussion on types of natural disasters. Hazards are a major concern in Africa, as discussed later in this chapter, and they should be identified and addressed before they turn into disasters. This table reiterates the need for accurate and reliable statistics in the field of disaster risk management generally in Africa. In all cases, government institutions need to have policies and frameworks that stipulate how information is to be collected, analysed and recorded; considering that African data on DRR is “often poorly reported or lacking altogether” (Guha-Sapir *et al* 2012: 28). This motivated for one of the research questions in the study which was to ascertain the extent decisions are based on reliable disaster risk information from hazard mapping and vulnerability assessment employed at NMBMM. Reliable disaster risk information from hazard mapping and vulnerability assessment should be approached from bottom up approach. A bottom-up approach in DRM is very important, as many times vulnerable communities are not involved in decision-making on issues that affect them. This approach

would replace the common belief that government and other stakeholders in DRM exclude the voices of the communities in decision-making processes.

3.3.2 Integrating vulnerability *vis-a-vis* hazard with capacity

Tobin and Montz (1997: 5) point out that there is a clear difference in definition and understanding of a disaster and a hazard. A hazard means the possibility of a negative outcome when there is an interaction of humans and extreme natural events, which leads to a disaster occurrence. Maskrey (1989: 1) & South Africa (2005: 221) defined hazard in a similar way by arguing that a hazard “is the probability that in a given period in a given area, an extreme potentially damaging natural phenomena occurs that induces air, earth or water movements, which affect a given zone. The magnitude of the phenomenon, the probability of its occurrence and the extent of its impact can vary and, in some cases, be determined”. From these definitions, one can clearly see that a hazard determines the magnitude a disaster will cause, despite the fact that hazards are not disasters; only when they are not well addressed in time do they escalate to a disaster (Boen and Jigyasu 2005 & UNISDR 2009: 17). Hazards have the capability to contribute to social and economic disruptions, loss of life, injury and loss of livelihoods and services. Tobin and Montz (1997: 5) emphasized that the contribution of human action in creating disasters cannot be ignored since many early researchers focused on physical extremes of nature, failing to tackle the role or contribution of human actions in creating hazards, which eventually become disaster occurrences.

Hazards can be contextualised into five categories: natural including geological; hydro-meteorological and biological, while human-induced may include technological and environmental degradation (International Council for Science 2007: 2 - 3). A hazard occurrence may include an occurrence of an earthquake, floods, or the cyclone, and translates into a disaster if mitigation and preparedness measures are not in place. Hazard may cause injuries, deaths, and destruction of property, infrastructure and livelihoods. Therefore, it is important for the government institutions to work closely with communities in the process of potential hazard identification in order to reduce vulnerability and mitigate future disaster occurrences. In Chapter Four, under Case Area and subsequently in Chapter Five, it is identified that NMBMM residents are exposed to hazards, which challenge their lives.

Understanding of vulnerability in communities has to be approached from various dimensions: *physical conditions*, including specific location and state of infrastructure; *economic conditions*, including people's sources of livelihoods and access to insurances and credits, and *social conditions* which includes education levels, health status, political groups, ages, gender and human rights. There is a strong indication that communities should be prepared for such occurrences. Building community capabilities is very important as a weak community is vulnerable to hazards which become disasters; community participation in all decisions is crucial. Below is an example of good governance and participation in DRR in Cameroon, where communities participated in hazard identification (Resilient City Report 2016: 9):

Participatory Slum Upgrading Programme applied in Yaounde, Bamenda and Kribi- in Cameroon.

Slum dwellers identified and analysed key problems such as poor roads, precarious livelihoods, unsanitary conditions, insecurity of tenure, lack of services, and finally, high vulnerability to climate change and natural disasters. Resident associations were trained and encouraged to propose sustainable, local solutions and coping mechanisms. These ranged from simple infrastructure improvements to complete formalization of the settlements.

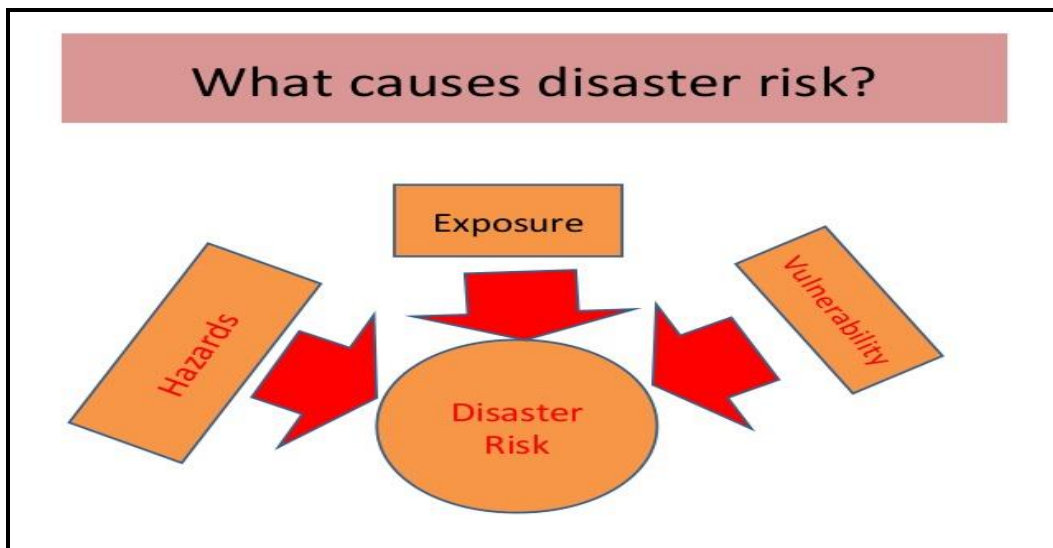
The above case-study is an example of how good governance and community participation were applied in finding best ways to reduce risk of the slum dwellers. A focal point in this chapter is that a major goal of DRR is to develop and implement sustainable programmes. Municipalities' understanding of the difference between a hazard and disaster, or how a hazard can become a disaster, would help when making DRR decisions throughout all DRM phases, namely, mitigation, preparedness, response and recovery. If hazards are addressed effectively and efficiently in advance, communities would be protected from becoming victims of disasters that could have been prevented. An investment in hazard mapping systems and vulnerability analysis, which significantly falls under key performance area one of the South African Disaster Risk Management Framework was explored in Chapter Two.

3.3.3 Integrating hazards and vulnerable conditions *vis-à-vis* disaster risk

There has been consensus on what a risk is: risk is the negative outcome that may be experienced as a result of negative interaction between natural or human-induced hazards and vulnerable communities. These consequences may range from economic activities disrupted or environment

damage, loss of lives, livelihoods and injuries (United Nations International Strategy for Disaster Reduction (2002: 24) & Magunda (2010: 3). Maskrey (1989: 1) states that risk is very close to disaster, as it includes total consequences as a result of a natural hazard, including loss of lives and livelihoods. Therefore, ‘risk implies a future potential condition, a function of the magnitude of the natural hazard and of the vulnerability of all the exposed elements in a determined moment’ Risk goes beyond nature as there are other risks embedded within an institution or society, which contribute to vulnerability of a community, such as poor public management of resources, and failure to implement DRM policies (Magunda 2010: 3). A conventional expression of risk is provided by Davao (2013: 16) as follows:

Figure 3.3: Conventional expression of risk



Source: Davao (2013: 16)

It can be said that risk is not an isolated event, but is contributed by the levels in which a community is exposed to hazards, vulnerability and also the nature of hazards in a particular community. This research calls for an understanding of risks through risk assessment as a major approach to facilitate relevant measures. In Chapter Five, it is found that NMBMM residents are exposed to different social-economic risks. Therefore, disaster risk assessment is the process that is done to determine the level of risks and to prioritize the risks. This is done by evaluating and linking the pre-determined standards to the level of risk. The disaster risk analysis and assessment also results in determining how vulnerable a community is through the identification

of various hazards, level of risk and the chance of disasters occurring (South Africa 2005). The assessments aim to make communities safer and sustainable by focusing on mitigation, preparation, recovery and also the resilience. Risk assessment comprises the following important phases:

- Preparation;
- Hazard assessment;
- Vulnerability assessment, and
- Capacity assessment and action planning.

(Venton and Hansford 2006 & International Federation of the Red Cross and Red Crescent 2007).

It is also important that there is understanding of the nature of risk that is largely dependent on the threat posed either through natural or man-made hazards. Risk analysis and assessment processes should be conducted within the frameworks of good governance, such as participation of stakeholders, especially the local government and citizens, as promoted by TDRMF in Chapter Two.

3.3.4 Disaster Vulnerability and Exposure as a Community Challenge

Exposure and vulnerability have been regarded as the main drivers of disaster risk, as they are key contributing factors of disaster risk. Areas that are hazard-prone and vulnerable therefore stand to be affected. Vulnerability is the degree to which an individual, household, community or area may be prone to a disaster or a hazard (International Council for Science/International Social Science Council 2015: 16). UNISDR (2015: 1) looks at vulnerability as those conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards. Maskrey (1989: 1) adds that vulnerability should broadly be looked at as a not-static and dynamic process, which integrates changes that may alter and affect the probability of loss and damage of those exposed elements in a society. In other words, vulnerability is dynamic, unpredictable and can manifest itself in various ways. Maskrey also further indicates that when determining vulnerability, other issues that require consideration can be identified such as mal-adaptation, the inability to incorporate

hazards within living patterns and irrational human response to hazard, and all these common elements are linked to one another (Maskrey 1989: 2).

Vulnerable communities sometimes lack capacity to address their own exposure. The capacity of a community looks into the qualities and resources an individual, household, a community and government possess or they can put together to remain resilient against an impact of a hazard. Human capacities may include material resources (i.e. food, animals, cash, and tools); social and organisational capacities (i.e. leadership, previous organising experience, community-based organisations and networks), and attitudinal capacities (i.e. beliefs, motivations, work values, ideas, creativity, and efficacy, argues IFRCRCS 2000: 7. The concept of vulnerability is integral to the study as it determines how communities and individuals address DRR. The study maintains that whilst general vulnerability of the Municipality must be conducted, vulnerable individuals and groups have to be identified should be given priority. Elements to look for in a community may include, those circumstances that limit the understanding and full access to important information and services from a general population perspective; including ethnicity; religion; language; citizenship; age; physical, mental, emotional, or cognitive status; culture; geography; or socio-economic status (Nick, Savoia, Elqura, Crowther, Cohen, Leary and Koh 2009: 338). Turner *et al* (2003: 2) argue that vulnerability is not determined only by exposure to hazards events), but also the sensitivity and resilience of the systems or elements experiencing such hazards. For example, if the government institutions are not well equipped they increase vulnerability of their communities. In addition, if the service delivery is weak or inadequate, the impact of the hazard will be very strong. Strong institutional capacity contributes to reduction in vulnerability and subsequently disaster risk reduction. Study objective two deals with vulnerability assessment as a core requirement in DRR.

3.3.5 Tracing Disaster Risk Management

In the late 1990s, the disaster risk management concept (sometimes referred to as risk management), was used because of its comprehensive and integrated approach to managing disaster efforts (Perry and Quarantelli 2005:14). It is believed that by the end of 1999, there were very few governments that had put in place DRM policies or frameworks for the reduction of risk and vulnerability to hazards. The majority of governments relied on disaster management

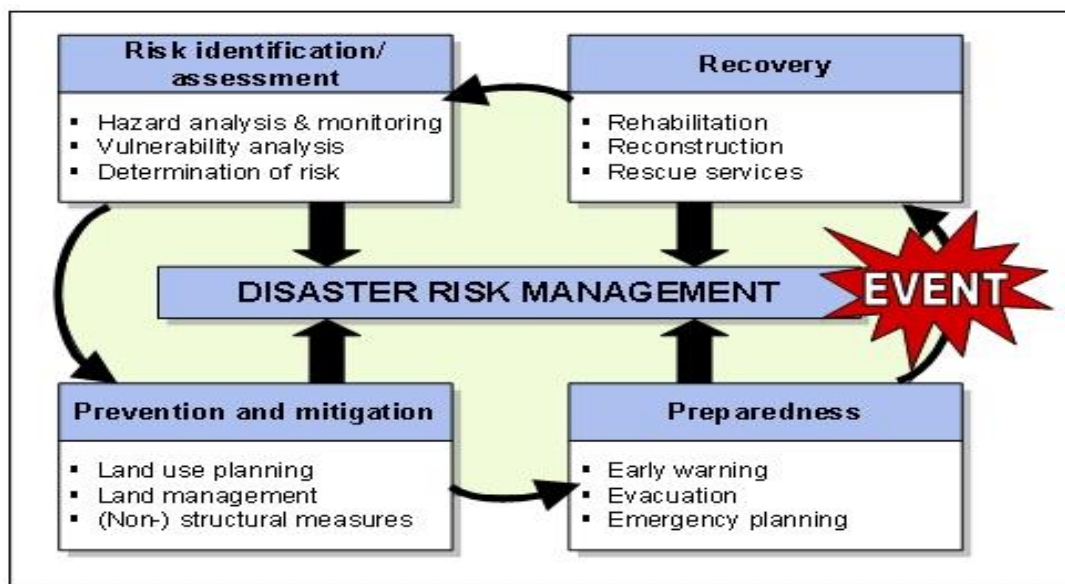
which was more aligned to responding of disasters. South Africa heavily relied on Civil Defence/Civil Protection until 1994, when a shift occurred from the “Civil Defence approach of 1957” which was response-oriented to a more holistic approach. The shift was also in accordance with international efforts such as those of the United Nations’ International Decade for Natural Disaster Reduction (1990 - 1999) call. Since then, South Africa made huge strides towards introducing a more comprehensive policy framework for disaster management. The Inter-Ministerial Committee for Disaster Management (IMC) of 1997, led to a disaster management Green Paper on Disaster Management for South Africa. This was followed by the Disaster Management Act No. 57 of 2002 and the National Disaster Risk Management Framework of 2005. The White paper is an authoritative report that highlights to a specific society on a specify issue of concern, while the Green paper is a discussion document which forms part of law making. South African Disaster Management policy frameworks are implemented through integrated development plans (IDPs), as different government departments are required to incorporate disaster reduction measures (Van der Waldt 2013: 3). In Chapter Two the focus is on DRM policy frameworks, both South African and international.

According to the UNISDR (2007: n.p), disaster risk management is defined as the “systematic process of using administrative directives, organizations, operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster”. This specifically includes designing policies, frameworks, governance issues, resources, and monitoring and evaluation measures. Furthermore, these administrative measures are mainly for promoting and improving disaster risk reduction in terms of preparedness, response, recovery and rehabilitation, to protect communities and their livelihoods, with final results being programme development and implementation (Van der Waldt 2013; Lavell *et al* 2012: 3 & Holloway 2009: 106). There is also confusion or a lack of consensus regarding the official naming of the term ‘DRM’, with some authors preferring to look at the concept DRM as a term made up of two components that are inter-related but also distinct, i.e. disaster risk reduction and disaster management (Van der Waldt 2013: 3). The concept DRM also provides the four commonly known disaster risk management phases/cycle as discussed below.

3.4 LOCATING THE BODY OF KNOWLEDGE ON THE DISASTER RISK MANAGEMENT CYCLE

The disaster risk management cycle consists of four phases, which are mitigation, preparedness, response and recovery/reconstruction. Many times disasters do not give a warning, which necessitates that governments and communities need to always be prepared. The DRMC facilitates or acts as a framework on what can be done under each phase (Baird 2010: 2 & O'Brien, O'Keefe, Gadema and Swords 2010). These phases also offer a framework on how to manage disasters through the phases/cycle, for example, on how to manage resources and responsibilities (Vasilescu, Khan and Khan 2008). These phases have been discussed later in this chapter, and also some of the interventions or measures that can be implemented under each phase are extensively explored in Chapter Two within the TDRM approach. It is highlighted that these phases are inter-linked and should not be treated in isolation. The following figure provides the four phases and arrows are used to show their association:

Figure 3.4: Disaster Risk Management Cycle



Source: International Federation of Surveyors (2006: 14)

Disaster Risk Management Cycle is made up of four important phases: risk identification/assessment; mitigation/prevention; preparedness and recovery. Risk identification and vulnerability assessments should be carried considered as main determinants of what should

be done in the other phases. For example, you cannot undertake mitigation measures without understanding the risks to which NMBMM residents are exposed. Failure to fully prepare in each of these phases will have a direct impact on the others. Political will to provide resources is important, in this case in NMBM where in Chapter Five, it is reported that many challenges faced in implementing DRR, are linked to lack of funding. The following debate focuses on each of these phases.

3.4.1 Disaster Risk Mitigation

Mitigation involves measures and other efforts adopted and implemented now, before a disaster strikes; for example, investing in long-term community well-being. The main aim is to ensure that future disasters and their impact are avoided; impacts may include loss of lives, livelihoods and financial consequences. Moreover, the failure to mitigate increases communities vulnerabilities to risks and other social-economic shocks. Effective mitigation requires a good understanding of risks, as advocated by TDRMF (Federal Emergency Management Agency 2014 & South Africa 2002). If implemented correctly, disaster mitigation can lessen the costs for communities and the government. However, mitigation still remains a challenge facing vulnerable communities and poor governments, more specifically in lower income nations where very little or no resources are allocated in the national budgets. In this research, mitigation has not received the required attention as stipulated in the DMA and the constitution.

Initiatives that empower communities coping capabilities and mechanisms should be well implemented, to leave a positive impact both infrastructural and non-infrastructural (Maskrey 1989:40 & CONCERN 2005: 5). Maskrey further indicates that the manner in which mitigation programmes are implemented is very important. This refers to approaches applied. For example, a top-down approach does not “take into account the real needs and demands of those affected by disaster. It also ignores complexity of most disasters, mitigation measures are frequently irrelevant or even counterproductive in many local situations and programmes rarely achieve their goals” (Maskrey 1989: 40). Based on these arguments, a bottom-up approach in mitigation provides success as people and their own autonomous organisations become a vehicle for affecting the underlying causes of vulnerability (Maskrey 1989: 40). In this case, it can also be argued that in the context of developing countries around the world, many might still be facing

similar challenges when it comes to mitigation programmes. Policy-makers do not give the required attention to vulnerable communities. In addition, a top-down approach is used instead of a bottom-up approach in developing and implementing related programmes for effective management of disasters. Mitigation must therefore be implemented in accordance with good governance practices.

3.4.2 Disaster Preparedness

Disaster preparedness is defined as activities which are geared towards minimizing disaster damage, enhancing disaster response operations and preparing governments, organizations and individuals to respond effectively and efficiently (South African Green Paper 1998: 93). Disaster preparedness therefore seeks to prepare for and reduce adverse effects of events such as earthquakes, floods, and cyclones. It entails all possible measures taken towards preparing for and reducing of the possible effects of a disaster occurrence. This would include, for example, predicting an occurrence and where possible, preventing an occurrence. Vulnerable communities are prepared so that any impact does not overwhelm local capabilities. In this case, they are able to respond to and effectively cope with any consequences. It is according to this argument that preparedness is regarded broadly as a goal, rather than as a specialised programme or merely a phase that immediately precedes disaster response (IFRCRC n.d: 6).

Preparedness becomes a continuous and integrated process of a wide range of activities and resources, and some of the preparedness efforts may include the following:

- Establishment of emergency response policies and standards;
- Continuous awareness to improve and maintain a state of awareness engaging individuals, the community and general public to create resilience;
- Partnerships are strengthen and new ones created;
- Make sure of arrangements and operational plans to be followed during and after a disaster;
- Increasing the efficiency, effectiveness and impact of disaster emergency response mechanisms at the community, national, especially based on previous experiences;
- The development and regular testing of warning systems such as the, weather forecasting systems; and evacuation plans.

- Education and training of officials and the population at risk; and
- Training of first-aid and emergency response teams (CONCERN 2005: 6 & IFRCRC n.d: 6).

These preparedness measures are very relevant in this research. In Chapter Five, it is identified that, for example, emergency response is not taken seriously considering respondents' dissatisfaction. Another example is that of recruitment and training of volunteers, which the municipality has not yet done, as required by the DMA. The framework adopted for this study, TDRMF, advocates for comprehensive preparedness.

3.4.3 Disaster Response

When disasters occur, in most cases communities are left desperate and that is when all assistance is needed. Disaster response involves all efforts or actions that happen immediately after a disaster has hit a community or an area. The main goal is to save lives and ensure that emergency assistance is provided to every victim damage and further injuries are also minimized; operations towards taking back the community are made more quickly and to achieve stability of the systems to a better state than they were before (Johns Hopkins and the International Federation of Red Cross and Red Crescent Societies 2008: 28). Successful response operation requires comprehensive coordination amongst all stakeholders. This may include clear outline of roles and responsibilities, logistical support and effective and efficient communications, for if the necessary preparations have not been made, the immediate needs of the victims will not be met. Disaster response needs to be timely, well-resourced and coordinated in order to be effective. In the context of this research, response was described as very slow by the respondents. The Municipality would need to enhance its response which was linked to insufficient mitigation and preparedness phases.

Response phase varies as it is determined by the scale, context nature of the disaster including how prepared the government institutions and communities were. The main tool in response is the implementation of plans which were prepared prior to the event by the local government disaster management teams and other stakeholders. In South Africa, each Municipality is required to develop plans in advance, and to review them based on lessons learned in case of a

disaster. All mitigation and preparedness plans are put into action and to a large extent tested of their effectiveness. There has to be documentation of success, failures and opportunities presented by each situation. Disaster response in South Africa remains mainly a responsibility of the local government and their preparation is very important. The current state of preparation faces many obstacles, as relevant IDPs are not always fully implemented on the ground.

A new approach to how disaster response is conceptualized was emphasized in the Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR), calling for a shift from managing loss to reducing risks. The overall goal is to minimize deaths of people killed or affected by disasters, and also to reduce loss of livelihoods and economic losses. To emphasize the importance of reducing risk, it was further incorporated into the resilience targets of the Sustainable Development Goals 2015-2030 (Resilient Cities Report 2016: 6).

3.4.4 Reconstruction and Recovery

Reconstruction and recovery happens immediately after a disaster has occurred, operations are started and efforts are made to attempt to make the community's life as ordinary as possible. During reconstruction and recovery basic services are restored and risk factors are minimized. These actions include repairing utility systems, health and communication facilities, and other basic services. It also includes, reconstruction of major infrastructure, the economy and environment and supporting the emotional, social and physical well-being of persons and communities affected. To minimize chaos, stakeholders' roles and responsibilities need to be clearly identified in order for the approach to be holistic (<http://www.disaster.qld.gov.au/>). Resources have to be made available by the governments and other institutions involved in DRM. Some of the guiding principles for reconstruction and recovery include:

- Local participation through bottom-up approaches; capacity and institution building to enhance preparations;
- Ensuring transfer of lessons from good practices for effective recovery; and
- Integration of risk reduction practices (replace avoid *ad-hoc* decisions with a comprehensive approach and reactive with proactive (Dan, Armas and Goretti 2014:5).

A sustainable reconstruction and recovery should also be approached from a holistic perspective that is from a multi-sectoral and multi-disciplinary approach. It should include scientists, engineers, communication and environmental specialists, and emergency managers, as indicated in Chapters One and Two, for purposes of this study. This phase builds on the other three, as it affords the institutions involved opportunities to develop and apply disaster risk reduction measures. These phases provide local government institutions such as in South Africa, an opportunity to re-think and revisit their DM, IDP frameworks and other relevant frameworks in service delivery. Communities should not be treated as receivers of donations during disaster instances, but sustainable reconstruction and recovery programmes in reduction of risks and vulnerability should be a priority.

3.5 DISASTER RISK REDUCTION: A DEVELOPMENTAL SOLUTION

The international community has pledged its commitment to disaster risk reduction, acknowledging it as one of the pertinent strategies that has a direct impact on sustainable development. Thus, most strategies relating to sustainable development have been evaluated to determine their commitment to risk reduction, as explored in the subsequent sections.

3.5.1 Risk reduction amidst critiquing the Millennium Development Goals

The MDG's were adopted by world leaders in 2000 for a period of fifteen years and came to an end in 2015. They were made up of eight goals reinforced with 21 specific targets; and more than 60 indicators. However, with regard to DRR, it was goal seven in particular that to a certain extent mentions DRM: it focused on ensuring environmental sustainability (United Nations 2010). It should be noted with emphasis that the MDG framework was blamed for not directly emphasizing on disaster risk management and risk reduction. UNISDR (2010: 2) states that MDGs ignored the contribution of DRR implementation/contribution in achieving or accelerating achievement of its goals MDGs (UNISDR 2010: 2).

Some of the MDG's achievements that are linked to Goal Seven on ensuring environmental sustainability include the efforts noted in integrating the principles of sustainable development into country policies and programmes and reversing the loss of environmental resources. It was

agreed that poor utilization of environmental resources contributes to poor climate change, pulling back sustainable development progress; the ozone one-depleting substances were virtually eliminated and the ozone layer was expected to recover by the middle of the century. More than 320 million people living in slums gained access to improved basic services such as water, sanitation and much decent housing exceeding the MDG target, a positive contribution to DRR (United Nations Economic Commission for Africa 2014: xvii). By 2014, there was a noted increase in levels of emissions in some countries which threatened DRR progress (United Nations Economic Commission for Africa 2014: xvii). Any DRR positive statistics linked to Goal Seven are very important, as they contributed towards progress in DRR, for example, improving living conditions of the people especially in vulnerable areas such as Informal Settlements and slum dwellers contributes in risk reduction, a strong focus in this research.

Critiques of the Millennium Development Goals in relation to disaster risk reduction argue that, despite the above documented success of the MDGs, the framework focused on specific, measurable targets at national levels and not at the grass-root levels - a top-down approach. The implications of this statement are that vulnerable communities, who suffer the most, were directly ignored. Another critique was around failure to give climate change attention, especially considering that its implications for DRR progress are enormous in poor continents like Africa and Asia (Forino, von Meding and Brewer 2015: 372). Climate change is among many factors that contribute to certain hazards and disasters, where vulnerability and exposure exist (Forino *et al* 2015:372). Resilient Cities Report (2016: 4) emphasized that in less developed economies, a severe and growing threat of climate change and natural disasters is looming.

The Millennium Development Goals framework failed to give special attention to peace and security, and other man-made shocks and disasters. Considering that humanitarian disasters have been an issue of global concern, and in the 21st Century they have escalated posing major challenges to human lives. The ongoing conflicts in many parts of the world in countries such as South Sudan, Somalia and in Syria make communities vulnerable to all kinds of hazards, risk and disasters; in fact, victims are desperate (Harris and Provost 2013). CRED/UNISDR (2016: 12) emphasise the nature of humanitarian disasters: “today some 613 million people live in 31 low-income countries. Many of these countries are either in post-conflict or conflict situations

and lack the resources to account adequately for their disaster losses or to reduce their vulnerability to disasters. Thus disaster mortality in low-income countries is probably even higher than research databases provide” CRED/UNISDR (2016: 12). The humanitarian crisis remains a global challenge that requires global commitment.

3.5.2 The Nexus between Disaster Risk Reduction and Sustainable Development

Sustainable development is a “matter of life and death. That’s the only conclusion that can be reasonably drawn from any examination of mortality trends from major disasters over the last twenty years” (CRED/UNISDR 2016: 3). Sustainable development means that a status of a long-term stability of the environment and the economy. Stability can be achieved through proper decision-making process in which integration of social concerns, economic and environmental (Ema 2015: 2). Based on this definition, sustainable development is closely linked to reducing disaster risk, a foundation for sustainable development, for this reason (ICSU-ISSC 2015: 2). Previous section highlighted that disasters continue escalate in numbers and their impact. Natural hazards are also on the increase due to unsustainable development practices and rapid growth in populations; both increase vulnerability and exposure of communities and capital assets (ICSU-ISSC 2015: 2).

In Africa, disaster risk conditions are worsening due to climate change impact (such as rainfall pattern changes, temperature increase) and the persistent conditions of vulnerability of most communities. The risk profile for the continent is characterized by droughts, water shortages, lack of sanitation, aggravated health epidemics and peace and security, creating a complex risk profile. Sustainable development efforts will continue to be undermined if proactive DRM implementation is ignored, and this requires integrated research and constant assessments of disaster risks that are effectively communicated to society and governments (Cutter 2014; (ICSU-ISSC 2015: 7). In relation to this study, it was pointed that a culture of hazard mapping and vulnerability is lacking in NMBMM.

The United Nations (2010) on Millennium Development Goals report provided some summarized arguments as to why DRR should be an integral component of sustainable

development: It was found that 85% of vulnerable communities to disasters such as earthquakes, cyclones, floods and droughts, live in developing countries. UNISDR (2016) found that 12.5 million Africans are challenged by floods and droughts. Therefore, DRR efforts must not be excluded when planning for sustainable development in developing countries. Any negative climate change status contributes to threatening the food security of the poorest people worldwide. This can be avoided by considering DRR planning used to adapt to climate change, responsibly manage growth and stop environmental degradation, to avoid continued the threatening of more lives and livelihoods. A focus on DRR increases community resilience, especially that of poor households. This prepares them to overcome any negative impacts when a disaster strikes. An example is that of devastating impact left by 2010 earthquake in Haiti where communities were in hopelessness, and an estimated total loss of an estimated US\$7.9 was incurred. In Africa, Malawi loses an average of 1.7% of GDP yearly to crop losses in droughts and floods, and droughts alone increase poverty in Malawi by 1.3% (IPU - UNISDR 2010: n.p).

This information is important to underline the need for disaster reduction in NMBMM, where research found that many people face many social-economic challenges, such as high unemployment rates and exposure to hazards. The Municipality needs to increase building local capacity efforts so as to develop and implement sustainable and resilient projects, and other stakeholders should come on board to support (private sector, investors, funding agencies and the insurers). Most importantly, communities should actively been included in every decision, so as to encourage community risk governance as asessed throughout this research.

3.5.3 Disaster Risk Reduction through the Sustainable Development Goals

The Sustainable Development Goals (SDGs) are described as the new agenda that focuses on shifting onto a path of inclusive, sustainable and resilient development. This agenda was adopted on 25 September 2015 and will end in 2030. It is composed of a set of 17 Sustainable Development Goals (SDGs) and 169 targets. There is a noticeable shift *from* MDGs *to* SDGs. The new SDGs build on success and failures of MDGs, therefore adopting a much more detailed sustainability agenda. The SDG framework addresses key systemic barriers which research indicates were neglected by the MDGs in fostering sustainable development such as inequality,

unsustainable consumption patterns, weak institutional capacity, and environmental degradation. The main objective is to achieve and address the root causes of poverty and the universal need for development that works for all people. The 17 SDG goals are closely linked to the UNDP's Strategic Plan which focuses on sustainable development, democratic governance and peace building, and climate and disaster resilience. Moreover, SDGs are in line with requirements of the Sendai Framework of 2016 to 2030. It was indicated that SDGs are broader when compared to MDGs as they have put into consideration issues that had not received attention, such as global environmental problems, economic and structural causes of the social issues emphasised by the MDGs. Therefore, out of the 17 goals, eight are directly or closely linked to DRM/DRR. This is a clear shift towards giving much attention to DRR matters in the contemporary era, as discussed below in each relevant goal.

Goal 2 focuses on bringing an end to hunger by 2030. This would be achieved by putting the necessary mitigation measures in place to create systems and institutions that promote and implement resilient agricultural practices that increase productivity and production. These practices will directly contribute to maintaining “ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality” (ICSU - ISSC 2015: 8). This focus is very relevant, linking to droughts affecting African continent, where most governments have failed to control the demand for basics in most vulnerable communities, seeking assistance from humanitarian organisation, for a very long time. In South Africa, for example, the government declared a state of disaster in all the provinces in May 2016 due to the effects of drought. Drought severity amplified by risk drivers in South Africa is linked to drought and water scarcity elsewhere in the world, submit Holloway, Fortune, Zweig, Barrett, Benjamin, Chasi and de Waal (2012: 6). Risk reduction in South Africa through sustainable mitigation and preparedness measures is needed. This commitment softens and curbs the ongoing effects of climate change which have continued to cause loss of livelihoods and increased poverty, as evidenced in the figure below. Research findings as discussed in Chapter Five found that many people rely heavily on government social grants in NMBMM. Social grants have become a way out of poverty for many South African homes due to the socio-economic challenges, like drought and unemployment.

Figure 3.5: Dry Maize cob in South Africa



Source: Merten (2016: n.p)

Figure 3.5 is an indication of dry farms in South Africa in 2015 through droughts which have been linked to climate change impact and poor agricultural practices. Therefore, Goal 2 has a direct contribution to make towards DRR practices, and the South African government should consider revisiting its existing policies and frameworks that have a direct or indirect role in building strong mitigation and preparedness strategies to build resilience for the future. Public services such as water provision for the citizens would also be improved through DRR implementation.

Goal 11 focuses on ensuring that governments and institutions enhance their commitment in building inclusive, safe and sustainable cities and human settlements. Therefore, policy frameworks need to be implemented effectively and efficiently, especially those dealing with climate change and should be in line with DRM major framework - Sendai Framework for Disaster Risk Reduction 2015-2030. Disaster Risk Reduction's success is largely dependent on inclusive and sustainable urbanization. Therefore, this goal aims at achieving major success by 2030 with a significant reduction of loss of human caused by disasters, including water-related disasters. This target is very crucial, as it focuses on poorest people living in unsafe and unsustainable cities and human settlements urban centres like in South African informal settlements. This would be achieved further by improving the impact of the services offered by the local government institutions to citizens such as proper waste management services, an

increase in number of decent human settlements to accommodate the increasing populations and general risk reduction.

Goal 12 aims at promoting sustainable consumption and production patterns by 2030 by providing everyone with the relevant information and awareness for sustainable development and lifestyles in harmony with nature. Human practices degrade the environment such as, failure to manage chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks. Disaster risk reduction is focused on promoting sustainable consumption and the positive relationship of man with the environment. Moreover, public awareness plays a huge role as communities have to be educated on what is appropriate/not appropriate practice. In Chapter Seven, recommendations are made for the need to improve the quality of public awareness programmes.

Goal 13 focuses on promoting actions at all levels towards addressing climate change by building and promoting resilience and adaptive capacity to related hazards and natural disasters in all countries. This goal requires governments to enforce integration of climate change measures into national policies, strategies and planning. Moreover, a culture of awareness on climate change mitigation, adaptation, impact reduction and early warnings need be integrated within the spectrum of public awareness education. Most important is the “acknowledgment that the United Nations Framework Convention on Climate Change is the primary international, intergovernmental forum for negotiating the global response to climate change” (United Nation 2015: n.p). The impact of climate change is huge in Africa, such as the continent bearing the burden of carbon emissions despite being the lowest contributor. Numerous authors postulate that climate variability and changing weather conditions are key risk drivers of drought affecting Southern Africa (Holloway *et al* 2012: 7; World Food Programme 2016:1; USAID 2011:1). Tadesse (2010: 1) states that “unfortunately, despite growing concern, no exact and reliable figures are available to quantify the economic costs of the negative impacts of climate change in Africa for either individuals or society as a whole”. In the context of this research, this goal requires functioning warning systems in which South Africa Weather Services must offer reliable information to the disaster risk management centres, for example, on accumulating

rainfall deficits combined with forecast conditions. This will enable informed decision-making processes for implementing policy frameworks.

Goal 15 focuses on protecting and restoring terrestrial ecosystems to ensure termination of all biodiversity loss. There is an urgent need to promote the implementation of sustainable management of all types of forests, stop deforestation, restore degraded forests and substantially increase afforestation and reforestation globally. Poor practices in managing forests and lands have contributed to man-made disasters such as desertification, landslides, drought and floods. Current statistics state that of 700 million people in 43 countries suffer today from water scarcity. More than 50% of Africans still suffer from water-related diseases (cholera, diarrhoea). Although the continent has several large rivers, Africa bears the most burden, characterised by chronic drought in some countries, such as Ethiopia, Somalia and Sudan, which need disaster relief assistance every year (UNISDR 2015: n.p).

3.6 SOUTHERN AFRICA AND SOUTH AFRICA IN CONTEXT

Significant for this research was to also highlight events taking place across the Southern Africa region relating to disaster risk management. This was crucial considering the fact that some countries in the region have a history of high levels of poverty which contributed mainly through the impact of climate change.

3.6.1 Southern Africa in Context

Southern Africa region is amongst some of the vulnerable regions in the continent and the world. The region continues to experience unprecedented frequency and magnitude of both natural disasters and man-made disasters, especially since the year 2000 (Southern African Development Community 2012 & USAID 2011:1). Its countries (Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia, and Zimbabwe) continue to face challenges of climate change, which has impacted negatively on the region. There has been an increase in risk-related food security, cyclones, fire, floods and water resources. It has also been noted that some islands might lose their sea-levels and protective reef barrier. Jubach and Tokar (2016: 2) supported this argument by indicating that 72% of natural disasters in Southern Africa relate to severe weather and hydro meteorological (Jubach and Tokar 2016: 2). A good example on the

impact of climate change is that of unprecedented El Niño weather patterns, which impacted heavily on the region, increasing levels of starvation and poverty for unfortunate and vulnerable people. For this reason, an estimated 15.9 million people in the region are highly food insecure in 2016 (World Food Programme 2016: 1). The implications of climate change in the region reduce and pull back any progress made towards risk reduction. The governments in the region are also overwhelmed.

The above statistics are an indication for the need for strengthened regional co-operation in risk management. The region also faces social and economic challenges as many people are poor and depend on government or other organisations for donations for survival. Disease epidemics, especially the impact of HIV & AIDS, have taken away family bread winners, increasing vulnerability of the households (Southern African Development Community 2012). In the process, governments and NGOs continue to invest to a large extent in providing free access to medical service, instead of directing the same resources to other needy development programmes.

The Southern African region has put measures at regional levels to enhance co-operation that include: (i) A Regional Disaster Risk Reduction Unit, that was developed in 2007 and its responsibilities are to co-ordinate regional mitigation/preparedness and response programmes for hazards and disasters trans-boundary; (ii) A Regional Platform for Disaster Risk Reduction: established in 2011; its objective is to bring together member countries annually for finding best ways to improve preparedness and address risk; (iii) A Regional Indicative Strategic Development Plan: this plan emphasises the need for regional cooperation by providing strategic direction to achieve the long-term goal of building the resilience, for example, for food security, and has been regarded as a success. The following are disaster risk management programmes implemented under this plan: regional Vulnerability Analysis and Assessment Program Management Unit; Climate Services Centre (formerly Drought Monitoring Centre); Natural Resources Management Programme; Water Programmes; Regional Remote Sensing Unit; and Agricultural Information Management System (International Bank for Reconstruction and Development/The World Bank 2010: 10,13 & Southern African Development Community 2012: n.p). Despite the above regional co-operation, the Southern Africa region indicates that it faces pertinent challenges with regard to Disaster Risk Management implementation.

Existing institutional frameworks for Disaster Risk Reduction are not funded as required. Underfunding cuts across regional, national, provincial and local municipalities. This increases vulnerability of the region to risk if these frameworks are not effectively implemented (International Bank for Reconstruction and Development/The World Bank 2010: 10, 13 & Southern African Development Community 2012: n.p):

- There is also limited co-ordination across the region in the implementation of institutional frameworks. This partnership is very crucial as it is a regional challenge. A comprehensive risk assessment and analysis is lacking, which affects how to best implement policy frameworks;
- There is generally a state of weak governance structures and institutional capacities, such as in the critical area of information and management systems which are crucial in identifying and managing risk reduction;
- There seems to be limited interest or commitment in addressing underlying risks factors. This relates to planning that is not fully based on comprehensive analysis. The implication is that DRR priorities are not identified (Southern African Development Community 2012).
- Scientific research on how to best prepare and respond to natural and man-made disasters receives limited commitment, despite being a focus area in the 21st century. Research informs proper decision-making by providing a reliable understanding of the hazards that shape our natural and built environments.
- A protocol on disaster risk reduction and management has not yet been developed, although it relies on other multi-disciplinary, existing protocols (health, water and security) (International Bank for Reconstruction and Development/The World Bank 2010:10, 13 & Southern African Development Community 2012).

The Southern Africa region continued disaster risk management challenges remain to be in the global arena, as many international organisations have had to come rescue many communities. For example, USAID alone funding for DRR programmes in 2011 alone provided a total of \$17,575,094 for stand-alone DRR programmes and \$10,823,009 for programmes that integrate

DRR with disaster response (USAID 2011: 1). These statistics reflect just one international organisation, therefore considering others who operate in the region would provide a clear picture of the positive contribution by such organisation.

The discussion was important in this research to highlight the common and shared regional disaster/hazard state of challenge. These challenges contribute largely to global disaster statistics, and for this reason, commitment to disaster risk management and risk reduction within the region is critical. Considering research by Holloway (2003: 5) which maintains that mitigation and preparedness measures must be given priority by government institutions in Southern Africa to anticipate and avert any risks and disasters in the region.

South African history makes it this very dynamic country, whose transmission is characterised by exclusion and inequality; it is thus one of the most unequal societies in the world. The majority of the people remain marginalised and live in unfavourable social-economic condition, in rural areas or informal settlements where access to adequate basic services is limited (Roth and Becker 2011: 443). Such inequality increases vulnerability of the population to hazards and disasters. There is continued population increase in South Africa, which is a risk factor. High population increases chances of exposure and vulnerability, and municipalities struggle with finding suitable land to settle those within informal settlements (Roth and Becker 2011: 443. Pelling (2007) indicated that risk accumulation is linked to unregulated livelihood activities, unplanned settlements and overcrowding. Population growth in unfavourable social-economic conditions makes it difficult to reduce risk management. In the context of this research, NMBMM has not fully implemented the requirements of the DRM policy frameworks, and for this reason those living in formerly marginalised areas, like the Informal Settlements and some parts of the Townships remain vulnerable. This research becomes important to reaffirm the importance of reducing risks in the NMBMM.

3.6.2 South African National Disaster Management Centre

The NDMC is the highest unit in the South Africa for disaster risk management. It guides on all matters pertaining disaster risk management in the country, such as developing and ensuring

proper implementation of relevant policy frameworks. The NDMC also bears responsibility of ensuring that other parties play their part in DRR, including the private sector, civil society and non-governmental organisations (South Africa 2005: 9). Key responsibilities of the NDMC are outlined in the Disaster Management Act 57 of 2002; therefore all activities of NDMC have to be implemented in line with the Act. Some of the responsibilities include:

- Establish and maintain institutional arrangements especially provincial and local government. There also have to be arrangements with other stakeholders outside the government;
- Build an updated data base on risk profile of the country, so that the information can be used inform risk reduction measures and for broader planning;
- Ensuring that communities receive necessary education and assistance to remain informed and ready to play their roles in DRR;
- Ensuring that disaster plans are developed and implemented by provincial and local government disaster management centres. This will improve the status of vulnerability affecting communities and households;
- Monitoring and evaluation compliance of the Act by DM Centres, for example, if IDPs are developed and implemented. The information collated is used to determine impact of DRR initiatives and for making necessary decisions; and
- Facilitate access to funding for disaster risk reduction initiatives and make recommendations on the funding when necessary (South Africa 2005: 9).

Another important institution charged with implementing disaster risk management is the provincial government.

3.6.3 Provincial Disaster Management Centres

In South Africa, the DMA requires that, each province establish a provincial disaster management centre (PDMC), which becomes its main functional unit for disaster risk management. The PDMC is expected to provide support and co-ordinate relationships between the NDMC, metropolitan and the district. Such support includes defining the nature of

relationships and objectives between these institutions; national, metropolitan and district. Other duties of the PDRM include (South Africa 2005: 12):

- It is expected to make sure that needed resources for DRR are available based on priorities. This also includes working with other line departments in ensuring other services are provided;
- Ensure that a risk assessment for the entire province is done, and report submitted to the NDMC. This includes annual reports on DRR activities of each province; and
- Ensure that monitoring and evaluation mechanisms are developed and implemented/used to determine progress and impact of DRR initiatives. These mechanisms also are to be utilized in ensuring good relationships between districts and metropolitan areas, as well as between a province and neighbouring provinces and countries (South Africa 2005: 12).

From the preceding discussion of the national disaster management centre, is the notion of the municipal disaster management centre, where the municipal focus and emphasis is placed.

3.6.4 Municipal Disaster Management Centres

Disaster risk management in the metropolitan and district municipalities are under the MDMC, which makes it the primary functional unit. Its main responsibility is to make sure that DM Act and NDMF are implemented effectively. It also has to ensure that community involvement takes place in development of IDP plans for disaster risk reduction. Interdepartmental relations and co-operative governance favourable environment also have to be put in place to facilitate collaboration (South Africa 2005: 14). Other important responsibilities for the MDMC (South Africa 2005: 14) are:

- To establish and maintain institutional arrangements especially with other government line departments, to contribute in DRR. Some of the departments may include, human settlements, water and sanitation, and the health department;
- Integrated development plans have to be developed and implemented, in consultation with communities. The IDP plans for DRR should be based on developed progressive risk profiles of the municipalities;

- Disaster risk reduction programmes and initiatives should be developed and implemented in accordance with the DM policy framework;
- A culture of risk avoidance and general awareness in the communities through public awareness education;
- Ensuring that comprehensive risk communication framework and systems are developed and functional. It is important to follow requirements provided by the NDMC and DMC;
- Monitor the incorporation of disaster risk reduction programmes/initiatives with development plans in the municipalities; and
- Compile and submit plans and annual reports to the NDMC, the PDMC (South Africa 2005: 14).

The above discussion on regional and local context of disaster risk management was relevant in grounding this research. It provides for the need for implementation of DRR frameworks to manage the numerous challenges facing the region and locally.

3.7 MECHANISMS FOR DISASTER RISK REDUCTION

There are many approaches, models, components or mechanisms in the body of research that can be adopted in facilitating disaster risk reduction. For example, in Chapter One, the Total Disaster Risk Management (TDRM) Framework was presented to ground this research. The next section briefly summarises the concept of DRR, and the difference between the three concepts DM, DRM and DRR. The section will also present discussion on other mechanisms/options that can be adopted for DRR implementation: Capacity Building Approach to Reduce Disaster Risk Approach; Disaster Risk Reduction Analysis through Crunch and Release Model Approach; and A Conceptual Framework for Disaster Risk Management and Community-Based Disaster Risk Management Approach.

3.7.1 Disaster Risk Reduction Concept

It is important to firstly, summarise the concept DRR. International efforts to promote DRR culminated into the World Summit on Sustainable Development in 2002 which developed what is known as the Johannesburg Plan of Implementation (United Nations 2002). As noted earlier, risk is probability or the final results of an exposure to one or more hazards, on a vulnerable

community or households. Risk also considers “elements at risk” such as damages to telecommunication networks and transportation systems (John Hopkins and the International Federation of Red Cross and Red Crescent Societies n.d: 30). This implies that certain systematic measures must be put in place depending on risk profile analysis of specific communities with the aim of making relevant adjustments to reduce vulnerability of communities. Disaster risk reduction entails relevant logical development and application of policies, strategies and practices to mitigate possible hazards and their effects. The final outcome is to achieve sustainable development by reducing socio-economic vulnerabilities of communities and households, upholds Van der Waldt (2013).

In efforts to align DRR, five measures were developed, and these include:

- Ensuring that policy and planning measures are in place (national or regional level)
- Integrate DRR into the policy framework;
- Physical coping and/or adaptive measures to risk;
- Physical preventative measures for infrastructures from vulnerability and exposure; and
- Community capacity building measures to increase resilience (Department for International Development (DFID) (2005).

In this exploratory research, clarity on the linkage or relationship among the concepts DM, DRM and DRR is important. Table 3.2 below presents a summarised understanding of the three concepts.

Table 3.2: The linkage between concepts DM, DRM and DRR

Concepts	Delineations
Disaster Management	Focuses mainly on preparedness for response; on policies, administrative decisions, and operational activities which pertain to the various stages of a disaster at all levels. The integration of pre- and post-disaster activities in order to safeguard lives and property against possible disasters.
Disaster Risk Management	Defined as the systematic process of using administrative decisions of an organisation, operational skills and capacities to implement policies, strategies and coping capacities of the society and communities to lessen the impacts of all forms of disasters. Such activities include, but not limited to all forms of structural and non-structural measures

	for prevention or mitigation and preparation for adverse effects of hazards. Van Niekerk (2008:4) argues that “if we therefore agree that the NDMF aspires to the ideals of DRR, it would be valid to argue that DRM is what each and every disaster management centre, government entity and organ of state should do”.
Disaster Risk Reduction,	Emphasizes a new global thinking in the management of disasters and disaster risk. It is the systematic development and application of policies, strategies and practices to minimise vulnerabilities and disaster risks in a society. It also involves prevention or to mitigation and prepare adverse impact of hazards, within the broad context of sustainable development. Van Niekerk (2008:4) notes that DRR in the context of developing country such as South Africa can at the macro level be compared to the aims of its NDMF. The NDMF has been explored in depth in Chapter 2.

Source: Adapted from Van Niekerk (2008: 4)

From the above concepts, one can identify that DM was a very reactive oriented concept and was found to be limiting, due to its inability to cater for the concept of risk reduction and giving limited emphasis to the ‘systematic process of using administrative decisions’. Due to the nature of growing exposure of communities to risks, DRM was adopted and governments and other stakeholders encouraged considering risk in all their planning and implementation. It was later acknowledged that there was a need for a more specific concept that would bring much attention to reduction of risk, hence DRR. These concepts are used interchangeably by many researchers, DRM practitioners and institutions. It was necessary to treat each of these concepts uniquely, but also to consider the shared aspects.

The following section will provide a discussion of approaches to reduction of risks in our society and each will be contextualised depending on each region, institution or community:

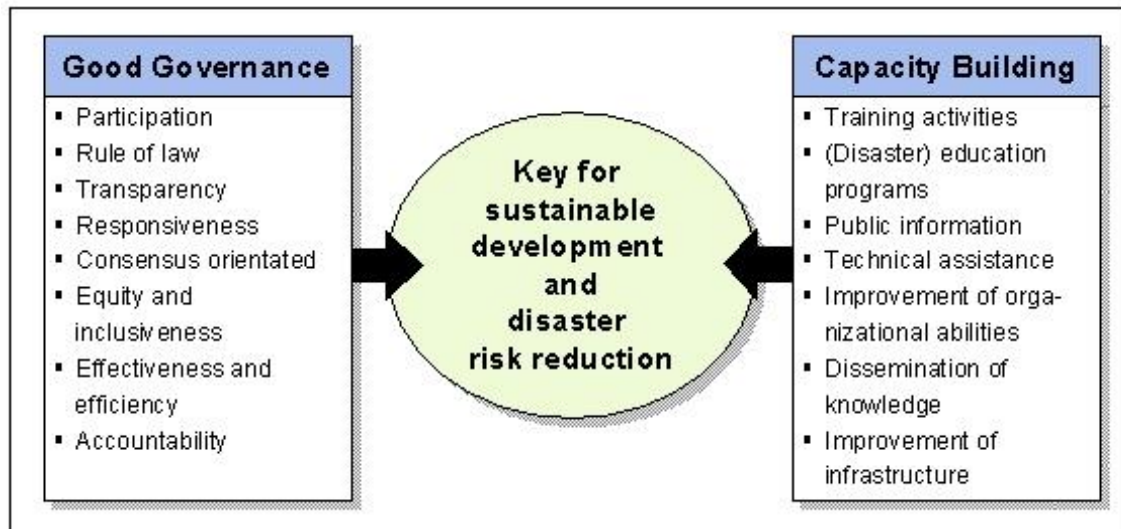
3.7.2 Capacity Building Approach *vis-à-vis* Good Governance for Reduction of Disaster Risk

In Chapter Two, good governance was presented as a guiding principle in managing local government institutions. It was also highlighted that capacity building should be provided as a priority and be implemented at all levels, sectors through policies and frameworks (International Federation of Surveyors 2006: 36). In order to reduce levels of risks in a community or an organization, there has to be efforts to develop skills and infrastructure to build their capacity (International Federation of Surveyors 2006: 36). There are various ways to ensure capacity

building in the context of DRR, such as ongoing training and education of disaster managers and practitioners; public education awareness initiatives; improving technology status so as to improve institutions performance in service delivery, and also making use of traditional knowledge (UNISDR 2004: 246).

Capacity building also demands participation of the community members which is an indication of good governance. Good governance is achieved through implementation of set policies in a comprehensive approach, an issue advocated and highlighted in Chapter Two of the research. Effective capacity building also requires bringing together all the strengths and resources available within a community so that they are properly utilised for the benefit of the communities. Institutions responsible in empowering communities are therefore tasked with building the capacity of the most vulnerable (UNISDR 2004). In this context, governance and capacity building are crucial elements for the DRM implementation. In South Africa, it was pointed out in Chapter One and Two that there are policy legislation that must be adhered to, for example, the Constitution of the Republic of South Africa, 1996 and the Batho Pele Principles. This approach can be understood by the figure that follows, presenting both good governance and capacity building as key elements that contribute to sustainable development and DRR.

Figure 3.6: Governance and capacity building for risk reduction



Source: International Federation of Surveyors (2006: 14)

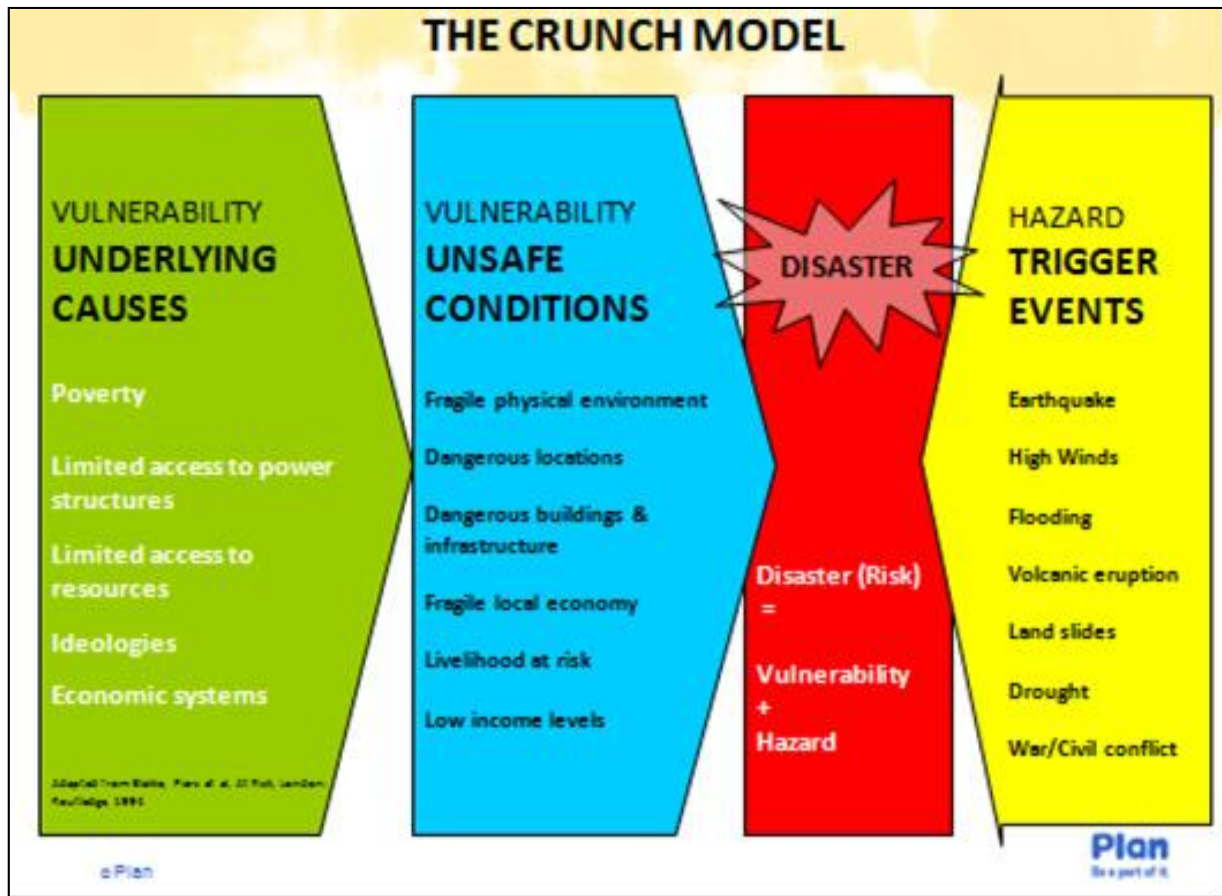
Capacity building and good governance are effective tools for achieving the sustainable development and DRR. Failure to incorporate good governance or appropriate capacity building practices may have a negative impact in achieving sustainable development. Finally, it should be realized that capacity building is not a once-off occasion but an ongoing process, which is largely the responsibility of the local government institutions. These two elements were reported as not well synchronized in the context of this research, as highlighted in Chapter Five.

3.7.3 Disaster Risk Reduction Analysis through ‘Crunch and Release Model’

The ‘Crunch and Release Model’ provides for an in-depth analysis and understanding of DRR, to facilitate implementing a pragmatic approach to risk interpretation, action and community-based interventions. It is a holistic approach to the evolving nature of multi-level and multi-dimensional disaster risk management in relation to the socio-economic impact to communities (Smyth and Hai 2012: 5), which is a focal point in this research. The ‘Crunch Model and Release’ is also called a disaster ‘*pressure and release* model’, a framework that facilitates understanding on disaster risk reduction. The concept pressure implies vulnerability conditions that are rooted in socio-economic and political processes, and for DRR to be achieved, the pressure has to be addressed. Negative impacts of a disaster will be experienced by human and non-human elements when a possible hazard meets vulnerable conditions. This framework can

also be viewed from understanding and explaining the causes of disasters through a cause-effect perspective (Smyth and Hai 2012: 5). In the context of this study, NMBMM faces different pressurizing issues rooted in social-economic systems and political processes, such as poverty, poor service delivery, unemployment, and corrupt institutions among others. These pressurizing issues have a huge impact on the disaster risk reduction status of the communities. Also, the South African democracy is regarded to be at a young stage considering the historical background of the country, and the reason many communities continue to face service delivery protests for the government to eradicate such pressures. The following figure provides the “Crunch and Release Model”.

Figure 3.7: Disaster Risk Reduction Analysis through Disaster Crunch Model



Source: Awal (2015: 20) & Wisner, Blaike, Cannon and Davis (2003: 51)

The Crunch and Release Model shows that vulnerability should be understood and approached from both underlying causes and their implications for society. For example, vulnerability in a specific society may be caused by vulnerable contexts, poor socio-economic and political processes that place too much pressure on the community (some of these issues are presented in Chapter Five of this research). Vulnerability when exposed to a hazard (Trigger Event) like an earthquake or civil conflict, translates to a disaster.

Hazard is not a disaster unless it affects a vulnerable community. This implies that a hazard will not most likely be a disaster if it affects a resilient community. A resilient community will be quick to fix any signs of a hazard before it becomes a serious issue. In contrast, one must acknowledge to some extent that an absence of a hazard does not always mean there will be no

disasters (Ines and Vu Minh 2012: 5; Awal 2015: 20). All these factors contribute to an unsafe environment, and understanding and addressing of such pressure needs attention to avoid disaster occurrence; which can be achieved through implementation of programmes and initiatives that are sustainable (Ines and Vu Minh 2012: 5 & Awal 2015: 20).

The translation of root causes by dynamic pressure in unsafe conditions in this research context was presented in Chapter Five. For example, some homes in the form of shacks and informal settlements are within areas or land that has not been allocated by the City of NMBMM. These areas are vulnerable to risks, natural and man-made hazards which become disasters eventually, due to communities' limited coping capabilities. The municipality frequently does not plan to service such areas, which worsens their vulnerabilities/exposure. The research recommends municipal planning to eradicate such areas and relocate the people to safer places. The research also advocates for Community-Based Disaster Risk Management Approach because it encourages the use of community-based assets, which asserts that communities should be able to take control of their situations, and not rely on outsiders. This integral discussion follows in context to the study.

3.7.4 Community-Based Disaster Risk Management Approach

The success of a DRR implementation largely is determined by how best the government and its communities are prepared. The CBDRR approach is a powerful approach to implementing disaster risk reduction initiatives. Community Based Disaster Risk Management Approach looks at how best various stakeholders can work together in planning initiatives for reduction of risks - and vulnerabilities. The approach includes all co-ordinated efforts and strategies that are applied or used by social groupings of individuals for the purpose of protection against the adverse effects of different types of risk they could be exposed to in their communities or households (Bhattamishra and Barrett 2009: 2). Communities at risk are empowered and assisted to re-discover their individual and communal potential that enhances how best they can stay resilient or cope with risks they are exposed to on a daily basis (Holloway *et al* 2008: 160). It was pointed out earlier in Chapter One in this study that DRR is a multi-disciplinary and multi-sectoral discipline and based on this premise, all intervention must involve stakeholders from all the sectors and disciplines such as: urban planners, environmental specialists, education and health.

In some countries like Japan, the term “Community-Based Disaster Management” was adopted to replace what local government called citizen participation. However, the use of the term in DRR has advanced in the 21st Century across the globe, as many policy makers in both the public and private sectors have come to comprehend that the success of any project or programme relies heavily on community participation (Chen, Liu and Chan 2006: 2 & Allen, cited in Meheux, and Dominey-Howes 2011: 102). This approach has led to documented benefits of DRR resilience in cases where initiatives have been developed using local knowledge to address vulnerability (van Aalst *et al* & Mercer *et al* cited in Meheux and Dominey-Howes 2011: 102). Promotion of community participation in disaster risk reduction is acknowledged by DM international and national frameworks, as discussed in Chapter Two and throughout the research.

There are different perspectives as to why CBDRR approach is considered a strong tool in service delivery in the context of DRR. Petal, Green, Kelman, Shaw and Dixit (2008) argue that the failure of previous approaches used by governments have created a common belief that many governments especially in Africa, have a tendency to exclude communities in decisions that affect them, which contributes to community failure of programmes. This may include policy-making and implementation and this approach has been found to contribute to failure to achieve policy objectives. This has caused governments to re-think and adopt community acceptable approaches such as CBDRR approach. In addition, the bottom-up approach mainly used in CDRRM has the potential to positive impact on communities and public policies meeting their objectives. In the South African context, the current state of service delivery in South Africa would improve if the bottom-up approach would be implemented effectively.

Many resources are lost during service delivery protests that are linked to communities’ anger over government institutions imposing programmes without consulting with communities (Pant, Pandey and Negi (2016: 8) indicated that this “approach promotes a bottom-up approach working in harmony with the top - down approach, to address the challenges and difficulties. To be effective, local communities must be supported into analysing their hazardous conditions, their vulnerabilities and capacities as they see themselves”. As highlighted in the quotation, it is a powerful social policy tool as it encourages voluntary participation of individuals. The

Community-Based Disaster Risk Reduction Approach encourages individual, voluntary participation in community projects. Through the voluntary concept, individuals come together and work as a team that is capable of participating and taking full ownership of the projects that benefit their communities. Through CBDRM, communities are strengthened to enable them identify their available community and household assets/resources that can facilitate enhanced community resilience.

Failure to adopt the CBDRR approach is linked to oppression and creating ignorance in communities. The implication of failure to apply this approach means government institutions create more poverty, ignorance and a dependency syndrome. This is very common in South Africa, where the poor communities make demands and blame the government for their poverty. This has forced the government provision of social grants instead of creating self-sufficient and self-sustaining opportunities for the citizens to shift away from the dependency notion and theory, one of the research findings presented in Chapter Five. Recent research by Resilient City Report (2016: 9) stated that “besides encompassing effective leadership, jurisdictional coordination, land-use planning and efficient financing, a crucial aspect of good governance is inclusive participation. Developing local knowledge and capacity while fostering local innovation for transformative adaptation and resilience building within cities could contribute to a global system change that is rooted in engagement with those who are most at risk” (Resilient City Report 2016: n.p).

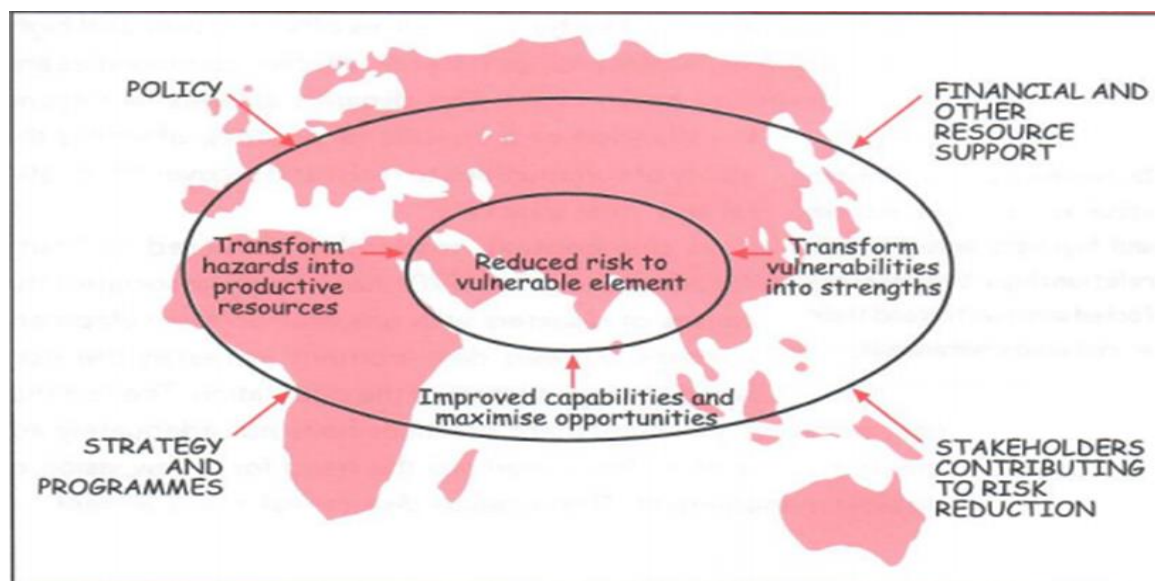
There is no *one approach fits all* in the framework for CBDRM implementation, and for that matter, each situation is unique. However, the above mentioned issues should be incorporated in whatever framework an institution decides to adopt.

3.7.5 Conceptual Framework for Disaster Risk Reduction

In 1997, Jegillos developed a disaster risk reduction framework and contended that the framework is made up of basic elements and that it was relevant that these elements be incorporated within a government’s policy frameworks. The elements include policy; financial and other resource support; strategies and programmes; and multi-stakeholder contributions to risk reduction (Jegillos 1999: 9; Van Niekerk 2005: 81). These elements formed part of the

research objectives and have been highlighted as important findings in the research. An important note is that these elements were developed in line with the global change that was occurring in the DRM discourse that materialised in the 90s for enhanced disaster risk management. As noted in Chapter Two, this was the period the United Nations member countries had started campaigns for international community to shift from reactive-oriented approaches to proactive approaches, in managing DRM. It was also the time the South Africa African Government was in transition from Civil Defence and Civil Protection to a disaster management approach. Jegillos (1999: 11) indicates that the aim of this approach is to mainly address underlying risks in a community or society, making it very relevant to the current debates around risk reduction. A comprehensive multi-disciplinary approach is crucial for this reason when addressing social and economic challenges, with the main goal of building a culture of sustainable development practices. The framework also suggests that communities, especially those vulnerable, should be assisted in enhancing their disaster resilience and coping strategies, as provided in the figure below.

Figure 3.8: Elements of conceptual framework for Disaster Risk Reduction



Source: Jegillos (1999: 9)

Policy in disaster risk reduction requires a clearly defined policy and change in the implementations. Effective implementation translates to service delivery satisfaction to the

citizens. Van Niekerk (2005: 81) indicates that policy change also requires sectoral reforms through multi-disciplinary approach in which all sectors include risk reduction in their development plans and also work together as a team. This is important in the context of South Africa, where disaster management implementation is considered a responsibility of the local government, while other line departments do not treat it with urgency. In supporting the implementation of the policies, there has to be systems and programmes. The systems create or provide an enabling environment for regional and national institutional coordination. Programmes or initiatives are the actual activities at the community levels and are developed as per scientifically identified needs of the community. This requires developing relevant strategies that cater for all aspects of disaster risk management, what Van Niekerk (2005: 81) called a “strategy that looks at the bigger picture and systems, spatial considerations, communication and information systems, warning and assessment systems, and codes and standards”. The final goal is to ensure that all disaster risk reduction matters are implemented in a co-ordinated, effective and efficient manner to ensure that service delivery is not restricted, impeded upon or interrupted as far as possible.

Stakeholder contribution in disaster risk reduction allows all to play their specific roles in their respective manner. For example, government institutions bear the major responsibility in providing services to communities; therefore they should put DRR plans in place. Other stakeholders include communities, private sector, individuals, and the relief organisation network. Emphasis should be placed on the roles and contributions of the community including community assets and local knowledge. Institutional capacity determines how best DRR programmes are to be developed and implemented. This is mainly in terms of sufficient budgets and qualified personnel, one of the stumbling blocks facing NMBMM in offering sustainable service delivery.

3.8 CONCLUSION

Chapter Three has presented typography of disaster risk management, with special focus on risk reduction implementation. The chapter began by presenting the international experience on disasters, as an escalating issue that needs international co-operation. It was followed by locating the body of knowledge on the Disaster Risk Management Cycle in which the four phases of the

cycle were summarised, in relation to this research. The Southern and South African Context was also presented in terms of vulnerabilities. Lastly, it offered a discussion of approaches to reduction of risks, which can be contextualised depending on each region, institution or community. Chapter Four presents the research design and methodology, and also the study area.

CHAPTER FOUR

RESEARCH DESIGN AND METHODOLOGY

4.1 INTRODUCTION

Research can be understood as the search for new knowledge that aims at adding or building to existing knowledge. Through research, Woody cited in Kothari (2004: 1) postulates that there is clear definition of problems, formulation of research questions, collection, organising and evaluation of data, arriving at a conclusion and testing of the conclusion. The application of scientific processes in conducting research is crucial in the academic field as it contributes to credibility of the findings, the view of Kothari (2004: 1). Martens (2016: 16) adds that the concepts of systematic and inquiry imply that research is a process of collecting, analysing, interpreting and using data to solve societal problems scientifically. This also means that research is one of the diverse numerous techniques that seeks to understand society.

This chapter reflects the complete research design, data collection techniques and analysis. The starting point is by clarifying concepts related to research, as well as highlighting debates around philosophical underpinnings of research methods. The last sections provide a detailed outline of research methods and justification in line with the research objectives, as some of the research limitations are highlighted.

4.2 RESEARCH PARADIGM

A paradigm is defined as those specific beliefs or assumptions researchers hold as central concerns of reality that contribute to a worldview; however, the researcher cannot prove them (Nieuwenhuis 2016: 52). Hennink, Hutter and Bailey (2011: 11) and De Vos *et al* (2014: 52) define paradigms as viewpoints of looking at reality, and that provide a reference for researchers to organise their reasoning and observations. One significant aspect of research paradigms is the ability to explain why researchers have certain beliefs about the world, and also what prompts the researchers to undertake certain actions (De Vos *et al* 2014: 52). The Epistemological, Ontological, Positivist or Post-positivist; Constructivist or Post-constructivist, Transformative and Pragmatic Worldviews are commonly known research paradigms that inform social science

research. In this research, the researcher is mainly influenced by post-positivism and social constructivism.

Post-positivism looks at reality as subjective or multi-dimensional. The reality is individually constructed by those who participate in a research, and for this reason, the researcher holds that reality is not a fixed entity. Reality that research participants bring out is determined and influenced largely by their culture, environment and gender. Unlike positivism that holds to knowledge as absolute truth, post-positivism does not generalise but aims at searching for reliable evidence also called traditional notion of the absolute truth of knowledge, submits Creswell *et al* (2016: 59). Given the nature of this paradigm, it is mainly used in quantitative research.

Constructivism or social constructivism is an approach common in qualitative research given its understanding of the world and that one's society is as important as an individual's meanings and thinking around certain topics, based on their personal experiences (Schutt 1999: 393). This motivates researchers to search for complex meanings instead of focusing on a single or narrow meaning by interacting with as many respondents as possible, suggests Creswell (2014: 37). Constructivism can be understood though considering both ontology and epistemology. The ontological looks at what is truth or reality; there are three unique ontological positions, idealism, materialism and realism. Epistemological worldviews, in contrast, focus on ways of finding the truth about the world and providing the basis of our truth. There are three common assumptions in constructivism that were adopted in this specific research, as provided by Creswell (2014: 38): the application of open-ended questions, in-depth interviews and focus-group discussions that allowed respondents to provide their own views for example on research objectives; in seeking to understand why participants understand and perceive a specific context, qualitative researchers collect data in its natural settings, and meanings are generated from data collected, made possible by the inductive nature of qualitative research.

Johnson and Christensen (2012: 32) define pragmatism as a philosophical position that maintains that what works is what is adopted. Creswell's (2014: 39) point of view is that researchers focus mainly on the problems instead of methods, and all possible approaches are used to find answers

or understand the problem. For these reasons, Creswell concluded that pragmatism offers a philosophical basis for mixed methods research (Creswell 2014: 39).

4.3 RESEARCH DESIGN

Research design is a framework or a plan that guides the researcher in conducting scientific inquiry, maintains Babbie and Mouton (2011: 74). The plan provides details on how, when and where data is to be collected, and also how it is to be analysed (De Langen 2009: 51 & De Vos, Strydom, Fouche and Delpont 2014: 73-142). Research design facilitates the researching and answering of the pre-determined research questions or test set hypothesis (De Langen 2009: 51 & Verhoeven 2011: 40). There are two meanings to research design: the first is the designing of a study in its broadest sense. This relates to the reasons why a researcher plans to study and also those decisions made relating to what design is to be used in the study. The second one refers to the alternative logical arrangements available from which one or more can be selected for the specific study, such as correlation research designs and experimental research designs (De Vos, Strydom, Fouché and Delpont 2011: 143). Verhoeven (2011: 40) further contends that the research design is the conceptual structure that articulates the type of data required, the methods to be used to collect and analyse the data, and how these processes will link up with answering the key questions raised in the research. The research design links and provides the purpose of the inquiry which includes exploration, description, explanation, prediction, evaluation and history (Verhoeven 2011: 40).

The research design places emphasis on the end product in research, that is, what type of study is to be undertaken in order to provide acceptable answers to the research questions (van Wyk n.d:8). Authors Kothari (2004: 31) & Verhoeven (2011: 40) postulate that a research design should answer the following issues:

- What the study focuses on;
- Purpose of the study;
- Where the research is going to be conducted;
- Type of data and where to find it;

- What is the time frame;
- Sample design for the research;
- Data collection techniques to be applied; and
- Data analysis and reporting style of the research to be adopted.

Once the research has answered the above stated questions, the overall design may be divided into the following categories:

- Sampling design, which can be either non-probability/purposive sampling or probability/random sampling;
- Statistical design, which may involve no pre-planned design for analysis or pre-designed analysis;
- Operational design, including operational procedures decisions which are not fixed as there are advanced decisions on operational procedures; and
- Observational design regarding data collection using unstructured instruments or structured instruments.

Based on the stated categories, Kothari (2004: 32) indicates that the main features of a good research design are that it must contain at least a plan that enables one to identify the sources and what kind of information is important to the stated problem under study; should provide a strategy on which approach/s should be applied to collect and analyse the data, and should determine timeframes and budget required for conducting the study.

There exist different research designs which can be simplified into three categories:

- Exploratory studies: the main goal of exploratory studies is to come up with a study problem for investigation; this further involves formulating hypothesis/research questions. Exploratory studies investigate social issues without expectations so that new ideas emerge. The research design in this type of studies must be flexible, so that different aspects of the study are considered (Schutt 1999: 605 & Kothari 2004: 35);

- Descriptive studies: these studies focus on providing a description of a specific group or individuals. The research design should be “rigid” and not flexible to avoid biasness and increase reliability (Schutt 1999: 12) ; and
- Experimental/hypothesis testing research studies: experimental studies aim at determining variables causal relationships. The design should stipulate procedures to be followed to limit bias and increase credibility of the results, highlights Kothari (2004: 35) and Schutt (1999: 159).

Both exploratory and descriptive studies are very common in social sciences, and for this reason, their related designs are commonly applied. This research was mainly exploratory due to the nature of the research questions as pointed out in Chapter One that it aimed to find out if DRR programmes play an important role in the Nelson Mandela Bay Metropolitan Municipality as part of the service delivery commitment by the local government. The following is a tabular table comparing research design in exploratory and descriptive studies:

Table 4.1: Comparing research design in exploratory and descriptive studies

Research design	Type of study	
	Exploratory studies	Descriptive studies
Overall design	Flexible design	Rigid design
1.Sampling design	Non-probability sampling design	Probability sampling design
2.Statistical design	No pre-planned design for analysis	Pre-planned design for analysis
3.Observational design	Unstructured data collection instruments	Structured data collection instruments
4.Operational design	Operational procedure decisions are not fixed	Advanced decisions about operational procedures

Source: Kothari (2004: 39)

From the Table, one can clearly identify that the two types of studies provide the social science researcher an opportunity to choose which design to adopt or to combine for his/her research.

Overall, the above discussion is relevant in this research to set out the research problems and the study design. A mixed methods research design was used by combining both qualitative and quantitative approaches. In the qualitative approach, data was gathered through in-depth interviews, open-ended questionnaires, focus-group discussion and observation. Quantitative data was gathered using a closed-ended questionnaire. In-depth interviews provided respondents an opportunity to share their experiences and views concerning the research. In-depth interviews contribute to new knowledge around world views, supporting development of new theories to sustain social interaction (Legard, Keegan and Ward 2003: 138). Quantitative surveys provided numeric description of attitudes, opinions of a sample population, as advocated by Creswell (2014: 13). Questionnaires were used to provide information about households at Motherwell and Walmer informal settlements, and that of staff at NMBMM, for purposes of determining their opinions around disaster risk management. Moreover, the population included a large number of participants from the communities as well. Interviews were conducted with NMBMM disaster management officials, government line departments, non-governmental organisations, private sector, and community representatives, and formed the qualitative part of the design.

4.4 MIXED METHODS RESEARCH APPROACH

Mixed methods research can be defined as the process that brings together elements of qualitative and quantitative research approaches, aiming to broaden and increase the breadth and depth of understanding research questions under study (Doorenbos 2014: 1). It also refers to all procedures of collecting and analysing both quantitative and qualitative data in the context of a single study (David, Afua, Philip and Douglas 2007: 19). Creswell (2006: 5) provides a summarized definition of mixed methods research as both a method of inquiry and design with philosophical assumptions. On the one hand, it provides a methodology that offers guidance on how to collect and analyse data using a mixture of both quantitative and qualitative approaches through the various phases in research process. Furthermore, from a method viewpoint, mixed methods research focuses on collecting, analysing, and mixing both qualitative and quantitative information in a single study (Creswell 2006: 5). Mixed methods is therefore a strong third approach along with qualitative and quantitative methods as it brings both forms of data together, thus enabling a better understanding of research problems. For this reason it was advocated in

this study. Critique to the mixed methods design is the fact that they can be difficult for a single researcher and thus time-consuming, particularly if the two designs are best used concurrently. Similarly, conflicts have been noted in cases where methodological purists argue qualitative and quantitative research designs should be used separately (Caruth 2013: 115). Grant (2007) cited in De Lisle (2011:90) is of the belief that mixed methods research simply is a “bastardization of positivism”.

Research design outlines many types of mixed methods research design; however, recent research by De Vos *et al* (2014: 440 - 442) provides a summarized discussion of four major designs based on the work of Creswell and Clark (2007: 62 - 79) and Ivankova *et al* (2007: 264-270). These include exploratory mixed methods design, explanatory mixed methods design, embedded mixed methods design and lastly, triangulation mixed method design. These authors caution that these four designs have very close similarities than differences; therefore, researchers have to try to identify which one suits their work. Doorenbos (2014: 2) also approves that there are four types of mixed methods research design with triangulation receiving more attention in social sciences. Based on this discussion, this research was found to fit into the triangulation mixed method, as discussed below.

4.4.1 Triangulation mixed method

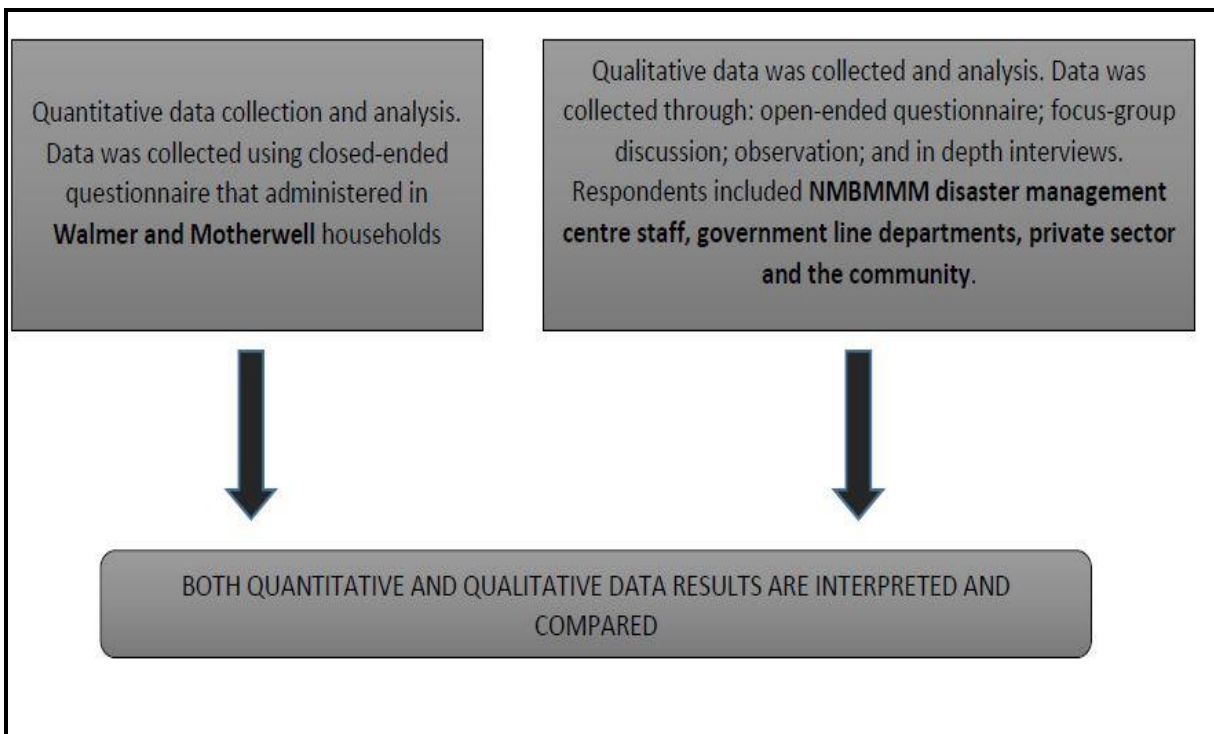
Triangulation is one of the commonly termed mixed methods strategies or tools and denotes application of multiple methods to study a research question of one’s interest. It may also refer to a process of surveying or researching for answers to find the most appropriate explanation for research questions in social sciences from numerous angles or perspectives. This entails equal weight in the applicable methods (Schutt 199: 382 & Verhoeven 2011: 136, 140). According to Salehi and Golafshani (2015: 187), triangulation can be defined as an approach that seeks to verify convergence among multiple and different sources of information to form themes or categories. It can simply be referred to as a partnership that exists among different methods in collecting data, analysing and confirming results for a particular study.

One strong benefit derived from this approach is that the quality of the findings is enriched, as data is collected separately, analysed and compared, and as a result, more reliable conclusions

are drawn (De Vos *et al* 2014: 442). Maree (2016: 42) supports this argument by indicating that an integrative perspective associated with triangulation brings out the richness of the data collected using both qualitative and quantitative method. The researcher applied both qualitative and quantitative data collection methods due to the nature of the research questions posed in Chapter One. This included structured and unstructured questionnaires, focus group discussions, in-depth interviews and observation. These methodologies were applied to the same respondents as described in the Figure below.

The following table provides concurrent triangulation as applied in this research study.

Figure 4.1: Concurrent Triangulation Strategy



Source: Author's perspective

Data was collected in two concurrent phases and was integrated during the interpretation phase, as suggested by Terrel (2012: 268). There are four types of triangulation, according to Denzin (1978) and Patton (1999) cited in Carter, Bryant-Lukosius, DiCenso, Blythe and Neville (2014: 545):

- *Data triangulation* focuses on collection of data at different times, or from different sources, in the study of a phenomenon;
- *Investigator triangulation* is where more than one researchers collect data relating to the same phenomenon independently and compare their findings;
- *Triangulation of theories* is where a theory derived from a new discipline is used to explain a phenomenon in another discipline; and
- *Methodological triangulation* focuses on data being collected through both qualitative and quantitative approaches, and findings are analysed and combined in the study. This research leaned more towards this option.

Based on the above discussion the following are some of the advantages of triangulation that motivated the researcher to adopt triangulation in this research. These advantages are linked to various research works by the following authors: Driscoll *et al* (2007: 25); Terrell (2012: 268); De Vos *et al* (2014: 444) & Doorenbos (2014: 2). New concepts that need in-depth understanding are applicable;

- Data type is easy to collect, analyse separately and independently, then later brought together;
- In cases where quantitative results are difficult to interpret, qualitative data is used to elaborate the same results;
- Findings from one approach can be better understood with a second source of data;
- Provide an opportunity for in-depth understanding in cases where either quantitative nor qualitative approaches are inadequate; and
- Provide for an opportunity to bring experts together, such as statisticians and qualitative experts.

4.4.2 Qualitative research approach

Qualitative research is a broad term, but commonly defined as research where the researcher is the main individual who collects and interprets the data. The data is collected in its natural settings without interference with the contents and forms of the human interactions (Creswell 1998: 15 & Keyton 2001: 62). Creswell (1998: 15) and Khan (2014: 225) add that in the process of the inquiry, a complex and holistic picture is developed through detailed views of respondents,

and is reported without alterations. In this research, data was collected in its natural settings and conclusions were derived without interfering with the original intentions of the respondents. Qualitative research uses discourse as its data and in this case, it related to naturally occurring messages that were captured in variety of forms (Keyton 2001: 63). Authors De Vos *et al* (2014: 310) reason that the qualitative approach focuses on empirical materials such as visual texts, case study, personal experience, introspective, historical, life story interviews and observational aspects.

The above discussion on qualitative research supports the five main types of qualitative research namely: narrative biography, phenomenology, grounded theory, ethnography and case study design (Creswell 1998: 27; Shkedi 2005: 15). The discussion also supports observation research, literature review, content analysis and other forms of desk research, as well as interviews and case studies, which are qualitative methods adopted in this research, as required by Creswell (2003:14, 15) and Verhoeven (2011: 136, 152).

According to Creswell (1998: 20 - 21); Patton (2002: 40 - 41) & Gilbert (2009: 35) some of the characteristics of qualitative research include:

- Multiple sources of data: there are various forms of data including participant observation, conversation analysis, focus-group interviews, narrative analysis, documents and audio-visual information. Since the data has to make meanings, after collecting, it is analysed and organised to form a theme that represent the whole data;
- Participants own meanings: qualitative researchers do not bring their own meaning, but focus on learning and understanding the views of the respondents. Failure to ignore participants' meanings may discredit research findings;
- Holistic account/naturalistic settings: the researcher collects the data from respondents in their natural settings. The researcher is taken into their "reality" by this method. The respondents have first-hand information as they provide information concerning their social-economic experiences;

- Researcher as main instrument: the researcher develops the instruments, such as questionnaires and interview guides for collecting data. This includes conducting literature review, interviews, surveys and participant observation;
- Persuasive nature of writing: qualitative researchers write to persuade the readers to give a sense of ‘‘being there’’; and
- Reflectivity: the qualitative researcher is able to review and evaluate his/her own impact on the process of data interpretation. This implies the ability to be aware of personal judgements and their impact on the data (Creswell 1998: 20 - 21; Patton 2002: 40 - 41 & Gilbert 2009: 35).

A discussion on the characteristics of qualitative research provided a foundation on which the study was undertaken. All respondents who took part in qualitative research were in their natural settings. Data collected was linked to that collated from staff at NMBMM disaster management centre, NGOs, the private sector and government line departments. All these respondents provided valuable information on service delivery rendered by NMBMM to its communities.

4.4.3 Quantitative research approach

A quantitative approach is also called a scientific method. Qualitative researchers primarily use post-positivist claims for developing knowledge which may fit into one of the following types:

- Cause and effect thinking;
- Reduction to specific variables and hypotheses and questions;
- Use of measurement of quantity or amounts;
- The test of theories;
- Strategies of inquiry such as experiments and surveys; and
- Collects numerical data on predetermined tools that yield statistical data (Creswell 2003: 18; Kothari 2004: 3; Keyton 2001: 11).

The approach post-positivist research paradigm was applied to the context of this research as the research presented new perspectives on disaster risk reduction service delivery in NMBMM. New perspectives were based on cause and effect thinking, and also on evidence collected from the respondents.

According to Verhoeven (2011: 111), the quantitative approach tends to focus towards post-positivist knowledge claims, an experimental strategy of inquiry, and pre-and post-test measures of attitudes. He clarifies by giving examples, where researchers embark on a research process to find answers to their set hypothesis. The aim is to justify or refute their hypothesis. Collated data is analysed using statistical procedures and the hypothesis is tested. The qualitative approach is considered very limiting or one that uses a “narrow-angle lens” to focus on a single or few causal factors. Babbie (2010) maintains that the quantitative approach tends to manipulate pre-existing statistical data using computational techniques. Gathered numerical data is usually generalised to represent groups of people or to explain a particular phenomenon. According to De Vos *et al* (2014: 312), the quantitative research approach is different from the qualitative research approach, as it focuses on experiments, surveys that apply closed-ended questionnaires, and also content analysis. Therefore, main categories of quantitative research designs include mainly experimental research and non-experimental research. As a result, quantitative research designs are either descriptive or experimental, where the descriptive does not measure their subject more than once, while in experiments, subjects are put through pre- and post-treatment. Therefore, a descriptive study aims at determining any associations between variables, unlike an experimental study whose aim is to establish interconnection (Hopkins 2010: 60). The most common characteristics of the quantitative approach include the following:

- The researcher makes use of structured instruments to gather data, such as questionnaires or computer software, to collect numerical data; data is gathered from larger sample sizes that are representative of the population;
- The research study can usually be replicated or repeated, given its high reliability;
- The researcher has a clearly defined research question to which objective answers are sought;
- All aspects of the study are carefully designed before data is collected;
- Data is in the form of numbers and statistics, often arranged in tables, charts, figures, or other non-textual forms; and
- The project can be used to generalize concepts more widely, predict future results, or investigate causal relationships (University of North Carolina 2014: 4 & Babbie 2010).

Before applying quantitative methodology, there is need to decide if it will be descriptive or experimental. One's decision determines how one gathers, analyses, and interprets the results. This research leaned more towards descriptive research in which closed-ended questionnaires were used to gather data to measure the significance of individual views on targeted respondents and the population they represent.

Using quantitative methods in social sciences poses some limitations, as highlighted below (University of Southern California 2016: 8 & Ngubeni 2011: 36):

- The quantitative researcher may lack or have limited information on contextual details of a hypothesis under investigation;
- It uses a static and rigid approach and so employs an inflexible process of discovery;
- Research findings can be regarded as having "structural bias" and false representation due to their nature in standard questions, especially because the data actually reflects the view of the researcher instead of the participating subject;
- There is limited information on participants' perceptions such as behaviour, attitudes, motivation on issues under study, as results provide numerical descriptions;
- The researcher may collect a much narrower and sometimes superficial dataset;
- The research is mostly carried out in an unnatural, artificial environment such as a laboratory as opposed to real world results; and
- Responses may also be limiting as pre-set answers may not necessarily reflect how people really feel about a subject.

In the context of this study, the researcher found that participants' perceptions such as attitudes and behaviour on issues under study were limiting, as the questions produced numerical descriptions.

Based on the discussion on both qualitative and quantitative research approaches, below is a comparative summary of the two methodologies (Thomas 2010: 304–305; López and Hernández 2011: 1 & Flick 2015: 12).

Table 4.2: Comparative summary of qualitative and quantitative research approaches

RESEARCH APPROACH	QUALITATIVE	QUANTITATIVE
Underlying assumptions	Reality is socially constructed There are many meanings	There is an objective reality The world is stable and predictable
Researchers role	Researcher is data gathering Instrument; Personal involvement; Subjective immersed	Researcher uses tools such as, questionnaire or equipment to collect data Detached and impartial
Participants	External personal interaction Personal experiences	Considered subjects, no personal interaction
Context	Naturalistic, no manipulation of context	Manipulation and control of context
Methods	Interviews, focus groups; field notes; Records-journals, maps, video, artefacts	Standardized instrument; Self- developed instruments; Record naturally occurring data as number/scores
Data	Word, pictures or objects; “Rich”, in- depth	Number and statistics; Efficient
Sample size	Smaller	Larger
Report	Descriptive write up; Reports can be biased	Statistical analysis and abstract language in write up; Objective/unbiased
Example methodologies	Narrative; Ethnographic; Case study	Survey; Correlational research; Causal- comparative; Experimental; Single subject

Source: Adapted from López and Hernández (2011: 1) & Flick (2015: 12).

This table provides a comparative summary of qualitative and quantitative research approaches, presented from a generic perspective; however, in the context of this research, observations were made that the researcher was the main qualitative instrument that gathered the data, implying that she was personally involved. In quantitative the closed-ended questionnaire to gather numeric data was used. Moreover, the qualitative data was rich and smaller in size as compared to (larger) quantitative data that was purely statistical.

4.5 RESEARCH METHODOLOGY

Research methodology focuses on process and specific tools for conducting the research and obtaining data (Mouton 2006: 75). Furthermore, Kothari (2004:8) refers to research methodology as the systematic way of finding answers to the research questions. This means when it comes to

methodology, there is a need to provide specific steps to be taken in order to attempt to answer the research question or prove the hypothesis.

There is a general concern around the confusion between methodology and methods, as pointed out by Perri 6 and Bellamy (2012: 11, 13). Methods refer to techniques acceptable in creating, collecting, coding and organising and analysing data in a specific research. Creswell *et al* (2016: 51) and Verhoeven (2011: 17) focus on methodology as specific, acceptable principles or norms that the researcher has to follow in collecting data, analysing, describing, and writing up their findings. Moreover, Myers (cited in Thomas 2010: 301) summarises that research methodology is the framework a researcher follows in search of answers, which moves from a set of assumptions to research design, data collection and reporting. The methodology becomes the theory of correct scientific decisions, according to Vilakati (2009: 40). A good methodology therefore also contributes positively to the researcher's work, as it helps in avoiding flawed research construction, which may directly contribute to irrelevant conclusions that the researcher ought to be cautioned against in the study.

In the research study, methodology refers to ways of obtaining, organising and analysing the data collected. Research methodology was determined by the nature of the research questions and in data analysis; the research demonstrates how the findings are linked to key questions in the research. Research methodology in this research was divided according to Hofstee's work (cited in Mouton 2015: 141) into three major sub-sections:

- Research instruments – this includes all designed tools or anything else that one plans to use in gathering the data for the entire research. It can range from interview guides, questionnaires, equipment to psychological tests and laboratory;
- Data – research instruments collect the data which researcher discusses; this may include discussions on their strengths and weaknesses; and
- Analysis – the data obtained is required to be analysed and meaning provided so that readers are capable of understanding how the researcher arrived at conclusions.

Following this discussion on research methodology, instruments that were used to obtain relevant data for this study are discussed in section 4.6 on the mixed methods approach.

4.6 RESEARCH DESIGN AND RESEARCH METHODOLOGY

Research design and research methodology are also confused with research methods. Nieuwenhuis (2016: 74) defines research methods as all the tools applied in collecting data in a particular study. Kothari (2004: 8) further adds that research methods are all techniques used by the researcher in studying the specific research problem, or conducting research operations. The author groups research methods in three categories; *firstly*, those methods useful to collect data in instances that the existing data is not sufficient to find answers; *secondly*, statistical techniques that are applied to establish relationships between the unknowns and the data, and *thirdly*, methods that evaluate accuracy of the research results (Kothari 2004: 8). Research methods are largely based on the aims of the research, and its conceptual framework including the research questions (Nieuwenhuis 2016: 74). In section 4.3, the research design was elaborated in relation to this research study.

Table 4.3: Differences between research design and research methodology

RESEARCH DESIGN	RESEARCH METHODOLOGY
The end product is the main focus. This is achieved by asking the question what kind of study and what results do you expect?	Main focus is on the research process, and tools and the kind of tools and procedures to be used.
Departure is mainly the research problem or question.	Departure is mainly (starts) with data collection or sampling
Focuses on the logic of the research: what kind of evidence do you require to sufficiently answer the research question.	None linear steps and objective procedures to be employed are the focus

Source: Adapted from Mouton (2015: 131)

The table above summarises the main differences between research design and methodology. In as much as there is the benefit of clarifying the differences, it is important to note that both of

them work hand-in-hand. Despite the fact that the research design provides the study with a broad overview, the methodology complements the research in providing the “how” part.

4.6.1 The Quantitative phase

A total of 300 copies of a closed-ended questionnaire were distributed to households during the quantitative research methodology phase of this research. These were households from two selected townships, Walmer and Motherwell Townships. These townships contributed as important communities in the Nelson Mandela Bay Municipality, and for this reason, were selected for the study. Quantitative research methodology was important to obtain data to identify pertinent issues around service delivery in the NMBMM, for example, possible gaps and opportunities to provide necessary understanding on how to best improve service delivery in the metropolitan.

4.6.1.1 Questionnaire

A questionnaire is an instrument used to collect and obtain data in self-administered surveys, especially when dealing with a large number of respondents. It therefore becomes a key feature of a survey process (Schutt 1999: 237). Questionnaires can be either structured or unstructured; structured questionnaires give respondents specific options to select the most appropriate, while unstructured questionnaire contains both specific answer options and space for respondents to write their response. Questionnaires may be answered during face-to-face interrogation or in a written form (Flick 2015: 133).

Questionnaires are mainly used to gather opinions and facts on specific issue under investigation from groups of people who have an understanding of issues under investigation. Therefore, the major aim is to receive comparable responses (De Vos *et al* 2011: 186 & Flick 2015: 134). Further to this, Kothari (2004) postulates that questionnaires must be well-defined and structured and questions to be asked must be relevant to the area under investigation. Research surveys involve responses to questions for purposes of gathering information from sample of people. Surveys may be used for explanatory, exploratory and descriptive purposes. Surveys present

attractive features such as efficiency, venerability and versatile which make it popular in learning social processes (Schutt 1999: 230, 232 & Maree and Pietersen 2016: 174).

A structured questionnaire in this research (See Annexure A) was used to collect relevant data from households from the two townships, and it was handed door to door in both townships. Following completion of the questionnaires, response scales were designed according to the Semantic Differential and Likert scales. To eliminate possible errors, the researcher pre-tested 50 questionnaires in each township amongst households. The researcher read the questions to randomly selected households. Pilot testing of a questionnaire enables the researcher to know how long the questionnaire would take to complete and also provides a chance to improve on the content and appearance, as described by De Vos *et al* (2011: 195).

The motivation to use quantitative methodology to collect data was due to the following advantages that have been supported by Flick (2015: 10-11):

- Quantitative research is applicable in big samples ranging from hundreds to thousands and it is easy to analyse the results. In this research, the households sample was 300 in total, hence quantitative allowed for easy analysis of the results;
- It allows for large geographical areas to be researched, with increasing reliance levels in the sample of the study. In this research, the townships selected are large geographically making quantitative research applicable;
- Quantitative research allows for testing of more than one research question as well the testing of many variables. In the study, five questions were tested as well as different variables; and
- It allows for confidentiality for the respondent, as the questionnaire was distributed door to door by the researcher and each household had an opportunity to express their opinions at own comfort.

The questionnaire was designed based on themes from preliminary literature reviews and also on existing questionnaires. The questions focused on service delivery issues relating to disaster risk reduction programmes in NMBMM, which was the topic under investigation in the study. The

questionnaire was divided in four main sections which had a total of 49 questions. Responses were limited to options on a five-point Likert-type scale and a maximum of eight-point scale for Semantic Differential. Below is a discussion on the four sections of the quantitative questionnaire:

SECTION A: This section consisted of fourteen questions and aspects covered were mainly biological details of the respondents. Questions included individual details, education levels, and source of income. This information provided a description of the respondents to determine their vulnerability to hazards, risk and disasters and the impact of services rendered by the NMBMM.

SECTION B: This section had ten questions and its main purpose was to establish the status of service delivery of basic amenities, such as access to water, housing and refuse removal. This information was relevant in determining the vulnerability and resilience of the respondents to disasters, risks and hazards; and good governance.

SECTION C: This section had twenty-five questions and focused on households or communities in NMBMM who had been affected by any disasters and the causes thereof during the period of 2014-2015. The main reason was to establish informed experiences of respondents on services delivery rendered by the NMBMM.

SECTION D: This section focused on emergency response and early warnings, an important aspect of disaster risk management.

4.6.1.2 Population

Salkind (2009: 31, 89) postulates that population is the totality of all subjects that conform to a set of specifications, and is made up of entire group or groups of individuals in which the researcher is interested. Population is a group of people about which the researcher draws conclusions (Babbie and Mouton 2006: 100). Verhoeven (2011: 114, 175) and Salkind (2009: 89) maintain that population is usually large and for this reason, it refers to domains the research is focusing on and from which the researcher has to select a sample. In this study, the source of the population is the residents that reside in NMBMM estimated at 1,152,115 in Chapter Four.

The target population was residents residing in Walmer (99794 households) and Motherwell Townships (38919 households). Thus, the accessible population was 300 respondents. This population was selected as it is the most significant one to provide relevant information on service delivery based on their experience as residents of these two populated townships.

4.6.1.3 Sampling

A sample is a small portion selected from the main population through a sampling process. A sample is a representation of the population and has to be as close as possible in terms of characteristics, to enable generalization of the results. A sample whose results cannot be generalised will make the results of the research unreliable (Salkind 2009: 31, 89 & Sithole 2013: 82). For this reason, a good understanding on the population to draw the study is important (Schutt 1999: 107). The following were some of the requirements that were followed in this research:

- Random sampling technique was adopted: samples were selected randomly so that each individual had a chance to be selected. This allowed for verification of characteristics for the acceptable variable of the population and generalizability of the results: The results from the sample were therefore generalised to the population. Generalisability normally is depended on representative of the researchers' sample to the population; and
- Sample size: the size of the sample determined statistical analysis. In this research, the sample size was big enough to allow for statistical analysis.

Neuman (2011: 219) indicates that the sampling process aims to collect and obtain particular events, cases, or actions that contribute to the researcher's clarity and enhanced understanding of issues under investigation. In this research, the probability sampling method was used to select the best sample of participants. Probability sampling methods support elements selected by chance. It also allows for selection of those samples with required characteristics. For this reason, the process has no systematic bias (Schutt 1999: 116, 117 & Verhoeven 2011: 183).

In the study, probability sampling was fitting to allow for systematic sample so as to allow for generalization of the results. Two townships were selected as a representation of the entire

NMBMM population. Furthermore, a sample size of 300 households was drawn by selecting every tenth respondent randomly from the municipality data base. However, the response rate was 299. This process entailed a random starting point in every street, thus randomly allowing each household a chance of being selected. The Table 4.4 below provides total number of quantitative respondents.

Table 4.4: Total respondents in quantitative methodology

TARGET COMMUNITY	INSTRUMENT USED	TOTAL DISTRIBUTED	TOTAL RESPONDENTS
Walmer Township	Closed-ended questionnaire	150	152
Motherwell Township	Closed-ended questionnaire	150	147
Total distributed and total respondents respectively		300	299

Source: Author's perspective

4.6.1.4 The respondents

Respondents for quantitative research methodology were households in both Motherwell and Walmer Townships in NMBMM. These townships are dynamic due to the historical background of South Africa, which was discussed in Chapter Two. For example, the two townships are described as one of the largest in the NMBMM municipality and for this reason provided a good case study.

4.6.1.5 Validity and reliability

The goal of social science research is to bring out a clear picture of the social world by drawing valid conclusions. Validity is used to mean “true” or “correct” or accuracy level of your conclusions about your empirical research. The aim of validity is to ensure that there are no systematic sampling errors, which mainly occur when some populations’ characteristics are under-represented or over-represented (Verhoeven 2011: 36; Schutt 1999: 136). To measure validity in this research, relevant literature was consulted in the construction of the questionnaire

and other research tools. Also, reliability of both questionnaires and interview guides were reviewed by the academic promoter and a qualified statistician. It was amended as per their suggestions and guidance with relevance to the context of the study.

Research results are used for making critical decisions such as developing public policies. It is on this premise that research results are judged as reliable. Reliability looks at whether same results would be produced more than once by a single object, by using a particular technique and frequently (Babbie and Mouton 2006: 119). This implies that replicability plays a critical role in determining reliability and is also linked to independence of the research (bias) and falsification of the research (making claims that are testable), asserts Verhoeven (2011: 36).

4.6.1.6 Data Analysis

Data analysis entails breaking up data into convenient patterns, themes, relationships, trends to understand existing relationships occurring between variables and concepts, to identify trends in the data (Somekh and Lewin 2011: 221; Babbie and Mouton 2001: 108). In this research the quantitative data was analysed and interpreted with the help of an expert statistician. Statistical software (SPSS) version 22.0 was used to analyse responses. Through descriptive statistics including means and standard deviations, where applicable, results are represented in the form of figures such as tables, pie-charts or graphs and other cross tabulations. Moreover, inferential procedures were interpreted using p-values and included Chi-Square goodness - of - fit and Binomial Tests.

4.6.2 The Qualitative phase

Qualitative research methodology was another approach used to gather data from respondents. Data was collected from the following groups of participants: NMBMM disaster management officials; government line department officials; non-governmental organisation officials; city management official; and community members. In-depth interviews were conducted with government line department officials; non-governmental organisation officials, government line department's officials and city management official. An open-ended questionnaire was distributed to the disaster management officials. Focus group discussions were held with community members and lastly, observation by the research was done throughout during field work. These approaches provided valuable information on respondents' perceptions, experiences

and facts regarding disaster risk reduction in the municipality. A list of all stakeholders both public and private was provided by the DM Centre, whereby the researcher randomly contacted individual institutions who were willing to participate in the research.

4.6.2.1 Unstructured questionnaire

Maree and Pietersen (2016: 180) argue that open-ended questions provide the respondents an opportunity to adequately express their views with honesty, especially when they involve complex questions. It also increases chances of broad thematic responses during analysis of responses in qualitative research. Open ended-questionnaires were found to be appropriate to administer at the NMBMM disaster management centre officials. Disaster management staff were selected for the study as it focuses on disaster risk reduction programmes at NMBMM. It was also relevant to include them in the study, as they have first-hand information regarding experience in implementing disaster risk management.

4.6.2.2 Focus group interview

A focus-group is a group of people who come together voluntarily from a similar or same background. Members share a common collective consciousness of qualitative research, maintain Wilkinson and Birmingham (2003:90). Therefore, the researcher's role is mainly to facilitate the discussion, and every participant in the group must get a chance to give their contribution voluntarily. Focus group interview strategy aims at examining deeper complex social economic issues that affect specific group of respondents (Liamputtong 2011: 3). The participants have to be given a non-threatening environment as they search for meanings and common ground. Another issue to note when using this form of strategy, is to remember that it is different from group interviews, suggest Cooks and Crang (1995: 56).

The researcher held two focus group discussions at the community level at Motherwell and Walmer townships. The groups were composed of between 6-10 community members, and the researcher coordinated the discussions. The importance of this strategy at community level was to allow community members to share their experiences as main beneficiaries of services rendered by the municipality. Other benefits for the research included the fact that the focus group strategy enhanced richness of information as participants are able to stimulate details of

their views and experiences during the discussion. An in-depth body of information was constructed as different participants provided their views which is one of the benefits of focus group interviews (Verhoeven 2011: 95).

4.6.2.3 Interviews

In-depth interviews are also referred to as unstructured interviews and are mainly a qualitative research technique that focuses on individual respondents. The individuals provide their input on specific topics or area under study. This information is integral as it is collected from natural settings (Boyce and Niale 2006: 2; Sithole 2013: 85; Legard, Keegan and Ward 2003: 138). The in-depth interview strategy is useful in instances when the researcher seeks detailed information to support quantitative data. The responses made it a rich methodology for gathering information, as conversation also lies in the purpose (Legard, Keegan and Ward 2003: 138).

The researcher had face-to-face interviews which were voice recorded and later captured. The researcher posed the question and the respondents were allowed to respond, and follow up questions were also asked to seek more information and clarities. The following groups of respondents were interviewed:

- Director for safety and security directorate who represented the city management. This information was relevant to document the role of the directorate and also to gather information on strategic level plans for the city in terms of service delivery in NMBMM;
- Two management officials for the government line department. These were the South African Weather Services (SAWS) and the South African Department of Defense. The two line departments work closely with the DM centre in the Eastern Cape region;
- Two management officials for two NGOs that work closely with the disaster management centre in servicing the municipality; NGOs have continued to play crucial roles in DRM and risk reduction across the world; and
- Two private sector officials were consulted, as Coca-Cola Fortuner in Port Elizabeth and the Woolworth stalls operating within NMBMM. Disaster risk management in South

Africa is considered as a responsibility of every institution and individuals. The private sector is required to offer corporate responsibility services in the communities.

4.6.2.4 Observation

Observation is a form of qualitative data collection method and involves a logical description of events and behaviour, in a selected social setting for study purpose. This can be at organisation and community settings (Kawulich 2005: 1). Kawulich further indicates that observation provides the researcher an opportunity to give a detailed description of existing situations using the five senses. Observation in qualitative research methods is more than looking, it entails lengthy integration between researcher and respondent (Wilkinson and Birmingham 2003: 116). In this research, the researcher applied non-participant observation. This form of observation provided the researcher with opportunities to check for non-verbal expression of feelings during the entire field work. Observation was also done to identify the nature or access to social economic elements, infrastructure, housing, and water, refuse removal and sanitation. The researcher also observed the institutional capacity of the disaster management centre and the weather services, in the forms of technology, equipment and human capacity. The observation enabled the researcher to draw conclusion on vulnerabilities and exposure of the communities.

4.6.2.5 Sampling

In qualitative research, a sample is the subgroup or segment of individuals of the population chosen to gather information (Schutt 199: 107). Qualitative research aims at collecting rich data which is achieved by use of the right techniques. To collect a rich qualitative data, the researcher collects diverse information over a lengthy period (De Vos *et al* 2011: 391).

In this research, non-probability sampling methods were adopted so as to allow for availability sampling. This implied that sampling did not follow or apply a random procedure, as respondents presented willingness and commitment to take part in the research. This procedure was applied across qualitative research, for example in interviews and focus-group discussion. The following Table 4.4 provides a list of various respondents in which data was collected:

4.6.2.6 Description of qualitative participants

Table 4.5 below provides a description of the qualitative respondents.

Table 4.5: Total respondents in qualitative methodology

Organisation	Designation	Instrument	Number Interviewed
Disaster Management Centre	Disaster Management officials	Open-ended questionnaires;	10
City Management	Director for Safety & Security Directorate	In-depth interview	1
Non-Governmental Organisations <ul style="list-style-type: none"> ▪ Al-Hamdaad Foundation ▪ Red Cross International Port Elizabeth 	Branch heads	In-depth interview	2
Government Line Departments: <ul style="list-style-type: none"> ▪ South Africa Weather Service ▪ Human Settlements Department 	Departmental heads	In-depth interview	2
Private sector: <ul style="list-style-type: none"> ▪ Coca-Cola Fortuner ▪ Woolworth stalls 	Branch /Store managers	In-depth interview	2
Community: <ul style="list-style-type: none"> ▪ Walmer Township ▪ Motherwell Township 	Community members	Focus Group Interviews	8 x 2=16
Total			33

Source: Author's perspective

4.6.2.7 Qualitative data analysis

Qualitative data analysis is about giving meanings to attitudes, values, experiences, understandings, feelings and knowledge of the respondents (Nieuwenhuis 2016: 109). Qualitative data analysis preserves the content and forms of human interaction, achieved by analysing qualities and not mathematical transformations (Keyton 2011: 58). This process was important as it supported the argument by Verhoeven (2011: 36) that qualitative data analysis is a vital process in social research in that it strengthens the quantitative results.

For purposes of this research, an inductive analysis of the data was adopted in which direction, order, meaning and structure was created for the data collected. Findings were allowed to emerge from dominant, frequent and significant themes. Data was presented in the forms of charts,

graphs and tables to illustrate statistical significance of the data. Furthermore, data analysis was done in three steps: data was prepared and organised; data was reduced, and visualized, presented and displayed. Individual in-depth interviews, focus-group discussions, and data in unstructured questionnaires were transcribed and analysed, with notes gathered during field observation.

4.5 ETHICAL PROCEDURES

Maree (2016: 44) maintains that all researchers should follow and maintain ethical considerations. Participants should be informed of all ethical considerations that will be followed where they are not aware. In this research, respondents were introduced and reminded of all ethical procedures in conducting the research, such as the importance of confidentiality, signing informed consent, caring, anonymity and privacy. Ethical clearance from the University and also permission from NMBMM authorities were granted to carry out the research. The research was executed within the norms for all ethical procedures.

4.6 RESEARCH CONTEXT

Research context in this research refers to a description of the case-study area, NMBMM where empirical research was conducted.

4.6.1 Introduction

In the previous section of the chapter, it was indicated that the research focused on Nelson Mandela Bay Metropolitan Municipality. Primary data was collected from households and other key DRM stakeholders in NMBMM including the private sector, government line departments and non-governmental organisations. The majority of the residents in NMBMM live in township areas and informal settlements, which were formerly marginalised. Considering that there has been accelerating pressure on local government to offer decent services to these urban informal areas, these areas continue to face various social-economic challenges.

4.6.2 South African Provinces

South Africa is made up of the following nine provinces: KwaZulu-Natal, Eastern Cape, North West, Limpopo, Free State, Gauteng, Limpopo, Mpumalanga, Northern Cape, and Western

Cape. This study focuses on Eastern Cape Province. According to Statistics South Africa, South Africa's population was approximated at 51 770 560 in 2011. However, recent estimates by Community Survey 2016 show an increase in population to 55 653 654. The Eastern Cape Province is described as one of the poorest provinces in South Africa. There are high poverty levels, mainly as a result that majority of the population living in the former homelands, whose main livelihood is subsistence agriculture. These facts call for enhanced service delivery in all sectors to improve the general living conditions of the local communities. The table below highlights the provincial profiles statistically.

Table 4.5: Mid-year population estimates by province, 2016

Province Population Estimate	Population Estimate	% of total population
Eastern Cape	6 916 200	12,6
Western Cape	6 200 100	11,3
Gauteng	13 200 300	24,0
KwaZulu-Natal	10 919 100	19,9
Limpopo	5 726 800	10,4
Mpumalanga	4 283 900	7,8
North West	3 707 000	6,7
Free State	2 817 900	5,1
Northern Cape	1 185 600	2,2

Source: Statistics South Africa (2016:2)

Total Population for the nine provinces are highlighted and the Eastern Cape province represents 12,6% of the total population. It therefore becomes the third populated province in South Africa.

4.6.3 Eastern Cape Province

Eastern Cape (EC) is the second largest of South Africa's nine provinces. It occupies approximately 170,000 square kilometres of land (14% of the total land of the country). The EC province is made up of two metropolitan municipalities and six district municipalities. These include the following: Alfred Nzo District Municipality; Amathole District Municipality; Cacadu District Municipality; Chris Hani District Municipality; O.R Tambo District Municipality; Buffalo City Metropolitan; Nelson Mandela Metropolitan, and Joe Gqabi District Municipality.

Figure 4.2: Sketch of municipalities in Eastern Cape



Source: <http://www.localgovernment.co.za/provinces/view/1/eastern-cape>

This figure provides a sketch of the municipalities in the EC province. The study focuses on NMBMM, which is one of the province's metropolitan municipalities.

The majority of the residents in EC are mainly black Africans, making up 83%, who speak Xhosa. The Afrikaans speakers make up 11% and English speaking 6%. Service delivery becomes very important as the majority of black South Africans still live in areas which were formerly marginalized in this particular province, mainly in the informal settlements/townships and rural areas. Despite efforts to uplift the poverty of most residents, EC province still remains one of the poorest in the country characterised mainly by the following issues: inequality both in terms of assets and income; food insecurity at 25%, and migration to other provinces in search of better economic opportunities (Eastern Cape Provincial Planning and Treasury 2014 - 2015: 2). The provincial government developmental plans should consider how best to mitigate and minimise these social-economic challenges.

4.6.4 Nelson Mandela Bay Metropolitan Municipality

The municipal vision statement for Nelson Mandela Bay municipalities is set to become a globally competitive and favourite metropole that works together with the citizens. The Municipal Mission Statement is to “ensure that it is a global city governed by an inclusive and innovative municipality, focused on sustainable service delivery, socio-economic development,

infrastructure development local and regional integration”. For the vision and statement of the municipality to be achieved, there are strategic objectives outlined in their IDP plan for 2015 - 2016:

- To make sure that all residents have access to quality basic services;
- To build a culture of citizenry participation, also called public participation, in all matters of the municipality, such as the IDP process;
- To ensure that public resources are effectively and efficiently managed for benefits of the citizens;
- To offer an integrated service delivery across the government spheres;
- To ensure competent public servants manage the institutions;
- To create a positive environment for a diverse and prosperous economy;
- To ensure a safe and healthy environment to all citizens within the metro; and
- To provide and maintain integrated sustainable human settlements (NMBMM IDP- 2015 – 2016):

These strategic objectives are further achieved through six key broad key performance areas including the following key aspects:

- Good Governance and Public Participation;
- Local Economic Development;
- Basic Service Delivery and Infrastructure Development;
- Financial Sustainability and Viability;
- Spatial Development Framework; and
- Municipal Transformation and Organisational Development.

4.6.5 Situational analysis of NMBMM

Situation analysis for NMBMM outlines the socio-economic challenges facing its residents, such as service delivery backlog, poverty and unemployment. Service delivery is a responsibility of the local government institutions in South Africa, because they are closest to the citizens.

Chapter Two and Three discussed the implications of service delivery in DRR. According to the 2011 Census, the NMBMM population was estimated at 1,152,115 residents covering an area estimated at 1 950 km². The following table provides the demographic information of NMBMM based on population group and gender:

Table 4.6: Demographic information for NMBMM - Population Group and Gender

	Female	Male	Total	Total % of Population
Black African	361518	331220	692738	60.13%
Coloured	141873	129593	271469	23.56%
Indian or Asian	6335	6502	12837	1.11%
White	85608	79816	165424	14.36%
Other	3787	5860	9647	0.84%
Total	599121	552991	1152115	1152115
% Total Gender	52.00%	48.00%	100.00%	100.00%

Source: StatsSA (2011) in Nelson Mandela Bay IDP (2015 - 2016:26)

The figure above points out that the NMBMM population is made of mainly black South Africans representing 60%, with females being dominant. Furthermore, the main residential areas in NMBMM that make up 40% of the population are most populated and described to be facing the “highest number of people with low income, unemployment, low education and low health standards” (NMBMM IDP 2015 - 2016: 31). Some of these areas include New Brighton, Zwide, Uitenhage-KwaNobuhle, Kwazakhele, the Northern Areas and Motherwell areas. In addition, there are 324 292 households in which formal households make up to 276850; informal households make up to 30202; households/flat/room in back yard add up to 6890; informal households in back yard add up to 8862 and others add up to 1488 (NMBMM IDP 2015 - 2016: 31).

Table 4.7: Demographic information indicating all households

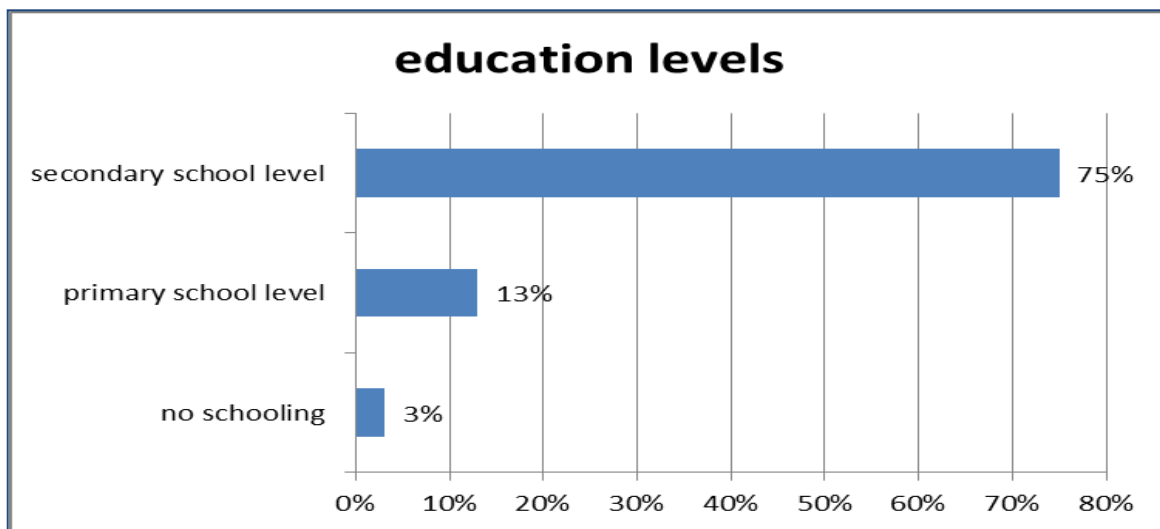
Type of household	Total
Formal households	276850
Informal households	30202
Households/Flat/Room in back yard	6890
Informal households in back yard	8862
Other	1488
Total	324292

Source: StatsSA Census 2011 in Nelson Mandela Bay IDP (2015 - 2016:26)

From the demographic information indicating all households above, one can conclude that, typical of other municipalities across the country, NMBMM municipality faces massive housing backlogs.

In 2011, the country’s official statistics on NMBMM revealed low levels of education, with 3% not having any formal education, 75% with secondary education and 13% at primary school level. These figures did not include ages 0-19 years of the population and tertiary levels. An educated population contributes to the overall economic growth of a country, while low education levels contribute to vulnerability of citizens to social and economic challenges. Table 4.8 below provides these statistics:

Table 4.8: Education levels



Source: NMBMM IDP (2015 - 2016: 30)

The graph above speaks to the importance of access to quality education in NMBMM and the need for enhanced efforts in promoting education and also ensuring that school-going children have a favourable environment at home and society. Another important aspect is the level of unemployment in the municipality, considering that the unemployment levels went up to 26.7% in the first quarter of 2016 in the country. Moreover, in 2014, the International Labour Organization (ILO) argued that 52.9% of the youth were unemployed in South Africa, which is a huge figure comparing to 46.95% of the population which falls under the age of 24 years (Holodny 2016: n.p).

Table 4.9: Unemployment statistics

Official employment status	Working age population			% of working age population		
	15 – 35 Years	36 - 65 Years	Total	15 – 35 Years	36 - 65 Years	Total
Employed	125427	164725	290152	15.77%	20.71%	36.48%
Unemployed	108817	58412	167229	13.68%	7.34%	21.02%
Discouraged work-seeker	26637	15225	41862	3.35%	1.91%	5.26%
Other not economically active	166188	123782	289970	20.89%	15.56%	36.46%
Not applicable	0	6181	6181	0.00%	0.78%	0.78%
Labour Total	427069	368325	795394	100.00%	100.00%	100.00%

Source: StatsSA Census 2011 in in Nelson Mandela Bay IDP (2015 -2016:26)

The table indicates that official statistics in 2011 found that only 36.48% were employed compared to 21.02%, who were not employed. Furthermore, 5.265 were categorised as those discouraged from seeking employment, 36.46% were categorised as those that were not economically active and lastly, only 0.78% were not applicable (NMBMM IDP 2015 - 2016:

30). This information links with findings presented in Chapter Five. Unemployment has negative consequences for peoples’ resilience to vulnerabilities and other socio-economic challenges.

The unemployment status is further supported by table 4.10 below on how much a household earns per month in NMBMM.

Table 4.10: Households monthly earnings

Percentage of households	Earning in rands
27.82%	between 1- 1600
5.71 %	between 1601-3200
4.8%	between 3201- 6400
4.38%	between 6401-12800
3.02%	between 12801-25600
0.22%	between 51201-102400
0.11%	between 102401-204800
0.08%	Between 204401 and more
8.60%	Others

Source: NMBMM IDP (2015-2016:32)

From an analysis of the statistics presented on the table above, a trend emerges: a huge gap exists in monthly income amongst the households. This highlights the inequality which dominates national discourse and which is further presented in Chapter Five as one of the findings. These statistics highlight the fate of many households which makes them vulnerable to social-economic challenges including high unemployment rates, poor living conditions and health-related issues.

4.6.6 Service delivery in NMBMM

Service delivery is a responsibility of the government and NMBMM claims to be performing extremely well when it comes to offering basic services to its residents, an issue that is debatable on the ground. The following are some of the official statistics as provided in NMBMM’s IDP (2015-2016:37-39):

- 100% of households have access to water within a 200-meter radius. This excludes residents in areas not demarcated by the municipality;

- 100% electricity of households within legally demarcated areas have access to electricity, excluding others such as 12% of households within demarcated areas. Illegal connections pose a challenge;
- 90, 87% of households have access to decent sanitation, such as in-house flush toilets and buckets as a means of decent sanitation, excluding households outside legally demarcated areas;
- Basic waste removal success is at 99, 99% excluding smallholdings; and
- Integrated human settlements adequately performing very well on housing delivery, such as 4680 units per annum.

The literature review further found that major service delivery challenges facing the municipality remain, around the lack of government land for relocating households living in areas such as flood plains and overcrowded areas. Another challenge was limited resources to implement storm water drainage systems in disadvantaged sections of the metro (NMBMM IDP 2015-2016: 37-39). These challenges contribute to vulnerability of communities and are a setback to DRR efforts. Allocation of funds for service delivery is very important so as to ensure overall achievement of set priorities.

4.6.7 Eastern Cape Departments and Budgets

The province is categorized into the following 11 directorates/departments, which work closely together: Budget & Treasury; Corporate Services; Economic Development Trade and Agriculture; Infrastructure & Engineering; Human Settlements; Office of the Chief Operating Officer; Office of the Speaker; Public Health; Safety & Security; Special Programmes Directorate, and Sport, Recreation, Arts and Culture. The following table depicts the summary of revised budgets per department for the periods 2013-2017 (MTEF):

Table 4. 11: Eastern Cape Department Budgets (2013-2017)

<i>No</i>	<i>Departments</i>	<i>2013/14 Main appropriation</i>	<i>2014/15</i>	<i>2015/16</i>	<i>2016/17</i>
1)	Office of The Premier	458 109	467 203	476 963	502 684
2)	Provincial Legislature	409 531	435 627	436 766	462 189
3)	Provincial Planning and Treasury	374 872	377 779	387 783	408 372
4)	Education	26 972 078	27 934 964	29 755 897	29 674 66
5)	Economic Development, Environmental Affairs and Tourism	1 070 858	1 444 359	1 525 947	1 592 062
6)	Health	16 584 328	17 509 012	18 234 588	18 892 969
7)	Roads and Public Works	3 670 311	4 025 444	3 931 075	4 093 204
8)	Social Development and Special Programmes	2 015 205	2 158 958	2262 514	2 374 521
9)	Rural Development and Agrarian Reform	1 714 488	1 867 163	1 859 443	1 945 366
10)	Local Government and Traditional Affairs	840 869	876 196	875 661	922 961
11)	Transport	1532 362	1 708 027	1 600 525	1686490
12)	Sport, Recreation, Arts and Culture	715 108	769 929	817 136	861 782
13)	Human Settlements	2 830 080	2 487 602	2 262 111	2 498 209
14)	Safety and Liaison	9 979	78 941	77 915	82 123
TOTAL		59 258 177	62 141 204	64 504 325	65 997 960

Source: Eastern Cape Provincial Planning and Treasury (2014 - 2015:30)

From the figure above, one does not see a direct mention of disaster risk management from provincial level planning. However, DRM is a responsibility of each directorate, thus programmes and initiatives should be incorporated within each departmental IDP.

4.7 NMBMM DISASTER RISK MANAGEMENT CENTRE

Disaster risk management in NMBMM is co-ordinated by the DRM centre which falls within the Safety and Security Directorate. Its role is to co-ordinate all stakeholders for a smooth disaster risk management operation. The department arrangements, reporting and related processes involve a close partnership with the other directorate departments, including Fire and Emergency Services, Traffic and Licensing, and Security Services. The DMC has the following facilities and structures that facilitate its implementation of the DRM policy frameworks (NMBMM Disaster Management Centre 2014 - 2015: 10 - 11):

- The Joint Operations Centre: provides a multi-disciplinary strategic management for response and recovery. It also enables services like CCTV camera monitoring of activities on the ground (NMBMM Disaster Management Centre 2014 - 2015: 10 – 11);
- Geographical Information Systems (GIS): this facility is used for mapping vulnerability and early warning networks. Vulnerable areas such as during flooding and fires across the metro. This office relies mainly on student interns as there is no full time dedicated staff, which has negative implications on service delivery (NMBMM Disaster Management Centre 2014 - 2015: 10 – 11);
- Satellite disaster risk management offices: there are seven satellite offices located across NMBMM. These offices are within communities to allow for close monitoring of situations on the ground. The capacity of these offices is not discussed within departmental annual reports (NMBMM Disaster Management Centre 2014 - 2015: 10 – 11);
- The DMC does not have a Centralized Control Centre whose purpose is to enable a 24 hour DRM operating facility. For this reason, the DM officials on standby have to rely on the main directorate’s centralized control centre office. This ultimately has a negative effect on the operations of the centre in providing their services, especially during emergency and response (NMBMM Disaster Management Centre 2014 - 2015: 10 – 11); and
- Intergovernmental relations structure: it is composed of a disaster risk management advisory forum; four ward local DRM committees representing some of the communities within the metro; emergency coordinating committee; South African police services joint

committee and joint planning committee. The implications of these structures for DRR in NMBMM are discussed in the analysis chapter.

4.7.1 The NMBMM Disaster Management Plan of 2010

The most current comprehensive DM plan was developed in 2010 following a disaster risk assessment exercise across the metro, by an external consultant SRK Consulting (Pty) Ltd. One of the major reasons for external consultants is the fact that the municipality does not have the qualified personnel to conduct such a comprehensive exercise on the ground. The table below provides the risk profile of the municipality:

Table 4.12: NMBMM Risk type and Prioritization

No.	HAZARD TYPE	Prioritized Risk Ratings
1.	Meteorological Hazards - Floods (River, Urban & Dam Failure)	0.85
2.	Hazardous Material - Hazmat: Fire/Explosion (Storage & Transportation)	0.85
3.	Hazardous Material - Hazmat: Spill/Release (Storage & Transportation)	0.82
4.	Hydro-meteorological Hazards - Severe Storms (Wind, Hail, Snow, Lightning, Fog)	0.81
5.	Disease / Health - Disease: Human	0.78
6.	Hydro-meteorological - Drought	0.78
7.	Environmental Degradation	0.76
8.	Fire Hazards - Formal & Informal Settlements / Urban Area	0.76
9.	Fire Hazards - Veld/Forest Fires	0.73
10.	Pollution - Water Pollution (Fresh and Sea)	0.72
11.	Major Event Hazards (Cultural, Religious, Political, Recreational, Commercial, Sport)	0.71
12.	Oceanographic - Storm Surge	0.71
13.	Transport Hazards - Road Transportation	0.70
14.	Civil Unrest - Xenophobic Violence	0.69
15.	Structural Failure	0.68
16.	Pollution - Land Pollution	0.68
17.	Civil Unrest - Terrorism	0.67
18.	Oceanographic - Sea Level Rise (Climate Change)	0.67
19.	Pollution - Air Pollution	0.65
20.	Civil Unrest - Demonstrations / Riots	0.65
21.	Oceanographic – Tsunami	0.65
22.	Transport Hazards - Rail Transportation	0.64
23.	Infrastructure Failure / Service Delivery Failure	0.64
24.	Civil Unrest - Armed Conflict (Civil/Political War)	0.61
25.	Disease / Health - Disease: Animal	0.61
26.	Geological Hazards – Earthquake	0.60
27.	Transport Hazards - Air Transportation	0.58
28.	Transport Hazards - Water Transportation	0.57
29.	Civil Unrest - Refugees / Displaced People	0.51

30.	Infestations - Plant Infestations (Intruder Plants)	0.44
31.	Disease / Health - Disease: Plants	0.41
32.	Radio Active Fall-out	n/a

Source: SRK Consulting (Pty) Ltd (2009: xiv)

From the table, it was identified that NMBMM residents are affected by many hazards. The most common hazards that pose major challenges include:

- Meteorological hazards in which floods contribute to river, urban and dam failure. These are major issues that affects the NMBMM residents and also the entire country;
- Hazardous material that cause fire explosions;
- Hydro-meteorological hazards including severe storms, wind, hail, snow, lightning, fog;
- Human disease hazards such HIV/AIDS; and
- Other risks include: drought, fire affecting informal and formal settlements.

In summary, the above hazards challenge the municipality in a number of areas. For example, infrastructural sustainability is vulnerable to floods, wind and drought. The residents' welfare is vulnerable to weather change patterns that contribute to droughts and floods, unemployment. The ecosystem is challenged by minimal rainfall supply and wind change. Both public and private property is vulnerable to storm surge, wind and floods; and food security is threatened by change in temperatures, rainfall and drought (Nelson Mandela Bay Metropolitan Disaster Management Centre 2014 - 2015:14). The municipality is responsible for ensuring that programmes and initiatives are put in place to mitigate worsening of the situation and also to prepare to respond effectively and efficiently when incidents occur. Sufficient budget allocations are very important for these reasons, so that DRR is addressed as opposed to simply offering reactive measures.

4.7.2 Disaster risk reduction programmes in Nelson Mandela Bay Metro

In efforts to reduce and manage risk, the municipality of NMBMM has programmes like early warning systems and public awareness education, as discussed below.

Early warning systems in NMBMM

Early warnings systems play a huge role in DRR and general implementation of disaster risk management. South African municipalities are expected to join both local and international bodies that have special focus on EWS, and NMBMM is a member of the Flash Flood Guidance Systems for South Africa (SAFFG). The municipality has a significant number of installed EWS across the metro as discussed below.

Remote camera project (CCTV): closed-circuit television cameras are installed across 31 locations the metro for monitoring situations on the ground such as traffic movement and crime.

Figure 4.3: CCTV camera located at Old Uitenhage road



Source: NMBMM Annual Report (2014/2015:17)

Such CCTV cameras like the one shown above (Figure 5.2) provide monitoring of traffics movements on the roads which enables easy response in case of an accident or need for intervention. Information is gathered, recorded and transmitted to a central data base for the municipality's future reference.

Automatic weather stations connected to CCTV installations: there are eight automatic Rain Gauges that are installed and maintained by the South African Weather Services NMBMM branch. This E.W.S enables monitoring of rain water levels for the municipality to take necessary precautions and measures.

Figure 4.4: Automatic Rain Station located in Blue Horizon Bay



Source: NMBMM Annual Report (2014/2015:17)

From the afore-going discussion, it is evident that there seems to be only two forms of early warning systems installed across the NMBMM; and also financial constraints challenges when it comes to maintenance of these technologies. Other forms of E.W.S such as Community-Based-Disaster Risk Management Early Warnings (CBDRM) are missing which would improve service delivery in the communities, as was discussed in Chapter Three.

Public Awareness Education

Primary research found that NMBMM conducts two main types awareness programmes: community awareness campaigns in taxi ranks, shopping malls and door to door; school and community safety for grades seven, four, and libraries disaster awareness. Awareness education leans more towards fires and floods that challenge the municipality; for example, there were 192 fire incidents and 24 flood incidents in 2015-2016 (NMBMM Annual Report 2016:32).

Figure 4.5: Fires incident in NMBMM



Source: NMBMM Annual Report (2016:32)

Figure 4.6: Flood incident NMBMM



Source: NMBMM Annual Report (2016:32)

These disasters in the forms of shack fires and flooding are some of the challenges communities face in the Municipalities, as presented in Chapter Five. Mitigation and preparedness programmes become very important so as to save lives and improve communities' resilience. The affected communities turn to service delivery protest, blaming the local government for poor or lack of service delivery.

4.7.3 Budget allocation for Disaster Risk Management in Nelson Mandela Bay Metropolitan Municipality

The municipality implementation of DRM faces many financial challenges which make it difficult to develop and implement important DRR programmes and initiatives. Available budget caters for general day-to-day operations of the DM centre and also for response. Efforts to improve this situation did not succeed despite the fact that a relief policy was finalised and adopted in 2010. Moreover, the failure for individual departments in the municipality to fully commit to setting DRR budget worsens the situation (Nelson Mandela Bay Annual Report 2014-2015:21). In the financial year 2015-2016, NMBMM's total expenditure in the municipality was 2 568 871 million Rand. Out of this amount, some of the following grants were identified as

having been directly or indirectly budgeted for development and implementation of DRM/DRR programmes and initiatives in NMBMM by different line departments: a disaster recovery sum of 28,803R; public safety sum of 419,171R; housing sum of 187,473R; health 1,675R; road transport 326,981R; and environmental protection 29,580R (NMBMM Budget 2014-2015:7, 8, 44). These figures are not the precise reflection, but it is clear that there are enormous financial challenges relating to sufficient budget allocation in NMBMM for service delivery.

4.8 CONCLUSION

Chapter Four has presented the research design and research methodology used to collate empirical investigation of the study. A motivation for mixed methods approach was provided throughout the discussions. The research method tools were also elaborated on, including closed and open-ended questionnaires, in-depth interviews with key stakeholders and focus group discussion with the community at NMBMM. The chapter also discussed the study area that is Nelson Mandela Bay Metropolitan Municipality (NMBMM) in terms of geographical location and service delivery status.

The next chapter focuses on the analysis, interpretation and reporting of data that was collected using previously discussed methods.

CHAPTER FIVE

FINDINGS, INTERPRETATION AND DISCUSSION

5.1 INTRODUCTION

In the previous Chapter, the research design was presented as a mixed methods approach and was discussed in two phases, *namely*: the quantitative and qualitative phases. In order to answer the main research question: *To what extent can the TDRM Approach be implemented by the NMBMM in implementing DRR programmes*, data was collected in various phases. In the first phase, a household survey was carried out with a closed-ended questionnaire in both Walmer and Motherwell Townships; in which a sample of 300 households were selected and a total of 299 questionnaires were completed. The data gathered was processed and analysed using the Statistical Package for Social Scientists version 22.0. The quantitative results present the descriptive statistics including means and standard deviations, where applicable. Frequencies are presented in tables, graphs and other figures. Inferential Statistical (IS) tests was used in the analysis of both Chi-Square goodness-of-fit-test and the Binomial test.

In phase two, qualitative data was collected using open-ended questionnaires distributed to disaster management staff, and in-depth interviews were done with other disaster risk management stakeholders in the Nelson Mandela Bay Metropolitan Municipality with the city manager's office, NGO management, government line department management teams; Safety and Safety and Security Directorate Office Director. The observation process by the researcher continued. Additionally, focus group discussions were conducted with community members. Qualitative data results were presented through emerging themes during the analysis (thematic analysis approach) and supported with respondents' voices.

Statistical data analysis denotes categorising, ordering, manipulating and summarising data in a logical and interpretable procedure. Therefore, the main aim of data analysis is to study relationships of research problems, testing and arriving at conclusions. Statistics in data analysis describe characteristics of a sample test and possible associations, as well test differences between groups, according to Kruger, De Vos, Fouche and Venter (2011: 218, 243).

5.2 PHASE 1: DISCUSSION OF QUANTITATIVE DATA

Barnes and Lewin (2011: 231, 232) maintain that in describing sets of data, the researcher's main focus is to follow the right steps to arrive at answers on different issues that have been measured. After the quantitative data was collected, Chi-Square Test and Binominal tests were used to include the p-values to determine the significance of the results. This tests provided an in-depth analysis and exploration of relationships between variables, their nature and extent, to classify and make possible predictions, as stated in the work of Barnes and Lewin (2011: 231, 232). This links up with the five main objectives of the study, which are to:

1. To understand the multi-level, multi-dimensional and multidisciplinary cooperation and collaboration mechanisms employed at Nelson Mandela Bay Metropolitan Municipality to influence effective disaster risk management;
2. To ascertain the extent decisions based on reliable disaster risk information from hazard mapping and vulnerability assessment are employed at Nelson Mandela Bay Metropolitan Municipality to influence effective disaster risk management;
3. To determine what the Nelson Mandela Bay Metropolitan Municipality is doing to enhance coordination and integration of stakeholders' action through good communication and efficient exchange of relevant and reliable information;
4. To understand the enabling mechanisms in place, including policy, structure, capacity building, and resources developed and institutionalized at the Nelson Mandela Bay Metropolitan Municipality to influence effective disaster risk management; and
5. To ascertain the extent the disaster risk management process is implemented at the Nelson Mandela Bay Metropolitan Municipality level to the community level to influence effective disaster risk management.

5.2.1 Chi-Square Tests Goodness-of-Fit

Chi-Square Tests belong to non-parametric tests. Non-parametric techniques are indicated as distribution-free tests due to their nature of fewer assumptions on the sample size or population distribution. Chi-Square is defined as a test of “significance most appropriate for nominal items, although can also be used with ordinal variables or a combination of both” (Babbie, Halley &

Zaino 2007:271). It determines if two test variables are independent or dependent, as supported by work of Pietersen and Maree (2016: 275). There are two kinds of Chi-Square Tests commonly used. The first is the Chi-Square Test of independence that tests if a relationship exists between two variables. The second is a Chi-Square Test of fit test applied in the research so as to test if any option was selected significantly more than the others. Chi-Square Test was used, and this relates to its ability to determine how sound an empirically observed association fits into a theoretically resulting model of no relationship (Babbie, Halley & Zaino 2007: 273). The probability sought was reported as $p < 0.0005$. A p-value of less than 0.0005 between variables implied a significant relationship; when the p-value was more than 0.0005, it implied no significant relationship between the variables. An example in this research is whether any option is selected significantly more often than others, between meter and wired electricity. The results found that a significant number (232, 77.6%) indicated that their electricity was through a meter ($\chi^2 (2) = 348.157, p < .0005$).

5.2.2 Binomial tests

A non-parametric technique applied when the researcher wanted to find out if a significant proportion of respondents selected one of the possible responses, only if there are only two options, for example: yes and no. Furthermore, the test can be extended if data that has more than two responses has been split into two distinct groups (van den Berg 2014: 1). The SPSS binomial test, for example, was applied to test if a proportion of a single dichotomous variable was equal to the population value.

In this research, binomial test was used to test if a significant proportion of respondents selected one of a possible two responses; for example, which is if their household electricity was connected *via* a meter or wire. The test was further extended in instances when data had more than two response options split into two distinct groups; for example, an income-related question which had nine options and a binomial test was used to test whether a significant proportion responded 'yes' or 'no' under each category.

5.3 ANALYSIS OF HOUSEHOLD SURVEY INSTRUMENT: ANNEXURE A

The analysis of Annexure A was very important to locate service delivery information in the context of disaster risk reduction of the municipality. Key aspects were covered in the questionnaire including the following; biological information; economic status focusing on employment; dwelling types and arrangements; refuse collection satisfaction; sources of power; hazard and disaster exposure and vulnerability; information regarding hazard mapping and vulnerability assessment; political will and community participation in risk governance. To collate in-depth information from the households, a total of 300 questionnaires were administered door to door, and 299 responses were received, indicating a 99.7% response rate.

5.3.1 SECTION A – BIOGRAPHICAL DATA

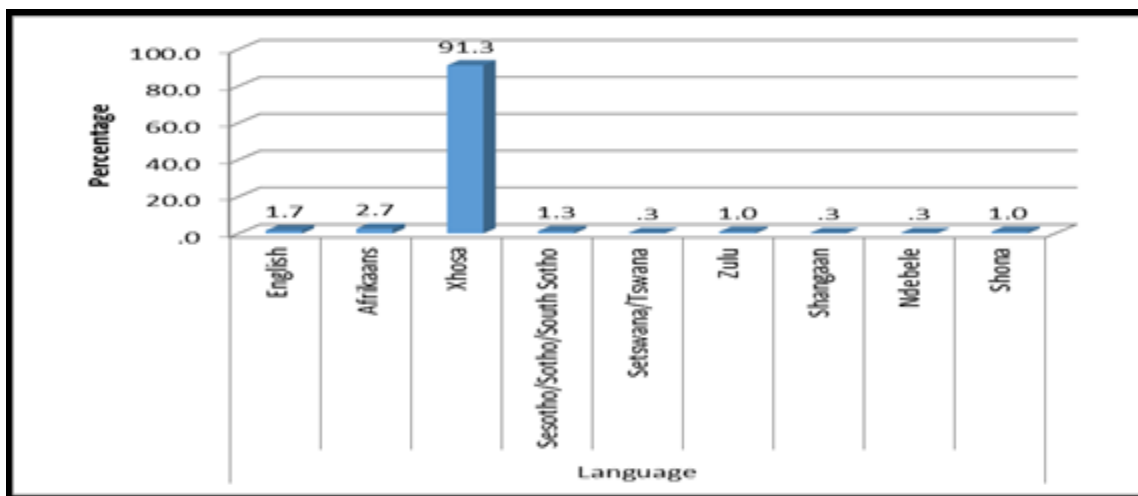
This section captures the biographical characteristics of the respondents who completed the closed-ended questionnaire. Respondents are the households in Walmer and Motherwell Townships who are community members of the Nelson Mandela Bay Metropolitan Municipality. The section looked at details and dimensions such as gender, age, language, and education, number of children, heads of households, employment status, and sources of income. Therefore, this section provides general characteristics and representation of the residents of NMBMM. Furthermore, biological aspects covered answer the implications of residents' exposure to natural and man-made hazards and disasters, and also their experiences of services rendered by the municipality in a broader perspective. The focus of the research presents new perspectives on disaster risk reduction in an attempt to reduce vulnerabilities and dangers to local communities. It is also an evolving one in the South African context, as well a global phenomenon. Doctoral research by Chagutah (2014) did not consider households' biographical data despite the research having a strong focus on DRR. Chagutah's research developed "a conceptual framework for disaster risk participatory communication for at-risk communities in South African municipalities"; however, communities were not consulted. Communities are the main beneficiaries of DRR services rendered by the local authorities, their views and recommendations would have provided a comprehensive view. This research therefore brings a new angle in looking at biographical data of community as respondents, when undertaking DRR research.

Table 5.1: Respondents location

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Walmer	152	50.8	50.8	50.8
	Motherwell	147	49.2	49.2	100.0
	Total	299	100.0	100.0	

Respondents for the questionnaire were from Motherwell (49.5%) and Walmer Townships (50.8%), yielding an approximately 100% response rate. These percentages are reflective of representation of participation in the research.

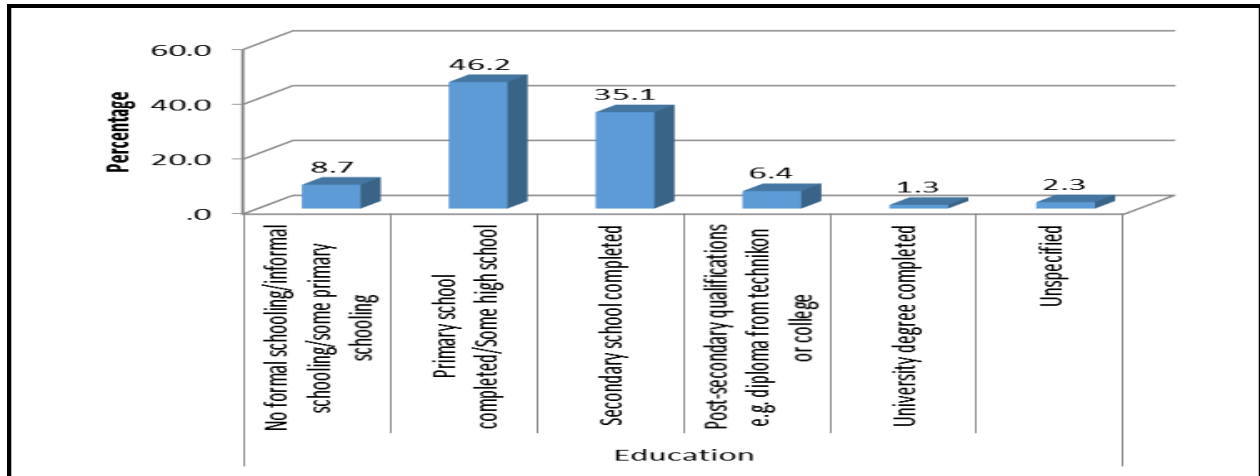
Figure 5.2: Languages



Majority of the respondents (91.3%) were mainly Xhosa-speaking. Other people were from the following categories: Afrikaans speakers (2.7%); English (1.7%); Sesotho/Sotho/South Sotho (1.3%); Setswana/Tswana (0.3%); Zulu (1.0%); Shangaan (0.3%); Ndebele (0.3%) and other (1.0%). These statistics imply that the majority of people living in NMBMM are Xhosa speaking, thus supporting the fact that they contribute to the majority population in the Eastern Cape Province. Furthermore, the South African historical background argues that in the urban areas, most black people live in the townships like Walmer and Motherwell and within Informal settlements where vulnerabilities are more prominent. These statistics are important for the municipality for general planning and implementation of DRM IDPs and DRR programmes. Certain programmes would need to be designed and implemented. Different languages would require teams familiar with the language, and this should also happen during IDP consultation with communities. Language has broadly been described as a contributing factor to capacity

building and information sharing in DRR, but also a catalyst that enhances the emerging culture of prevention (IFRCRCS 2011; 22). Thus, awareness programmes should be designed based on these languages e.g. print and broadcast materials.

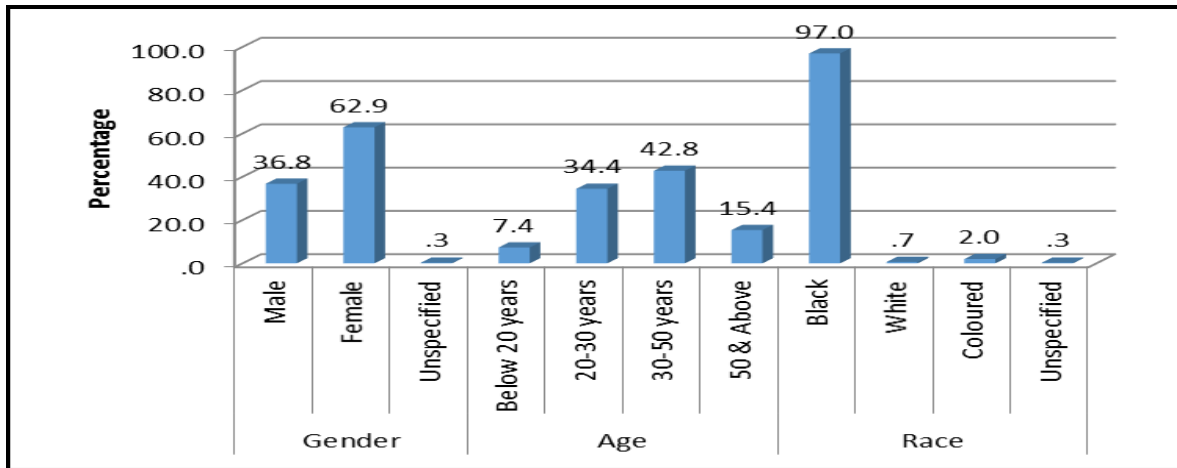
Figure 5. 3: Education



From the illustrated values, 47.3% of the respondents had completed either primary school or had been to some high school. Those respondents who completed high school were 36.0%, with those that had no formal education, 8.9%, followed by 6.5% who had at least a diploma or certificate; only 1.4% had a university degree. These statistics link up with statistics discussed in the previous section under the study area where NMBMM was found to face low education levels. This is reflective of a society where the majority of the respondents have no quality formal education, which contributes to their vulnerability to social-economic challenges, such as failure to secure employment as one of the major concerns. Also, education levels in any society can be used to measure DRR vulnerability, meaning this information can determine how people cope with shocks and stresses in terms of levels of comprehension of the magnitude or extent of disasters. In NMBMM, an educated community is also a good source of change as it can participate in decision-making processes with regard to disaster risk reduction. Access to sustainable education for the poor is a much-needed imperative in South Africa considering the vulnerability of society to the on-going *fees must fall* debacle and service delivery protests that have led to closure of some institutions, destruction of property and in one province, the reported death of a student. Against this background, the Municipality ought to be on stand-by to provide emergency response and protect infrastructure, and this would require well-co-ordinated efforts

between line departments and members of the public. In due course, the government should enhance its commitment in addressing service delivery in education to mitigate related challenges that push back gains of sustainable development.

Figure 5. 4: Gender, age and race correlation

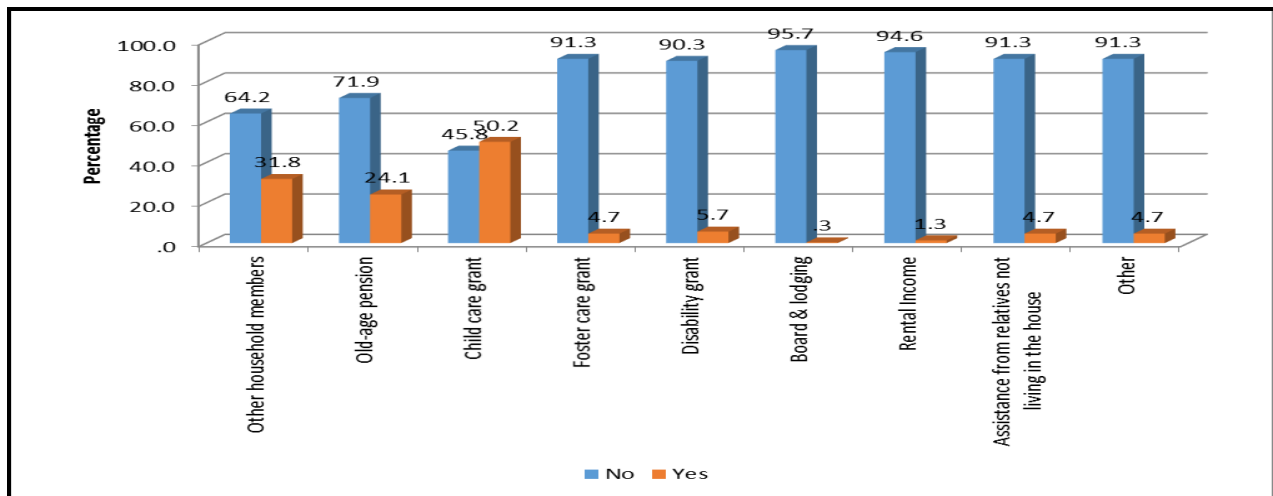


The bar graph above indicates that females were the majority of respondents at 62.9% and men at 36.8%. Women and children fall into the category of vulnerable groups when looking at DRR in general. Raphela (2011:53) argues that analysing vulnerable groups in DRR specific features are considered, including gender and age, as they influence people’s coping mechanisms, and also affects their vulnerability in a disaster situation, particularly. Moreover, gender goes hand-in-hand with age of the people (largest age group falling between 30-50 years) and the highest gender being female (62.9%). This statistics are central as access to resources and decision-making such as risk governance participation in many contexts is faced with gender inequalities. The significance of gender in NMBMM could assist in policy formulation and a focus on implementation on how each gender and age groups can contribute to sustainable DRR, and also be catered for during the DRR planning and implementation processes.

In relation to racial composition in NMBMM, the bar graph further provides that the majority 97.3% of respondents were mainly Black, followed by Coloured at 2.0% and the White race represented as 0.7%. This confirms the fact that a large percentage of people living in the townships and informal settlements are predominantly made up of Black South Africans. These areas of settlements face many challenges which lead to service delivery protests, and what Alexander (2010: 25) called rebellion of the poor. Based on the preceding situation, it follows

then that service delivery should be enhanced in these areas so that the gap in accessing basic services can be mitigated. As mentioned in Chapter Three; it was pointed out that understanding of vulnerability in communities has to be approached from various dimensions: physical conditions, including specific location and state of infrastructure; economic conditions, including people’s sources of livelihoods and access to insurances and credits; and social conditions which include education levels, health status, political groups, ages and gender including human rights. A demographic analysis of NMBMM is important in this research, because the information is a crucial determinant of local government service requirements. Certain decisions on DRR like budget allocations for service delivery and changing needs of residents require reliable information.

Figure 5. 5: Comparing sources of household income

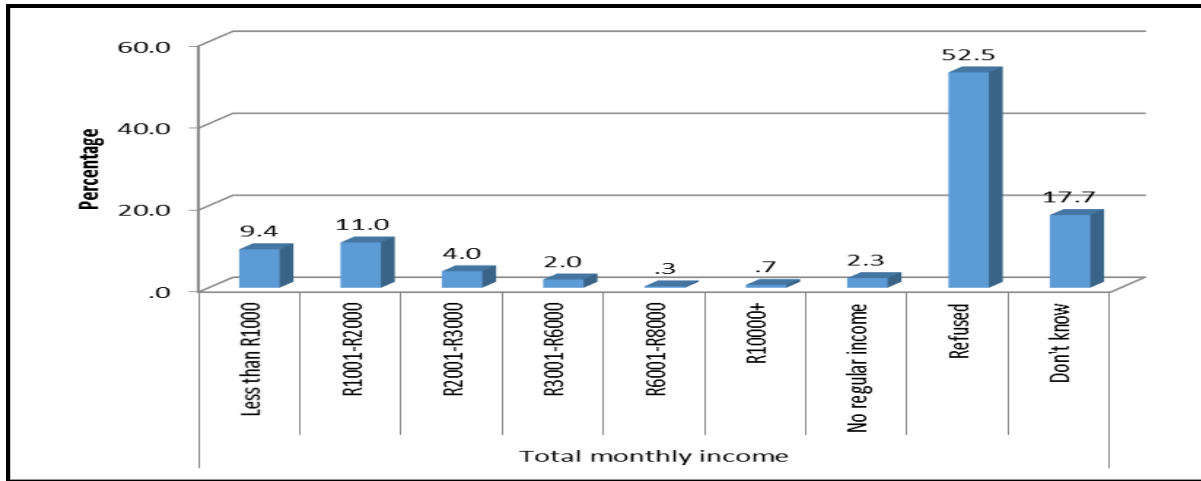


As illustrated in Figure 5.5 most households rely on child care social grants, reflected at 50.2%, followed by other household members’ contributions at 31.4%. The rest includes: old age pension 24.1%; foster care grant 4.7%; disability grant 5.7%; board and lodging 0.3% and rental income 1.3%. Assistance from relatives not living with them in the house represents 4.7% and the ‘other’ category depicts 4.7%. These statistics are important as one can ascertain that many households in the metro do not have sustainable sources of income, which has a direct negative impact on their coping strategies on current, and future shocks and disasters. This is not an isolated incident as many African urban city dwellers face many socio-economic challenges including under-employment, unemployment and poverty (Hove, Ngwerume and Muchemwa 2013: 5). In South Africa, government policies on the reduction of poverty through educating

people have been implemented. However, critiques have argued that a policy like Growth, Employment and Redistribution (GEAR) has increased inequality between and within the people of South Africa, hence the failure to achieve a trickle-down effect (Mlinganiso 2012: 20). Thus, an important aspect for due consideration by the NMBMM is to enhance peoples' opportunities, such as creating employment. Also, the Municipality should create awareness of potential disasters and risk reduction strategies are a significant aspect in community education, especially for the marginalized groups.

The Eastern Cape Province faces a social grant dependency crisis as this is the only immediate solution and relief available, given the severity of poverty and general hardship experienced by households. For example, in 2012, 58% of total households or over a third of the population in the Province received various forms of social grants. The Eastern Cape Province is regarded as "the second province after KwaZulu-Natal to display a high dependency on social grants" as highlighted by the Eastern Cape Provincial Treasury" (2014/2015: 6). Nelson Mandela Bay residents can therefore be considered as very vulnerable, which calls for local government to increase efforts in increasing economic sustainable opportunities that will enhance citizens' resilience, for example, through the creation of employment opportunities as a recovery strategy. The researcher also cautions that this statement does not imply that all aspects of marginalisation and vulnerability in NMBMM represent a state of disaster. According to the Good Governance Learning Networks (2014: 13), it is argued that the current South African National Development Plan 2030 has not clarified the manner in which the poor can be prepared to enhance their resilience to future socio-economic shocks. Therefore, effective disaster risk reduction would require an analysis on forms of livelihoods and other means of survival in the NMBMM municipality, so that all planning places the needs of local residents as first priority. In Chapter One, it was highlighted that it is important to understand households' livelihoods through the Sustainable Livelihoods Analysis Framework (SLA), which was provided as a strong tool that has been adopted extensively by DRR practitioners and academics, and can thus offer the Municipality a tool to carry a comprehensive in-depth analysis of its residents.

Figure 5. 6: Monthly total household income



A significant percentage (52.5%) did not feel comfortable about providing information on their monthly income. However, other statistics point to poor monthly earnings: 9.4% earn less than a 1000 rand a month; 11% earn between 1001- 2000 rand a month; 2% earn 3001 - 6000 rand; 3% 6001 - 8000; 7% earn 1000 rand and 2.3% have no regular income. A household monthly income is important as it indicates how a single household survives, and can determine if the population lives above or below 2 US dollars a day, as a generally accepted measure. A lack or poor household income is a form of a hazard waiting to become a disaster, “as poor households often identify vulnerability as a condition that takes into account both exposures” to risks and hazards like poor income, concedes Philip and Rayhan (2004: 1).

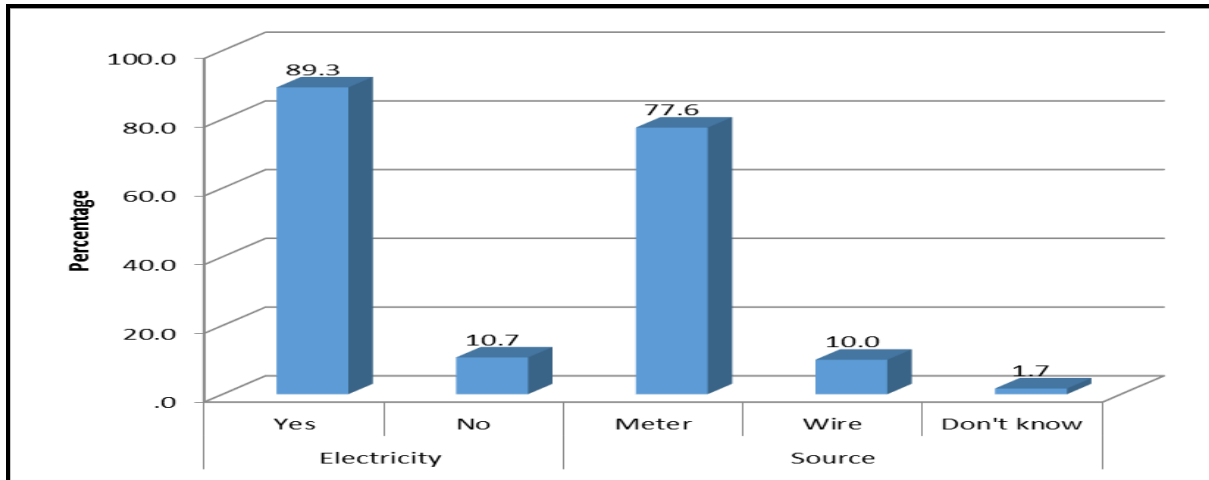
In chapters Two and Three, it was emphasised that hazards should be identified and addressed effectively and efficiently in advance, so that communities would be protected from becoming victims of disasters that could have been prevented. In South Africa, local government is tasked with reduction of poverty, through job creation and economic growth, and programmes such as Local Economic Development (LED). This is a significant aspect for due consideration by the Municipality in particular and local government in general, as all too often, local communities face severe hazards due to a lack of knowledge and public orientation of the imminent dangers in their local spaces of habitation. The Total Disaster Risk Management Framework (TDRMF) encourages disaster risk management through good decision-making and effective use of limited resources. This entails placing emphasis on the importance of hazard mapping, vulnerability and

risk assessment as a major tool that generates reliable disaster risk information, thus an analysis of income levels of NMBMM residents. The information forms the basis for making major decisions, such as pre-disaster and post-disaster planning for risk reduction and response interventions in NMBMM, as postulated by de Guzman (2003: 12). This indicates that there is a need to invest more in hazard mapping systems and vulnerability analysis, which mainly falls under the Key Performance Area one in the South African Disaster Risk Management Framework, which is yet again, a significant aspect of DRR in the contemporary focus on Local Government Management and Development.

5.3.2 SECTION B - SERVICE DELIVERY IN BASIC AMENITIES

This section aimed at looking into the current situation with regards to service delivery of basic amenities, such as access to electricity, water, housing and refuse removal. The researcher noted that research by Pharoah (2006) on the discourse of disaster risk management in South Africa did not pay attention to these critical DRR aspects. Pharaoh's study focused on evaluating the effectiveness of the City of Cape Town's 2006 winter preparedness strategy. However, the research did not directly mention or detail different types of services that are rendered by the Municipality and form part of DRR implementation. Disaster risk management in its broader sense should critically consider how citizens feel about services rendered by the municipalities, and also the implications of their current situation. Therefore, the concept of governance is central to addressing systemic factors that contribute to the vulnerability of the local communities in the NMBMM region.

Figure 5. 7: Access to electricity



Access to electricity was at 89.3% and of this percentage, 77.6% had their electricity through meter connection, 10% said it was wire connected illegally, and 1.7% had no idea if their electricity was metered or wired. Illegal connection of electricity and other unacceptable connections are a hazard to a community and a household, as it exposes the victims to fire outbreaks. Fire can cause loss of lives, property and livelihoods. Many households from those surveyed have opted for an illegal connection out of desperation, despite being aware of the possible dangers. Research shows that anger and blame is directed to government's empty promises to provide communities with proper services. "We are tired of empty promises from the government...no electricity and no proper houses, so we decided to do the little that we can do and take electricity," remarked a community member (Gowa 2011: 1). Furthermore, service delivery protests in South African municipalities have a strong link to the apartheid government's nature of governance that led to the emergence of social movements in the early 2000 (Shaidi 2013: 73).

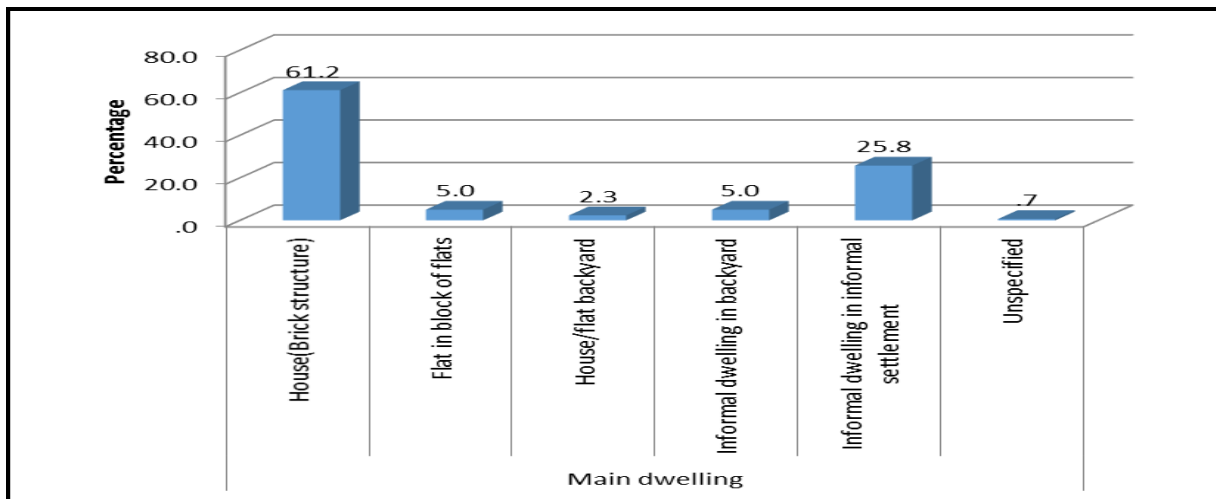
These statistics can further be linked to issues around stakeholder collaboration where some line departments do not work closely with the DM centre. This was an issue that came up in qualitative research, which some respondents were not happy with how decisions were made with regard to DRM amongst stakeholders, mainly because they lacked consultation. Some respondents argued that key decisions are made without bringing all concerned stakeholders

together; for example, decisions that concern some line departments are made without bringing them on board. The implication of this lack of consultative decision-making process is that it creates confusion and delays in DRM service delivery. Chagutah's (2014: 131) research found that municipalities in South Africa are not committed to dialogical interaction in the design of communication interventions for DRR, yet communication plays a crucial role in DRR. The following are some of the pertinent responses provided by the respondents:

- *There is lack of collaboration at times between departments and sectors that would increase service delivery; and*
- *Communication is lacking amongst line departments and some decisions are sometimes made without bringing all concerned departments together.*

Access to electricity links to Objective One raised in Chapter One, that is the multi-level, multi-dimensional and multi-disciplinary co-operation and collaboration mechanisms at NMBMM. In designing and implementing DRR programmes, this information could assist in exploring causes and effects of fires as a priority hazard in NMBMM, as a further significant risk reduction strategy for effective municipal governance in the context of working with local communities.

Figure 5. 8: Main dwelling unit



The figure indicates that 61.2 % had brick houses; 25.8% had informal dwellings in informal settlements; 5% reside in blocks of flats; 5% occupy informal dwellings in backyards; 2.3%

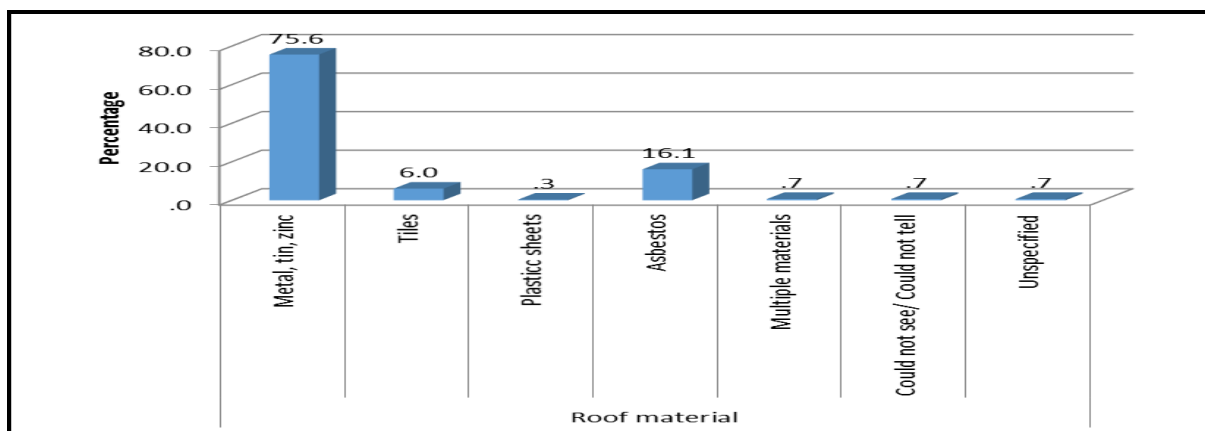
reside in a house/flat and 0.7% reside in unspecified dwellings. The implications of these statistics are that those living in poor structures are exposed to many dangers such as flooding, fires, health and environmental hazards. A brick structure/house is much more resilient or resistant to floods, wind, fire and hurricanes, when compared to informal dwellings such as backyard dwellings and shacks. Previous research argued that informal dwellings significantly constitute a hazard for many residents in South Africa (Holloway, Roomaney, Pharaoh, Solomon and Cousins 2008: 4). Informal dwellings are also buildings without city planners' guidance, which makes it difficult for municipal entities to offer services effectively and efficiently. For example, the fire and rescue services and disaster management centre report difficulties in accessing informal dwellings during emergencies. This information requires respective government departments, like human settlement and public works programmes, to improve services in such vulnerable areas so as improve citizens' general living conditions. This section links to Objective Four of the overall research that focused on understanding the enabling mechanisms in place, such as capacity building, and the resources for DRR. Moreover, in Chapter Three, mitigation measures were described as taking actions before a disaster strikes and in this case, building stronger houses to withstand hazards and minimise future disasters and their impact. Without mitigation actions, the safety, financial security and self-reliance of communities are jeopardized (South Africa 2002).

Chi-Square Test Goodness-of-Fit

	Observed N	Residual
House (Brick structure)	183	123.6
Flat in block of flats	15	-44.4
House/flat backyard	7	-52.4
Informal dwelling in backyard	15	-44.4
Informal dwelling in informal settlement	77	17.6
Total	297	
Test Statistics		
	Which of the following best describes the main dwelling unit that this household occupies?	
Chi-Square	375.003 ^a	
Df	4	
Asymp. Sig.	.000	
a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 59.4.		

Analysis confirmed that significant numbers (232, 61.2% and 77, 25.8%) indicated that the main dwelling units are brick houses and informal dwelling in informal settlements, respectively ($\chi^2(4) = 375.003, p < .0005$).

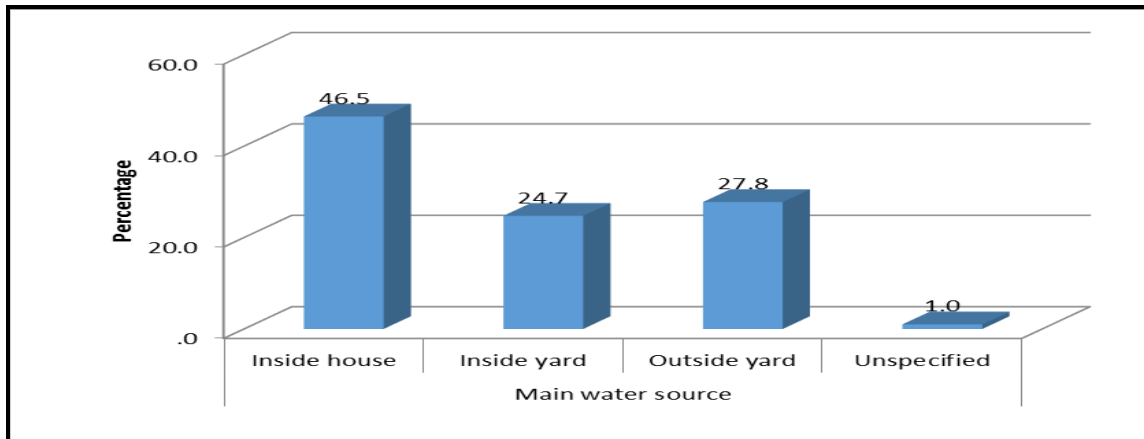
Figure 5. 9: Relationship between different roofing materials and fires



A significant number (75.6%) indicated that their roof was made of metal, tin and zinc. Sixteen percent (16%) were made of asbestos, 6 % made of tiles, 7% made of multiple materials, and 3%

of plastic sheets. These statistics imply that some dwellings do not have proper roofing in their houses which makes them pre-disposed during weather or climate related seasons, such as adverse weather conditions, including strong winds and rains. The roofs or entire house are exposed to being blown away by strong winds, catching fires, washed by floods and leakage during rainy seasons. According to Raphel (2011:42), the use of cheap and highly flammable roofing or building materials is contributing to vulnerability factors of communities in the South African context. The need for developing *green disaster-resistant roofing materials* is a national issues and in 2015, the South African government signed a ‘memorandum of understanding’ with University of Delaware to investigate the technology and to deliver a total of 2.2 million low-cost township houses (University of Delaware 2015). These statistics required the municipality to increase its efforts in building community resilience and safety in the metro. Vulnerability contributes to disaster occurrences thus necessitates the need for its reduction that negatively impact on the safety of communities’ lives.

Figure 5. 10: Main water source



A significant number (46.5%) indicated that their main water source was inside the house; 24.7% have access inside the yard, 27.8% was outside the yard and 1.0% was not specified. These statistics denote a community where not every resident has access to water sources inside their homes or dwelling places. In Chapter Two, it was indicated that the Constitution of the Republic of South Africa, 1996 provides an overall framework on matters that pertain to the well-being of the communities and for that reason, NMBMM bears the duty to ensure that all its residents have

access to all basic services. A household's quality and water source is a key component in sustainable development, and also determining the quality of services provided by the municipality. In a municipality such as NMBMM, where the majority of its residents are black and were a formerly disadvantaged group, access to indoor water is crucial as it would also function in a contributory manner in an event such as fire outbreaks. Fire outbreaks were identified as a major common hazard in NMBMM raised in the Chapter Four of this study. The community does not need to rely mainly on government departments like the DM centre and centre/fire brigades to respond to small fires; thus access to indoor water should be encouraged as one of the safety recommendations, as it would enable them to apply basic skills acquired in in Public Awareness Education Programme (PAEP). This section linked up with responsible citizenship raised in Chapter Two in which the local community is expected to be a key DRR stakeholder.

Table 5.2: Chi-Square Test Goodness- of- Fit on housing arrangement situation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Own	247	82.6	83.2	83.2
	Rent	34	11.4	11.4	94.6
	Other	16	5.4	5.4	100.0
	Total	297	99.3	100.0	
Missing	System	2	.7		
Total		299	100.0		
	Observed N	Expected N	Residual		
Own	247	99.0	148.0		
Rent	34	99.0	-65.0		
Other	16	99.0	-83.0		
Total	297				
Test Statistics					
	Which of the following best describes the housing situation of this household?				
Chi-Square	333.515 ^a				
Df	2				
Asymp. Sig.	.000				
0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 99.0.					

Chi-Square Test Goodness-of-Fit showed that a significant number (247, 83.6%) indicated that their families owned a house ($\chi^2(2) = 333.515, p < .0005$). A house is an asset that contributes to

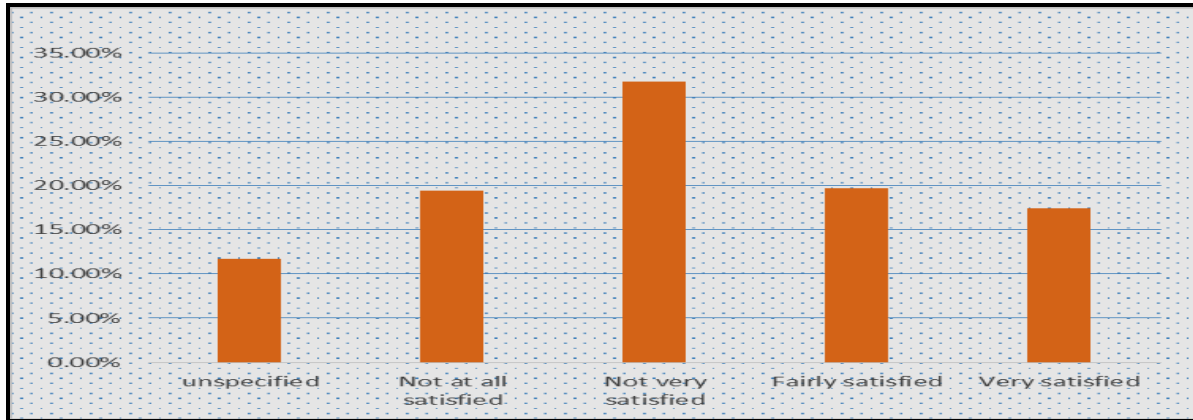
the resilience of a household to different forms of socio-economic shocks, disasters and hazards. Thus, an asset enhances their capacity to resist a hazard's harmful effects and to recover easily (Wisner, Blaikie, Cannon and Davis 2003: 12). Owning a house creates sustainable economic benefit as a household does not need to move to an informal area where they could be exposed to many challenges, such as crime and lack of municipal basic services. In Chapter Three, it was discussed that lack of a proper house contributes to vulnerability of a community. This information further links to the next section on how each house household acquired the house, considering that the South African government since 1994 has put forward various pieces of legislation that bind them to the provision of houses to the needy communities.

Table 5. 3: How was the house obtained?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Purchase it	33	11.0	13.5	13.5
	From the government but had to pay a subsidy	19	6.4	7.8	21.3
	From the government and was not required to pay a subsidy	192	64.2	78.7	100.0
	Total	244	81.6	100.0	
Missing	System	55	18.4		
Total		299	100.0		

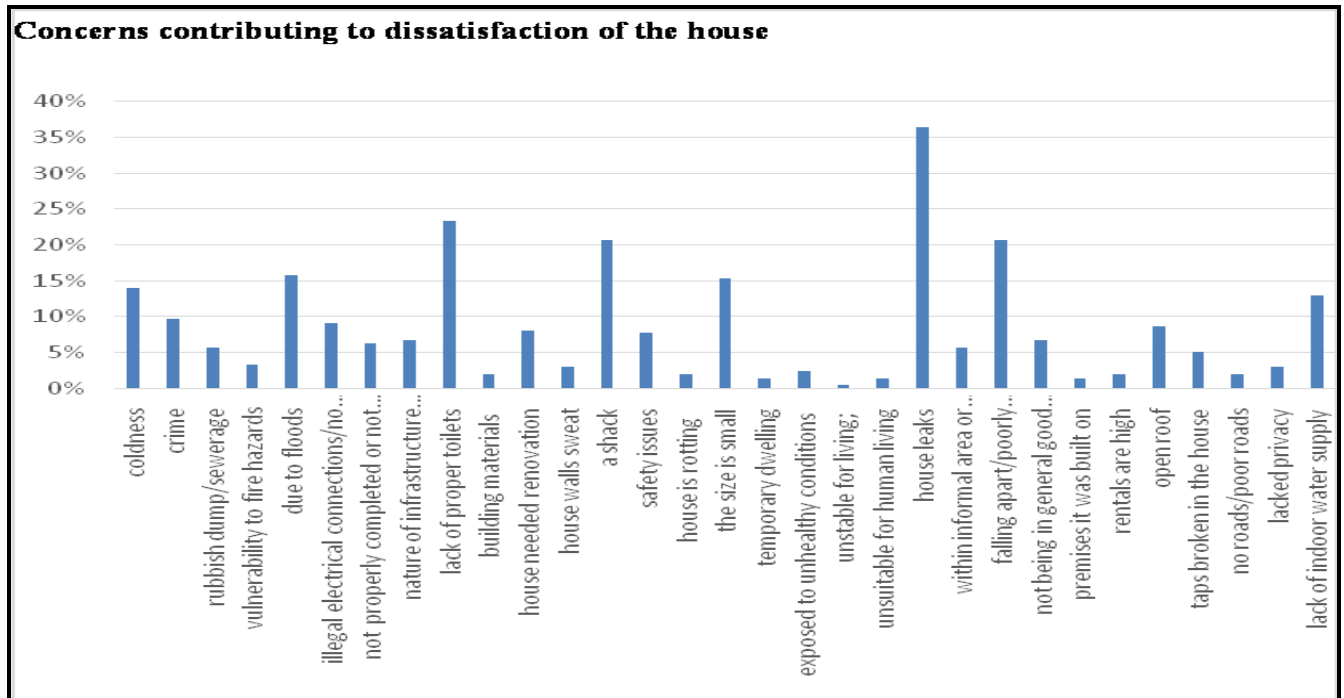
A significant percentage (78.7%) of the owners indicated that they had acquired a free house from the government, 13% purchased their house, and 7.8% received a house from the government, but had to pay a subsidy. These are positive statistics; however, the demand for housing from the government by the poor has proved to be an issue of ongoing challenge, characterised by rising service delivery protests, as evidenced in recent times. These statistics are important as they could assist the municipality with planning and implementation of services, which includes payment for services, due consideration for subsidisation and those categories who fall into the indigent communities for free services.

Figure 5. 11: Chi-Square Test Goodness-of-Fit satisfactions with the house



Chi-Square results found that significant number (95, 31.8%) indicated that most individuals are not very satisfied with their houses ($\chi^2 (3) = 17.424, p < .0005$). Based on these statistics, it can be concluded that NMBMM residents are vulnerable to a number of issues, as provided in the next figure. Hazard mitigation practices are a major component to reduce the physical impacts of disasters, such as building resilient houses that give household members comfort, especially during environmental events (Lindell and Prater 2003: 117). This section links up with the discussion in Chapter Three.

Figure 5. 12: Concerns contributing to dissatisfaction of the house



There were a number of concerns that make NMBMM residents dissatisfied with their houses, as discussed below.

Weather-related issues: residents highlighted that weather-related issues did not render their homes favourable, as 3.3% said it was vulnerable to fire hazards; 15.8% to floods and 14% to coldness. 2.9% said house walls sweat; 36.4% experience house leaks; 8.6% indicated that it had open roofs exposing them to vulnerable conditions and 1.4% or 43 revealed they were unsuitable for human living. In Chapter Three, it was discussed that weather and climate changes continue to cause havoc in many parts of the world, and South Africa is not an exception. The municipality thus needs to enhance its efforts to improve these conditions that expose the residents to disaster. Programmes should be developed to assist these vulnerable households to build resilience against potential disasters.

Regarding the nature of the houses, 20.7% stated that it was a shack that exposes them to many dangers; 1.9% claimed that it was rotting, making it a hazard; 15.3% stated that the size was small; 5% had taps broken in the houses; 1.4% were in temporary dwellings meaning they would need to relocate; 2.4% stated that their house was exposed to unhealthy conditions; 0.5% argued that it was within unstable conditions; 9.1% noted illegal electricity connection/dangerous

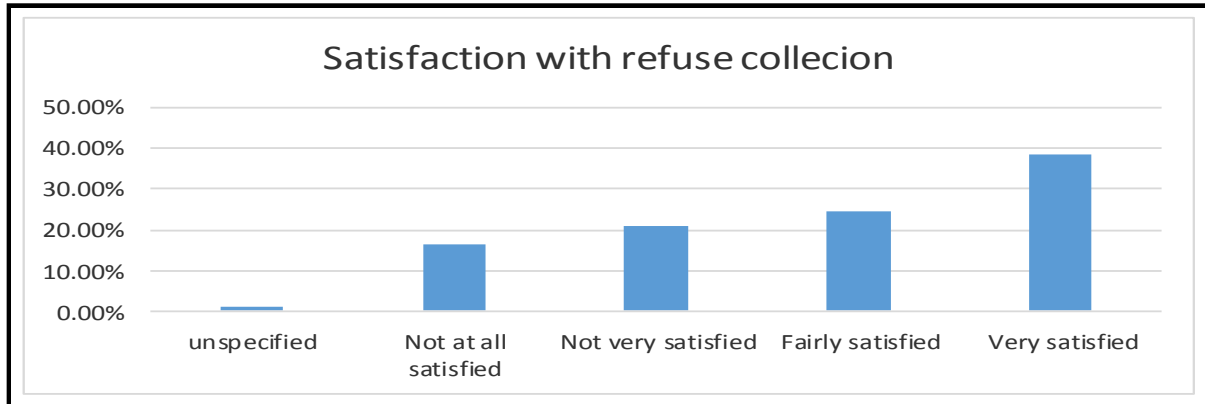
electrical connections/no electricity; 6.2% were not properly completed. A further 1.9% stated that the rentals were high for the households to afford; 23.4% stated there was a lack of proper toilets; 1.9% noted that the building materials used to make the houses is of cheap quality or asbestos, making them vulnerable to dangers, and 8.1% of the houses needed renovation, as the residents felt that they were exposed to danger. These statistics have been reported to be associated with RDP houses; some government officials and civil society have stated that these are legitimate complaints, as some homes collapse during extreme weather seasons (http://www.parliament.gov.za/live/content.php?Item_ID=5916).

Regarding the surroundings, 5.7% indicated it was within informal areas or the environment was not favourable; 20.6% had inhabiting spaces that are falling apart and are poorly constructed or of a substandard quality; 7.7% had safety issues. A further 6.7% of residing spaces are not in generally good condition; 0.6% noted crime within the area, and 5.7% were located near the rubbish dump/sewerage that exposes them to health issues. Poor surroundings expose residents to health and environmental hazards (Brender, Maantay and Chakraborty 2011:37). The municipality has the responsibility to enhance service delivery in these areas, to reduce exposure of the residents to imminent dangers and potential hazards. Disaster risk reduction requires that homes be built in correctly demarcated areas so that services are effectively and efficiently rendered.

Regarding infrastructure challenges, 1.9% highlighted that there are no roads or the roads were in a poor condition. With water being a scarce but essential commodity, at least 12.9% experienced a severe lack of indoor water supply exposing them to serious health hazards and challenges to their survival. A further 6.7% complained about the nature of infrastructure surrounding their homes. Progress has been made since the dawn of democracy in improving the infrastructure of the urban townships and informal settlements; however, some critics like Pernegger (2007:37) argue that “today’s infrastructure requirements are tomorrow’s backlogs”, an issues that requires political commitment as a major aspect in DRR.

These statistics imply that the state of NMBMM residents’ houses and dwelling spaces face many unfavourable living conditions, which makes them vulnerable and exposed to several health and safety threats. The NMBMM needs to enhance their efforts from a multi-sectoral approach in their service delivery to the local residents.

Figure 5. 13: Satisfaction with refuse collection



From the figure, one can see that 16.3% were not satisfied with refuse collection as opposed to 38.3 %, who were very satisfied. Overall, this means a significant percentage are not happy with refuse collection as one of the basic services provided by the municipality. Moreover, dissatisfaction with refuse collection is one of the many issues that makes South African citizens “take to the streets” with protest action and strikes. Therefore, the need for “improving public service delivery is one of the biggest challenges confronting local administration” (Akinboade, Mokwena and Kinck 2014: 1). Failure to collect refuse exposes communities to many health hazards and also creates blockage of drainage systems and general degradation of infrastructure overall. Risk reduction involves ensuring that public health issues are addressed to mitigate outbreaks of diseases, especially those already facing day-to-day challenges. Recent local government elections brought in new leadership that has put in place new measures in waste management, in which the municipality’s Waste Management Sub-directorate has embarked on weekly collection in all wards, unlike before (Nelson Mandel Bay Communications 2016:1). This is a positive move that would contribute to residents’ satisfaction on refuse collection, directly increasing DRR efforts. This section links with the discussion raised in Chapter Two which included the mandate of local government in municipal service delivery.

Table 5. 4: Chi-Square Test Goodness-of-Fit on sources of power for cooking

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fire-wood	5	1.7	1.7	1.7
	Gas	9	3.0	3.0	4.7
	Paraffin	27	9.0	9.1	13.9
	Electricity	255	85.3	86.1	100.0
	Total	296	99.0	100.0	
Missing	System	3	1.0		
Total		299	100.0		
	Observed N	Expected N	Residual		
Fire-wood	5	74.0	-69.0		
Gas	9	74.0	-65.0		
Paraffin	27	74.0	-47.0		
Electricity	255	74.0	181.0		
Total	296				
Test Statistics					
	What is your main source of power for cooking?				
Chi-Square	594.000 ^a				
Df	3				
Asymp. Sig.	.000				
a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 74.0.					

A significant number (225) of respondents indicated that their main source of power for cooking was electricity ($\chi^2(3) = 594.000, p < .0005$). It should be noted that this figure also includes those with illegal electricity connections. In the previous section, it was found that 10% of those who have power gained it through illegal wire connections. Other respondents' main source of power for cooking was fire-wood, gas or paraffin. These sources of power for cooking are common, yet they pose threats to the households and community especially during rainy seasons and a windy summer season. Later in this chapter, it will be reported that research showed that 10% of deaths reported in 2014-2015 were caused by gas. Risk reduction requires hazards identification and their root causes to enable relevant programmes to be developed and implemented by NMBMM municipality and other stakeholders, as stipulated by the Total Disaster Risk Management (TDRM) Framework. Furthermore, this links to the importance of mitigation approaches as discussed in Chapter Three under the literature review.

5.3.3 SECTION C - DISASTER OCCURRENCES

This section looked at households or communities in NMBMM which were affected by any disasters and the causes thereof during the period 2014-2015. This information is important considering that a recent study by Sithole (2014) focused on municipal disaster management in South Africa, and but not provide for households' responses on disaster occurrences in the municipalities selected for the research undertaken. Sithole's (2014) study methodology excluded service delivery beneficiaries but focused on municipal managers, who were targeted to provide feedback on the effectiveness of the structures in place. The study proposed for an intergovernmental relations model between all organs of the state that are tasked with DRM implementation; arguing that a uniformed arrangement creates a healthy functioning both vertical and horizontal inter-governmental relations consistency. The section links again with Chapter Three of the research which highlighted an increasing nature of disaster occurrences across the globe and locally, especially in households whereby families are exposed to such imminent dangers and risks.

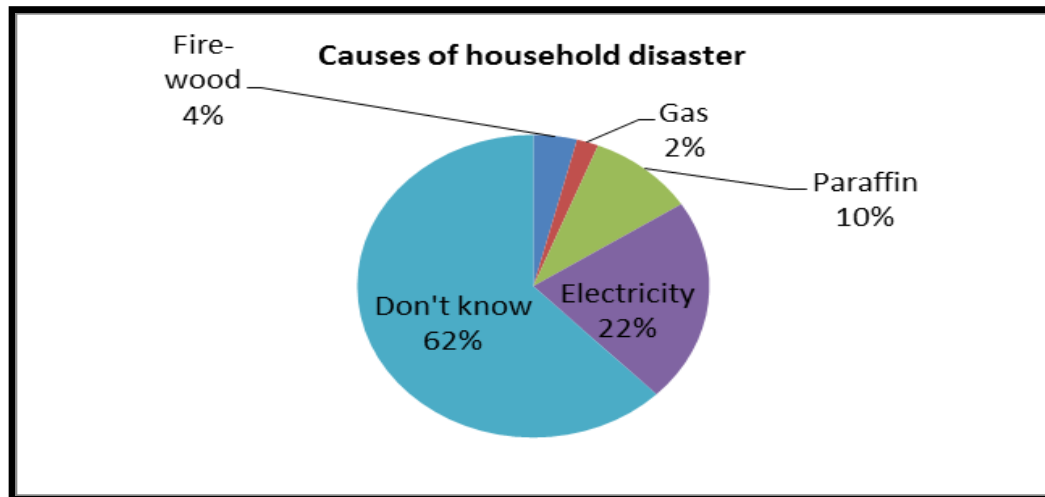
Table 5. 5 Own households affected by disaster incidence

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	89	29.8	30.5	30.5
	No	203	67.9	69.5	100.0
	Total	292	97.7	100.0	
Missing	System	7	2.3		
Total		299	100.0		

A total of 30.5% indicated that their households had been affected by a disaster during the 2014-2015 period. These statistics indicated that NMBMM households/families are vulnerable to disasters and the need for enhanced DRR mitigation and preparedness measures should be boosted. The number of deaths across the world in 2015 was estimated to have been more than 26 000 due to natural disasters, and doubled that of 2014, a sign of the increasing occurrence of deaths. These negative statistics could be linked to qualitative findings in which one NGO stated that *more needs to be done to educate the public on the importance of prevention and community responsibility*. If households do not take prevention and mitigation measures seriously, it could

have a direct impact on being vulnerable to disasters and shocks. One approach as required by the South African DMA is to educate the public on mitigation and preparedness measures; thus, public awareness education on components of DRR should also be enhanced in NMBMM, using guidelines provided by research undertaken by Van Niekerk (2005: 209). This information is significantly linked to Objective Five of this research study.

Figure 5. 14: Causes of household disaster



At least 4% of the respondents indicated that they had been victims of some form of disaster caused by the use of fire-wood. Two percent (2%) indicated that the disaster had been caused by gas usage, while 10% indicated that the disaster had been caused by paraffin usage. A further 22 % was caused by electricity and 62% didn't know what had caused the disaster. There are many different causes of disasters in a household and the most common ones are linked to sources of power for cooking. These statistics require NMBMM to strengthen existing initiatives on fire prevention and mitigation. The Sendai Framework 2015-2030 clearly advocates hazard mapping and vulnerability assessments at household levels and communities; there is a need to enable reliable mitigation and preparedness measures. Qualitative research found that some of these hazards could be eradicated if departments worked closely with one another. One qualitative respondent said the following: *...inter-departmental committees are non-functional although they happen to meet some times.* For example, illegal connections can be eradicated if proper relationships exist between DM Centre and Power and Electricity Department to ensure illegal connections are eradicated.

Table 5. 6: I know someone affected by a disaster

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	154	51.5	52.0	52.0
	No	142	47.5	48.0	100.0
	Total	296	99.0	100.0	
Missing	System	3	1.0		
Total		299	100.0		

A significant 52% reported that they knew of someone who had been affected by a disaster in 2014 - 2015. These statistics are important as an indication that the residents of Nelson Mandela bay Municipality are vulnerable to being affected by disasters frequently. These statistics linked with qualitative research that found that there exists a lack of commitment from all stakeholders to develop and implement comprehensive sustainable DRR initiatives (Disaster management officials, the Safety and Directorate office, NGOs, private sector and communities). The South African Weather Services and the Disaster Management Centre stated that campaign efforts have continued to accumulate necessary information regarding multi-hazard information, but still there is a lack of sustainable solutions, as many recommendations gathered have not been implemented on the ground. Some of the comments included the following:

- *There are no specific DRR plans for each hazard in the metro. For example, there are no detailed flood line delineations and assessments on the impact of tidal surges and sea level rise, and storm;*
- *A Flood Hazard Management System needs to be developed for the Nelson Mandela Bay Municipality; and*
- *The municipality is not doing enough to give us decent homes and other services.*

The lack of commitment to develop and implement comprehensive DRR programmes in NMBMM is not an isolated challenge, as most municipalities in South Africa are failing to adhere to this legal requirement (prevention and mitigation). Research points this challenge to the current response-oriented professionals in local government who are tasked with implementing DMA, as they are mainly current or former emergency management services/police/fire men (SALGA 2011: 54). Disaster risk reduction initiatives should be developed and implemented based on reliable disaster risk information reflecting Research Objective One. This is very significant if one considers the fact that the municipality pointed out

that one major challenge it continues to face relates to financial resources to enable DRR implementation, with an urgent call for political will (Nelson Mandela Bay Annual Report 2014-2015: 21 - 22). These statistics link to all five research objectives raised in Chapter One of the study.

Table 5. 7: Death was caused by disaster in 2014 - 2015

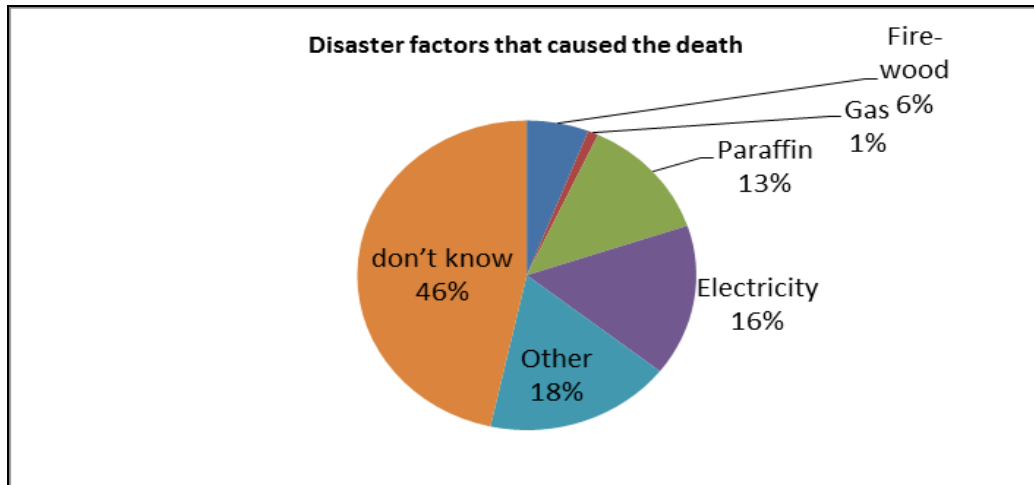
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	66	22.1	22.1	22.1
	No	232	77.6	77.9	100.0
	Total	298	99.7	100.0	
Missing	System	1	0.3		
Total		299	100.0		

The figure above indicates that 22% knew of someone who had died from disaster-related incidences in their neighbourhood. These statistics indicate that the NMBMM current DRM strategies and programmes need to be reinforced so that there are no reported deaths caused by localised disasters. It must be taken into account that if communities and the municipality are properly prepared, there would be reduction or no deaths reported in the households. It is generally accepted that in developed countries, households and their municipalities do not suffer huge loss of lives when affected by fires, given their preparedness and mitigation status as compared to rural communities. Qualitative research found that the manner in which early warnings are disseminated follows long channels, before it reaches vulnerable communities, which can lead to deaths. One respondent argued the following: *We do not send information directly to the communities to avoid further chaos, argued one respondent of the DM officials.* To reiterate what was raised in Chapter Three, statistics show the increasing death rates across the world due to the increasing nature of both man-made and natural disasters. Therefore, it has become imperative for DRR to ensure that households and local communities do not become victims of these hazards and threats to their personal safety and security.

A new perspective is needed on the importance of community awareness on negative effects of disasters, such as loss of lives, especially because it is an aspect not reported often in the communities. A good example is that of research conducted by Muzenda-Mudavanhu (2016) that looked at the gap on child participation in DRR, but excluded mentioning any deaths in

Africa. The research argues that when children participate, it is within their rights as they contribute to issues of risk that affects their lives, and most importantly, their future.

Figure 5. 15: Factors that caused the deaths



The pie-chart indicates that 6% of the deaths reported had been caused by fire-wood, 6% caused by gas, 13% by paraffin, 16% by electricity, 18% was within other causes and 46% did not know the causes of the death. These statistics are an indication that people's lives and safety are important to mitigate deaths linked to the municipality's agenda for service delivery. This is evident with 16% deaths caused by electricity as a consequence of illegal connections or poor connections by municipality. These statistics are linked to qualitative findings in which respondents indicated the following details.

Communities in NMBMM and specifically vulnerable communities are exposed and vulnerable to hazards, shocks including flooding during winter, poor housing structures, and shack fires in some areas, diseases, poor infrastructure, unemployment, crime and drought. Most of the vulnerable areas of NMBMM are mainly the informal areas within the Townships. An NGO respondent made the below statement:

- *In the historically vulnerable areas of the metro, communities still remain very vulnerable to disasters, and exposure to hazards is higher than in the suburbs; and*

- *There are no specific DRR plans for each hazard in the metro including illegal electricity connections, the use of paraffin...fire-wood and gas. Therefore, a shift to a culture of up-to-dating DRR plans for each hazard rather than relying on an overall municipal DM plan that was last updated in 2010, is what is needed. Community-based disaster risk reduction initiatives are encouraged as they are lacking in NMBMM, which forms part of responsible citizenry, as discussed in Chapter Two of the study. This section links up with the Research Question Two (from Chapter One), that looked at whether information and decisions are based on reliable information relating to hazard mapping and vulnerability assessment.*

Another respondent stated that:

- *Some community members do not show commitment in taking part in decisions affecting their communities, such as the IDP processes, and instead tend to protest instead of making themselves available to attend public forum meetings and participate proactively.*

This information brings to light a new perspective on possible measures that can mitigate deaths caused by lack of sustainable service delivery in risk reduction in NMBMM.

5.3.4 SECTION D - EMERGENCY RESPONSE AND EARLY WARNINGS

Emergency response and early warnings are key aspects of disaster risk management and for this reason; the South African DRM policy framework dedicated Key Performance Area Four (4) to response and recovery. One priority of the Hyogo Framework for Action 2005-2015 was to have made sure that early warnings were enhanced through identification, assessment and monitoring of disaster risks. Response and early warnings cannot be separated from DRR and for this reason, this section aimed at identifying how respondents feel about the services rendered by NMBMM. In a study conducted by both Chagutah (2014) and Sithole (2013), it was discovered that both authors did not consider how specific households viewed response phases and early warnings within their case study areas, which was one of the major focal points in this research study, and through this study, it is hoped that the relevance of this aspect would be highlighted in disaster risk reduction and an orientation to households on the potential risks.

Table 5. 8: Assistance during a disaster

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	41	13.7	23.4	23.4
	No	134	44.8	76.6	100.0
	Total	175	58.5	100.0	
Missing	System	124	41.5		
Total		299	100.0		

Regarding emergency assistance during disasters, 76.6% of respondents did not receive assistance in the event of a disaster. These statistics indicated that service delivery in the form of emergency response and assistance to disaster victims in NMBMM is almost lacking, creating a state of hopelessness when the need arises, and despite KPA 4 of the NDMF of 2005, which focuses on response and recovery. Priority 5 of the Hyogo Framework for Action 2005-2015 called for institutions to build capacity for disaster preparedness and effective response at all levels, which was discussed in Chapter Three. The main purpose of the response phase is to save lives, property and livelihoods as a Constitutional imperative, and also as part of the broader effective disaster management perspective.

The poor status in response in NMBMM can also be linked to qualitative findings as follows:

- Some municipality employees were blamed for lack of commitment to offer services to residents, which can cause delayed response to emergencies. A respondent from the line department said the following: *The municipality lacks honest and hardworking government officials.*

There is no standardised and co-ordinated communication that would enhance response in the NMBMM for effective service delivery. It should be noted that the NDMF has a strong focus on information management and communication requirements for the municipalities. An example was from an NGO that said: *...we do not rely on DMC or other stakeholders to inform us on what is happening on the ground. We have our own in-house trained community volunteers to be*

on the ground. This lack of standardised and co-ordinated communication creates confusion and delays.

This section brings attention to the relevance of immediate responses in DRR, considering that not all research gives this aspect attention. An example by Muzenda-Mudavanhu's (2016) research did not highlight the aspect of immediate and effective response in emergencies. The research had a strong focus on DRR as it presented the need for, and ways in which children can participate in DRR.

Table 5. 9: Stakeholder involvement during response

		If yes, tick which body offered assistance/support?					Total
		DM Authority [NMBMM MM]	National Disaster Management Centre	NGO's	Other	Don't know	
Did you receive any assistance in the events of a disaster?	Yes	19	3	1	12	3	38
	No	0	0	0	3	44	47
Total		19	3	1	15	47	85

Cross tabulation indicated that of the 23.7% who had received some form of assistance during emergencies, 19 respondents indicated that assistance had come from the NMBMM disaster management centre authorities. Moreover, of the 3 respondents who mentioned the National Disaster Management Centre, one respondent was assisted by a non-governmental organisation, and 12 respondents indicated that they got help from other stakeholders including: community members; fire department; councillors; Green Care Hospital; Red Cross and Army Foundation. DRR is everyone's business in South Africa at large. Therefore, different stakeholders are expected to participate in assisting affected communities. The low statistics can also be linked to qualitative findings that certain stakeholders, specifically the private sector and NGOs, were blamed for only being active during the response phase.

Another example was raised by the NGOs, that the Department of Public Health does not provide enough services in the events of emergencies and response. Often this endangers the most vulnerable groups of people suffering from chronic diseases, such as diabetics and high blood pressure. In order to save lives, the NGOs have had to take the initiative to implement programmes on emergency health care to cater for these vulnerable groups during emergencies,

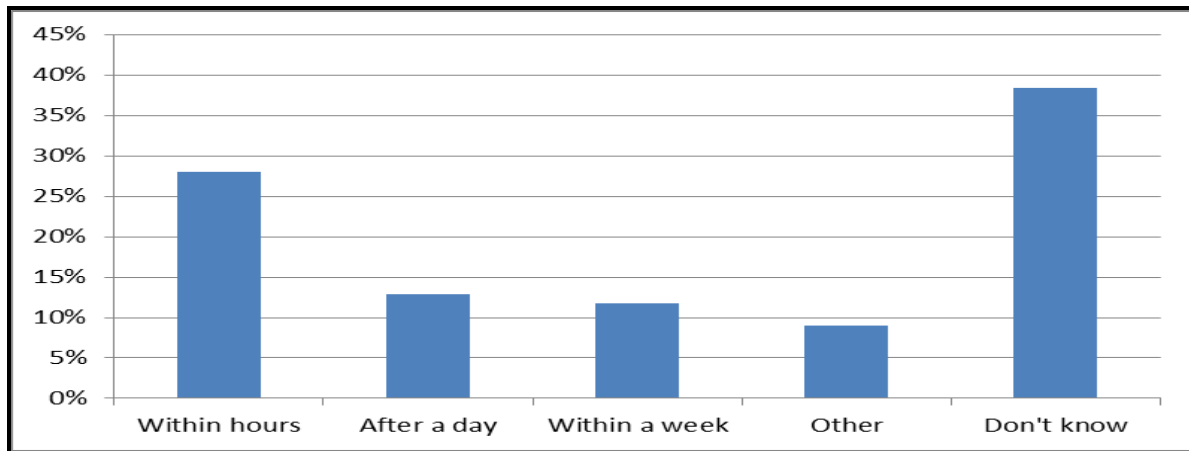
where screening of individuals is carried out and appropriate measures are taken. Provision of health during response/emergencies is to be at the forefront of the government departments. Some of the responses included the following:

- *Public health care is missing in times of response as there is no screening of persons to identify those who need help. People with chronic diseases might have lost their medication which requires immediate identification and assistance, and*
- *There is a need for completion of health-related needs and a vulnerability assessment for the NMBMM at the earliest.*

There was a general agreement that lack of commitment for mitigation measures, which leads to high demand for response efforts, is made worse by the fact that *there lacks a legally binding policy on partnership of the stakeholders in DRM in the municipality and generally in South Africa.*

These statistics call for a radical change in the manner in which response is handled in the municipality by all stakeholders, including the community. Disaster response and assistance in the South Africa municipalities has been regarded as a general challenge (Raphela 2011:70-71). This theme resonates with and responds to the research objectives One and Four raised in the introductory chapter of this study.

Figure 5. 16: Chi-Square Test Goodness-of-Fit on response period during a disaster/emergency



Response period during a disaster happened within hours for 28.0% respondents, while 12.9% said it takes a day to get any assistance, 11.8% indicated it happens within a week, 9% indicated other and 38.4% did not know about time taken. These statistics provide a poor state of response to disasters in the NMBMM. Effective and efficient response is measured within the time taken by the respective municipal department to respond to an incident. Therefore, it can be said that assistance must be offered as quickly as possible (in 'real time'), meaning there should be officials on standby.

There were many reasons as to why response is always delayed at NMBMM, as indicated in the qualitative responses. The municipality does not have the necessary financial capacity to hire the required number of employees to enable them to fully meet demand for the residents. This challenge was reported by most respondents: the Disaster Management Centre, NGOs, Government Line Departments and the Safety and Security Directorate. A good example was that of the Safety and Security Directorate and some DM officials, who argued that the DM Centre operates on only 10 DM officials responsible for co-ordinating all DRM issues in the municipality. This is a small number of employees when compared to the total of 324 292 households in NMBMM, as provided in Study Area section in the previous methodology chapter. The following are some of the responses:

- A respondent from the DM Centre argued that there *are vacant positions of 17 staff in the DM centre that need to be filled in 2015 as per the organogram and it is not happening. This year (2016) we lost two team members as the department could not afford to pay them;*
- *DRR implementation has not been easy...due to minimum tools to implement the policies and frameworks, and*
- *From the NGO perspective...as a manager I am cannot fully implement all developed DRR programmes due to lack of staff. After we train volunteers, they leave once they have acquired the skills to seek sustainable opportunities elsewhere.*

Important to note was the fact that the DM centre indicated that they have not met the requirements of the DMA relating to volunteer recruitment and training. Chapter Seven of the DMA sections 15(1) (g) and section 58 require municipalities to maintain an inclusive approach to volunteers in disaster management. Volunteers play a huge role in filling the gaps where the municipalities are facing employee shortages. Volunteers should be recruited from their respective communities and trained as per the DMA (Kabaka 2012: 58).

This discussion calls for enhanced and co-ordinated response efforts between all stakeholders in NMBMM, and necessary resources should be made available through proper financial allocation. This question points to the need for reliable early warning systems and institutional capacity in NMBMM. The response phase requires good preparation that should be revisited and is clearly outlined in the NMBMM DM plans. In Chapter Two, it was outlined that response is a strong requirement of the TDRMF, which has grounded this research study due to its immense relevance in the current context of risk management *vis-à-vis* community safety.

Further Chi-Square Test Goodness-of-Fit

Frequencies				
	Category	Observed N	Expected N	Residual
1	Within hours	78	43.0	35.0
2	After a day	36	43.0	-7.0
3	Within a week	33	43.0	-10.0
4	Other	25	43.0	-18.0
Total		172		
Test Statistics				
Chi-Square		39.488 ^a		
df		3		
Asymp. Sig.		.000		
a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 43.0.				

Further Chi-Square Tests indicated that a significant number (78 respondents) received assistance within hours in case of a disaster ($\chi^2(3) = 39.488, p < .0005$).

Table 5. 10: Satisfaction of response during emergencies/disasters

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Don't know	88	29.4	31.8	100.0
	Not at all satisfied	60	20.1	21.7	68.2
	Not very satisfied	31	10.4	11.2	46.6
	Fairly satisfied	59	19.7	21.3	35.4
	Very satisfied	39	13.0	14.1	14.1
	Total	277	92.6	100.0	
Missing	System	22	7.4		
Total		299	100.0		

Chi-Square Test Goodness-of-Fit

Frequencies				
	Category	Observed N	Expected N	Residual
1	Not at all satisfied	60	47.3	12.8
2	Not very satisfied	31	47.3	-16.3
3	Fairly satisfied	59	47.3	11.8
4	Very satisfied	39	47.3	-8.3
Total		189		

Chi-Square	13.392 ^a
df	3
Asymp. Sig.	.004
a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 47.3.	

A significant 60 respondents (21.7%) were not at all satisfied and 59 (21.3%) were fairly satisfied with the response time in the event of disaster, ($\chi^2 (3) = 13.392, p < .0005$). These statistics are not positive considering the years the DM Act and its framework have been in existence in South Africa. The response phase depended largely on preparation of all stakeholders and that response is immediate, not within hours. Issues around early warning systems, as indicated earlier, will need to be improved, as well as sustainable financial support from the government. This section links with research question Four that looked at the existing enabling mechanisms in place, including policy, structure, capacity building, and resources developed and institutionalised at the NMBMM.

Table 5. 11: Dissemination of Early Warnings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Received early warnings more Frequently	58	19.4	20.9	20.9
	Frequently	7	2.3	2.5	23.4
	Less frequently	16	5.4	5.8	29.1
	Rarely	87	29.1	31.3	60.4
	Don't know	110	36.8	39.6	100.0
	Total	278	93.0	100.0	
Missing	System	21	7.0		
Total		299	100.0		

Analysis of the dissemination of early warnings (EW) for those who were aware of them in their household, shows that 20.9% received early warnings more frequently, 2.5% received them frequently, 5.8% received less frequently, 31.3% rarely and 39.6% did not know. These scores can be attributed to a lack of, or minimal, early warnings systems in the municipality, as highlighted in the previous chapter. It can also be as a result the fact that communities are not very familiar with any available options of early warnings. Qualitative research further found that EW dissemination adopts the top-down approach in information sharing with the communities. Despite existing standards and uniform methods that are supposed to be adopted throughout the metro to communicate with the communities on early warnings such as weather, most of the time information follows a complex channel. Almost all the respondents agreed that information dissemination to vulnerable communities is only communicated *via* community leadership. This implies that rarely do communities at risk receive direct warnings from the DMC officials but *via* community leadership. Top-down approaches create delays in ensuring that residents receive information on time, and also deny citizen participation and their right to receive EW as fast as possible. Information is consequently delayed and it can create confusion during emergencies. Some of the responses included the following:

- *We do not send information directly to the communities to avoid further chaos, argued one of the DM officials;*
- *Community members communicate the message to ward leaders/counsellors who then contact the DM Office/officials on duty during an emergency;*
- *I have never received an early warning on my cell phone from the municipality, and*

- *We have not set-up cell phone data base for early warnings to residents, as we do not want to cause chaos. Information has to be passed via community leadership.*

Going forward, the municipality should enhance the adoption and application of information technologies including cell phones for communicating with communities, as this is not currently happening. In other parts of the world, both developed and developing, technology like mobiles is extensively used in DRR between municipalities and communities. Technology has proved to serve as an effective tool in enhancing service delivery generally. This will require public education around what information to expect and what to do with it, to avoid causing chaos and confusion. Disaster risk reduction requires efficient dissemination of information on time as it contributes to save lives, livelihood and properties. The Total Disaster Risk Management Framework (TDRMF), as discussed in Chapter Two, reaffirms the relevance of information management and communication.

Previous research found that communities living in informal settlements live in fear of being affected by fires, as there are no community warnings and procedures, submits Ngcamu (2011: 157). In light thereof, enabler 2 of the South African DM Framework reiterates the importance of building a culture of resilience in the public domain *via* public awareness education and training. The questions link to objective number two to Five, particularly objective Five , which focuses on ascertaining implementation of disaster risk management processes between the municipality and the community, while Chapter Two discussed the significance and implications of early warnings as a point of emphasis.

Chi-Square Test Goodness-of-Fit

Frequencies				
How often do you receive Early Warnings on disasters in your household by the NMBMM				
	Category	Observed N	Expected N	Residual
1	Daily	58	42.0	16.0
2	Weekly	7	42.0	-35.0
3	Monthly	16	42.0	-26.0
4	Other	87	42.0	45.0
Total		168		
Test Statistics				
How often do you receive Early Warnings on disasters in your household by the NMBMM				
Chi-Square	99.571 ^a			
Df	3			
Asymp. Sig.	.000			
a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 42.0.				

Significant numbers reflected as 58, 19.4% and 87, 29.1% indicated that respondents often received early warnings on disasters daily and on other unspecified times, respectively ($\chi^2 (3) = 99.571, p < .0005$). These statistics present a situation of confusion around early warnings, especially residents understanding of E.W.S. The Hyogo Framework for Action advocates for a people-centred approach to early warning. It indicates that communities understanding of threats around them, and also how to respond to them on time save many lives (International Federation of Red Cross and Red Crescent Societies 2012: 5). Moreover, the 3rd international conference in 2006 by UNISDR aimed at developing an early warning check list for communities and governments (Pearson 2012: 1), as discussed in Chapter Two. This particular checklist can be adopted in NMBMM in finding the best available option for developing and implementing EWS.

Table 5. 12: Source of early warnings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NMBMM DM office station	6	2.0	2.2	2.2
	Community channels [Leaders, radio, neighbours etc....]	40	13.4	14.5	16.7
	TV station	87	29.1	31.6	48.4
	Other	61	20.4	22.2	70.5
	Don't know	81	27.1	29.5	100.0
	Total	275	92.0	100.0	
Missing	System	24	8.0		
Total		299	100.0		

Chi-Square Test Goodness-of-Fit

Frequencies				
	Category	Observed N	Expected N	Residual
1	NMBMM DM office station	6	33.3	-27.3
2		0	33.3	-33.3
3	Community channels [Leaders, radio, neighbours etc....]	40	33.3	6.8
4	TV station	87	33.3	53.8
Total		133		
Test Statistics				
	Who issues the early warnings?			
Chi-Square	143.842^a			
Df	3			
Asymp. Sig.	.000			
a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 33.3.				

A significant score of 87%, ($\chi^2 (3) = 143.842, p < .0005$) showed that when an early warning is issued, it mainly comes from the television. Local communities in NMBMM have as the main option the medium of television for early warnings, which is not a positive strategy. Firstly, it is not many people who might keep their televisions switched on to follow through on early warnings. Secondly, there is the question of being caught unaware by a disaster or a shock that could lead to loss of lives, property and livelihoods. Televised warnings in South Africa do not provide details on what individuals and households should do next with the information, as this is mainly the responsibility of the municipality.

An important aspect to consider is the source of an early warning, as it must be credible and accepted by the receiver. The Nelson Mandela Bay Metropolitan has policy efforts in place with regards to ensuring that early warning systems are in place, mainly through South Africa Weather Service (SAWS). However, qualitative research identified that community vulnerability is related to lack of ignorance on the benefits of Community- Based Early Warning Systems as they do not exist. The current channels of communication between NMBMM DM centre and communities created delays. Priority 2 of HFA 2005-2015 mainly calls for identifying, assessing and monitoring disaster risks and enhance early warnings (UNISDR 2004:5,6). There is a need to re-evaluate the current strategy policy of NMBMM regarding DRR as it does not seem to be making use of all available options in implementing effective and reliable EW systems, including cell phone/mobile phones. The deliverance and benefits of E.W.S have been highlighted in Chapter Three.

Table 5. 13: Satisfaction on Early Warnings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Don't know	74	24.7	27.4	100.0
	Not at all satisfied	72	24.1	26.7	72.6
	Not very satisfied	30	10.0	11.1	45.9
	Fairly satisfied	54	18.1	20.0	34.8
	Very satisfied	40	13.4	14.8	14.8
	Total	270	90.3	100.0	
Missing	System	29	9.7		
Total		299	100.0		

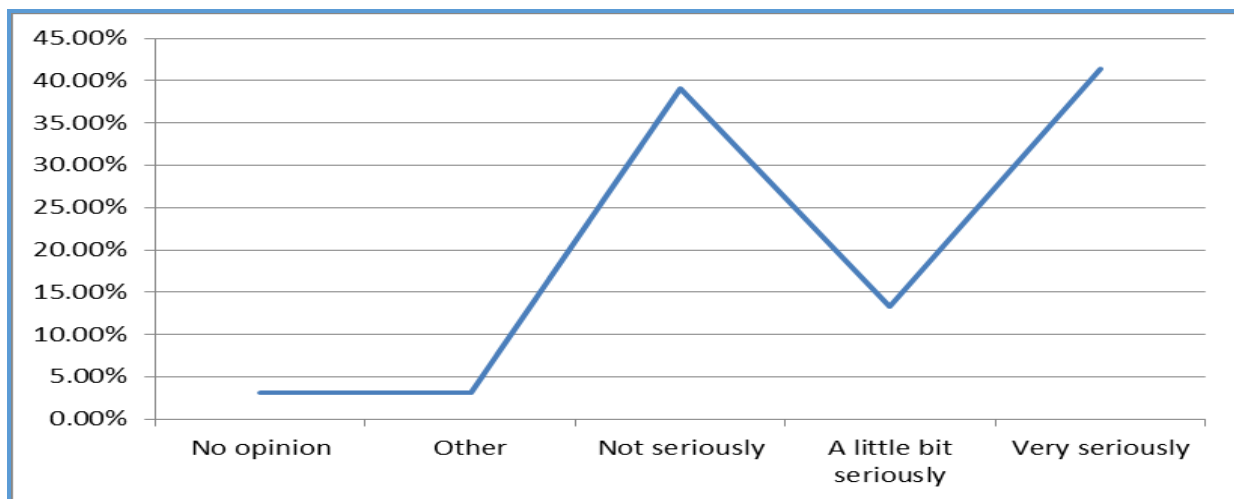
From the Figure above, 27.4% of respondents did not know what to say concerning satisfaction with early warnings, 26.7% were not at all satisfied, 11.1% not very satisfied, 20% were fairly satisfied and 14.8% were very satisfied with the early warnings. These statistics are clear that NMBMM needs to do more in developing and implementing acceptable E.W.S. In Chapter Four, it was identified that NMBMM has very few options relating to E.W.S., and the fact that communities need to be educated and made aware of these important DRR measures and what happens during IDP process.

Chi-Square Test Goodness-of-Fit

Frequencies				
	In general, what is your level of satisfaction, on early warnings on disaster related issues?			
	Category	Observed N	Expected N	Residual
1	Not at all satisfied	72	49.0	23.0
2	Not very satisfied	30	49.0	-19.0
3	Fairly satisfied	54	49.0	5.0
4	Very satisfied	40	49.0	-9.0
Total		196		
Test Statistics				
	In general, what is your level of satisfaction, on early warnings on disaster related issues?			
Chi-Square	20.327 ^a			
Df	3			
Asymp. Sig.	.000			
a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 49.0.				

A significant number reflecting 71, 24.1% indicated that most respondents are not satisfied with the early warnings issued in NMBMM ($\chi^2 (3) = 20.327, p < .0005$).

Figure 5. 17 Attitude towards disaster information



From the graph, 3.1 % of the respondents had no opinion towards disaster information, 3.1% belonged to other, and 39.1% indicated they did not take disaster information seriously,

while 13.3% took it a little seriously and 41.4% very seriously. Risk information communicated to the community aims at decreasing existing risk, empowering them with information thus enabling them to take greater control. Risk information requires participation of the citizens to make informed decisions regarding their risks, and also communicating the information to the municipalities.

Qualitative research supported this finding in which risk information is not treated with urgency by communities. This included the lack of citizen participation which was linked to the existing community leadership structures, such as ward committees and other forms of leadership, where leaders are regarded as agents of political parties' interests, and not having the interest of the general well-being of their communities. Disaster risk management community leadership structures were also labelled to have minimal or lack of clear understanding of DRR; for example during focus group discussions, it was identified that ward leaders are fully aware of the existing government institutions like the DMC, but do not fully understand what their roles are in increasing community awareness and commitment to risk reduction. A respondent argued the following “...*there is limited evidence if community leaders fully play key roles of mobilising communities on becoming more responsible citizens. These leaders do not develop, implement and maintain any CBDR initiatives on DRR programmes, as they “refer to it as a government responsibility”*’.

This contributes to a lack of seriousness by communities towards DRR matters. A shift is needed in which risk information is given attention in NMBMM. Members of the public need to be educated more on this matter. Therefore, communalities do not just become receivers, but givers of the information. Risk information will further inform communities of what information to expect and what to do with it. Nelson Mandela Bay Metropolitan can enhance its efforts by ensuring that there is full involvement of communities in the decision-making process, such as making presentation and participation during the IDP processes.

Chi-Square Test Goodness-of-Fit

Frequencies				
What is your attitude towards disaster information?				
	Category	Observed N	Expected N	Residual
1	Very seriously	53	40.0	13.0
2	A little bit seriously	17	40.0	-23.0
3	Not seriously	50	40.0	10.0
Total		120		

Test Statistics	
What is your attitude towards disaster information?	
Chi-Square	19.950 ^a
Df	2
Asymp. Sig.	.000
a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 40.0.	

Further analysis of only those who responded to the first 3 categories of the Chi-Square Test yields two significant numbers: 53 (17.7%) and 50 (16.7%), indicated that the attitude of respondents towards disaster information is equally distributed into taking it very seriously and not taking it into serious consideration, respectively ($\chi^2 (2) = 19.950, p < .0005$).

Table 5.14: Public awareness programmes in 2014 - 2015

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	67	22.4	22.9	22.9
	No	226	75.6	77.1	100.0
	Total	293	98.0	100.0	
Missing	System	6	2.0		
Total		299	100.0		

Only 22.4% of the respondents indicated that they had benefited from public awareness education as compared to a significant number (77.1%) who did not. These statistics indicate that in general, the general public and vulnerable communities are not receiving sufficient essential public education awareness, as required by the DMA. Disaster risk reduction is not about responses, but more about enlightening the communities on how best they can stay resilient. The perception people have on DRR programmes and initiatives is that they need to be inclusive of changing minds through awareness education as a good practice in NMBMM. These statistics

are direct implications of the current programmes, as qualitative research found that DRR programmes and initiatives focus mainly on schools, and very little on household levels and the general public.

- The NGOs stated that *more needs to be done to educate the public on the importance of prevention and community responsibility... communities contribute to destruction of infrastructures and irresponsible activities.*

It can be noted from literature reviews and discussions in the context of this research study, that public education has been outlined by South African DRM policy and frameworks as an important aspect that should be incorporated and implemented for sustainable DRR. Research by Hay, Hay, Mlissa, Blake, Imrie and Goldberg (2012) focused on climate change impacts on water service delivery in a local municipality in South Africa; however, the research omitted detail on the need for municipalities to enhance public awareness initiatives in the communities. Communities are the beneficiaries of DRR programmes; therefore they should be encouraged and educated on how to contribute to risk reduction. Thus, the call for a shift to enhance awareness programmes is an ongoing strategy in South Africa.

Table 5. 15: Disaster committee in the communities

Is there a community disaster committee in your area?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	52	17.4	17.9	17.9
	No	239	79.9	82.1	100.0
	Total	291	97.3	100.0	
Missing	System	8	2.7		
Total		299	100.0		

In Table 5. 16 above, a small percentage of respondents 17.9% highlighted that there has been a DRR committee in their area. Contrary to this, 82.1% did not have any community committees. Further binomial tests indicated a significant proportion had no community disaster committee in their areas (82%, $p < .0005$). These statistics may mean that the role of the community in DRR is not given priority. Disaster risk reduction community committees are important forums where members participate in best ways to build resilience in their areas. In Chapter Two, this research looked at responsible citizen engagement for effective DRR, and as per qualitative research, it

was clear that communities do not seem to fully get involved. Communities understand their situation better than anyone else, and they are always the first to arrive on a scene of disaster. Most importantly, they are uniquely capable of finding solutions that reduce underlying risks in their communities. This theme responds to research question number Five, that looked at how disaster risk reduction programmes and initiatives implementation can be inclusive of communities in NMBMM, in addressing DRR as a significance pro-active approach to enhancing municipal service delivery. To reiterate the relevance of community committees, Chapter Three looked at the community involvement as a critical aspect of DRR which informs the community DRR committees, and is essentially a strong aspect in CBDRM approaches.

Table 5. 16: Levels of satisfaction with community committee

Frequencies ^a				
Rate your level of satisfaction, on community disaster committee in your area?				
	Category	Observed N	Expected N	Residual
1	Very satisfied	18	10.8	7.3
2	Fairly satisfied	17	10.8	6.3
3	Not very satisfied	4	10.8	-6.8
4	Not at all satisfied	4	10.8	-6.8
Total		43		
a. Is there a community disaster committee in your area? = Yes				

Further analysis found that of the 17.4%, who indicated that they had some form of community DRR committees, 18 respondents were very satisfied and 17 respondents were fairly satisfied. Against the original percentage that is 17.4%, the statistics are still poor with regard to efforts in ensuring community participation in risk reduction in NMBMM.

Chi-Square Test Goodness-of-Fit

Test Statistics	
Rate your level of satisfaction, on community disaster committee in your area?	
Chi-Square	17.000 ^a
Df	3
Asymp. Sig.	.001
a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.8.	
b. Is there a community disaster committee in your area? = Yes	

A significant 18 (41.86%) and 17 (39.5%) respondents indicated that they were very satisfied and fairly satisfied respectively, with the community disaster committee in the area, with ($\chi^2 (3) = 17.000, p < .0005$).

Table 5.17: Hazard mapping and vulnerability assessment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	7	2.3	2.4	2.4
	No	287	96.0	97.6	100.0
	Total	294	98.3	100.0	
Missing	System	5	1.7		
Total		299	100.0		

It was only a small portion of 2.4% who had participated in hazard mapping and vulnerability, as compared to 97.6%. These statistics highlight the current nature in which hazard mapping and vulnerability assessment are not given priority in NMBMM, with a negative impact on communities; for example, it increases their exposure to risks. Qualitative research recaps the fact that hazard mapping is not done in a co-ordinated manner among stakeholders. The NGOs stated that they carry their own hazard mapping and vulnerability assessment depending on what programmes they want to implement as they do not rely on the municipality. Also, the South African Weather Services stated that: *it ...carries a weather hazard assessment for the entire metro and long term climate change scenario forecasts, at a cost.*

The manner in which hazard mapping is conducted, can have a positive or negative impact on vulnerable communities, and members of the public. Disaster risk reduction programmes/initiatives must be based on reliable information, which is linked to Objective One of the study. These exercises are a core requirement of DRR as they bring about credible decisions-making processes, for example, in designing DRR programmes, as highlighted by de Guzman (2003:12). An urgent commitment is required for hazard mapping and vulnerability assessment, more importantly, that is inclusive of the communities.

Binomial Test						
		Category	N	Observed Prop.	Test Prop.	Asymp. Sig. (2-tailed)
Have you been involved in any hazard mapping and vulnerability assessment exercise in your community?	Group 1	No	287	.98	.50	.000 ^a
	Group 2	Yes	7	.02		
	Total		294	1.00		

a. Based on Z Approximation.

A significant proportion (98%, $p < .0005$) indicated that most respondents have not been involved in any hazard mapping vulnerability assessment exercise in their local communities, which is a matter of concern and must become a consideration for the Municipality in its DRR strategy and work with the local households.

Table 5. 18: Household emergency plans

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	9	3.0	3.1	3.1
	No	285	95.3	96.9	100.0
	Total	294	98.3	100.0	
Missing	System	5	1.7		
Total		299	100.0		

Household emergency plans were presented as not a very common strategy practised in NMBMM, as only 3.1% indicated that they had household emergency plans in place, as compared to 96.9%. These statistics imply that NMBMM residents are not familiar with the household plans. During focus group discussions, the participants were not aware of household emergency plans, nor their relevance. This can be linked to the fact that the Municipality does not have or implement comprehensive public awareness initiatives, as mentioned earlier. It can also be linked to the fact that communities were blamed for lack of interest in risk governance. One respondent said the following:

- *Communities suffer from dependency syndrome where government is expected to provide all service, and citizens do not acknowledge their responsibilities in DRR.*

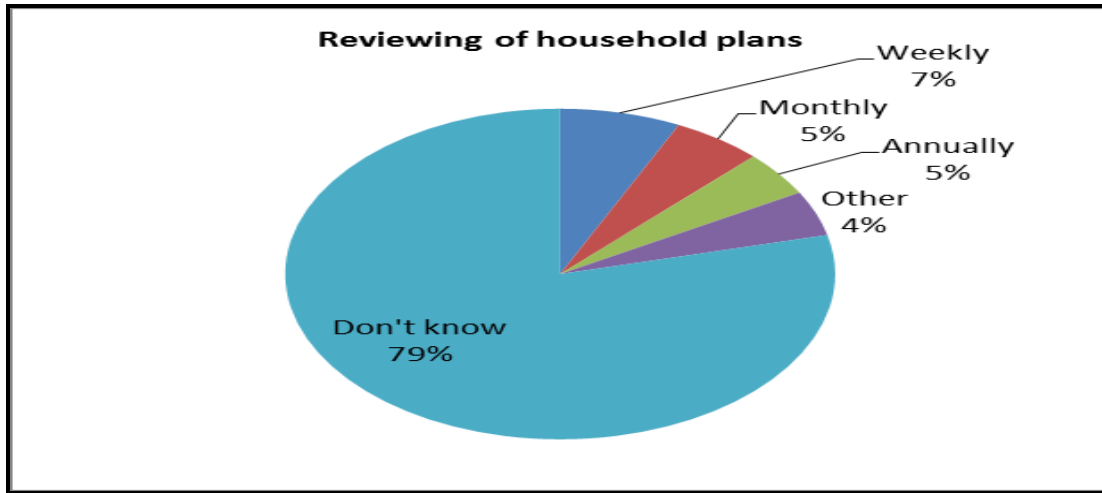
Household plans are the first commitment by a family in staying prepared and knowing how to best respond in an event of a disaster. For example, the plan should include some key aspects, such as what basics to stock, what to do when a disaster happens, who to call for assistance, and what vulnerable people in the family should do. It must be developed in conjunction with neighbours as closest allies, while ensuring that emergency supplies are maintained (Ontario Ministry of Health 2013). It is submitted that the NMBMM needs to put in place programmes that assist communities in building a culture of having basic household emergency plans. Assistance can be sought from other cities that have similar programmes in the country. The relevance of household plans was ignored in a previous research whose focus was to assess social vulnerability in the context of water infrastructure in South Africa, as the research does not recommend household emergency plans, for example, as a basic preparation strategy by a household and considering that many households' in South Africa rely on municipal water supply and when it is not available they tend to protest (Hay, Hay, Mlissa, Blake, Imrie and Goldberg 2012).

Binomial Test						
		Category	N	Observed Prop.	Test Prop.	Asymp. Sig. (2-tailed)
48 Does your household have any emergency plans?	Group 1	No	285	.97	.50	.000 ^a
	Group 2	Yes	9	.03		
	Total		294	1.00		

a. Based on Z Approximation.

A significant proportion indicated that most households do not have any emergency plans (97%, $p < .0005$).

Figure 5. 18 Reviewing of household plans



Household plans should be reviewed regularly; however, of the 3.1% who had responded that they had households' plans, a significant number of 79% did not know anything about reviewing of households plans. These statistics show that those who indicated that they actually do have household plans, are not familiar with reviewing other plans. A family's coping capability can largely be determined by emergency preparedness, firstly by understanding particular risks and hazards that they are vulnerable to, and secondly, by developing an emergency plan/kit in the home containing important emergency contacts, food, water, and basic medical supplies (Levac, Toal-Sullivan and O' Sullivan 2012: 727). The National Disaster Education Coalition (1999:5) also reiterates that "families can and do cope with disaster by preparing in advance and working together as a team. Knowing what to do is your best protection and your responsibility". It is essential for NMBMM to develop and implement DRR programmes specifically focusing on the need for families/households to ensure they have such plans. The plans should also be kept up to date so that families are prepared in case of an emergency.

5.4 PHASE 2-DISCUSSION OF QUALITATIVE DATA

In Chapter Four, it was indicated that data was also collected using qualitative methods. This section presents qualitative data that was supported with quantitative data.

5.4.1 Introduction

This section of the chapter provides a discussion on the analysis of the data collected during in-depth interviews, focus- group discussions, open-ended questionnaire and during observation process. An open-ended questionnaire was distributed to the ten full-time disaster management officials at the NMBMM disaster risk management centre who are tasked with implementing disaster risk management policy frameworks. In-depth interviews were held with the Acting Director for the Safety and Security Directorate representing the city management; two non-governmental organisation senior managers; two government line department senior managers; and two private sector organisation heads responsible for corporate responsibility. Moreover, two focus group discussions with community members were held at the community levels and lastly, notes taken by the researcher during observation process were analysed. The questions in the interview schedules, focus group discussion and the open-ended questionnaire were either the same or very similar, to allow for comparison. Some of the findings were integrated with quantitative findings, and others from the analysis in the forms of themes are discussed below.

5.4.2 Stakeholder partnerships and collaboration

Table 5. 19: Institution/Department

Organisation/Departments	Count of respondents
NMBMM Disaster risk management centre	10
City management [Safety & Security Directorate]	1
Government line department [South African Weather Services & The South African Defence Force]	2
Non-Governmental Organisations [Al-Hamdaad Foundation & Red Cross South Africa]	2
Private Sector [Coca Cola Fortuner & Woolworth]	2
Community members from Walmer and Motherwell Townships	16

The table above outlines institutions/departments and number of respondents from each one of them that took part in the research. Their contribution in service delivery to NMBMM is discussed later in this section.

Table 5. 20: Years of partnership

Years of partnership	Count
1-5	0
6-10	16
11-15	1
16 and above	0

From the table above it can be noted that stakeholders who participated in this research have partnered with NMBMM for between 6 and 15 years. Implications of their collaboration are highlighted later in the discussion. Stakeholder collaboration and partnership is a very important component for DRM and generable building of a sustainable society. Research question number caps one looked at how best co-operation and multilevel, multi-dimensional and multidisciplinary strategies can be enhanced at Nelson Mandela Bay Metropolitan Municipality to influence effective disaster risk management. In Chapter Two of the research there was emphasis on stakeholder partnerships and collaboration as a key feature of TDRMM. Quantitative research found that partnership and collaboration is important to implement sustainable initiatives from multi-sectoral and multi-disciplinary approaches, in NMBMM as, for example, 25.8% had informal dwellings in informal settlements which denote vulnerability. Nel (2013: 400) stated that despite the need for partnerships, especially public private partnerships, for enhanced service delivery, there is a lack of a culture of awareness and understanding. This author proposes a shift towards an integrated systems management to enhance risk management among DRM stakeholders.

5.4.3 Day-to-day responsibilities of respondents

Based on qualitative data, the respondents' responsibilities and contributions by their organisations in relation to overall DRM in NMBMM were summarised as follows:

- **Disaster Management Centre:** the disaster management officials' overall role is to ensure that the DM Act and the NDMF are implemented on the ground. Some of the day-to-day responsibilities involved the following: ensuring that IDPs and DM plans are developed and implemented; co-ordination of team events such as community awareness education on at community levels; monitoring satellite offices; establishing community local DM committees such as ward leaders; influencing stakeholders to adhere to the DM Act, and offering relevant employee trainings. In Chapter Two, it was highlighted that the DM Act requires the establishment of national, provincial and municipal disaster management centres, in the country.
- **Safety and Security Directorate:** this office co-ordinates activities of the following departments in NMBMM; DRM Centre, Fire Emergencies, Traffic Services and Security Services. The Director attends all meetings held by these departments and approves or disapproves any plans for the municipality, for example, DRR initiatives. This department becomes important in this research as it represented the City Management.
- **Government Line Departments:** there were two line departments that participated in this research and their key responsibilities and duties were summarised to mainly include; (i) South African Weather Service: provides weather monitoring equipment, maintaining and monitoring early warning systems regularly, for the NMBMM, at a cost. Additionally, it also serves as a member of the DM Advisory Forum. (ii) The South African Defence Army (SADA) mainly offers security during disasters and also provides non-food donations during relief and emergencies in the metro.
- **Non-Governmental Organisations:** Two NGOs participated in this research, that is, Red Cross South Africa Port Elizabeth and AL-Hamdaad Foundation. Their roles in NMBMM mainly remain within response/emergency and sometimes during recovery. They provide relief donations such as food parcels, medical services and blankets. The NGOs also design and implement public awareness programmes, serve in the DM Advisory Forum, carry out their own situation assessment during and after an incident/disaster and sometimes assist some families to rebuild themselves.
- **The community:** communities remain the key stakeholders in NMBMM as they are the beneficiaries of services rendered. Community members assist during emergencies,

participate in public awareness education programmes and inform the municipalities during emergencies.

5.4.4 Legislative policy frameworks and governance

Disaster risk management policy frameworks serve as a guide to all stakeholders involved in disaster risk management service delivery. This section is important when addressing the DRM, as some researchers such as Ngcamu (2011) failed to consider the legislative framework and governance aspects in their doctoral research, yet it focused on DRR.

The following issues emerged within this specific theme:

Knowledge of the policy framework content: the research found that some of the respondents such as the DM officials, NGOs and line departments were aware of and familiar with the contents of the South African DRM policy frameworks. However, some Ngo respondents argued that many municipality officials generally do not understand the content and how to implement the policy frameworks. It was also indicated that communities do not fully understand what their responsibilities are when it comes to DRR. For example, one respondent said:

- *Communities do not understand DM policies and what is required of them in contributing towards risk reduction in their communities.*

Disaster risk reduction requires stakeholders to familiarise themselves with the content of all local and international frameworks, as discussed in Chapter Two. The implication for not fully understanding the requirements of DM policy frameworks translates to poor implementation on the ground.

Implementation of DRM policy frameworks: the non-governmental organisation respondents argued that disaster risk management policies remain in the academic arena and not at the local government levels. This argument was linked to failure by the municipality to comprehensively implement the DRM policy framework on the ground. The government line departments were also blamed for not doing enough when it comes to budgeting resources for risk reduction in the

metro. Moreover, the private sector presence is only seen during an emergency response. The following were some of the responses:

- *Disaster management policy frameworks are mainly idealistic. There lacks commitment from the government in implementing them through DRR programmes.*
- *We do not have proper housing, we have challenges with water and drainages systems, sanitation, refuse collection.*

Effective implementation of DRM policy frameworks requires political commitment. Respondents from the DM centre, government line department and NGOs similarly argued that there seems to be a lack of political will when it comes to disaster risk education in NMBMM. Likewise, the South African Weather Services in NMBMM indicated that it has recommended numerous mitigating issues through appropriate research, but the challenge is with the implementation. It was pointed out that implementation will depend on whether there is political will to implement all or some of the recommendations. The office of the Security and Safety Directorate further expressed its frustration as it felt that politics are important in NMBMM though it is used as a tool to motivate service delivery protests. Limited political will is also evident in the ‘chronic’ state of minimal budget allocation for DRR in the municipality, as discussed under the section Research Context. Some of the responses included the following:

- *Each political party uses politics as a tool to take control of the metropolitan.*
- *There seems to be a lack political will from government line departments when it comes to DRR.*
- *The municipality lacks honest and hardworking government official.*

This theme answers research question number four highlighted in Chapter One and Four of the study which seeks to understand the enabling mechanisms in place, including policy and structure, in NMBMM. Political will forms one of the crucial aspects of disaster risk reduction and as literature has shown, it is not given the necessary attention as evidenced in the reactive approach that dominates DRM in South Africa (Van Niekerk 2005: 77, 144).

The South African government should recognize the urgent need for resilience-building, as recently agreed by global nations under three global frameworks: the Sustainable Development Goals, the Sendai Framework for Disaster Reduction, and the Paris Agreement. The government has a political mandate as well as a scientific one, to take immediate and bold action to create more resilient urban centres through co-operation with all stakeholders (Resilient Cities Report 2016: 4).

5.4.5 Integrated Development Plans

The majority of the respondents felt that although IDPs are developed as per needs of the communities, they fail to comprehensively report on these important events. Some of the responses highlighted, include the following:

- *IDPs do not focus, mention nor outline how they will develop programmes that will reduce identified priority risks in the municipality;*
- *The IDPs do not address DRR initiatives or programmes; and*
- *IDPs do not also mention how DM plans will be implemented.*

Respondents also indicated that the majority of stakeholders in the municipality do not treat DRM with urgency, and for this reason they do not cater for DRR in their institutional or departmental IDPs. Disaster management is generally regarded mainly as a responsibility of the DM centre in NMBMM. The sustainable development in NMBMM cannot be achieved without considering the “integration of disaster risk reduction into development activities through the Integrated Development Plan (IDP) process” (Van Niekerk 2005: 4). In Chapter Two, it was discussed that the Local Government Municipal Systems Act No. 32 of 2000 mandates the inclusion of applicable disaster risk management plans as core components of municipal Integrated Development Plans (IDPs). These findings require the NMBMM to enhance its efforts in developing and implementing comprehensive DRM IDPs. Lessons can be learned from other municipalities in the country that have comprehensive DRM IDP plans, like the City of Cape Town’s Metropolitan Municipality. The aspect brings a new perspective considering that NMBMM Disaster Risk Management IDPS and the overall municipal IDPs do not propose in detail how they would reduce risk in the municipality but report on what has been done. For

example, they only outline how DM plans would be implemented, and worse, that there was never a budget allocation provided for the coming financial years.

5.4.6 Institutional capacity of the in NMBMM

The NDMF KPA 1 focuses on integrated institutional capacity for disaster risk management and implementation of DRM. A study was conducted by Sithole (2014), but it must be noted that it did not consider the institutional capacity aspects in a comprehensive approach. The author focused on inter-governmental relations as a planning instrument for local government disaster municipal planning in South Africa. The study, however, focused only on DM officials excluding other stakeholders involved in DRR in selected case studies, yet stakeholders' views are very important as they might be unbiased and not base research on municipal officials only. Below are some salient sub-themes that developed in the discussion of the current study:

Human resources and relevant skills: the municipality is challenged, as employees at the DM Centre indicated that they did not have advanced qualifications such as public management and disaster management degrees, which limits their performance in implementing DMA. Some of the responses included the following;

- *Apart from relevant professional development courses we have done, there is a need to have an undergraduate qualification, which we can do via part-time degree courses in disaster management.*

DM officials added that they do not feel motivated to acquire more skills, as the department does not have structures in place to motivate them. For example, *there is no progression policy for employees, which demotivates their performance as they do not know when they would get a promotion.*

In Chapter Two, progress reports on HFA implementation identified skilled human resource constraints as one of the major issues that affect developing countries in their commitment to implement their national DRR frameworks (UNSDR 2014: 4). The municipality should increase

its efforts in ensuring that budgets are allocated for hiring the necessary number of skilled employees, to offer decent services in the municipality.

Technology and equipment: research shows that technology and equipment play huge roles in overall DRM. Some officials indicated that the municipality has reasonable technology to facilitate DRM service delivery, such as machinery and vehicles, specialist trailers and vehicles. There are bilge pumps, generators, water trailers, energy lighting plants, mobile Joint Operation Centre, and public address systems. With regard to Early Warning Systems which are an important component in DRR, they are limited to only Remote Camera Projects (CCTV) and Automatic Weather Stations connected to CCTV installations. It was also indicated that not all DM staff are familiar with the application and use of this available technology and for this reason, services of the South African Weather Services are utilised at a cost to the DM centre. The research Question Four looks at what enabling mechanisms are in place in NMBMM. Disaster risk reduction requires up-to-date technology and equipment to enhance service delivery in NMBMM. Quantitative research found that only 23.3% reported having received response during emergencies from the municipality.

Financial capacity: noted as the major challenge in NMBMM that distresses all stakeholders in NMBMM. According to the DM centre and the Safety and Security Directorate, *disaster management services delivery within the municipality is implemented within normal budgetary provision, and for this reason there is no specific budget allocation for the day-to-day operations or neither for relief operations.* The NGOs and the private sector focus mainly on the response phase as they are constrained financially and thus not able to fund sustainable mitigation and preparedness programmes. Quantitative research found that communities have previously lost loved ones, an issue that can be linked to a lack of mitigation measures, and blamed on poor budgets for DRR. Issues around financial constraints in South African municipalities are a huge challenge, as indicated by previous researchers such as Van Niekerk and Coetzee (2012: 344). On a different note, some respondents argued that it was not only about limited finances for DRM, but that the municipality also faces other challenges relating to financial capacity, as provided by the responses below:

- *The most pertinent question is how effectively is the funding being utilised as there are a lot of resources wasted in the municipality. For example, too much money spent on salaries and not enough on the delivery of services.*
- *Population increase puts pressure on available funds to meet needs of poor communities, such as people migrating from the rural areas settling in the informal areas.*

Multi-sectoral and multi-disciplinary approach involvement: research found that DRR is not receiving attention within the requirements of the national and international framework on this important aspect. Some respondents such as the NGOs stated that many DRR stakeholders in NMBMM implement programmes and initiatives with minimum consultations or individually. For example, one NGO said the following:

- *Community DRR task teams should be put in place, and be composed of different sectors; this is not happening on the ground.*
- *A similar statement was made by the Safety and Security Directorate, that departments do not talk and sometimes decisions are passed without consulting stakeholders.*

Total Disaster Risk Management Framework, as raised earlier in the study, places emphasis on the roles of various sectors, stating that there has to be an increased “awareness of these sectors on the impact of disasters on sustainable development and on the limitations of current local capabilities and capacities, allowing for common recognition among stakeholders of the need for strengthened co-operation and collaboration at all levels” (de Guzman 2003: 3). Recent research by United Nations (2014: 36) maintains that multi-sectoral platforms for DRR functioning have not been universally achieved globally. For NMBMM to be an inclusive, safe, resilient and sustainable city, as per Sustainable Development Goal 11 and the New Urban Agenda, a paradigm shift in public management of institutions, including between national, provincial and local government and most crucial with its communities, is crucial (Resilient Cities Report 2016: 9).

5.4.7 Information Management and Communication

This theme responds to research question number three that looked at what NMBMM is doing to make sure that there are reliable systems in place for the co-ordination and integration of stakeholders.

Respondents indicated that while the municipality has reasonable disaster management information systems in place, there is a state of crisis within the municipality, caused by the manner in which certain important issues are handle/communicated. For example, the office of Safety and Security Directorate stated that:

- *Communication systems between local government and provinces are not uniform or standardised, which is not good.* Reliable systems are important so as to keep the communication going, as the local governments report to the provincial offices which are the closest institution to the national DM Centre.

Collecting, analysing and sharing of information: the current ways and approaches in which information is collected, analysed and shared amongst the stakeholders in the municipality, are not acceptable to some degree. It was clear that most stakeholders in the municipality prefer to carry out their own research which they use in implementing individual organisational DRR activities. For instance, the NGOs and the South African Weather Services indicated that they carry their own risk analysis and impact assessments instead of relying on what has been gathered by the DM Centre. Moreover, records of this information are individually stored by stakeholders, and this translates to duplication of information in the municipality. Another example was given by some NGOs who are very actively involved during response in NMBMM, relating to Early Warning Information, and indicating that they do not rely on the DM Centre during emergencies for information on what is happening on the ground. They have put in place their own programmes in which recruitment of community volunteers and relevant trainings are in place, thus monitoring situations on the ground. This situation reflects a lack of collaboration amongst stakeholders in NMBMM, especially on the responsibilities of the DM Centre that exists as a co-ordinating body. One NGO stated the following:

- *Unqualified stakeholders or team members are used to supply information to the stakeholders.*

5.4.8 Stakeholder collaboration and involvement

The existing collaborations for DRR between the municipality and other key stakeholders are not strong enough in NMBMM. This issue was associated to lack of a legally binding policy on partnership of the stakeholders in DRM in the municipality, and generally in South Africa. Some of the responses included the following:

- *Inter-departmental committees are non-functional although they happen to meet some times;*
- *Stakeholders do not agree or talk to each other; and*
- *Stakeholders get involved but a lot needs to be done to get private sector and big companies to make a positive impact.*

The DM Centre indicated that most stakeholders like the private sector and NGOs only want to contribute during the emergency and response phases. Line departments in NMBMM were described as not taking their responsibilities seriously when it relates to DRM, and were blamed for not having done enough in contributing to DRR in the municipality. For example, the majority do not budget for DRR in general. The following table provides a summary of some of the activities stakeholders mainly contribute in DRR in NMBMM:

Table 5. 21: Summary of contribution by stakeholders in 2014/2015

Names of Stakeholders	Capacities of participation in NMBMM
Private sector	Contribute mainly during the response phase where they provide donations such as food parcels and clothing.
Non-governmental Organisations	Assist mainly during response and rehabilitation phases: <ul style="list-style-type: none"> - donations during crisis, soup kitchen, food for victims - medical services such as counselling - public awareness training to community members - part of our Joint Operations Centre (JOC)
Government line departments	Assist mainly during mitigation phase including: <ul style="list-style-type: none"> - offering services like infrastructural provision such as E.W.S. - part of Joint Operations Centre (JOC) - offer capacity building on severe weather programmes
Vulnerable communities	<ul style="list-style-type: none"> - recipients of public awareness education - DRR Programmes - volunteering during relief operations - response and recovery - source of information from the ground

Author's perspective

From the table above, one can argue that DRR is mainly focused on the response phase and it is reactive-oriented in NMBMM. Key actors in disaster risk reduction are expected to build strong partnerships with communities, civil society, the private sector, governments, and regional and national governments and international institutions (UN/ISDR Africa 2004:7). This theme responds aptly to the Research Objective Four raised earlier in the study, which focuses on understanding the enabling mechanisms in place at the Nelson Mandela Bay Metropolitan Municipality to influence effective disaster risk management.

5.4.9 Community vulnerability

Community vulnerability was identified by respondents to include both social and economic shocks, risks and disasters. Quantitative analysis found that many households rely heavily on government social grants, not a sustainable approach to livelihoods. Vulnerability creates hopelessness reduces peoples coping mechanisms, and failure to have basic strategies such as the household emergency plans in place', as found identified in the quantitative analysis that revealed that 96.9% did not have this important approach. However, some the respondents, like the South African Weather Services, raised the following argument:

- *Despite the efforts made by the government in offering much needed services, vulnerability of communities creates a dependency syndrome on government...unlike the private home owners who are more prepared, and rarely rely on government assistance. For example, they have insurance to rebuild their livelihoods/homes unlike poor communities.*

Communities indicated that they turn to service delivery protests in NMBMM believing that it is the best option that will make the government address their grievances. This issue came out strongly during the focus group discussions, for example, that *poverty and hunger lead to more protests*. Thus, poverty and service delivery have a direct correlation as those that mainly protest in NMBMM were regarded as the poor communities. Some NGOs argued that the poor are justified in their demand for better socio-economic opportunities and sustainable service delivery. However, the government line departments stated the following regarding poverty and service delivery:

- *It was naïve to think that it is still poverty and hunger which is driving the protests in NMBMM. It has to do more with demands for FREE access to services such as housing, water and electricity, including those who do earn stable livelihoods and do not want to be responsible citizens.*

Other responses included the following:

- *The local government operates under constrained budgets which create delays in service delivery, while at the same time, informal settlements keep mushrooming defeating the budget allocations against increasing community needs for service delivery.*

In Chapter Three, it was highlighted that communities play a major role in disaster risk reduction. Certain models and frameworks can be adopted by communities to assist on how best it can manage and cope using available resources, for example, by heightening awareness and implementation of the Community Disaster Risk Reduction Framework.

5.5 CONCLUSION

Chapter Five presented results of the triangulated quantitative and qualitative data as was highlighted in both Chapter One and Chapter Four. Quantitative data was collected from households through a closed questionnaire. Qualitative data was collected through an open-ended questionnaire for the DM officials; interviews with NGOs and government line departments and the private sector; focus group discussions with community members, and observations by the researcher throughout the research.

Quantitative data was presented in the form of graphical presentation to gain a holistic view of the study. The qualitative data was presented in thematic form and analysis, while supported by respondents' direct opinions. Through the respondents, it was clear that despite the efforts made by NMBMM to meet the requirements of the DMA, in DRR certain key aspects have not yet received the expected attention. This empirical study has successfully explored the five study questions as the findings revealed a close synergy with the issues raised in the earlier conceptualisation of the study.

CHAPTER SIX

FRAMEWORK FOR DISASTER RISK REDUCTION AND SUSTAINABLE SERVICE DELIVERY

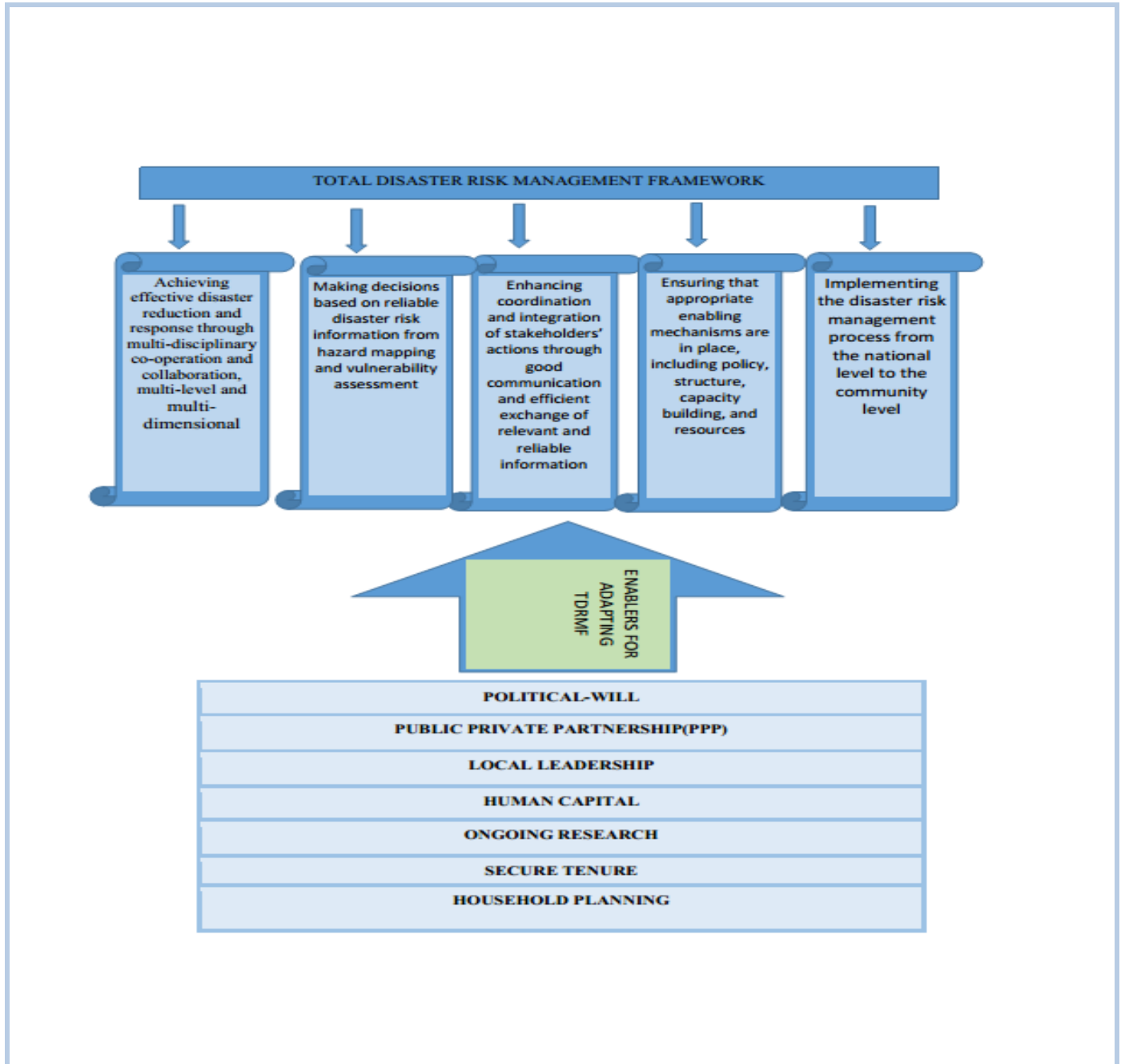
6.1 INTRODUCTION

In the previous chapter, the summary, conclusion and recommendations for the research were provided. A conclusion was derived that the TDRMF that presents a “window of opportunity” for overall Disaster Risk Management implementation at a selected municipality as a case study in particular, and could be suggested for South African local government municipalities in general. The research therefore, advocated for Nelson Mandel Bay Metropolitan Municipality to adapt and contextualise its current *modus operandi* for developing and implementing disaster risk reduction programmes and initiatives. This chapter presents one of the thrusts of the study as a new contribution in that some enablers would facilitate the implementation of the framework in NMBMM. The enablers were developed based on extensive literature reviews and research findings arising from the study.

6.2 TOTAL DISASTER RISK MANAGEMENT FRAMEWORK AND ENABLERS

The research advocates for the adaptation of TDRMF together with the enablers. These enablers include: the political will, public-private partnerships (PPPs), capable local leadership, sufficiency of human capital, ongoing research, secure tenure and proactive household planning. The following figure provides the linkage between the TDRMF and the Enablers.

Figure 6.1: TDRMF and the advocated enablers



Source: Modified from Asian Disaster Reduction Centre (2007)

The main purpose of the enablers is to facilitate implementation of the framework. For example, research found that in NMBMM, there lacks strong political commitment or will to advance the cause and purpose of DRR. For this reason, it should be given attention so as to facilitate a

“fresh approach” in addressing municipal service delivery in the context of disaster reduction and promoting a safer environment for the local communities. Moreover, the enablers can be understood by identifying key actors, and description of the linkages between the enablers and the actors. Table 6.1 below then aptly provides a summary of the significant relationships as a multi-sectoral and collective responsibility of key stakeholders. The need for strong relationships for effective DRR was presented in Chapter Five and also in Chapter Seven.

Table 6.1: Summary of suggested enablers

ENABLER	Actor	Description
Political will	Government spheres	All spheres of government are a centre of decision-making processes. There is a need for local government to commit to providing leadership/guidelines and much-needed resources so as to enable the successful implementation of the Framework.
Public Private Partnership(PPP)	Public and private Institutions	This includes all public line departments and the public sector. Related institutions to adapt the framework in designing and implementing DRR programmes and initiatives. This would require committing to resources allocation for effective and efficient service delivery.
Local Leadership	Communities	Includes both urban and rural communities and households to ensure that structures like ward communities, civil society organisation and NGOs participate in all decisions pertaining to risk reduction.
Human Capital	Households & communities	Households should remain the centre of decision- making. This requires communities to have access and be empowered with all the skills that empower them to stay resilient to reduce their vulnerabilities. Community participation would also be enhanced.
Ongoing research	Research institutions, government, NGO’s	Ongoing research by different stakeholders in the area of DRR on how best to contextualise and implement the framework is of paramount importance.
Secure Tenure	Local communities	Secure tenure access to communities would enable durable structures and risk reduction exposure. People will live without fear of facing demolitions of their structures and also service delivery would be easier to implement.
Household planning	Households	Proper household planning is integral to enable proper preparedness, mitigation and response to shocks and disasters, and contribute to better emergency planning.

Source: Authors perspective

The above enablers were identified as important considerations for the adaptation of the TDRMF specifically with reference to NMBMM. These enablers have been expounded as deliberated below:

- *Political willingness* is a major driving force for DRM implementation for every government. One recommendation of Hyogo Framework for Action was on the need for political willingness and commitment to risk reduction. Thus, the Sendai Framework for Disaster Risk Reduction advocates for “strong commitment and involvement of political leadership in every country at all levels in the implementation and follow-up” of DRR. Moreover, the enabling environment should able be created and initiated by government (UNISDR 2015: 9, 12). This enabler would contribute to effective and efficient service delivery in risk reduction, as indicated by Subban and Theron (2016: 55) indicating that, a successful implementation of IDP’s priorities in local government requires financial planning and commitment. This commitment includes DRR as part of the IDP’s strategic focus.
- *Public Private Partnership* (PPPs) according to National Treasury (n.d: 4) involves long-term commitments between the public and private sectors. This consists of all forms of collaboration between their institutions towards a common goal, especially for the well-being of the general society and in this study to enhance service delivery in risk reduction and general DRM. Nel 2013 (336, 337) identified that governments often do not have political willingness or buy in to PPP’s. One contributing factor is the nature of decisions being politically motivated, thus a lack of long-term commitment. What is significant though, is that as an enabler, PPP is needed in NMBMM if the TDRMF is to be a success.
- *Local Leadership* should be encouraged in which all community stakeholders such as women, children and people with disabilities take part for equal representation purposes. Subban and Theron (2016: 44, 51) acknowledged that the NDP advocates for “determined leadership, a capable state and sacrifice on all levels of participation” in service delivery. The authors further stated that there is need for traditional leadership engagements and improved communication strategies must be developed for municipalities to achieve service delivery effectiveness. Therefore, through these

enablers, a full and meaningful participation would contribute to successful implementation of the TDRMF. This will require leadership to be demonstrated through a multi-cultural approach in NMBMM. A multi-cultural approach in NMBMM will capitalise on opportunities relating to embracing different cultures represented in the Municipality. Furthermore, the approach would contribute towards social transformation in which all racial groups are expected to play a role in all forms of developments, argues Cele and Chipunga (2016: 2).

- *Human Capital* is also referred as part of community empowerment. This enabler if well adapted and implemented has the potential to revitalise and strengthen NMBMM's urban poor. Research findings indicated poor levels of education among many residents in NMBMM, and this situation contributes negatively to households and general community participation in sustainable development. Furthermore, research also identified skills-shortage of Disaster Management officials in NMBMM. This enabler requires communities to be empowered with necessary skills on understanding their surroundings, for example: their exposure to potential risks, hazards, socio-economic shocks and disasters. These efforts would also transform to improved livelihoods and citizen meaningful participation in economic development of the country at large. From a different angle, this enabler is relevant considering what Subban and Theron (2016: 44) put forward that, "the National Planning Commission's (NPC) main goal regarding the need for a national plan is the urgency to address the poverty cycle and exclusion of the majority of people from opportunities for further education". Access to all forms of education for the masses significantly contributes to human capital sustainability. To further add to this, Dreier (1996:123) stated that many government institutions, civic leaders, and academic institutions have embraced and continue to advocate for the notion of community empowerment.
- *Ongoing research* should be carried out by all stakeholders involved in the DRM. This should include government, NGO's, and learning institutions. Of importance, is the implementation of the research recommendations by the local authorities. In Chapter Five, one of the issues raised by the South African Weather Services was the failure of the Municipality to implement recommendations provided through research on important programmes. It stands to reason then that UNISDR (2015: 15) relating to SFDRR calls

for all stakeholders to acknowledge “long-term, multi-hazard and solution-driven research in disaster risk management to address” challenges, gaps and social-economic shocks affecting our society. This enabler promotes continued research on how TDRMF can be adapted and implemented on specific cases, hazards and risks and disaster situations in NMBMM.

- *Secure Tenure* in this research refers to communities and households’ safe and resilient structures/homes. Research in Chapter Five identified that one challenge in NMBMM is the status of houses in which some are a hazard to those communities living in them. There was also infrastructural challenges that hinder service delivery, especially during response to emergencies. The Municipality also stated that land for settling vulnerable communities remains an ongoing challenge. Secure Tenure enabler would facilitate proper implementation of the TDRMF. Thus, proper secure tenure would provide the agency to influence positive transformation in people’s lives.
- *Household planning* should be at the centre of TDRMF. In Chapter Five, the research identified that majority of the respondents are not aware or familiar with household plans. Household plans entail proper preparedness and response to socio-economic shocks and disasters, rather than over-reliance on government assistance (as a survival strategy). This enabler would facilitate adaptation and successful implementation of TDRMF, particularly in NMBMM.

6.3 CONCLUSION

This chapter builds on the significance and contribution of the study that was presented in Chapter One. It presented a summary of suggested enablers for the adaption and implementation of TDRMF, which should be applied together with other recommendations highlighted across the research findings from the empirical study in Chapter Five and recommendations raised in Chapter Seven. The enablers place political willingness as a driving force, and household and communities at the centre of sustainable decision-making processes, ultimately for TDRM implementation in NMBMM as an imperative.

CHAPTER SEVEN

CONCLUSION AND RECOMMENDATIONS

7.1 INTRODUCTION

The final chapter provides a synthesis of the research results and findings. It also provides the conclusion and recommendations arising from the study. A brief summary of the research problem and objectives is provided, followed by a summary of chapters. Lastly, a conclusion is presented with recommendations through the empirical study. The chapter ends with future research imperatives.

7.2 RESEARCH PROBLEM AND OBJECTIVES: KEY RESEARCH QUESTIONS EXPLORED IN THE STUDY

The study was guided by the main research aim and objectives. The research aimed to understand if DRR play an important role and also investigated and documented the enabling the environment, that is, structure and measures for the effective application of a TDRMF in NMBMM. Each research question is discussed in the section below, linking each with the key findings of the study. The guiding research question was pointed out in Chapter One as, ‘‘to what extent can TDRMF be adapted and incorporated in implementation of DRR programmes in NMBMM?’’.

7.2.1 Research Question One

The first research question guiding this study was:

How can multi-level, multi-dimensional and multi-disciplinary co-operation and collaboration mechanisms be employed at Nelson Mandela Bay Metropolitan Municipality to influence effective disaster risk management?

This research question sought to investigate the mechanisms employed by Nelson Mandela Bay Metropolitan Municipality to initiate and sustain multi-level, multi-dimensional and multi-disciplinary collaboration and co-operation. In addition, the study explored programmes and initiative activities for this mechanisms used in networking for sharing of information, expertise, resources, and collaboration and co-operation in local capacity building in vulnerability and risk

assessment, among other marginalized issues. The nature of the respondents selected for the research on these mechanisms was addressed through both quantitative and qualitative methodologies. Quantitative data was collected through a closed ended-questionnaire that was distributed to NMBMM households. Qualitative data was collected through the following methods: an open-ended questionnaire that was distributed to DM officials; in-depth interviews held with non-governmental organisations (NGOs), the private sector, government line departments and Safety and Security Directorate office. Focus group discussions were conducted with community members, and lastly, through observation. Through these data collection methods, significant data was collected. Findings from both quantitative and qualitative data revealed that NMBMM faces major challenges to effectively incorporate these mechanisms in overall DRM implementation processes. However, with improvement of political will through resources allocation, there is a “window of opportunity” for improvement, as these mechanisms fit very well in an overall DRM.

7.2.2 Research Question Two

The second research question guiding this study was:

To what extent are decisions based on reliable disaster risk information from hazard mapping and vulnerability assessment at Nelson Mandela Bay Metropolitan Municipality in influencing effective disaster risk reduction?

It was imperative to ascertain the importance to hazard mapping, vulnerability and risk assessment as a fundamental tool for generating reliable disaster risk information, which serves as basis for making decisions on disaster reduction and response interventions at Nelson Mandela Bay Metropolitan Municipality. Among the possible programme activities for this strategy, the study set out to establish the promotion of hazard mapping strategies, vulnerability and risk assessment at the local and community levels, status of collaboration and co-operation in vulnerability and risk assessment of critical facilities, and collaboration and co-operation in assessment and enhancement of early warning systems. Although the majority of respondents were fully aware of the benefits and importance of making DRR decisions based on reliable disaster information, there are no regular programmes on hazard mapping and vulnerability assessment in NMBMM. This current situation may be linked to the nature of relevant skills of the employees at the Municipality, and thus relying on external consultants, which is costly for

the municipality, which yet operates on a constrained budget for overall DRM. Findings showed that DM Centre officials do not possess necessary skills and expertise, and there is an over-reliance on costly consultants. It can therefore be said that an urgent shift towards a culture of hazard mapping and vulnerability is required in NMBMM.

7.2.3 Research Question Three

The third research question guiding this study was:

What is the Nelson Mandela Bay Metropolitan Municipality doing to enhance coordination and integration of stakeholders' actions through good communication and efficient exchange of relevant and reliable information?

The research aimed to ascertain if information plays an important role in disaster reduction and response at Nelson Mandela Bay Metropolitan Municipality. The study explored if NMBMM has the enhancement of disaster risk management information systems at various levels, capability and skills development for DM practitioners, integration of information technology and local knowledge, and strengthening of early warning systems for natural hazards, including climatic anomalies attributed to climate change. As the findings showed, there are basic communication structures and exchange of relevant information that is happening. However, much needs to be done to enhance stakeholders' coordination and integration. There is a need for well-defined communication structures/policies so that some stakeholders do not feel left out, especially when it comes to exchanging reliable information. The municipality should commit to developing a communication and co-ordination framework through a consultative process, as this could enhance DRR service delivery.

7.2.4 Research Question Four

The fourth research question guiding this study was:

What are the enabling mechanisms in place, including policy, structure, capacity building, and resources developed and institutionalized at the Nelson Mandela Bay Metropolitan Municipality to influence effective disaster risk reduction?

In order to understand disaster reduction policies and measures developed and institutionalised at Nelson Mandela Bay Metropolitan Municipality, a thorough review of existing policies and combined with primary data was done. The research also investigated and documented

experiences of the NMBMM in implementing matters within this specific notion. Findings showed that the requirements of DMA 57 of 2002 and the National Disaster Management Framework of 2005 have not fully been implemented on the ground. Major challenges such as financial constraints and limited political will hinder smooth implementation of the entire process. Furthermore, capacity building of stakeholders with knowledge and skills on how to best implement the policy frameworks is needed.

7.2.5 Research Question Five

The fifth research question guiding this study was:

How disaster risk reduction programmes and initiatives implementation can be inclusive of communities in NMBMM, in addressing DRR?

In pursuit of determining if Nelson Mandela Bay Metropolitan Municipality's decision-making process fully applies the standard principles, processes and techniques of risk management to disaster management for the purpose of improving services delivery; this objective aimed at ascertaining systematic methods for identifying, analysing, assessing and managing disaster risks, as well as frameworks and their associated effects applied by the national, provincial, local government and communities. The study determined that standard principles of community participation and citizen engagement in risk reduction are not treated as a matter of urgency. There lacks a culture of reactivity through sustainable mitigation and preparedness measures; communities are mainly receivers of services.

7.3 SUMMARY OF THE CHAPTERS

An elaboration of the six chapters of the study places this final chapter into context, as summarised below.

7.3.1 Chapter One

Chapter One of the study presented the background to the study by providing the rationale for the topic, including the study objectives. The domain of Public Administration was integrated to strengthen the adopted conceptual framework for the study. Disaster risk management and DRR were highlighted under the 'Batho Pele' Principles, which is a strong foundation and standard

setting norm for service delivery in the South African landscape. Framework governing the research was summarised, and the methodology adopted was presented. Study limitations were outlined, and lastly, chapters in the study were delineated.

7.3.2 Chapter Two

This chapter presented the theoretical and conceptual framework of Public Administration *vis-a-vis* DRM. This included contextualising the need for DRM in local government, including a brief discussion of DRM legislative framework in the city of NMBMM. International policies and frameworks that shaped DRR were also highlighted. The framework for Total Disaster Risk Management was analysed. The need for mainstreaming DRR in public management was presented, including public policy perspectives. Social realities of government and governance for enhanced DRR were presented, and imperatives of responsible citizen engagement in risk governance were emphasised.

7.2.3 Chapter Three

Chapter Three presented a body of literature on disaster risk management from an international, regional and local perspective. The chapter contextualised disaster risk management through a discussion on the classification of disasters and disaster vulnerability as a community challenge. It was also important to trace the present status of vulnerability in the region, that is Southern and South Africa, and their implications in achieving sustainable DRR service delivery. Approaches and models for disaster risk reduction were also presented as ‘best’ practices in DRR. Ultimately, the overall aim of DRR is to create a better society for all citizens.

7.3.4 Chapter Four

This chapter discussed the research design and methodology adopted in the study. Both quantitative and qualitative methodologies were used to determine aspects of the study that relate to overall DRM and DRR in particular. A closed-ended questionnaire was used to collect data from households, while an open-ended questionnaire was used to collect data from DM officials tasked with co-ordinating DRM in NMBM. In-depth interviews were conducted with NGOs, line departments and the private sector. Focus group discussions with two groups from the communities occurred, and observation was used as a data collection method. Lastly, data was analysed and reported.

7.3.5 Chapter Five

This chapter presented the findings of the study from data gathered using the various research tools. The results following the analysis were presented in the forms of graphs, tables and pie charts. Significant patterns and trends in the statistical analysis and correlation of variables were presented through discussions. The significance of the variables was illustrated using Chi-Square and Binomial Tests. Objectivity was maintained throughout the analysis and the understanding of views and opinions expressed by respondents.

7.3.6 Chapter Six

This chapter presented the notion of the TDRMF for DRR programmes towards sustainable service delivery as an important focal point for the municipality. Thus, taking the household at the centre of decision-making process. The chapter proposed several enablers that would enhance the adaptation, contextualisation and implementation of the TDRMF in NMBMM. This builds on contribution of new knowledge that was discussed in Chapter One.

7.4 CONCLUSION

The final results indicate that the Total Disaster Risk Management (TDRMF) Framework presents a ‘window of opportunity’ for overall Disaster Risk Management implementation in South African local government municipalities. The framework should be contextualised specifically for developing and implementing disaster risk reduction programmes and initiatives at Nelson Mandela Bay Metropolitan Municipality. The overall findings can be used to bridge the existing gaps in enhancing risk reduction, which is an important contribution to this area through the study.

The following section provides a summary of the prevalent themes that emerged from the study.

7.4.1 Biographical data of the respondents

The majority of the respondents were females (62.9%). Nelson Mandela Bay Metropolitan Municipality is a multi-cultural City and the majority of the respondents (91.3%) were mainly Xhosa people. Research found that vulnerability to socio-economic challenges such as shocks and risks are high in NMBMM. Most households (50.2%) rely on child care social grants.

Despite the fact that 52.5% failed to provide details of their monthly earnings, of the 47.5% who responded, the highest numbers (11%) earn between 1001-2000 rand. It was documented that in terms of education levels, the majority (47.3%) of the respondents had only completed either primary school or had been to a high school. The implication of the biographical information is that it enabled the researcher to draw conclusions about the status of vulnerabilities, for example, socio-economic status.

7.4.2 Service delivery in basic amenities

Nelson Mandela Bay Metropolitan Municipality is tasked with the provision of quality services to its residents. On a positive note, 89.3% have access to electricity inclusive of both meter connection and wire connected (illegally). In terms of housing delivery, at least 25.8% lived in informal dwellings in informal settlements and 5% occupy informal dwellings in backyards. The roofing of their homes was mainly made up 75.6% of metal, tin and zinc; 16% were made of asbestos, 6 % of tiles; 7% of multiple materials, and 3% plastic sheets.

At least 46.5% of the respondents had their water source inside the house, while 24.7% accessed their water from the yard. A further 27.8% was outside the yard, with 1.0% not specified. The findings also revealed that 78.7% of those who indicated that they owned a property, had acquired it free from the government. However, a significant number (31.8%) were not very happy with the conditions of the house. For example, this was due to weather-related issues that made their homes not favourable (hazards, floods, coldness, walls sweat, and leakage). There were also other issues around the surrounding environment: dangerous environments, house damage making it a hazard, and also dissatisfaction with infrastructure around the houses. Moreover, regarding service delivery on refuse collection, only 38.3 % were very satisfied. The main source of power for cooking was fire-wood (1.7%), gas (3.0%), paraffin (9.0%) and electricity (85.3). However, the electricity users included all forms of connections. The implication is that this gives a wider view of levels of service delivery, impacting on pertinent issues around services delivery.

7.4.3 Disaster Occurrences

The municipality is vulnerable to various hazards, disasters and social-economic challenges. Respondents indicated that a total of 30.5% households had been affected by a disaster during the 2014 - 2015 period. Some of the disasters had been caused by the use of fire-wood, gas usage and paraffin usage. With regard to knowing someone who had been affected by a disaster, 52% had knowledge of this information, while 22% reported knowing someone who had died from a disaster. The overall implication of these disasters is the danger of people losing lives in the future, if DRR is not addressed.

7.4.4 Emergency Response and Early Warnings

Emergency response and early warning as per respondents needs to be enhanced. The time taken to respond to emergencies is too long, and not immediate. For example, 76.6% indicated that they had never received assistance in the event of a disaster. The main source of early warning was mainly through the television, which reveals a gap in the use of alternative ways, like cell-phone warnings. Risk information is not treated with urgency by communities; for example, only a small percentage (2.4%) had taken part in hazard mapping and vulnerability assessment. There are no community-based early warning systems and respondents did not understand the importance of household emergency plans, or those locally developed, nor did they utilise coping strategies.

7.4.5 Legislative policy frameworks and governance

Basic understandings of the disaster risk management policies and frameworks by stakeholders, contribute to poor implementation of the Disaster Management Act on the ground. Findings also showed that lack of political will further contributes to poor financing of DRM, an issue that contributes to the DRM IDP being very sketchy. Stakeholders' collaboration and partnerships are weak and the respondents' collaboration was between 6 and 15 years. However, the private sector contribution remains mainly on response.

7.4.6 Information Management and Communication

Findings showed that there are many issues that need to be strengthened regarding the manner in which disaster risk management information is collected, analysed, stored and disseminated in NMBMM. For example, some civic society organisations do not rely on the Disaster Management Centre for information relating to emergencies, but have their own trained volunteers based on the ground. Each institution conducts its own research to facilitate the implementation of any DRR programmes and initiatives. The implication of this lack of collaboration leads to uncoordinated interventions and duplication of duties.

7.5 RECOMMENDATIONS ARISING FROM THE STUDY

This section provides key recommendations based on the data obtained from the respondents through both open-ended and closed questionnaires, in-depth interviews, focus group discussions and observation. The empirical results indicated an important relationship amongst key variables of the study in relationship to Disaster Risk Reduction and Disaster Risk Management in Nelson Mandela Bay Metropolitan Municipality. The following are the recommendations to the Nelson Mandela Bay Metropolitan Municipality, as well as recommendations for due consideration by future researchers.

From the preceding discussion and emphasis, the following recommendations emerged from the study:

7.5.1 Role and Implementation of Policies and Frameworks

The Constitution of the Republic of South Africa of 1996, Disaster Risk Management Act 57 of 2002 and the National Disaster Management Framework of 2005, are very important legislative frameworks underpinning disaster management and ensuring safe and productive lives of all South Africans, including those in NMBMM. These legislative frameworks and policies need to be understood by all stakeholders through a culture of ongoing awareness, to create buy-in and appreciation by municipal employees and other stakeholders. Sustainable risk reduction in the communities cannot be achieved without building capacity of the staff through professional

development. Professional development that relates to subject content has the power to improve employees' performance and the achievement of organisational goals.

The objectives of the DMA can only be achieved if those tasked with its implementation fully understand what is expected of them. In this regard, it is submitted by the researcher that the Municipality is required to develop and implement a monitoring and evaluation framework for compliance to the DMA. This approach would facilitate a culture of pro-activeness in the municipality.

7.5.2 Institutional Capacity *Vis-a-Vis* Disaster Risk Reduction Programmes and Initiatives

Disaster risk management requires political will, and there is need for enhanced political will in building institutional capacity in Nelson Mandela Bay Metropolitan Municipality. Existing institutions need to be provided with the necessary financial support so that they are able to offer efficient and effective services to the residents. Lack of political will demotivates employees as they have to work under constrained budgets. Adequate budget allocations each financial year will enable smooth running and functioning of the Disaster Management Centre and its satellite offices.

Institutional capacity directly links with programmes and initiatives, therefore a sufficient budget allocation will enable the development of necessary and comprehensive IDPs, and subsequent programmes and initiatives which will have sustainable impact on the ground. For example, an improved municipal planning on DRR is envisaged, in which programmes to reduce risk would need to be identified through proper scientific processes and also priorities. This process would facilitate completion and developing of programmes on community hazards and vulnerability assessments such as the following: detailed Hazardous Material Transportation (HAZMAT) Risk Assessment Systems and the Flood Hazard Management System for the Municipality. A complete and detailed drought risk assessment is needed as there are high levels of poverty in the Municipality; programmes on household emergency plans, the development of contingency plans for disaster risks, and also Household Emergency Plans Programmes are essential.

7.5.3 Community Involvement in Risk Governance

Communities need to be encouraged to take responsibility in the reduction of risks, and not over rely on government support. Key to this is empowering communities, as well as utilising existing structures to improve risk reduction. This endeavour would require strengthening the role of local leadership, including the ward committees, women and men community groups and counsellors. Community-based disaster risk management framework or approaches should be developed and implemented through the local leadership structures. In Chapter Three, it was indicated that such approaches have the potential to strengthen community commitment in risk reduction. Public Awareness Education Programmes (PAEP) would need to be enhanced, with a major focus on mitigation and preparedness; this focus should be broad and not directed at schools only. Through PAEP, communities' perceptions would be changed on their roles and responsibilities regarding risk reduction.

7.5.4 Information Management and Communication

Communication among the different stakeholders needs to be strengthened in NMBMM, and this can be achieved by developing a communication framework for stakeholders' collaboration. The municipality would also need to develop and implement a comprehensive Information Management System shared by all stakeholders for capturing incident information. The municipality should capitalise on the benefits of information communication technologies by developing a framework for cell phone/mobile early warnings systems, in the community. This would enhance their dissemination of information to at-risk communities.

7.5.5 Role of Volunteers

Volunteers need to be recruited and trained to assist in disaster risk management, especially by the NMBMM Disaster Management Department. This should be done as per requirements of the DMA 57 of 2002 and the NDMF of 2005. It would also ensure a variety of skills needed to deal with DDR, are accessible and applied.

7.6 FUTURE RESEARCH IMPERATIVES

- Future research should be conducted focusing on all Townships and Informal settlements within the Nelson Mandela Bay Metropolitan Municipality on DRR implementation;
- A comparative study needs to be conducted between NMBMM and other metropolitan areas, like the City of Cape Town;
- Future research should be done on other factors such as the role of Information Communication Technology for enhanced early warnings in the communities;
- Public involvement in disaster risk reduction such as preparedness, needs to be investigated further;
- Research on how public private partnerships in the context of DRR can be enhanced should be investigated;
- Future research could be based on ‘best’ options for financing disaster risk reduction as a paradigm shift; and
- Lastly, comparative research on mitigation and response programmes between rural and urban areas in the Eastern Cape would be valuable.

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9 ANNEXURES

9.1 Ethical Clearance Certificate- University of KwaZulu-Natal



22 March 2017

Ms Martha Kabaka Sibanda (214584513)
School of Management, IT & Governance
Westville Campus

Dear Ms Sibanda,

Protocol reference number: HSS/1495/0150

New project Title: Towards a Total Disaster Risk Management Framework for Implementation of Disaster Risk Reduction Programmes: The case of Nelson Mandela Bay Metropolitan Municipality

Approval Notification – Amendment Application

This letter serves to notify you that your application and request for an amendment received on 22 March 2017 has now been approved as follows:

- Change in Title

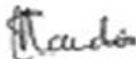
Any alterations to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form; Title of the Project, Location of the Study must be reviewed and approved through an amendment /modification prior to its implementation. In case you have further queries, please quote the 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 period of 3 years from the date of original issue. Thereafter Recertification must be applied for on an annual basis.

Best wishes for the successful completion of your research protocol.

Yours faithfully



Dr Shamla Naidoo (Deputy Chair)

/ms

9.2 Gatekeeper's Letter – NMBMM



SAFETY & SECURITY

Tel: 42 24 11 501 7000 Fax: 42 24 11 545 7244
PO Box 578 Port Elizabeth 6001
Republic of South Africa
Email: info@nmbmm.gov.za

18 March 2015

To: School of Management, IT & Governance
University of Kwazulu-Natal

Dear Sir / Madam

RE: **APPROVAL LETTER FOR MS. KABAKA'S RESEARCH PROJECT TITLED:
DISASTER RISK REDUCTION PROGRAMMES IN NELSON MANDELA BAY
METROPOLITAN MUNICIPALITY**

The Nelson Mandela Bay Municipal Disaster Management Centre has received a request for a gate keeper's letter confirming that the municipality has allowed student researcher, Ms. Marsha Kabaka (0721289532) to carry research in our municipality.

Ms. Kabaka's research topic has been provided as Disaster Risk Reduction Programmes in Nelson Mandela Bay Metropolitan Municipality (NMBMM). The aim of her study indicates that it will offer new knowledge and insights in the establishment, or strengthening an enabling environment for effective, sustainable disaster risk reduction techniques by local authorities. The results of the survey are intended to contribute to developing a fresh approach to understanding disasters, their nature and underlying causes, preventing their harmful effects, as well as seeking opportunities from their occurrences.

Ms. Kabaka is aware that she will not receive any monetary support from the municipality. She has also promised to follow the right research codes. Ms. Kabaka will also discuss her findings with the city's relevant officials and a copy of her final research will be submitted to the relevant department for future records and decision making.

NMBMM is aware that confidentiality and anonymity of records identifying NMBMM employees as participants will be maintained by the School of Management, IT & Governance at the University of Kwazulu-Natal.

We also acknowledge that University of Kwazulu-Natal will be willing to provide any further details concerning Ms. Kabaka research when need be.

We wish her success.

Yours faithfully,

H. Lerisdown
(Acting Director: Disaster Management)

WORKING TOGETHER FOR BETTER

1

9.3 Letter from Language Practitioner

TO WHOM IT MAY CONCERN

6 December 2016

EDITING CERTIFICATE

This dissertation, entitled **DISASTER RISK REDUCTION PROGRAMMES IN NELSON MANDELA BAY METROPOLITAN MUNICIPALITY**, by MARTHA SIBANDA, has been edited to ensure technically accurate and contextually appropriate use of language for research at this advanced level of study.

Yours sincerely

A handwritten signature in blue ink that reads "CM Israel". The signature is written in a cursive style with a long horizontal stroke at the bottom.

CM ISRAEL
BA Hons (UDW) MA (UND) MA (US) PhD (UNH)
Language Editor

9.4 Letter of Informed Consent

**UNIVERSITY OF KWAZULU-NATAL
SCHOOL OF IT, LAW & MANAGEMENT**

Dear Respondent,

Research Project No. HSS/1495/015D
Researcher: Ms. Martha Kabaka (0721289532)
Supervisor: Dr. Mogie Subban (031 260 7763)
Research Office: Ms. Mariette Snyman (031 260 8350)

I,, at the.....you are invited to participate in a research project entitled **Disaster Risk Reduction Programmes in Nelson Mandela Bay Metropolitan Municipality (NMBMM)**.

The aim of this study is to:

Offer new knowledge, and insights in establishing or strengthening the enabling environment for the effective sustainable application of disaster risk reduction (DRR) techniques by local authorities. Moreover, the research will test applicability of Total Disaster Risk Management [TDRM] Framework at the NMBMM. I hope to understand your experiences in issues around disaster risk reduction that are offered by NMBMM. The results of the survey are intended to contribute to developing a fresh approach to understanding disasters, their nature and underlying causes, preventing their harmful effects, as well as seeking opportunities from their occurrences.

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, IT & Governance**, UKZN.

If you have any questions or concerns about completing the questionnaire or about participating in this study, you may contact me or my supervisor at the numbers listed above.

The survey should take you about 20 minutes to complete. I hope you will take the time to complete this survey.

Sincerely

Investigator's signature _____ Date _____

CONSENT

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 so desire.

SIGNATURE OF PARTICIPANT

DATE

.....

9.5 SAMPLE SURVEYS

9.5.1 Household Questionnaire

DISASTER RISK REDUCTION PROGRAMMES IN NELSON MANDELA BAY METROPOLITAN MUNICIPALITY

STUDENT: MARTHA KABAKA (214584513)

HOUSEHOLD SURVEY

	0	1	2	3
	Below 20 years	20-30 years	30-50 years	Over 50 & above
1. Indicate your age at your last birthday				

	No	Yes	Don't know
2. Are you the head of the household?	0	1	99
	TICK		

3. In your household, how many children are there under the age of 18? <i>[Interviewer: Enter two digit number. Don't Know = 99]</i>		
---	--	--

4. What is your home language?		TICK
English	1	
Afrikaans	2	
Xhosa	3	
Sesotho/Sotho/South Sotho	4	
Setswana/Tswana	5	
Pedi/Spedi/North Sotho	6	
Zulu	7	
Shangaan	8	
Ndebele	9	
Other: specify		

5. What is the highest level of education you have completed?						
Don't know [Do not read]	No formal schooling/informal schooling/some primary schooling	Post-graduate	University degree completed	Post-secondary qualifications e.g. diploma from technikon or college	Secondary school completed	Primary school completed/ Some high school

1	2	3	4	5	6	7
INSERT RELEVANT Code from answer						

	No	Yes	TICK
6. Do you have a job that pays cash income?	1	2	
7. (IF YES) Is it full time or part time?	1	2	
8. Are you presently looking for a job (even if you are presently working)?	1	2	

9. What additional sources of income does your household have?			
	A First mentioned response	B Second mentioned response	C Third mentioned response
None	0		
Other household members also work	1	1	1
Old-age pension	2	2	2
Child care grant	3	3	3
Foster care grant	4	4	4
Disability grant	5	5	5
Borde & lodging	6	6	6
Rental Income	7	7	7
Assistance from relatives not living in the house	8	8	8
OTHER: SPECIFY			
Don't know <i>[Do not read]</i>	99		

10. What is the total income of your household per month?									
No regular income	R10 000+	R10001-R8000	RR8001-R6000	R6001-R4000	R4001-R2000	R2001-R1000	Less than 1000	Refused	Don't know [DNR]
97	1	2	3	4	5	6	7	98	99

11. Respondent Gender		TICK
Male	1	
Female	2	

12. Respondent's race		TICK
Black	1	
White	2	

Colored	3	
Indian	4	
Could not tell	99	

	Yes	No	Don't Know [DNR]
13. Does the respondent have electricity in the house?	1	2	99
TICK			

14. (IF YES), is it through a meter or a wire?	Meter	Wire	Don't Know [DNR]
	1	2	99
TICK			

15. Which of the following best describes the main dwelling unit that this household occupies?	TICK	
House (brick structure)	1	
Flat in block of flats	2	
House/flat back yard	3	
Informal dwelling in backyard	4	
Informal dwelling in informal settlement	5	

16. What is the roof made of: ONE CODE ONLY	TICK	
Metal, tin, zinc	1	
Tiles	2	
Thatch	3	
Plastic sheets	4	
Asbestos	5	
Multiple materials	6	
Could not see / could not tell	7	

	Inside house	Inside yard	Outside yard	Don't Know [DNR]
17. Where is your main water source?	1	2	3	99
TICK				

18. Which of the following best describes the housing situation of this household?	TICK	
Own it	1	
Rent	2	
Other [Specify]: _____	3	
Post code		

19. IF RESPONDENT IS THE OWNER, how did you obtain your house?	
Purchased it.	1
From the government but had to pay a subsidy	2
From the government and was not required to pay a subsidy	3

20.	Very satisfied	Fairly Satisfied	Not very satisfied	Not at all satisfied
Overall, how satisfied are you with your house?	1	2	3	4

21. IF DISSATISFIED: What makes you feel dissatisfied? DO NOT PROMPT. Multiple Mentions Possible. Accept Up To Three Responses.			
	A WRITE IN _____ (1 st response)	B WRITE IN _____ (2 nd response)	C WRITE IN _____ (3 rd response)
Cold	1	1	1
Crime	2	2	2
Dirty area/its next to a rubbish dump/sewerage	3	3	3
Fire hazard/it can burn down at any time	4	4	4
Flooding	5	5	5
Illegal electricity connection/Dangerous electrical connections/ No electricity	6	6	6
Incomplete/ not properly completed	7	7	7
Infrastructure	8	8	8
It doesn't have a proper toilet/No toilet	9	9	9
It is built from cheap material/ It's made of asbestos	10	10	10
It needs to be renovated	11	11	11
It sweats	12	12	12
It's not a brick house/ It's not a proper house/ It's a shack	13	13	13
It's not safe	14	14	14
Its rotten	15	15	15
Its small	16	16	16
Its temporary	17	17	17
Its unhealthy/we get sick easily	18	18	18
Its unstable	19	19	19
Its unsuitable	20	20	20
Leaking	21	21	21
Surrounding area/the environment/ it's in an Informal settlement	22	22	22
The house is crumbling down/it is full of cracks/ It is poorly constructed/substandard	23	23	23
The house is not in good condition	24	24	24
The premises on which it is built	25	25	25
The rent is expensive/ It's not my house	26	26	26
The roof is open	27	27	27
The taps are broken	28	28	28
There are no roads/poor roads	29	29	29
There's no privacy	30	30	30
Water/No water supply in the house	31	31	31
NA - Satisfied	97	97	97

22. Your satisfaction in refuse collection by City of NMBMM	Not satisfied	Not very Satisfied	Farley satisfied	Very satisfied
Overall, how satisfied are you with refuse collection?	1	2	3	4
TICK				

	Select	
23. What is your main source of power for cooking?		
Fire-wood	1	
Gas	2	
Paraffin	3	
Electricity	4	
Don't Know	99	

	Select	
24. What is your main source of power for cooking s?		
Fire-wood	1	
Gas	2	
Paraffin	3	
Electricity	4	
Dot know	99	

25. Have you been affected by any disasters [last 2 years] caused by the following items listed below?	Select	
Fire-wood	1	
Gas	2	
Paraffin	3	
Electricity	4	
Don't know	99	

	Yes	No
26. Do you know anyone who was affected by any disaster [last 2 years]	1	2

	Select	
27. If yes, what contributed to the disaster?		
Fire-wood	1	

Gas	2	
Paraffin	3	
Electricity	4	
Other [specify]	5	
Don't know	99	

	Yes	No
28. Do you know anyone who has died from disaster -related incidences in your area in the last 2years?	1	2

	Select	
29. If yes, what disaster caused the death?		
Fire-wood	1	
Gas	2	
Paraffin	3	
Electricity	4	
Other [specify]	5	
Don't Know	99	

	Yes	No
30. Has your own household/family been affected by any disaster incidences in the last Two years?	1	2

	Select	
31. If yes, what caused the disaster?		
Fire-wood	1	
Gas	2	
Paraffin	3	
Electricity	4	
Other [specify]	5	
Don't know	99	

	Yes	No
32. Did you receive any assistance in the events of a disaster?	1	2

	Select

33. If yes, tick which body offered assistance/support?		
DM Authority [NMBMM]		1
National Disaster Management Centre		2
Private sector		3
NGO's		4
Others [indicate].		5
Don't Know		99

34. If your answer was a YES indicate	Not very satisfied	Not Satisfied	Farley satisfied	satisfied	Very satisfied
Overall, how satisfied were you with assistance that was offered?	1	2	3	4	99

	Don't know	Within a week	Within a day	In hours	Other
	1	2	3	4	99
35. How soon do people usually get any assistance/response in case of a disaster in your area?					

	Not very satisfied	Not Satisfied	Farley satisfied	satisfied	Very satisfied
	1	2	3	4	99
36. Your level of satisfaction, on response time/period in an event of disaster in your area?					

	Don't know	Within a week	Within a day	In hours	Other
	1	2	3	4	99
37. How often do you receive Early Warnings on disasters in your household by the NMBM?					

	NMBMM DM office	I receive a cell/mobile SMS	Community channels	TV station	Others [specify]	Don't know
--	------------------------	------------------------------------	---------------------------	-------------------	-------------------------	-------------------

	station	from my network provider	[Leaders, radio, neighbors' etc....]			
	1	2	3	4	5	99
38. Who issues the early warnings						

	Not very satisfied	Not Satisfied	Farley satisfied	satisfied	Very satisfied
	1	2	3	4	99
39. In general, In general, what is your level of satisfaction, on early warnings on disaster related issues?					

	Yes	No
40. Have you receive public awareness education on disaster management in the last TWO years in your community	1	2

	Don't know	Within a week	Within a day	In hours	Other
If your answer was a yes,					
41. How many times do you receive disaster awareness campaigns in your community?	1	2	3	4	99

	Yes	No
42. Do you take the information disseminated on disasters seriously?	1	2

	1	2	3	4	99
If your answer was a no,					
43. What is your attitude towards disaster information?	Not sure	A little bit sure	sure	Very sure (specify)	No opinion

	Yes	No
44. Is there a community disaster committee in your area?	1	2

	Not very satisfied	Not Satisfied	Farley satisfied	satisfied	Very satisfied
If your answer was a yes,	1	2	3	4	99
45. Rate your level of satisfaction, on community disaster committee in your area?					

	Yes	No
46. Have you been involved in any hazard mapping and vulnerability assessment exercise in your community?	1	2

	Don't know	Within a week	Within a day	In hours	Other
If your answer was a yes,	1	2	3	4	99
47. How often does this exercise happen?					

	Yes	No
	1	2
48. Does your household have any emergency plans?		

	Weekly	Monthly	Annually	Other[specify]	Don't know
	1	2	3	4	99
49. How often are these plans reviewed? To introduce new changes?					

Thank you for completing the questionnaire.

9.5.2 Open ended questionnaire: NMBMM Disaster Risk Management Centre Officials

Topic: Disaster Risk Reduction Programmes in Nelson Mandela Bay Metropolitan Municipality, in South Africa.				
Student: Martha Kabaka (214584513)				
NMBMM Staff Survey				
1. Indicate age at last birthday?	Below 20 years	20-30 years	30-50 years	Over 50 & above
What is your highest level of education?				
2. Sex		Male	Female	
3. How long have you been working in the NMBMM DM department?				
4. State your position at the DM department				

5. Briefly describe some of your major responsibilities at DM department.

.....

.....

.....

6. Indicate by ticking in the box below some of your areas of expertise in DM.

Emergency Preparedness, Response and Disaster Risk	Area of expertise	Tick all relevant expertise
	Risk assessment/analysis	
	Professional Fire Fighting Skills	
	Victim Management Skills	
	Emergency Management Skills	
	Incident Assessment	
	Incident Management Training (i.e. Xenophobic Violence, Disease Outbreak)	
	Radio Communication	
	Disaster Management (general and introduction)	
	Contingency Plan Development	
	Training Communities and Training of Trainer Programme	
	Life Safety Education	
	Safety Planning at Live Events	

	Conducting Planning and Awareness Events	
	Disaster Operation Centre Management Principles and Procedures	
	GIS Use	
	Linking Disaster Risk and IDP	
	Post Disaster Analysis	
Administrative topics	Report Writing	
	Project Management	
	Developing /updating DM Plans	

7. Do you think Disaster Management personnel have relevant skills and experiences? Please explain.

.....
.....
.....

8. Are there professional development opportunities in areas of disaster management in your department?

Yes	No
-----	----

9. Are you familiar with the Disaster Management Act 57 of 2002 and the National Disaster Management Framework of 2005?

Yes	No
-----	----

10. If your answer above was a yes, indicate whether the requirements of the DM Act, and the NDMF are fully implemented by your municipality [please provide details].

.....
.....
.....

11. In your view, would you say disaster management plans are adequately addressed in the integrated development plans (IDP's) by NMBMM?

.....
.....
.....
.....

12. Do you think adequate financing is allocated for disaster risk reduction programmes at NMBM?

Yes	No
-----	----

13. Do you agree with the statement that, “political and stable relationships between council and Disaster Management officials is essential for the integration between IDPs and Disaster Management plans”?

Strongly Disagree	
Disagree	
agree	
Strongly agree	

14. To what extent was integration of Disaster Management plans in the IDP achieved in 2013 and 2014?

.....

.....

.....

.....

15. Is there adequate focus on disaster prevention and mitigation at NMBMMM?

Yes	No
-----	----

16. If your answer was a NO *please explain.*

.....

.....

.....

17. Indicate the role played by the following stakeholders in DM in the last 2 years

Names of stakeholders	List areas of their participation in the last 2 years at NMBMM
1. Private sector	
2. Non-Governmental Organisations [NGO's]	
3. Other government departments	
4. Vulnerable communities	
5. Others, discuss.	

18. In your view, is there adequate involvement of other stakeholders in DM at NMBMM?

Yes	No
-----	----

19. If your answer was a NO, briefly explain.

.....

.....

20. List most relevant formal and informal disaster risk reduction programmes/projects that were implemented by your municipality on DM within in the last 2 year.

Disaster Management Main Phases	Key measures	Year 2013-2014 Programmes /projects/initiatives
1. Pre-disaster planning	Risk assessment; prevention; and preparedness	
2. Post-Disaster planning	Relief, rehabilitation; & reconstruction	
Others, please indicate		

21. Please indicate by ticking in the table below, equipment and technology available for your disposal at NMBMMM for DM implementation.

Equipment and technology necessary for disaster risk reduction function at your disposal	Category Equipment available	Tick all relevant categories
Vehicles	Firefighting truck/Fire engines	
	Water truck	
	Hazardous Material Unit	
Technology	Technology two way radio	

	Global Positioning System units	
	Early warning systems	
	Digital cameras	
	CCTV monitors	
	Call center equipment	
	Office Computers/Laptops	
	Personal iPad	
	Multimedia unit	
	Cellular/mobile Phones	
Emergency equipment	Back-up generators	
	Fire extinguishers	
	First Aid equipment	
	Protective clothing	
	Jaws of life (tool used to free people from mangled cars, burning or collapsed buildings...)	
	Emergency lighting	
	Drones	
Recovery material	Relocation/rehabilitation centers	
	Non-perishable food	
	Food preparation equipment	
	Relief packs	
	Storage for recover equipment	
	Blankets	
	Mattresses	
	Tents	
Administrative	Office space	
	Storage space	
	Stationary	
	Office equipment (fax, computers)	

	Access to emergency funds for purchasing food for victims	
Others, list		

22. Indicate by ticking in the relevant box regarding the relationship of your municipality [NMBMM] with other spheres of government.

Type of municipality	Relationship	
National	Unacceptable	1
	Acceptable with room for improvement	2
	Good	3
	Very good	4
Provincial	Unacceptable	1
	Acceptable with room for improvement	2
	Good	3
	Very good	4
District	Unacceptable	1
	Acceptable with room for improvement	2
	Good	3
	Very good	4
Local	Unacceptable	1
	Acceptable with room for improvement	2
	Good	3
	Very good	4

23. Are there any other sources of funding for DM programmes?

Yes	No
-----	----

24. If your answer was a yes, briefly explain.

.....

.....

.....

.....

25. Please, discuss other issues that could improve the state of NMBMM.

.....
.....
.....
.....

THANK YOU FOR YOUR PARTICIPATION IN THIS RESEARCH

9.5.3 Interview Schedule for Government Line Departments; Private Sector; Safety & Security Directorate; and NGO’s

MS. MARTHA KABAKA (214584513) PHD STUDENT, SCHOOL OF MANAGEMENT, IT & GOVERNANCE, COLLEGE OF PUBLIC GOVERNANCE, UNIVERSITY OF KWAZULU-NATAL.

RESEARCH TOPIC: DISASTER RISK REDUCTION PROGRAMMES IN NELSON MANDELA BAY METROPOLITAN MUNICIPALITY

The research will answer the following questions;

- 1. How can the multilevel, multi-dimensional and multidisciplinary cooperation and collaboration mechanisms be employed at Nelson Mandela Bay Metropolitan Municipality to influence effective disaster risk management?*
- 2. To what extend are decisions based on reliable disaster risk information from hazard mapping and vulnerability assessment at Nelson Mandela Bay Metropolitan Municipality in influencing effective disaster risk reduction?*
- 3. What is the Nelson Mandela Bay Metropolitan Municipality doing to enhance coordination and integration of stakeholders’ action through good communication and efficient exchange of relevant and reliable information?*
- 4. What are the enabling mechanisms in place, including policy, structure, capacity building, and resources developed and institutionalized at the Nelson Mandela Bay Metropolitan Municipality to influence effective disaster risk reduction?*
- 5. How disaster risk reduction programmes and initiatives implementation can be inclusive of communities in NMBMM, in addressing DRR?*

INTERVIEW GUIDE FOR MUNICIPAL AND GOVERNMENT EMPLOYEES

DATE:	
RELEVANT OFFICE:	
RESPONDENT NUMBER:	
INTERVIEWER NAME:	
CAPTURED BY:	

A. POLICY BACKGROUND AND MANDATE OF THE NELSON MANDELA BAY METROPOLITAN MUNICIPALITY

1. List the mandates of the municipality in terms of regulating Disaster Risk Management that you are aware of?

.....

.....
.....
2. Mention key policies the municipality/department utilises to execute its mandate relating to Disaster Risk Management?

.....
.....
.....
.....

3. In your view, are there any policy shortcoming that affect the municipality's/department's ability to achieve its mandate relating to Disaster Risk Management?

.....
.....
.....
.....

B. THE STATUS OF DISASTER RISK REDUCTION IN NMBM TOWNSHIPS/INFORMAL SETTLEMENTS

5. What strategies is the NMBM Municipality taking in order to upgrade or eradicate (or mix of approaches) service delivery issues that contribute to risks, hazards or disasters?

.....
.....
.....
.....

6. What opportunities and challenges do you think they meet when executing (5) above?

.....
.....
.....
.....

C. DRR PROGRAMMES AND COMMUNITY PARTICIPATION

7. Do you think communities in the Nelson Mandela Bay Municipal are well informed and participate fully in matters of their municipality? Example IDP process.

[1] Yes [2] No

9. The Integrated Development Plan (IDP) and budget of the municipality is informed by the needs of the communities.

14. If there is an emergency e.g.; hazardous situation, accidents, fire or floods, for example:

a. How soon after the incident does the municipality receive this information?

.....
.....

b. How quick is the municipal response after receiving the incident report?

.....
.....

c. Who communicates with whom in such instances? (In other words, are there specially designated persons and communication channels within the residential areas and within the municipality?)

.....
.....
.....

d. Are the incident reporting and response times the same for all residential areas (i.e. low, middle and high income; formal and informal)?

.....
.....

e. If not, what measures would ensure greater preparedness and responsiveness in the sub-optimal areas?

.....
.....
.....
.....

15. What do you think are the strengths of the Nelson Mandela Bay Municipality with regards to service delivery to its communities?

.....
.....
.....

16. What do you think is the weakness of the Nelson Mandela Bay Municipality with regards to service delivery to its communities?

.....
.....
.....
.....

17. What do you think are the opportunities of the Nelson Mandela Bay Municipality with regards to service delivery to its communities?

.....
.....
.....
.....

18. What do you think are the threats of the Nelson Mandela Bay Municipality with regards to service delivery to its communities?

.....
.....
.....
.....

19. Comment on commitment by other line departments/private sector /Citizens and NGOs in DRM efforts.

.....
.....
.....
.....

20. Is there any other comment or view you would like to express before closure of interview?

.....
.....
.....
.....

9.5.4 Community Focus Group Discussion Guiding Questions

MOTHERWELL AND WALMER TOWNSHIP COMMUNITY FOCUS GROUP DISCUSSION: GUIDE QUESTIONS ON DISASTER RISK REDUCTION PROGRAMMES

1. Are you aware of any legislation which enforces the government to protect you against disaster or other risks?
2. Are you aware of any mechanisms in place by municipality to prepare the community for future disaster events? [Explain].
3. Have you been affected by a disaster before?
4. Do you know anyone who has been affected by a disaster before in your community?
5. Does your household have any plans in place to respond to a disaster such as flood? [Explain]
6. Explain how your community responds to a disaster such as flood or fire
7. Are you aware of measures the municipality has in place to respond to a flood in your community?
8. Are there any legislation or community rules that stipulate how you should behave/live so as to not endanger your neighbours' to flood or any other risk?
9. Whom do you contact when a disaster occurs? [NMBMM office, local leaders like counsellor, other municipality line departments, such as social development etc...]
10. Do you know any private company /organisation/NGO that deals with disaster issues in your community? [Explain] do anything to reduce your exposure to flood impacts?
11. Do you think that your community can help in reducing risks'? Explain

Thank you for your time