UNIVERSITY OF KWAZULU-NATAL

EXPLORING EFFECTIVENESS OF DISASTER RISK REDUCTION STRATEGIES IN RURAL MUNICIPALITIES: A CASE STUDY OF NDWEDWE LOCAL MUNICIPALITY

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DECLARATION

I, **Nkanyiso Brighten Mkhwanazi**, hereby declare that this dissertation is my own original work and has not been submitted at any University for examination. The sources used are fully acknowledged by complete references. This dissertation is submitted in fulfilment of the Master of Commerce degree in Leadership, in the Graduate School of Business and Leadership, College of Law and Management Studies at the University of KwaZulu-Natal, Westville Durban, South Africa.

Signature…….....

Date…….

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ABSTRACT

Local government is at the coalface of service delivery. One of their duties is to ensure the safety of its communities from risks that can occur at any time in their daily lives. Communities can be exposed to disaster risks that usually occur when they are least expected. Hence local municipalities should always be forearmed with effective disaster risk reduction strategies. It has always been found evident that almost all the municipalities do have these strategies in place, however, not much has been studied regarding the effectiveness of such strategies in the rural municipalities. This study will thus explore the effectiveness of disaster risk reduction strategies in rural municipalities using a case study of Ndwedwe Local Municipality.

The theoretical framework of this study looks at the practices from a worldwide point of view that have been looked at in order to prepare, mitigate and most importantly to reduce the risk that disasters impose to the communities, but most importantly rural communities. The literature review delves into an insightful analysis of the models that are utilised in the other countries as well in South Africa but also takes a closer look as to which model can be most suitable for a rural municipality like Ndwedwe. The models that the study looks at are: - The Community-Wide Vulnerability and Capacity Assessment (CVCA) Model, Community-Based Risk Reduction Model and South African Disaster Risk Assessment Model. The study then further looks at the status quo of the municipality in terms of its readiness to different forms of disaster that it periodically faces. The study further explores the existing strategies in juxtaposition to their implementation and feasibility in a rural municipality. And lastly recommends the model that it can employ in order to render its disaster risk reduction strategies effective.

This study employed a qualitative research design. There were 10 semi-structured interviews that were conducted as well as four focus group discussions. The participants comprised of both the administrative senior management employees as well as the political leadership of the municipality. The focus group discussions (FGD's) were conducted with the ward committee members from 4 Wards in order to get the feelings of the community members on different aspects of the research study. The face-to-face interviews which were subsequently transcribed and key themes were developed, analysed and interpreted. Secondary data was employed in this study was extracted from relevant journal articles, websites and books.

The findings of this study blatantly show that rural municipalities are vulnerable to the disaster risks because of the lack of resources, both financial and human. They also show that the municipality needs to use a 'bottom-up' approach by involving the communities in the

identification of risks as well as the implementation of the municipal proposed strategies. Findings also show that rural municipalities need to undertake disaster risk assessments in order to allocate the resources accordingly. Most of all, the implementation of the strategies needs to have its own budget allocation, hence political buy-in and senior management willingness are also pivotal.
Keywords: disaster, risk, disaster risk reduction strategies, hazard, vulnerability analysis, disaster risk management assessment, disaster risk reduction model, resilience, community participation.

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List of Acronyms

ADPC	Asian Disaster Preparedness Centre
CBOs	Community Based Organisations
CCGs	Community Care Givers
CDBG	Community Development Block Grant
CDWs	Community Development Workers
CHEs	Complex Humanitarian Emergencies
CRED	Centre for Research on the Epidemiology of Disasters
CVCA	Community-wide Vulnerability and Capacity Assessment
DMA 57 of 2002	Disaster Management Act 57 of 2002
DMAA 16 0f 2015	Disaster Management Amendment Act 16 of 2015
DDMC	District Disaster Management Centre
DMO	Disaster Management Officer
DRMAF	Disaster Risk Management Advisory Forum
DRMC	Disaster Risk Management Centre
DRRS	Disaster Risk Reduction Strategy
EDA	Economic Development Administration
EDP	Economic Development and Planning
ERMSA	Environmental Resources Management Southern Africa

EW(s)	Early Warning(s)
EWS(s)	Early Warning System(s)
FEMA	Federal Emergency Management Agency
FGDs	Focus Group Discussions
GIS	Geographical Information Systems
GDP	Gross Domestic Product
HUD	Housing and Urban Development
IDPs	Integrated Development Plans
IDNDR	International Decade for Natural Disaster Reduction
IDRM	Institute for Disaster Risk Management
ISDR	International Strategy for Disaster Reduction
IGR	Intergovernmental Relations
iLembe	iLembe District Municipality
KZN CoGTA	KwaZulu Natal Cooperative Governance and Traditional Affairs
NDMF	National Disaster Management Framework
NFIP	National Flood Insurance Programme
NGOs	Non-Governmental Organization
NLM	Ndwedwe Local Municipality
PDMF	Provincial Disaster Management Framework
PDMC	Provincial Disaster Management
RDP	Reconstruction and Development Programme
SBA	Small Business Administration
SRC	Swedish Red Cross
UN/ISDR	United National/ International Strategy for Disaster Reduction
WMO	World Metrological Organization

CHAPTER ONE

INTRODUCTION

1.1 Introduction

The ever-increasing scale of human plight periodically becomes evident when disaster, in any manner or fashion, rears its ugly head in communities that are especially based in rural municipal areas (Carrivick and Tweed, 2016). Disasters in different forms; which could be thunderstorms, lightning, hailstorms, drought, veld-fires, fires, any other form; always strike communities when least expected. When such happens communities, become faced with the deterioration in their livelihoods, socioeconomic conditions, environment food security in times of droughts (Lindell and Prater, 2003). On the other hand, communities, worldwide, are being negatively impacted by climate change, which further exacerbates these conditions. It is from this particular premise that municipalities should always be forearmed with community-based disaster risk reduction strategies (Carrivick and Tweed, 2016). This study is primarily intended to explore the effectiveness of disaster risk reduction strategies within the rural Ndwedwe Local Municipality, which forms part of the family of iLembe District Municipality. ILembe District Municipality comprises of four local municipalities, namely KwaDukuza, Ndwedwe, Maphumulo, Mandeni local municipalities.

1.2 Background to the Study

The study emanates from the Constitution of the Republic of South Africa of 1996 in Schedule 4. Schedule 4 clearly advocates for the functional areas of concurrent national and provincial legislative competences, one of such competences is disaster management (iLembe

District Municipality, 2015.). The Disaster Management Act, 2002 (Act No. 57 of 2002) was assented to provide for the following:

- An integrated co-ordinated disaster management policy that focuses on preventing or reducing the risk of disasters, mitigating the severity of disasters, emergency preparedness, rapid effective response to disasters post-disaster recovery.
- The establishment of national, provincial and municipal disaster centres;
- Disaster management volunteers;
- Matters incidental thereto.

It is also worth-mentioning that subsequent to this Act, Disaster Management Amendment Act No.16 of 2015 amended some of the parts of the principal Act of 2002 where a particular emphasis has been made with regards to the role of local Municipalities in terms of disaster risk reduction measures (iLembe District Municipality, 2015). Amending the section 45A in Act 57 of 2002, Section 16 (3) (4) of Disaster Management Amendment Act No.16 of 2015, respectively stipulate that:

- A local municipality must establish capacity for the development co-ordination of a disaster management plan and the implementation of a disaster management function for the municipality which forms part of the disaster management plan as approved by the relevant municipal disaster management centre.
- A local municipality may establish a disaster management centre in consultation with the relevant district municipality in accordance with the terms set out in a service level agreement between the two parties, in alignment with national norms and standards.

(Disaster Management Amendment Act No. 16 of 2015)

ILembe District Disaster Management Centre (DDMC) unit conducted a two-day workshop in February 2015 with the presence of provincial disaster management specialists, district local disaster management specialists, academia and practitioners (iLembe District Municipality, 2015). The District Disaster Management Unit had invited the KwaZulu-Natal Department of Co-operative Governance Traditional Affairs (KZN CoGTA) Disaster Management Centre (PDMC) unit, the family of four Local Municipalities to this session. The PDMC unit is the custodian of disaster management in the Province whilst the DDMC unit co-ordinates this key performance area amongst its Local Municipalities, Sector Departments and all other stakeholders (iLembe District Municipality, 2015). The workshop

emanated from the disjuncture between the pervasive and accelerating losses of life property, deterioration of the socio-economic conditions, and lack of food security in this agrarian municipality vis-à-vis the declared progress in disaster risk management strategies, initiatives practices over the last five years. The workshop disaster risk reduction resolutions to be implemented in the local municipalities were then taken. The following were the resolutions that were taken:

- The District and its family of local municipalities must establish an Intergovernmental Relations Forum (IGR Forum) consisting of internal and external stakeholders on Climate Change.
- A SWOT and a needs analysis on the current Climate Change institutional capacity be conducted with the aim of developing effective Climate Change structures at both district and local municipality levels.
- The District Municipality and its family of Municipalities must incorporate Climate Change issues into their Disaster Management Plans aligned to their Integrated Development Plans, Spatial Development Framework and Provincial Growth Development Strategy.
- The District Municipality must develop a Climate Change Strategy aimed at adaptation and mitigation responses against climate change impacts. The developed strategy must be aligned to both National and Provincial Climate Change Response Policies.
- The District must develop a comprehensive database of current future projects in response to the impacts of Climate Change.
- The District and its family of municipalities must develop integrated strategies for community awareness and capacity building programmes that seek to address both climate and disaster management issues.
- The District and its family of municipalities must develop Fire-Fighting capacity to ensure prevention and mitigation against fire related incidents or disasters.
- All municipalities must budget provisions for disaster management and Climate Change projects and policies.
- A District Drought Technical Task Team must be formed and strengthened through engaging various organisations and research institutions, including groups with indigenous knowledge.

- All municipalities must make provisions for installation of lightning conductors in areas that are prone to lightning.
- The District Municipality must ensure a fully functional Disaster Management Centre and must assist local municipalities to establish disaster management centres.

(Resolutions of February 2015 Ilembe District Disaster Management on Risk Reduction Strategies on Disaster and Climate Change).

In the light of the above, the study thus attempts to explain the current situation in one of the rural local municipalities within the district and explore the effectiveness of these disaster risk reduction strategies and initiatives, in order to maximise their salience effect. The study will examine the resolutions taken in juxtaposition with the local municipality's resources, vis-à-vis human, financial, institutional other related resources. Examination needs to be done in order ascertain the effectiveness of certain strategies adopted looking at this rural local municipality.

1.3 Problem Statement

Many resources have been put in place in the urban municipalities in terms of technology, human capital, financial resources, even public private partnerships intensify the effectiveness of disaster risk reduction strategies initiatives. On the contrary, the rural municipality in question seems to fall short of such resources since it is grant-dependent hardly has any revenue base. The resources referred to, in this case, are therefore, financial resources human resources. For rural municipalities within iLembe District to strengthen their state of readiness for natural disasters, such resources are not a matter of luxury but, a necessity. Whilst the South African Constitution, 1996 Chapter 2, Section (a**),** as the supreme law of the l, clearly stipulates that the people of South Africa have a right to live in an environment that is not detrimental to their health well-being, imposes duty on the state to promulgate policies to implement policies to ensure that this right is upheld. At a level of this rural municipality in question, this study has identified the following problems in juxtaposition to the Resolutions of February 2015 ILembe District Disaster Management on Risk Reduction Strategies on Disaster Climate Change:

- The rural local municipality under iLembe District Municipality has 19 wards with each ward having a population of approximately 3500 people.

- The municipality is grant-dependent hardly collects much revenue.
- The Disaster Management Section falling under the Directorate of Social Community Services consists of only one Disaster Management Officer there is no organogram that speaks solely to the issues of Disaster Management.
- The municipality does not have a Fire-Fighting Department whilst its communities are prone to fire disasters.
- The municipality depends on the District Disaster Management Centre has not established its own Disaster Management Centre. Hence when disasters like floods, veld fires, thunderstorms, deadly lightning, and other forms of disaster strike occur, the local municipality has no capacity.
- Most of the wards in the municipality are deep rural are highly susceptible to these hazards.
- Disaster management has not been budgeted for in the previous years except for the only employee that is in the Disaster Management Unit
- There is a great lack of infrastructure in terms of reducing the impact of lightning impact, to cite one example. There is a lack of lightning protection masts in the wards thus leaving the communities vulnerable to lightning.
- The municipality lacks the early warning risk reduction systems in this way it is always reactive than proactive.
- The mere fact that this is a grant-dependant municipality, it therefore means that the municipality depends on the District Disaster Management Centre other Sector Departments for the responses post-disaster. This means that the turn-around time for the response will not depend on the municipality where the incident has occurred, but solely depends on the response from other external stakeholders such might tarnish the image of the municipality may lead to service delivery protests.

Closely related to the above challenges, the UN/ISDR (2010) identified five challenges as well as opportunities faced by local municipalities in implementing successful disaster risk reduction strategies these include *inter alia*:

- Lack of interest capacities especially the funding mechanisms for risk reduction projects;
- Understanding local risk vulnerabilities where local government lacks knowledge about disaster risks vulnerabilities;

- Maintaining upgrading critical infrastructure;
- Managing long term process as disaster risk reduction initiatives often suffer from staff changes, (which in the case of the local municipality in question, it is the lack or shortage of staff),
- Long-term political commitment learning from disasters where focus on short-term recovery works post-disaster.

Subbarao (2005) examines the economic social impact of disasters the role of social protection relative to other interventions. Moreover, Subbarao (2005) stated that as natural disasters are occurrences of natural extreme phenomena that affect vulnerable population, it therefore implies that this results in human economic loss. As a poor municipality in question, it cannot therefore afford not to prevent such losses. Since it has been earlier mentioned that this is a grant-dependant municipality, it sets to reason therefore that the poorer the community the more vulnerable they are, to disasters (Environmental Resources Management Southern Africa 2009). The poor are more likely to reside in hazardous locations, in substandard housing. In addition, such is the state of affairs in this particular local municipality community. The communities live in thatched roofed houses. They have limited access to reduction instruments. These communities are less likely to rebuild income-generating assets, they take longer time to recover hence automatically get into poverty traps.

According to Subbarao (2005) the Social Impacts could be displacements leading to the psychological cost of relocation. There could be post-disaster trauma more especially among the elderly, orphans vulnerable children. The study will also examine in the strategies, the interventions prior to disaster that is:

- Prevention which may decrease probability of income loss amongst the members of the community as well as;
- Mitigation to reduce the impact like insurances of which is highly unlikely in a poor rural municipality.

It is also significant to explore the how communities cope after the occurrence of the disaster, this examines:

- Immediate response after disaster
- Medium-term response livelihood support
- Long term reconstruction of any damages

The study was striving to examine whether all the above elements were included in the disaster risk reduction strategies of the municipality.

1.4 The aim of the study

Given the aforementioned context on disaster management this study aims to intensively evaluate the critical role that the municipality can play in, how it can contribute to, disaster risk reduction in more ways than one. The aim of the study will explore the local municipality's central role in coordinating sustaining a multi-level, multi stakeholder platform in order to promote disaster risk reduction. This needs to be looked at, simply because of the fact that local municipalities are in a better position to engage coordinate the stakeholders who are involved in disaster risk reduction initiatives.

1.5 The objectives of the study

The following objectives were formulated by the researcher to provide a full understanding of the disaster risk reduction strategies in rural Municipalities. Hence the objectives of this study are;

- To explore the effectiveness of the current risk reduction practices in Ndwedwe Local Municipality.

- To identify critical success factors in the current municipal practices regarding disaster risk reduction.

- To determine the alternative measures towards improving Local Municipality's Disaster Management practices.

- To explore how the municipality intends to implement the Disaster Management Amendment Act 16 of 2015.

- To make recommendations on the most effective risk reduction strategies for this rural local municipality**.**

1.6 Research Questions

- To what extent are the risk reduction strategies effective?

- What are the critical success factors in the current municipal practices regarding disaster risk reduction?

- What are the alternative measures towards improving Local Municipality's Disaster Management practices?

- Does the municipality understand the importance of the Disaster Management Amendment Act of 2015?

- What recommendations can enhance effectiveness of risk reduction strategies for this rural local municipality?

1.7 Significance of the study

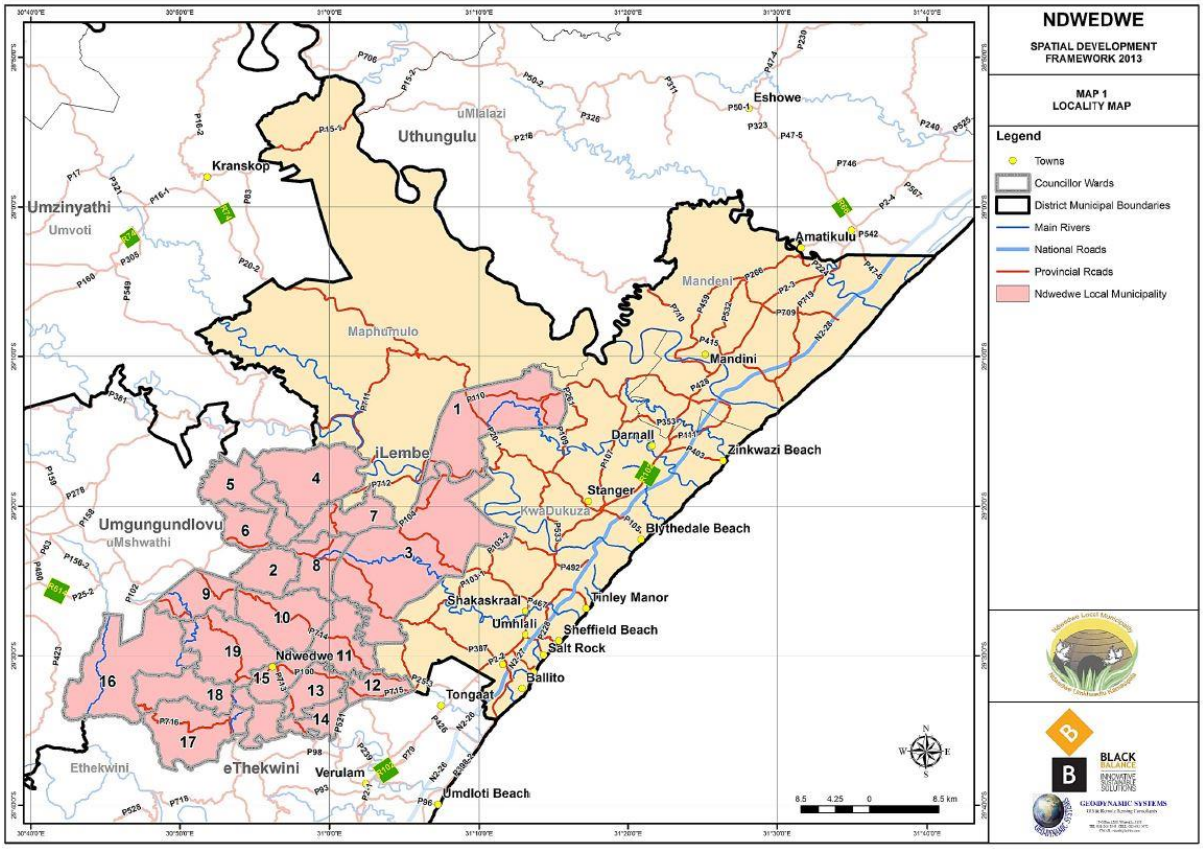
The significance of this study cannot be overemphasized when one looks at the vulnerability of the communities in this particular local rural municipality. The study will seek to explore more viable ways to risk reduction hence prevent the periodic fatalities that this municipality is more often engulfed with. It is also an undeniable fact that it is in the local communities where disaster happens, neither at a national nor provincial, therefore it sets to reason that a local authority is the most important vehicle to drive the disaster risk agenda. According to Maskrey (2007), challenges that seem to face the International Strategy for Disaster Reduction system are:

- Institutional arrangement, which this study will also explore;
- Risk identification, which the study will look at whether the municipality does have mechanisms to identify such risks;
- Early warnings, which the study will look at whether the municipality does have if so, their effectiveness;
- Investment, the study will also look at how much has the municipality invested in its systems;
- Ultimately, the local level climate disaster risk reduction, which the study will also delve into.

1.8 Brief methodology

This is a qualitative study, because it is striving to comprehend the significance of current strategies in addressing disaster as the study explores effectiveness of disaster risk reduction strategies thus the followed the case study approach. The case study for this research paper is Ndwedwe Local Municipality. The reason behind the selection of this organization as a case study is solely because Ndwedwe Local Municipality is one of the most rural municipalities in iLembe District (Integrated Development Plan, 2015). Thus, disaster issues affect this municipality harshly due to lack of resources allocation compared to urban and semi-urban municipalities such as KwaDukuza Local Municipality within iLembe District.

Map of Ndwedwe Local Municipality



Source: Ndwedwe Local Municipality Spatial Development Framework, 2013

1.9 Limitations

This dissertation has identified low prioritisation of rural municipalities such as Ndwedwe Local municipality is attempting to assist in disentangling the problem. In the process of

solving the problem, the study contributed to new knowledge. The dissertation focuses on effectiveness of disaster risk reduction strategies in rural municipalities. The dissertation used Ndwedwe Local Municipality as a case study, thus findings can be generalised to other rural municipalities as the reviews of literature within the study highlights that rural communities experienced related conditions when it comes to disaster management. However, this lies on level of development in a particular rural municipality.

1.10 Structure of dissertation

Chapter One presents the introduction background of this study which provides an overview of the study a rationale for the necessity of the study, as well as setting the context outlining the problem statement, aim objectives. Chapter two presents literature related to the study encompassing previous studies related to the case study builds the conceptual framework for the study preliminary theoretical framework. Chapter Three focuses on the methodology related to the study. This section is guided by the literature review, aim objectives of the study. Chapter Four provides a detailed presentation analysis of the data obtained in the study. Chapter Five is the summary conclusion chapter of this study. Thus it builds on conclusions reached during the course of the study to provide a final conclusion.

1.11 Conclusion

This chapter provided a broad insight about the nature of the study conducted. It discussed the relevant background of the study described the problem statement, aim objectives of the study. Thereafter, the chapter provided a rationale that motivated the researcher to undertake a study of this nature. The case study approach was also discussed the structure of the study was explained. The next chapter presents reviews of literature relevant to the objectives and the entire purpose of the study. Moreover, the proceeding chapter provides an insightful overview of the disaster risk reduction models.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

In this chapter a review of literature relevant to the aim objectives of the study is discussed. However, it may be not be necessary identical literature but it should be collateral to the area of study. The literature review is aimed at obtaining a detailed knowledge of the topic being studied. The primary purpose of writing reviews is to demonstrate a professional grasp of the background content relevant to the study being undertaken. This chapter aims to critically discuss contextualized analysis about disaster management. Thus, the chapter starts by discussing disaster management then it ends by providing an insightful discussion on disaster risk management. The chapter contextualizes these concepts by discussing the role of the international community in disaster management, South African insight on disaster management disaster management mechanisms. Moreover, the chapter stipulates learnable lessons from the international community regarding disaster management and disaster risk reduction strategies.

2.2 Background to Disaster Management and Disaster Risk Management

The impact of natural or man-made disasters is immeasurable, resulting in deaths and the destruction of houses as well as social and economic infrastructure. Collapse of infrastructure, animals, crops are important measures of physical impacts and these are rising exponentially in developed countries such as the United States of America (USA) (Mileti, 1999), but the rate of increase is even greater in developing countries such as India and Kenya (Berke, 1995). Disasters have economic effects which are direct, indirect secondary, which exacerbate poverty as well as unfavourable balance of trade more especially in developing countries as they rely on the importation of goods during catastrophes. Democratic government spheres are accountable to all its citizens, who are vulnerable and

susceptible to disasters by providing relevant responses such as physical and social mitigation. Herzog (2007) suggests that disaster effects can be lessened with insightful mitigation or planning efforts. Yodmani (2001) suggests that disaster management practices have evolved from largely a top-down relief and response approach to a more inter-sectorial risk management approach. The paradigm of risk management provides more room than before for addressing the issues of risk reduction for the poor who are mostly vulnerable to fast onset disasters, because disaster management in the past was dealing with response and recovery, disaster risk management encapsulates all disaster management components (prevention, preparedness, mitigation, response, recovery rehabilitation). The Institute for Disaster Risk Management in Southern Africa (IDRM) is of the opinion that disaster risk management is a development approach to disaster management (Van Niekerk, 2005). Disaster risk management differs as it deals with systematic management of administrative decisions and the implementation of policies and strategies while disaster management deals with the management of resources including disaster prevention, mitigation, preparedness, response and rehabilitation or recovery (Van Niekerk, 2005).

Van Niekerk, 2005 outlined that developing countries such as South Africa have often failed to implement disaster management strategies such as preparedness, prevention, mitigation response, recovery and rehabilitation. This failure is due to lack of financial resources and lack of technology, more particularly in rural municipalities. This impacted negatively on the wellbeing of people and the economy of this country. Van Niekerk (2005) argues that in developing countries, the impact of disasters inevitably goes beyond their immediate devastation as it exacerbates poverty and sets back economic development. Haddow and Bullock (2006) claim that during the 1990s, the economic toll of natural disasters topped $608 billion worldwide, more than the previous four decades combined. This is caused by technological advancements and infrastructural expansion (development) which is costly to rebuild after the disaster event. Haddow et al. (2006) confirm that, from 1990 to 1999, the Federal Emergency Management Agency (FEMA) spent more than $4, 25 billion to provide disaster assistance on disaster management prevention and preparedness strategies in the United States. This is catastrophic to developing countries as they rely on the USA after disaster occurrence for relief, recovery, rehabilitation and reconstruction. Natural disaster occurrences such as the Tsunami in Asia in 2004, Hurricane Katrina in the United States of America in 2005 and the Muzzaffarabad Earthquake in India in 2005, resulted in serious socio-economic costs.

Furthermore, the International Bank for Reconstruction Development (1999) stated that extreme natural events such as fires, floods, earthquakes droughts, have always been part of the natural cycle where all parts of the world are exposed to them to some degree or other (Haddow et al. 2006). The catastrophic losses experienced by eThekwini Municipality are mainly caused by societal actions such as deforestation and clear-cutting of sugar plantations meant for property development and industrial construction. Immigration and migration of people to coastal areas and built informal settlements in flood plains are other contributing factors. Migration and immigration resulted in uncontrolled urbanization on vacant land that is unsuitable for safe housing. In addition, informal settlements have been subjected to rapid spread of fires and flash floods (Van Niekerk, 2005).

International experiences of disasters are that they are mainly caused by floods, earthquakes as well as volcanoes. Since these activities influence community risk, it is apparent that if disaster frequency is to be reduced, then safety must also be sought as a major goal in comprehensive strategic planning to reduce disasters (Yodmani, 2001). Local governments require the assistance of structures involving all disaster practitioners and specialists dedicated to monitoring and improving disaster preparedness approaches. More than anything else, disaster identification and reduction at an international level as well as at national levels must be supplemented by local activities. The Centre for Research on the Epidemiology of Disasters (CRED) (2006) states that disaster preparedness often fails because it is rarely evidence based. It suggested that more scientific studies are needed in order to improve the effectiveness of disaster preparedness and prevention. Moreover, people who are the victims of disasters are not warned early as the study conducted on the Tsunami in Tamil Nadu (India) suggests that only 15% of the population had been warned of the impending tsunami that most of these warnings came from family friends (CRED, 2006).

The implementation of disaster management is essential to all countries as they can avoid and mitigate the impacts of disasters. The essentials of disaster management include the prevention of its negative effects on communities, the economy, and infrastructure. Syed (2008) asserts that the public health objectives of disaster management can be stated as prevent unnecessary morbidity, mortality, economic loss resulting directly from the disaster; eliminate morbidity, mortality, economic loss directly attributed to mismanagement of disaster relief efforts. This section aimed at providing comprehension on disaster

management and disaster risk management, it further stipulated the causes of failure in implementing disaster risk strategies more particularly in developing countries. The following section highlights the historical background on disaster management strategies. This is to demonstrate how then leaders reacted and addressed occurrence of distractors events through policies and other interventions (Yodmani, 2001).

2.3 The History of Disaster Management Strategies

Early disaster management strategies include inter alia, the promulgation of the United State of America (USA) Congressional Act of 1803 which was passed to provide financial assistance to a New Hampshire town that had been devastated by fires Haddow and Bullock (2006). Another notable example is that of the cold war era where the nuclear war was seen as a potential disaster threat. Haddow et al. (2006) indicate that the United States of America was struck by a series of major natural disasters such as those which led to the National Flood Insurance Act of 1968 which created the National Flood Insurance Program (NFIP) and brought community based mitigation into the practice of Emergency Management. The authors state, in the 1970s, the Disaster Relief Act of 1974 was passed, which holistically included all departments from commerce to treasury. The literature shows that 1970 was a turning point for the effective and efficient implementation of disaster risk reduction strategies (Haddow et al., 2006).

The President of the United States of America in 1978, Jimmy Carter came up with a plan to consolidate emergency preparedness, mitigation, and response activities into one federal emergency management organization which established the Federal Emergency Management Agency (FEMA). From the 1980s to 2005, FEMA experienced administrative problems which were perpetuated by the September 11, 2001, terrorist attacks. Haddow et al. (2006) explain that after the terrorist attacks of September 11, FEMA and the newly formed Department of Homel Security, together with partners in emergency management such as fire, police and public health at the state and local government levels have been charged with expanding and enhancing the nation's emergency management system. The Philippines, unlike the USA, shares with several Asian countries the unenviable distinction of being one of the world's most disaster-prone countries. According to Annelies and Victoria (2001), the

Philippine government's inadequacy and the limitations of the prevailing view of disaster management compelled NGO's and people's organizations to promote develop an alternative approach with the organization of the Citizens' Disaster Response Centre or Network (CDRC/N) in 1984. The Philippine National Red Cross has implemented its Integrated Community Disaster Planning programme in place since 1994. The following section outlines how the world previously experienced disasters. These disastrous events are discussed in form of case studies.

2.4 International Community Role in Disaster Management

A disaster can require the involvement of the international community of responders when a nation's capability to respond has become overwhelmed (Haddow et al., 2006:221). A number of international agreements emphasize the importance or the linkages of environmental management and disaster risk reduction, and identify responsibilities to reduce disaster risk. There are three types of emergencies which are characterized by definitions established by the United Nations (UN) that normally involve an international humanitarian response: natural disasters, technological disasters and complex humanitarian emergencies (CHEs). The United Nations promotes prevention and mitigation activities through its regular development projects. By encouraging the building of early warning systems and conducting monitoring and forecasting routines which are working to increase local capacity to adequately boost local regional preparedness (Haddow et al., 2006).

2.4.1 Global Decade of Natural Disaster Reduction

The global decade of natural disaster reduction is specifically from 1990 to 1999. The United Nations disaster risk reduction strategy in0 the form of an international relief and humanitarian system is to reduce loss, disaster-related death and disability. Smith (2002) indicates that the main aim of the International Decade for Natural Disaster Reduction (IDNDR) was to ensure a shift in the reactive approach towards natural disasters to that of pro-active planning and prevention. The five goals of the International Decade for Natural Disaster Reduction (IDNDR) are as follows (Smith, 2002):

- Improve the capacity of each country to mitigate the effects of natural disasters, paying special attention to assisting developing countries in the assessment of

disaster damage potential in the establishment of early warning systems disaster-resistant structures when where needed,

- Develop appropriate guidelines strategies for applying existing scientific technical knowledge, taking into account the cultural economic diversity of different countries,
- Foster scientific engineering endeavours aimed at closing critical gaps in knowledge in order to reduce the loss of life property,
- Disseminate existing new technological information related to measures for the assessment, prediction mitigation of natural disasters,
- Develop measures for the assessment, prediction and mitigation of natural disasters through programmes of technical assistance and technology transfer, demonstration projects and education and training tailored for specific disasters and locations, to evaluate the effectiveness of these programmes.

The International Decade for Natural Disaster Reduction led to a fundamental shift in the way disasters are viewed. Away from the notion that disasters were temporary disruptions to be managed by humanitarian responses and technical interventions and towards recognition, those disasters are a function of both natural and human drivers (ISDR, 2004; UNDP, 2004). According to Van Niekerk (2005), the IDNDR was dependent on the financial and other support provided by member states. It was also the responsibility of member states to formulate their own policies and strategies, and establish national platforms that would serve as the focal points for disaster reduction activities. Although the decade had a very slow start, over 130 countries managed to setup national committees. According to Ritchie (2004) cited in Van Niekerk (2005)., the committees of different nations focal points differed in their capacities effectiveness with less than one-quarter becoming fully active most in South Asia, due to the impetus activities of the Asian Disaster Preparedness Centre, only a few in Africa

Van Niekerk (2005) asserts that the Decade placed a focus on scientific solutions and to the transfer of hazard-mitigation technologies to developing countries. This was most often capital intensive and did not take the capacities of member countries into consideration. These projects also placed a disproportionate emphasis and reliance on external experts. Van Niekerk (2005) indicates that beside the dilemmas of development, some other weaknesses during the IDNDR by the international community include the following:

- The violation of human rights in disasters,
- A low degree of relief coordination collaboration,
- Difficulties in providing aid. Some of the weaknesses listed above were, however, recognized in a mid-decade review of the IDNDR (Van Niekerk, 2005:56).

This led to a much wider consultation by the IDNDR including development officials, politicians, the economic sectors, environmentalists and disaster relief professionals. The end of the decade was accepted as not enough time in the international arena to address all the challenges identified adequately (Van Niekerk, 2005). Van Niekerk (2005) states that in the concluding forum of the IDNDR held in Geneva, Switzerl in July 1999, a document, A Safer World in the 21st Century, Disaster Risk Reduction was adopted. The document was compiled through consensus discussions among hazard and risk management stakeholders, and included a commitment by all stakeholders to (ISDR, 2004 and UNDP, 2004):

- Conduct a national audit or assessment process of existing functions necessary for a comprehensive an integrated national strategy of hazard, risk disaster prevention, projected over 5-10 20 years' time period,
- Conduct dynamic risk analysis with specific consideration for demography, urban growth the interaction or compound relationships between natural, technological environmental factors,
- Build, or where existing, strengthen regional or sub-regional, national international approaches collaborative organizational arrangements that can increase hazard, risk disaster prevention capabilities activities,
- Establish coordination mechanisms for greater coherence improved effectiveness of combined hazard, risk disaster prevention strategies at all levels of responsibility,
- Promote encourage know-how transfer through partnership among countries with particular attention given to the transfer of experience to those countries exposed to risks,
- Establish global, national, regional or sub-regional information exchanges, facilities or websites dedicated to hazard, risk disaster prevention linked by agreed communication standards protocols,
- Link efforts of hazard, risk disaster prevention more closely with the Agenda 21 implementation process enhanced synergy with environmental sustainable development issues,

- Focus multi-year risk reduction strategies on urban concentration mega-city environments,
- Institute comprehensive application of land-use planning programmes in hazard-prone environments,
- Develop apply standard forms of statistical recording of risk factors, disaster occurrences their consequences to enable more consistent comparisons,
- Undertake periodic reviews of accomplishments in hazard, risk disaster reduction efforts at all levels of engagement responsibility,
- Study feasibility of specific alternative funding resource allocation modalities that can ensure continued commitment to sustained risk disaster prevention strategies (ISDR, 2004 UNDP, 2004)

The gaps identified in the above mentioned strategy was pro-actively filled by a global commitment to reducing disaster-related death and disability which was formalized by the Yokohama Strategy for a Safer World: Guidelines for Natural Disaster Prevention, Preparedness and Mitigation

The United Nations adopted its International Strategy for Disaster Reduction (ISDR) in 2001 to promote the necessity for disaster reduction and risk mitigation as part of its central mission (Cronin, 2008). The International Strategy for Disaster Reduction has played a pivotal role in promoting disaster awareness, training and research at all levels of society. This initiative seeks to enable global resilience to the effects of natural hazards in order to reduce human, economic, and social losses, through the following mechanisms:

- Increasing public awareness,
- Obtaining commitment from public authorities,
- Stimulating interdisciplinary intersectoral partnerships expanding risk reduction networking at all levels,
- Enhancing scientific research on the causes of natural disasters and the effects of natural hazards and related technological and environmental disasters on societies (Cronin, 2008:10).

Haddow et al. (2006) attest that the above mentioned strategies are carried out through the UN country offices and governments, focusing on the most vulnerable communities. Mitigation and preparedness strategies are implemented at all levels of society via public

awareness campaigns, secured commitment from public authorities, intersectoral cooperation and communication, and technical knowledge transfer. The prevailing disaster management approaches and strategies are propagating comprehensive approaches toward handling disasters. The results of the strategy were reviewed at the World Conference on Disaster Reduction in Kobe, Hygo, Japan, in January 2005 (McMahon and Faen, 2007))

2.4.2 Global Platform for Disaster Risk Reduction

In 2006, the UN launched a consultative process to consider practical ways to strengthen the ISDR system and better support governments to meet their commitment to implement the Hygo Framework for Action. It aimed to become the main global forum for all parties involved in disaster risk reduction including governments, United Nations agencies, international financial institutions, regional bodies, civil society, the private sector, and the scientific and academic communities to:

- Raise awareness on reducing disaster risk,
- Share experience,
- Guide the ISDR system (UN ISDR, 2008).

This platform demonstrates how governments, UN agencies, international financial institutions, civil society, scientific academic communities are able to undertake projects programmes that tackle both disaster risk reduction poverty reduction at the same time.

2.4.3 Global Assessment Report on Disaster Risk Reduction

Cronin (2008) indicates that the ISDR is presently coordinating efforts of governmental, international and civil society partners to produce a Global Assessment Report on Disaster Risk Reduction (GAR/DRR). It is expected that the report will be launched by the UN Secretary General in Geneva 2009. The primary objectives of the 2009 Global Assessment Report will be to:

- Establish a credible widely accepted reference point for information on global disaster risk patterns trends,
- Increase understing and awareness of the mutually supportive relationship between development and disaster risk reduction by specifically focusing on links between disaster and poverty trends. This is a radical realignment of priorities in addressing the Hygo Framework for Action

- Strengthen the ISDR system's capacity for planning and joint programming at all levels by providing a global level review of national, regional and thematic reporting on implementation of the Hygo Framework for Action (United International Strategy for Disaster Reduction, 2008).

The global assessment report on disaster risk reduction is very important as it shows clearly the cause and the relationship between disasters and poverty, as disasters impact directly on the poor.

2.5 South African Overview on Disaster Management

South Africa is one of the developing economies that are often tightly affected by distractors events. In South Africa, accountability is a standard of public life, where holders of public office are accountable for their decisions and actions to the public and must submit themselves to whatever scrutiny is appropriate to their offices (Armstrong, 2005). Armstrong (2005) refers to the obligation on the part of public officials to report on the usage of public resources and answerability for failing to meet stated performance objectives (Gildenhuys Knipe, 2000). South African government officials in all spheres are accountable to citizens if there are backlogs and poor service delivery. The Constitution of the Republic of South Africa, 1996 (chapter 7:152), requires local government to provide democratic accountable government to local communities; ensure the provision of services to communities in a sustainable manner; promote social economic development; promote a safe healthy environment; encourage communities community organizations in matters of local government matters (Armstrong, 2005). Government accountability to all citizens translates to improving the lives of the poor and the vulnerable.

2.5.1 The Impact of Disaster in South Africa

The impact of natural or man-made disasters is extensive and practically immeasurable. Natural disasters result in deaths, displacement of people, destruction of houses and other infrastructure, isolation of vast areas of the country due to destruction of vital social economic infrastructure, including bridges, roads, power stations, water supply systems, hospitals schools. Disasters contribute to the retardation of development in the affected regions (Dunne and Mhone, 2003). According to Dunne and Mhone (2003), the impact of disasters at the household level, disrupts normal livelihoods, displaces families, destroys

infrastructure and disentangles social and community networks. Syed (2008) asserts that disasters can seriously disrupt development initiatives in several ways, including loss of resources, interruption of programmes, impact on the investment climate, impact on the non-formal sector and political destabilization. This suggests that the budget for development initiatives such as housing construction can be deviated or channelled to respond to other areas affected by disasters. Furthermore, disaster impacts can cause social activism resulting in political disruption, especially during interminable period of disaster recovery.

2.5.2 Effect of Disasters on Economies

Huigen and Jens (2006) distinguish the economic effects of disasters as direct, indirect and secondary. They define direct effects as the economic damage to property and the loss of income. Direct effects may be in the form of the destruction of sites of production such as factories or farms. The example of direct effects are loss of capital (housing and farm l), loss of stocks, costs of emergency relief and repairs, and production loss (poor harvests, destruction of crops, death of livestock). Indirect economic effects may be caused by direct losses, which result from the decline in production and the provision of services, for example, a reduction in the activity of suppliers. Furthermore, both direct and indirect effects may result in secondary effects which appear sometime after the disaster. Huigen and Jens (2002) state that secondary effects include an increase in disparity between individual and family income, ecological changes or negative changes in the balance of payments (Clay, 2004)

According to Rasmussen (2004) the aforementioned impacts may cause spill-overs at the macro-economic level, as fiscal and external pressures can lead to imbalances that spark economic crises, and an increase in the incidence of poverty can create social unrest. Syed (2008) stresses that the secondary effects of a disaster include inflation, balance of payment problems and increases in fiscal expenditure and decrease in monetary reserves. Natural disasters are detrimental to the economic development of developing countries as they may be accompanied by a reduction in the Gross Domestic Product (GDP), increase in imports, and deterioration in fiscal balances. Croward (2006) found that 21 major natural disasters in Southern African countries led to an average worsening of the trade balance owing to an increase in import growth, to a lesser extent, a reduction in export growth. Due to flooding in 2000, Mozambique lost over 10% of its total productive fields, as well as the crops in the field, about 40 000 head of cattle were washed away (Croward, 2006). Sudden fast onset

disasters such as floods have been particularly costly, both in terms of loss of human life financially. It is estimated that the 2008 KwaZulu-Natal storm surges, which was declared a disaster, cost the South African government millions of r in relief aid, considerably more in terms of road other infrastructural repairs, apart from the huge social costs of the disaster (Syed, 2008). According to Syed (2008), disasters especially when they have occurred repeatedly within a short period of time, have a negative impact on the incentive for further investment. Investors need a climate of stability certainty to be encouraged to risk their money.

2.5.3 Impact on Infrastructure

In India most of the communication infrastructure was destroyed a good portion of the transportation infrastructure was damaged. Local government had no immediate means to alert the central government of their imminent needs. This resulted in the lack of initial assessment, urban search rescue teams were not sent in time to be fully effective in their missions. The bulk of the initial rescue missions were carried out by neighbours helping neighbours, digging with their personal tools (Haddow et al., 2006). The earthquake caused damage in 7904 villages in 21 of the state's 25 districts. The district of Kuchchh where the epicentre was located sustained the bulk of the damage, with more than 400 villages affected. In five major towns, buildings were virtually 100% damaged 257 000 of the houses were damaged or destroyed. However, in the city of Ahmedabad, 179 buildings were destroyed (Haddow et al., 2006).

2.6 Disaster Management Mechanisms

When the disaster has occurred there are there are tools that can used to minimize the impact of disastrous events. Cutter, Richardson and Wilbanks (2003) suggested ten disaster management mechanisms. These are fully discussed on the following section.

2.6.1 Hazard Identification Mapping

Under the ambit of hazard identification mapping, mitigation strategies entails an analysis of hazards in a particular area using Geographical Information Systems (GIS) tools as well as Hazard United States (HAZUS). GIS can help to show the distribution of damage or spatial or geographical distribution of risks or losses from one or more man-made natural disasters in the form of a map. Bullock et al. (2006) argue that the federal government has extensive programmes that map virtually every hazard, these products are available to communities.

This is quite evident because FEMA's National Flood Insurance Program (NFIP) provides detailed flood maps studies, the U.S. Geological Survey (USGS) provides extensive earthquake landslide studies maps. Bullock et al. (2006) confirm that Geographical Information Systems (GIS) have become ubiquitous staples for all local planning organisations. The hindrance of GIS is that it fails to superimpose the human built environment onto the hazards.

The authors indicate that FEMA has developed a tool called HAZUS which is the nationally applicable methodology for estimating losses from earthquakes at the community or regional level (Bullock et al., 2006). It also allows users to compare results from different study case scenarios, including mitigation actions. Cutter, Richardson Wilbanks, (2003) indicates HAZUS as being touted as an 'off the shelf" application, the default inventories of buildings structures, geology, economic values included in the model is derived from very general national overviews inventories has not been populated with local level data. The author further argues that local emergency managers can glean a general picture of potential losses from scenario events, but cannot detail expected losses for specific places (communities or countries) without updating providing data on local building inventories, geology, critical infrastructure.

2.6.2 Design Construction

Design construction applications as a mitigation strategy help government to regulate any infrastructural construction by implementing coding systems that supports risk reduction. According to El-Masri Tipple (2002), sustainable l-use policies for the mitigation of natural disasters should be complemented by appropriate housing design, construction methods use of building materials. These policies should be tailored to strengthen structural conditions of the dwellings reduce physical vulnerability, to create employment generate income for the poor. Moreover, they should reduce construction costs employ locally available materials construction methods enhance community participation quality control. Haddow et al. (2006) emphasize that this strategy is governed by building codes, architecture design criteria, soil and landscaping considerations.

Furthermore, code criteria that support risk reduction usually apply only to new construction, substantial renovations or renovation to change the type or use of the building. McMahon et al. (2007) argue that poor communities have few resources for sturdy construction,

inadequate disaster warning systems, communications technology or disaster response. Roads bridges may be unable to withst earthquakes or floods in developing countries. Buildings are often constructed of the most economical materials, predisposing them to the collapse of houses spread of fires. Enactments of buildings codes are the responsibility of the states which reflect geographical differences across the United States. The building codes in different countries are not the same, mainly because topography, lscapes, climate, types of soils underlying rocks vary.

2.6.3 L-Use Planning

History has shown clearly that l-use planning was one of the earliest tools used to encourage mitigation. Hazardous sites are often favoured by the poor because of their low economic potential the high chance of avoiding eviction, as well as proximity to employment opportunities in surrounding commercial industrial areas. The high costs of urban l, low levels of affordability, and inappropriate l policies speculative developments by the private sector are some of the problems to build low cost houses (El-Masri et al., 2002). Ironically, public housing schemes for the poor, with their high costs standards, have in general been ineffective in meeting people's needs in both qualitative and quantitative terms. The solution is to improve access to l for housing the poor in order to limit the encroachment of residential settlements onto physically hazardous sites. For example, in Rabaul, Papua New Guinea, the government has made l available to volcano victims at a safe distance of 20 km from the vulnerable site (IDNDR, 1996). Also, a relocation process has been established to reduce risks of lslide flooding in Lima, Peru (Lero Mira, 2000). In South Africa, areas affected by disasters are upgraded or people living in those informal settlements are relocated to the peripheral of urban areas. In the United States of America, according to Haddow et al. (2006), Congress passed the National Flood Insurance Act of 1968. This act required local governments to pass a floodplain management ordinance in return for federally backed, low-cost flood insurance being available to the community. One of the most significant legal pressures applied to encourage l-use planning management in the coastal zone was the National Flood Insurance Programme (NFIP) administered by the Federal Insurance Administration (FIA). The following examples show how l-use planning is applied to promote risk reduction (Bullock, 2006):

- Moving structures out of harmful zone through property acquisition is clearly the most effective tool, although it is costly,

- The North Carolina coastal setback ordinance seeks to preserve the fragile eroding coastlines of its barrier islands,
- The Alquist-Priola Act in California limits developments near known earthquake faults.

The mitigation strategies supply local governments with technical tools to determine where the floodplains are in the communities in order to steer development away from these areas using maps. Haddow et al. (2006) state that strategies for l-use planning offer many options for the implementation of mitigation which include acquisition, easements, storm water management, annexation, environmental review floodplain management plans. Haddow et al. (2006) state that l–use planning encompasses a myriad of zoning options such as density controls, special use permits, historic preservation, coastal zone management, subdivision controls. This means that l-use planning assists in determining places of high risk such as determining where the floodplains are in the communities so they could steer development away from these areas.

2.6.4 Financial Incentives

Financial incentives as one of the mitigation strategies in the United States of America are new. The approaches used by localities to reduce disasters include special tax assessments, passage of tax increases or bonds to pay for mitigation, relocation assistance, and targeting of federal community development or renewal grant funds for mitigation (Haddow et al., 2006). Linnerooth-Bayer and Kunreuther (2003) state that in most emerging economy countries, the authority and financing of disaster management is divided between national, regional, and municipal authorities. In the past, municipalities in many central European countries have been dependent on the national government for their financial base, but this is changed as national governments place more responsibility on lower-level authorities.

In the US there are emerging areas of financial tools which include special assessment districts, impact fees, and transfer of development rights. The most predominantly used programmes are as follows:

- Community Development Block Grant (CDBG) – has been useful to communities that are interested in incorporating mitigation into their recovery process,

- Housing Urban Development (HUD) - provides flexible grants to help cities, countries, and states to recover from presidentially declared disasters, especially in low-income areas.
- Small Business Administration (SBA) – provide financial incentives for mitigation,
- Economic Development Administration (EDA) – administers programmes provides grants for infrastructure development, business incentives, other forms of assistance designed to help communities alleviate conditions of substantial persistent unemployment in economically distressed areas regions (Haddow et al., 2006).

Haddow et al. (2006) claim that the above tools provide incentives to developers as a means of promoting good risk-reduction development practices.

2.6.5 Insurance

Insurance in modern times is used as a mitigating tool to transfer the risks from the community or individual to an insurance company. The United States of America created the National Flood Programme (NFIP) as a mitigation tool which subsidized the cost of the insurance so that premiums would be affordable (Haddow et al., 2006). Insurance as a mitigating strategy plays a tremendous role, as anyone buying a property with a Veterans Administration (VA) or Federal Housing Administration (FHA) loan has to purchase insurance. The 1993 Midwest floods triggered major changes to the NFIP which also strengthened the compliance procedures and established the following incentive programmes (Haddow et al., 2006):

- Flood Mitigation Assistance (FMA) - this is a fund for flood planning, flood mitigation grants, additional policy coverage for meeting the tougher compliance requirements such as building elevation,
- Community Rating Systems - these reward those communities that go beyond the minimum floodplain ordinance requirements with reduced insurance premiums.

Such mitigation incentives can be duplicated in local governments more especially in developing countries. In South Africa, however, such tools can be more valuable in the

Reconstruction and Development Programme (RDP) houses for poor people as they are often built on the flood plain.

2.6.6 Structural Control

Structural control is basically not meant to reduce risks but is used to protect existing development. There are different types of structural control that vary in terms of the nature of the disaster which encapsulates the following: levee, seawalls, bulkheads, breakwaters, groins and jetties (Bullock et al., 2006). Haddow et al. (2006) states that the US Army Corps of Engineers have designed and built levees as flood control structures across the United States. The authors further allude that levees as mitigation strategies had limitations which was experienced in the 1993 Midwest floods, where they were breached. Such floods gave residents a false sense of safety that increased property development, and exacerbated the hazard in other areas. The government of the US located people on the high lying areas (Napier and Rubin, 2002). In the United States, new designs and strategies to implement wetlands friendly policies are being adopted in cities which are built below sea level. Structural control as a mitigation strategy such as levees is equally controversial because they protect in one place and increase damage in another (Haddow et al., 2006).

2.6.7 Disaster Preparedness

Previously, preparedness strategies were ignored because disaster management was responding to and recovering from the disaster impact. Disaster preparedness ensures that appropriate systems, procedures and resources are in place to provide effective assistance to disaster victims, thus facilitating relief measures and rehabilitation services. Manitoba Health Department in Canada (2002) stated that a comprehensive preparedness programme increases the community's capacity to cope with the larger hazard impacts. A feasible and practical example is that of sandbagging before the water rises and evacuating vulnerable populations (for example the elderly) which allows the remaining community to cope better with floods. This clearly shows that implementing preparedness strategies can effectively reduce damage and generate emergency response actions.

Disaster preparedness deals with activities that occur before an event strikes whether slow or fast onset disasters. Manitoba Health Department (2002) mentions two aspects of preparedness which focuses on management response which are as follows:

- Emergency response plan - deals with meeting the special demands created by an impact on the community,

- Business continuity planning aims to ensure services are maintained when the organisation is negatively affected by disasters, even if the effects are limited to internal disruptions. Emergency response planning deals with how an organisation will help its clients cope with the extraordinary demands a disaster creates. In contrast, business continuity planning deals with how an organisation copes with the impact of the disaster with its own systems and resources (Manitoba Health Department, 2002).

There are four parts to a preparedness programme which encapsulates: planning, training and education, resource management and exercising (refers to the physical training of the personnel such as fire marshals). Training is the most fundamental as others are intended to support the implementation of the planned initiatives. The effective preparedness programme is responsible for various activities which are as follows (Manitoba Health Department, 2002):

- identifies develops the organisational structure that will direct manage an emergency response,
- identifies who has the authority responsibility relating to different aspects of the response,
- develop the procedures guidelines that will ensure effective coordinated action,
- create a written plan as a means of documenting the decisions that are made during the process,
- Budgeting, coordination and shared understanding that is generated.

Another component of response preparedness is to bring the skills, knowledge, functions and systems together and apply them against event scenarios (Manitoba Health Department, 2002:31). This means that all government departments and different stakeholders should meet and integrate their knowledge and expertise in preparation for any catastrophe. Furthermore, private and public organisations should prepare their internal disaster management pro-active plans with the aim of avoiding or mitigating any risk or disaster.

2.6.8 Community Protection Works

According to Wu and Lindell (2003), community protection works include dams, levees, and drainage systems that protect an entire area from hazard impact. Community protection

works are most commonly used to divert floodwater past communities that are located in floodplains. They also can be used to provide protection from other types of water flows such as tsunami and hurricane storm surges (Haddow et al., 2007). Most urban municipalities in South Africa are dominated by very high density drainage systems whereas their geographical location are in a valley flow large numbers of houses are built on floodplains without any community protection works, especially in poor informal townships. Bullock et al. (2007) argue that community protection works can protect against two types of geophysical hazards: landslides and volcanic lava flows, and some industrial hazards. They further define four types of flood control works which are defined as follows (Haddow et al., 2007):

- Stream channelization - is the process of deepening and straightening stream channels. Deepening a channel prevents flooding by increasing the volume of water that the channel can carry. Straightening a channel allows the water to move downstream faster by shortening the distance it must travel.
- Dams - are elevated barriers sited across a streambed that increase surface storage of flood water in reservoirs upstream from them. These structures can be made of concrete, earth, or with a rock core that provides additional strength.
- Levees - are elevated barriers built with resistant soil placed along the streambed that limit stream flow to the floodway. To be effective, a levee must be built on soil that is resistant to prevent it from settling.
- Floodwalls - are built of strong materials such as concrete. They are more expensive than levees, but are also stronger.

In addition, they can be built nearly vertically. This makes floodwalls attractive in urban areas where space is limited and land values are high. Floodwalls must be constructed on stable soil to prevent settling or collapse. Community protection works such as stream channelization and flood walls are commonly seen in formal settlements within urban municipalities. In the informal settlements such community protection works are not conspicuous as the households are washed away by flash floods such as in Kennedy Road.

2.6.9 Disaster Response

Syed (2008) indicates that disaster response is the sum total of actions taken by people and institutions in the face of disaster. The author further argues that disaster response includes

the implementation of disaster preparedness plans and procedures, thus overlapping with disaster preparedness. The disaster response comes with the completion of disaster rehabilitation programmes. Each activity is formally or informally governed by a set of policies and procedures, and each activity is typically under the auspices of a lead agency. Disaster response activities are implemented by a myriad of government organizations, international and national agencies, local entities and individuals, each with their roles and responsibilities. 36 When a disaster event such as a flood, fire, storm surge, thunderstorm or tropical cyclone occurs, the first personnel to respond are often local police, fire, and emergency medical personnel. According to Haddow et al. (2006), the first responder's jobs is to rescue and attend to those injured, suppress fires, secure police the disaster area, begin the process of restoring order. In South Africa, they are supported in this effort by local emergency management personnel and community government officials.

2.6.10 Recovery and Rehabilitation

Recovery is faster and more effective when it is based on a plan that has been developed before disaster strikes. To design a pre-impact recovery plan, an organisation should:

- Define disaster recovery organisations that include major stakeholders from l-use building construction agencies, business groups, neighbourhood associations,
- Identify the location of temporary housing. This is a difficult issue and usually causes conflict. Resolving this before a disaster speeds up recovery,
- Address the licensing and monitoring of contractors and retail price controls to ensure victims are not exploited. Also address the administrator's powers and resources available. Local government should be overwhelmed by all the work that needs to be done immediately after a disaster, so agencies should make arrangements to borrow staff from other jurisdictions to use trained volunteers such as local engineers, architects, planners,
- Recognize the recovery period as a unique time to implement policies for hazard mitigation and incorporate this objective into the recovery planning recovery (Lindell, 2004).

Rehabilitation and reconstruction comprise most of the disaster recovery phase. This period, following the emergency phase, focuses on activities that enable victims to resume normal, viable lives and means of livelihood. It also includes the restoration of infrastructure, services and the economy in a manner appropriate to long-term needs and defined development

objectives. Syed (2008) states that 37 reconstruction must be fully integrated into ongoing long-term development plans, taking into account future disaster risks. It must also consider the possibilities of reducing those risks by the incorporation of appropriate mitigation measures.

2.7 Disaster Risk Management

According to Mitchell (2003), July and August 2003, appeared as the scramble for a disaster reduction framework inception with the establishment of two different fora, which are the Instituto de Estudios Ambientales (IDEA) and the UN's International Strategy for Disaster Reduction (UN-ISDR-2003). These two different fora were designed as steps toward creating an overarching understing of disaster risk reduction and how it can be measured. The development of a Disaster Risk Reduction Framework in Barcelona and Colombia occurred when a number of large international organisations became concerned with disaster risk reduction frameworks. The interest in developing a framework was the consequence of a trend toward increasing commitment and documenting 'good practice' for effective disaster risk management (UN-ISDR, 2003). Jegillos (2003) cited in Van Niekerk (2005) provided a conceptual framework for disaster risk management. Within this framework the author makes mention of certain requirements. He argues that one of the prerequisites for any disaster risk management to be effective is the establishment of clear policy guidelines which needs to "address all aspects of disaster risk management that ensures mitigation as a proper priority". Hazard, vulnerability and capacity assessments and monitoring must also be undertaken in order to accurately identify adequate prevention and mitigation measures.

The aforementioned excerpt emphasizes that disaster assessments should contain examination of current risk management practices. Aspects such as benefits, costs, participation, equity, support gained from various sectors, sustainability, resources, adequacy of these practices need to be considered. Van Niekerk (2005) further argues that reform and change in different sectors must be established in order to include disaster risk management 38 components. This will require a multi-disciplinary focus and a readiness by various sectors and government to institute continuous improvements in current risk management practices. The author argues that effective linkages of measures and policies within regional and national systems, spatial considerations, communication and information systems, warnings and assessment systems, codes standards should form part for effective disaster risk management. Improving current practices should be included in a risk management plan. This dynamic plan must be

integrated into development planning in order to determine the immediate and long term cost or benefit implications of not taking mitigation into action.

A further component of disaster risk management is the establishment of a permanent organisation and planning center (Van Niekerk, 2005). The author is of the opinion that such a center should function as the focal point for disaster risk management in order to identify, plan for and implement various types of risk reduction measures. This centre will further be responsible for ensuring that multi-stakeholder assessments are conducted and that different plans and programmes are adequately communicated to government and the public. The centre will further establish (as a requirement) a system for an effective post emergency or disaster review. This review must advise government and public on whether, as a result of a disaster, mitigation measures were adequate or whether additional measures were needed (Van Niekerk, 2005). Besides the holistic planning and development of programmes mentioned above, the implementation of specialist programmes is also needed. These programmes could include the implementation of programmes (awareness, training and education) that specifically target reduction of vulnerability of priority sectors such as local business, agriculture, urban poor, and basic social services.

There is a need for the existence of strategies to implement public awareness and education programmes in order to ensure stakeholder and community participation in risk management (Van Niekerk, 2005). Apart from the national and regional focus of disaster risk management, (Van Niekerk, 2005) further emphasizes the support for traditional and indigenous measures of risk reduction. The recognition of coping mechanisms of individuals and 39 communities need to be considered and strategies to strengthen them must be encouraged. This community focus continues in the support for the development of self-reliance and self-help at community level. Arnell, Yohe, Lasco, Ahmad, Cohen, Hope, Janetos, Perez (2007) and ISDR (2004) assert that disaster risk reduction should be conceived as taking place within the broad context of sustainable development. Yamin (2004) Thomalla et al. (2006) argue that in practice, however, there has been a disconnection between disaster risk reduction sustainable development, due to a combination of institutional structures, lack of awareness of the linkages between the two perceptions of competition between hazard-based risk reduction, development needs emergency relief. Schipper Pelling, (2006) cited in emphasize that the disconnection persists despite an increasing recognition that natural disasters seriously

challenge the ability of countries to meet targets associated with the Millennium Development Goals.

A disconnection also exists between disaster risk reduction and adaptation to climate change, again reflecting different institutional structures and a lack of awareness of linkages. Disaster risk reduction, for example, is often the responsibility of civil defence agencies, while climate-change adaptation is often covered by environmental or energy departments (Thomalla et al., 2006:16). Disaster risk reduction tends to focus on sudden short-lived disasters, such as floods, storms, earthquakes volcanic eruptions, has tended to place less emphasis on "creeping onset" disasters such as droughts. Many disasters covered by disaster risk reduction are not affected by climate change. However, there is an increasing recognition of the linkages between disaster risk reduction and adaptation to climate change, since climate change alters not only the physical hazard, but also vulnerability. O'Brien et al. (2006) reveal two broad approaches (top-down and bottom up) to disaster risk reduction, and adaptation to climate change can be incorporated differently into each. The top-down approach is based on institutional responses, allocation of funding and agreed procedures and 40 practices. This approach is followed in most developed countries, and adaptation to climate change can be implemented by changing guidelines and procedures. Allen (2006) further indicate that the bottom-up approach to disaster risk reduction is based on enhancing the capacity of local communities to adapt to and prepare for disasters (Allen, 2006). Actions in this approach include dissemination of technical knowledge and training, awareness raising, accessing local knowledge and resources, and mobilizing local communities. Blanco (2006) attest that climate change can be incorporated in this approach through awareness and the transmission of technical knowledge to local communities. Bridging the gap between scientific knowledge and local application is a key challenge. History has proven that disaster risk reduction strategies have been ignored and not managed in a comprehensive and holistic manner, especially in South Africa, because disasters have often been managed in a crisis management scenario. Historically, however, the literature on disaster risk reduction indicated different alternative approaches in determining the level of acceptable risk. Disaster risk reduction embarked upon to achieve sustainable development, protection of people and livelihoods. According to the International Bank for Reconstruction and Development (1999) the processes of disaster risk management include risk identification, hazard assessment, vulnerability assessment and vulnerability analysis.

2.7.1 Risk Identification

Risk identification includes hazard assessment and vulnerability assessment. Vulnerability analysis is a tool in disaster management and in recent years, a more comprehensive approach than that of disaster risk management has emerged which encapsulates three components which are hazard assessment, vulnerability analysis and enhancement of management capacity. These activities are essential for the definition of strategies to manage disaster risks, including risk reduction (mitigation of the impact of disasters) and the estimation of potential losses necessary for financing or transferring risk. According to the International Bank for Reconstruction and Development (1999), hazard assessment requires scientific understanding of relevant natural phenomena and interpretation of historical records of the occurrence of events. Coburn et al. (1991) stated that there are three essential components in the determination of risk, each of which should be separately quantified. These components are as follows:

- The hazard occurrence probability: the likelihood of experiencing any natural or technological hazard at a location or in a region;
- The elements at risk: identifying making an inventory of people or buildings or other elements which would be affected by the hazard if it occurred, when required estimating their economic value;
- The vulnerability of the elements at risk: how damaged are the buildings or people or other elements would be if they experienced some level of hazard.

The aforementioned components depict clearly the causes and the relationships between the severity of hazards and the degree of damage caused. The International Bank for Reconstruction and Development (1999) suggests that the most important means of reducing disaster risk is reducing vulnerability. Two common strategies used are avoidance and resistance. Avoidance seeks to reduce the effects of hazards on settlements by banning people building in hazards zones settlements or modifying the pattern of occurrence of the hazard with structures such as dams or irrigation systems. Resistance seeks to reduce the damage caused by hazards by constructing settlements that can withstand their effects (International Bank for Reconstruction and Development, 1999). The International Bank for Reconstruction and Development (1999) presented different ways of presenting losses which include scenario mapping, potential loss studies and annualized risk mapping. This indicates that areas affected by disasters are spatially depicted in a map using Geographical Information Systems as a processor. The

International Bank for Reconstruction and Development (1999) confirms that when hazard assessments and vulnerability assessments are combined, it is possible to develop estimates of potential losses.

2.7.2 Hazard Assessment

Bankoff (2003) argues that hazard assessment provides the basis for the identification of hazard zones, which can be presented on maps at various scales. Such maps may indicate the expected peak intensity of an event (as is done on earthquake zone maps) and the frequency of occurrence in a particular area (as is done on flood plain maps). Yodmani (2001) indicates that hazard assessment determines the likelihood of experiencing any natural or human-made hazard or threat in the community. Assessment includes the nature and behaviour of each of the hazards the community is exposed to.

2.7.3 Vulnerability Assessment

Vulnerability assessment focuses on the targets of natural hazards. It involves the evaluation of expected performance structures, infrastructure and institutions. In this regard, Mexico is fortunate to have highly competent intellectual and institutional resources for hazard and vulnerability assessments. Hurricanes, floods, coastal flooding, and drought, vulnerability assessments are carried out by the National Water Commission. Earthquake, volcano, landslide hazards assessments are handled by the National Centre for Disaster Prevention (CENAPRED) units of the National Autonomous University of Mexico (International Bank for Reconstruction Development, 1999). In Mexico, assessing vulnerability compares the resistive capacity or strength of a structure to the expected and natural hazard loads associated with the structure's location. Buildings and infrastructure are classified by structural type and material. Based on laboratory tests and actual disaster damage experience, engineers are able to estimate the expected performance of structures subjected to such factors as ground shaking intensity or wind speed. (International Bank for Reconstruction and Development, 1999). Buildings with poorly secured roofs are known to suffer damage in hurricanes. More sophisticated differentiation of expected performance is possible for a range of classes of structures and infrastructure.

In Mexico, surveys conducted and evaluation of buildings and infrastructure can provide estimates of potential damage 43 and can help to identify weaknesses in critical structures or systems. The gap in this literature is that estimates of potential damage cannot be applicable to rural infrastructure as well as in squatter settlements (International Bank for

Reconstruction and Development, 1999). The informal settlements do not have the scale of the impacts commonly ascribed to them mainly because the levels of consumption of resources is so much smaller than for formal settlements. (International Bank for Reconstruction and Development, 1999). Currently, disasters are being seen as an opportunity to capitalize on the inflow of resources for relief to promote long-term development. In developing countries, disaster relief and development are looked at as two distinct phenomena. Affected communities are considered helpless and passive receivers of aid involved in the process of relief and rehabilitation (www.egyakosh.ac.za). There are some other avenues to reduce disasters such as undertaking vulnerability analysis because vulnerability is one of the three essential components in the determination of risk.

2.7.4 Vulnerability Analysis

Vulnerability analysis, as part of process of disaster risk management, includes vulnerability conceptualization, assessing and mapping social vulnerability, assessing demographic vulnerability, assessing political vulnerability, assessing social vulnerability and vulnerability evaluation. Local governments in developing countries are failing to implement vulnerability analysis using modern scientific approaches, strategies and models such as Geographical Information Systems (GIS). The United States of America is an example of good practice because it used Multi-Hazard Identification and Risk Assessment as well as GIS which are useful for spatial vulnerability distribution and analysis (Bullock et al., 2007). Most South African Municipalities do not have such socio-technical approaches and models (including maps) in place to assess a community's exposure to specific hazards and vulnerability to physical and social impacts. Bullock et al. (2007) argue that communities vary in their exposure to environmental hazards. In the United States source is used which is a set of maps contained in FEMA's (1997) Multi Hazard Identification and Risk Assessment. In 1997, this e-source described exposure to most natural hazards and some technological hazards. Some disasters can initiate 44 others. One way of identifying areas exposed to multiple hazards is to use a GIS to overlay the areas subject to these different hazards (Bullock et al., 2007).

2.8 Learnable Lessons from the USA Disaster Mitigation

This section discusses process that developed economies such as the USA undertake in structuring their disaster mitigation intervention, and what South Africa can learn from these intervention processes. According to Syed (2008), disasters have resulted in significant morbidity, mortality and economic loss. The public is concerned with two objectives in

disaster management. The first is the promotion of preventable strategies to avoid negative consequences of the disaster and the second is the prevention of losses due to disaster mismanagement. Van Zyl (2006) states that the promotion of a "culture of prevention" is practically enabled by access to examples of best practice in disaster risk reduction. The examples of best practice include indigenous knowledge application, disaster management plans and development initiatives stated in the Integrated Development Plans (IDPs). Moreover, examples of best practice encapsulate early warning messages through community radio stations, distribution of pamphlets to vulnerable communities. Lindell et al. (2007) argue that, for some hazards, it is possible to control the source of danger. Technological hazards can be prevented. For example, fires can occur only when there is fuel, oxygen and an ignition source.

In the case of urban municipalities, the causes of fires vary in the informal settlements as it is often caused by paraffin, gas stoves, candles and arson. Fires are uncontrollable in such areas because houses are built of combustible materials and fire extinguishers are not available. Ashford et al. (1993) cited in Bullock et al. (2007) found that source control for structural fires can be achieved by confining fuel to prevent it from mixing with oxygen. According to Haddow et al. (2006), flood hazards can be controlled by maintaining ground cover that decreases runoff by causing rainfall to infiltrate the soil. Flood hazard prevention systems can be practical and implemented successfully if disaster preparedness is taken into cognizance.

Disaster mitigation can be defined as pre-impact actions that protect passively against casualties damage at the time hazard impact (as opposed to an active emergency response) include community protection works, l use practices, building construction practices works, l-use practices, building construction practices (Lindell Perry, 2000). Disaster mitigation refers to measures that can be taken to minimize the destructive and disruptive effects of hazards and thus lessen the magnitude of a possible disaster.

It is argued that disaster mitigation can occur at any time, but is most beneficial if it is taken before an event escalates into a severe disaster. Haddow et al. (2006) indicate that mitigation is the cornerstone of disaster management as it includes keeping homes away from floodplains, engineering bridges to withst earthquakes, creating and enforcing effective building codes to protect properties from hurricanes, earthquake, floods, and landslides. According to FEMA (1999) disaster mitigation is defined as "sustained action taken to reduce or eliminate the long-term risk to people and property from hazards and their effects. Disaster mitigation can be structural (for example, mitigating hazards to prevent a disaster), as well as

non-structural (for example, mitigating the vulnerability of a community to reduce the impacts of a disaster). One way to reduce disaster damage is to adopt hazard mitigation practices, which can be defined as actions that protect passively at the time of impact (Haddow et al., 2006). Hazard mitigation does not require people to take action when disaster strikes. Hazard mitigation involves:

- Hazard source control intervening at the point of hazard generation to reduce the probability or magnitude of an event. This includes the installation of special couplers on railroad tank cars to prevent them from being punctured,
- Community protection works, such as dams and levees, confining or diverting materials flows, iii. L-use practices, reducing or eliminating development on l that has high hazard exposure,

  Building construction practices using strong materials and hazard-resistant design, such as window shutters that protect against wind pressure and debris impact,
- Building contents protection preventing damage to furniture and equipment such as furnaces, air conditioners, washers, and dryers (Haddow et al., 2006).

Mitigation differs from the emergency management disciplines because it looks at long-term solutions for reducing risk as opposed to preparedness for hazards, the immediate response to a hazard, or the short-term recovery from a hazard event. Haddow et al. (2006) claim that mitigation is usually not considered part of the emergency phase of a disaster as in response, or as part of emergency planning as in preparedness. One way to reduce the physical impacts of disasters is to adopt hazard mitigation practices. Disaster mitigation can also be closely linked to development, thereby maximizing long-term development as well as risk reduction. Syed (2008:110) claims that the causes of and the relationship between disasters, social and economic development are ignored. The growing body of knowledge on the relationship between disasters and development indicates four basic themes which are as follows:

- Disasters set back development programmes, destroying years of development initiatives,
- Rebuilding after a disaster provides significant opportunities to initiate development programme,
- Development programmes can increase an area's susceptibility to disasters,

- Development programmes can be designed to decrease the susceptibility to disasters and the negative consequences (Syed, 2008).

The relationship between disasters and development helps all development programmes to design and implement disaster mitigation strategies for all development phases with the aim of reducing disasters. Syed (2008) states that decision-makers who ignore these relationships between disasters and development do a disservice to the people who place their trust in them. Increasingly, around the world, forward thinking to the Ministries of Planning and Finance with the support of the United Nations and Non-Governmental Organisations (NGO) officials are assessing development projects in the context of disaster mitigation and are designing disaster recovery programmes with long-term development needs in mind. The Green Paper (1998) on Disaster Management proposed the establishment of a holistic disaster management structures to support and enhance development in South Africa, through risk management. The introduction of the White Paper in 1999 on Disaster Management upset the "apple cart" as it called for a paradigm shift to be made. Disaster management was no longer being seen within the context of response to disaster, but the emphasis was on prevention, mitigation, and development. Furthermore, disaster management was also seen in the context of training and developing communities who are affected by disasters and employees who work under disaster management departments. Manitoba Health Department in Canada (2002) depicts clearly that knowledge management and capacity of communities and employees is important for mitigation strategies to be implemented easily. Such initiatives are of value to organisations and these initiatives are as follows:

- development of staff training education programmes,
- public education on responsibilities,
- the efficient effective management of resources,
- threat resource analysis,
- Identification of resource requirements, resource availability and shortfalls.

Von Kotze and Holloway (1996) indicate that disaster mitigation can be achieved through proper engineering, spatial planning, and municipal management. Examples of disaster mitigation include protecting deep and shallow wells in a cholera-prone village and planting trees to stabilize a deforested landslide-prone slope. Haddow et al. (2006) argue that local governments often feel that federal state (USA) mates overlap restrictively do not provide

enough funding. Local governments, as the direct regulators of l-use building construction practices, are politically vulnerable to blame for withholding l from development requiring hazard mitigation measures that drive up local development costs. The United States of America have attempted to support local governments and meet federal requirements in many different ways. These include mates that local jurisdictions apply traditional l-use planning tools such as zoning and subdivision regulations. However, states have also encouraged local governments to include hazard mitigation objectives in their everyday investment policies to reduce community hazard vulnerability.

In the case of floods, South African Municipalities has failed to reduce loss by reducing hazard exposure. Furthermore, there are no strategies and programmes in place for dams and levees. Lindell et al. (2007) confirm that the occurrence of floods in the United States led to a programme of constructing dams and levees. Unfortunately, floods continued to increase in the United State of America, so the federal government has more recently tried to intervene indirectly. States must update hazard mitigation plans within six months of a presidential disaster declaration as a condition for receiving disaster assistance. Hazard mitigation survey teams (USA) comprising the Federal Emergency Management Agency (FEMA), state and local representatives are formed after disasters, to identify community mitigation needs and opportunities. Whenever a presidential disaster declaration is made, a Federal Hazard Mitigation Officer (FHMO) is appointed to manage hazard mitigation programmes. The FHMO participates in the preliminary damage assessment, helps assess local mitigation issues, develops a mitigation strategy, and also evaluates state mitigation programmes for regional analysis and recommendation. FEMA and the affected state establish a written agreement that defines the duties and responsibilities that the federal, state, and local governments assume after a disaster. In 1996, FEMA developed a system to classify hazard mitigation strategies in terms of five categories which are hazard source control, community protection works, l-use practices, building construction practices, and building contents protection (Lindell et al., 2007:193).

The building construction practices means that property owners can change their construction practices voluntarily because of risk communication or incentives. They can also change involuntarily because of building code requirements. According to the Manitoba Health Department in Canada (2002), decreasing or mitigating the impact of an event on a community involves actions at the threat and actions directed at the community's vulnerability. Considering the common flood hazard as an example, dikes that prevent

floodwaters from spreading are directed at threat while l-use plans that preclude building on the flood plain are directed at the vulnerable population. In many cases, mitigation strategies are not adopted because of a lack of public support. Devastating disasters are relatively rare, while the costs and sacrifices associated with l-use regulation and building code enforcement can be seen every day. As a result, people are apt to resist mitigation strategies in the absence of a perceived threat (Burby, 1998).

The Manitoba Health Department (2002) argues that structural mitigation activities are able to shift the disaster threshold permanently so that a particular scale of event no longer presents the risk of causing a disaster. Storm sewer systems, retention ponds, and riverbank parks are all examples of flood mitigation activities that prevent heavy rain falls from flooding homes (erson, 2000). These measures are designed to hold an amount of rain that is determined to be large enough to cause flooding and common enough to justify the cost of the mitigation. Henstra McBean (2004) state specific examples of disaster mitigation which include better design construction, enforced through enhanced building codes; more advanced warning mechanisms to alert people about impending hazards (such as, weather warnings) the modification of socio-economic activities to reduce vulnerability of at-risk populations.

Yodmani (2001) indicates that the evolution of approaches from relief and response to risk management has begun to influence the way disaster management programmes are now being planned and financed. There are initiatives aimed at reducing social and economic vulnerability and investing in long-term mitigation activities. The author further argues that such initiatives aimed at prevention and mitigation are few, poorly funded insignificant in comparison with money spent by donors development banks on humanitarian assistance relief, as well as on post disaster reconstruction. The United States of America mitigation strategies are socio-technical oriented in nature. The American federal government has six accepted tools used for disaster mitigation which include hazard identification and mapping, design construction applications, land-use planning, financial incentives, insurance structural controls (Haddow et al., 2006).The above sections mainly focused on the overall content about disaster management disaster risk management

The proceeding sections provide insightful theoretical review of three disaster risk assessment models advocating effective disaster risk reduction. There are number of disaster risk assessment models to promote effective execution and implementation of disaster risk

reduction. However, the relevant application of the model depends on the internal and external factors comprising the environment. Thus this study chose to only discuss three disaster risk assessment models because there are more relevant to the study. This chapter proceeds from the previous chapter (Chapter two) and it is intended to articulate a much focused discussion on three disaster risk assessment models. Moreover, this chapter compares the three models by outlining the underlying factors need to be considered when implementing these models. The following section provide an conceptualise review of the three disaster risk assessment models, namely the community-wide vulnerability capacity assessment (CVCA) Model, community-based risk reduction model South African disaster risk assessment model

2.9 Conceptualising of the Three Disaster Risk Assessment Models

As clearly elaborated in previous sections, disasters are no longer viewed as extreme events created entirely by natural forces. It is now widely recognised that risk (physical, social and economic) which are unmanaged vice versa over a period of time lead to the occurrence of disasters. The focus on disasters is therefore not only on the natural processes but also on its interaction with the human system and its broader environment (Haghebaert, 2007). Hence, emphases on the vulnerability-driven approach in disaster risk assessment. Another important consideration is the evolution of approaches in disaster, where effective disaster risk reduction strategies must begin with an acknowledgement conceptualisation of the complex dynamic ways in which social, political, economic physical structures result in important differences in the vulnerability of those they are expected to protect serve (Comfort, 2004). Hence, this can best be attained through community risk assessment beginning at the local level (Haghebaert, 2007). Further, over the last two decades there has been an increasing awareness that disaster risk assessment is most effective at the community level where specific local needs, resources and capacities are met (ADPC, 2000). Haghebaert (2007) appropriately outlined that the top-down disaster risk reduction interventions often fail to adequately address the specific vulnerabilities, needs dems of the community (Jeggle, 2007). It is at the local level that these vulnerabilities and needs encountered by the community can be adequately assessed and managed through the application of appropriate disaster risk assessment models. The proceeding sections discuss these disaster risk assessment models.

2.9.1 The Community-Wide Vulnerability and Capacity Assessment (CVCA) Model

This model was developed with the intent of being applicable universally across diverse cultures, community sizes, geographic locations, and resource levels (Kuban MacKenzie-Carey, 2001). The primary purpose of the model is to guide and enhance the disaster risk assessment process at local level thereby promoting disaster planning towards effective disaster risk reduction. These goals are further driven by the strong and clear principles underpinning this model.

(a) Underpinning fundamentals of the Model

One of the principles that advocate the CVCA model is the fundamental that the population of every community, regardless of size, demographics and geographical location, contains a diversity of needs and expectations. Therefore, it is necessary to begin with a clear understanding of people as victims, survivors or vulnerable communities in order to contribute to capacity building vulnerability reduction at the grassroots level (Comfort, 2004). The community-wide vulnerability and capacity assessment model demands a self-reflection process by bringing to light the strengths and shortcomings of current activities and highlighting the unfulfilled needs of the vulnerable groups. The primary responsibility to prepare for and respond to disaster rests with the individual. Hence, this model assists to raise public awareness of hazards, vulnerabilities, capacities and risk taken by society (Smith, 2004). This in turn triggers positive responses by communities to initiate programmes of mitigation against the '"shocks" to their community. In order to effectively employ this particular model, number of underlying principles must be considers. These principles are briefly discussed below:

- Individual capacity to respond to disaster varies from person to person and changes over time. This is so because vulnerability is dynamic and varies amongst different people and over time (Brooks, 2003). Certain people are therefore more vulnerable to certain hazards or threats than others due to their exposure to the hazards, their level of resilience and ability to cope. However, this model supports effective targeting of the most vulnerable groups to ensure they are not driven further into destitution by repeat events. The focus is on empowerment of people at risk.
- The planning process must consider the unique needs of the "most vulnerable" and enhance their capacity to respond and recover from disasters. For this reason, the model requires the participation of the vulnerable groups in the planning, implementation and analysis process. Their active involvement is expected to

contribute to the development of a greater understanding of core problems associated with vulnerability such as strengths and coping mechanisms already existing locally. Such engagement can offer insights into the development of programmes that can help the vulnerable groups achieve self-sufficiency (Smith, 2004).

- The community-wide vulnerability and capacity assessment process does not necessarily require specific equipment like computers and GIS mapping or a sophisticated level of detail about the population. However, the more detail-rich the process and visually supported through well-structured maps, the more precise and meaningful the outcome.

These core principles form the basis on which this model is structured and implemented (Kuban and McKenzie-Carey, 2001). The characteristics of the CVCA model incorporate the following discussed step:

Step: 1 Create the Planning Team

This step involves establishing a multi-disciplinary team of "experts" or people knowledgeable about a diversity of issues (Jeggle, 2007) relating to disaster risk management. The composition of the team should also be based on the information that is required and the best possible role-player's to provide and access the desired information. The team should include: representatives from disaster risk management; response/emergency organisations like fire, police emergency medical services; municipal planners; health services; social services; from the business sector; non-governmental organisations (NGOs); key volunteer organisations. While not all of these are required on a continual basis, they should all provide input into the determination of "vulnerability" and in the development of a meaningful solution to the problem. The involvement of community-based organisations (CBOs) is critical to the success of this process. Typically, these organisations have direct link, knowledge and the confidence of members of the vulnerable groups. Therefore inclusion of their representatives could provide much needed and valuable information, reliable communication channels or networks with these populations, and increased credibility of the process. These CBOs are often volunteer-based, thus having a greater degree of flexibility and adaptability than public organisations and could better access donors. Once the team has been created, with a leader identified and respective roles allocated amongst team members, it becomes necessary to consider the terms of reference of the team.

Step: 2 Set the Planning Parameters for the Team

Immediately after the team has been properly constituted, they should engage in determining parameters for their planning process. This requires defining the boundaries of what they will strive to achieve, how they will function, clarification of their roles responsibilities, logistical arrangements resource needs, meeting procedures, broader network communication links (Ahrens Rudolph, 2006). Having set the guidelines for the effective management and functioning of the team enables the team to commence with the collection of data and information**.**

Step: 3 Gather Relevant Information

Team members should be advised of the basic information required and be tasked to gather it before any other activity is commenced. The emphasis should be on accurate, comprehensive and timely information collected from the correct and appropriate sources. As a rule, all data and information should be presented as visually as possible to provide a better understanding within the set context. This information on the population and their immediate environment serves as a base in critically analysing the community**.**

Step: 4 Define and Map the General Population

This step is intended to establish a broad view of the municipality and its population as a foundation upon which additional information is based. The input for this step may be population statistics, census data and development plans. Whilst the output is a marked map detailing the boundary of the municipality, key facilities within it, as well as a comprehensive list of relevant information on the municipality. This visual map makes it easier to demarcate the "high density" areas.

Step: 5 Identify and map high-density areas

Using well defined criteria, the team is expected to highlight and capture the "high-density" areas onto the municipal map. During the planning phase, response and intervention purposes, this categorisation of information is crucial as most of the vulnerable are likely to be inhabitants of this zone. To further improve efficiency within the municipality, the next step entails dividing the municipality into distinctive sectors of operation.

Step: 6 Divide and Map the Municipality into Operational Sectors

An analysis of the municipality is more readily understood and action is more easily defined when classified as manageable segments according to geography and population size. Each sector should be: clearly described; easily identifiable (as conspicuous zones on the map); and manageable during the planning and response processes. Once this information is loaded onto the municipal map, the risk identification process can commence.

Step: 7 Define and Map "High-Risk" Areas.

The focus of this step is to gain a broader perspective of risk which would then provide a more meaningful context for the subsequent discussion on the "most vulnerable" segments of the population. Therefore, historical records, geographical analyses, industrial records, and all reports and records on hazard analyses are vital source of information. The desired output is a set of markings on the municipal map that identify those areas that are relatively "high-risk". The contextualisation of the risk factors in terms of the possible or anticipated hazards pave the way for the examination of the vulnerable groups (Bogardi and Birkmann, 2004).

Step: 8 Select Applicable Categories for the "Most Vulnerable"

Well-structured criteria to define and determine the "most vulnerable" is developed through broad consultation with representatives from interest groups, social services, education, and the municipal planning section. The team is also required to create a list of identifiable population groups that are deemed to be "most vulnerable" to disasters that is, those who are at the greatest likelihood of being at risk. The next point of concern is for the team to ascertain the location of the "most vulnerable" groups.

Step: 9 Identify, Categorise and Map Sites Related or Specific to the "Most Vulnerable" Groups

The emphasis here is to trace the sites that either relate to or service the needs of this identified group ("most vulnerable"). Such sites or facilities may include seniors' homes, frail care facilities, social service access points and health clinics. Each of these sites should be recorded within its appropriate sector and marked on the map to visibly identify its location. Distinct marking on the map makes it easier to move on to the next step and to verify where the large concentrations of the "most vulnerable" group spend their time.

Step: 10 Identify and Map other Areas where each of the "Most Vulnerable" Groups has Significant Numerical Presence

An understing of the nature, lifestyle and limitations of the "most vulnerable" leads to a pattern which points to their presence. Also useful is to solicit information from those who work closely with this group of people for example: health services, recreational services, financial services, social services and shopping centre. The outcome is a list of key locations within the community where a high concentration of the most vulnerable is, corresponding to precise markings on the map. This output links on to the following action of determining the overlap between the most vulnerable groups and the high-risk areas.

Step: 11 Identify Overlap of the most Vulnerable Groupings or Sites and High Risk Areas

The aim of this step is to understand where the two vulnerabilities (that is, of people and activities or things) intersect to result in a relatively higher risk level. These overlaps should be abundantly clear if the map has been marked correctly (with the use of different colours, codes and shading). After all, each step of action forms the building block to the next. Likewise, this leads to the review of the most critical periods of vulnerability.

Step: 12 Identify Critical Periods when each Group is Particularly Vulnerable

Vulnerability and risk change over time, with relocation or with changes in activity making it is necessary to provide another layer of clarity regarding the change of vulnerability over time. A simple three-category time-frame analysis is recommended where the distinction involves the workday hours (0), workday night hours (N) weekend or holiday hours (H). Simultaneously, a review of the "most vulnerable" groups vulnerability levels (that is High, Medium, Low) during each of the three categories of time need to be clarified and captured. This process reveals the impact of time and the level of vulnerability thereby introducing thought to the possible emergency needs of the most vulnerable.

Step: 13 Estimate Likely Emergency Needs of the "Most Vulnerable"

The intent of this step is to gain a broad understanding of the possible emergency needs of the various vulnerable populations. This is expected to be an on-going effort of refining one's perception of the unique needs, services or resources that may be required by each vulnerable group and within each sector. The outcome should be a comprehensive matrix reflecting the various hazards within the three categories of time against the various sectors of the identified vulnerable groups and the corresponding needs and services (Cardona, 2001). This

information will add on to the following section on the actual capacity of the vulnerable groups.

Step: 14 Identify Realistic Expectations Regarding the Capacity of each Identified Group

Having identified who is involved, where they may be located, what services or resources they might need, leads to the point of analysing the capacity of these group members to responding or recovering from disasters (Bogardi and Birkmann, 2004). The outcome should be a list of general expectations by the vulnerable group, prioritised into High, Medium or Low to reflect the impact which they may have on planning or response processes. Further, issues of change on levels of vulnerability need to be incorporated onto the comprehensive matrix that has been developed.

Step: 15 Consider Conditions that Change the Presence or Vulnerability Level of the Identified Group.

An important starting point of note is that the community does not remain static. They are constantly adapting to changes in their environment. It is therefore necessary to capture these changes and the impact it has on the vulnerability and risk levels of the most vulnerable groups before the process of prioritisation can commence.

Step: 16 Categorise Sectors, Facilities or Community Segments into Relative Levels of Priority

Having gained all of the above information, it is possible to undertake a more informed assessment regarding risk and the most vulnerable population of the community. Each community sector, vulnerable-group facility, or vulnerable group concentration should be categorised into one of three priority levels (with 1 being the highest and 3 being the lowest). This prioritisation informs the planning process and may also be a priority during the response and recovery processes. It is therefore crucial to consider related and broader issues that impact on the process and its outcomes.

Step: 17 Identify Issues or Groups for Further Consideration or Action

The process is likely never over, if for no other reason, because people and their capacity undergo change on an ongoing basis. In addition, people physically move in and out of the municipality as well as within it. This results in new and added dimensions to the determined

levels of risk and vulnerability. As such, broader and related issues should be reviewed and appropriately addressed to meet the desired outcomes (Jeggle, 2007). Therefore, continuous review and monitoring is vital for the success of this process.

Step: 18 Review Update

This process demands that its results be reviewed at least annually and revised and updated accordingly. Revisions must be considered if conditions change significantly (for example, vulnerability of a group can change due to evolving environmental, social, political, or economic conditions).

The above steps clearly map out and capture the complete process of the community-wide vulnerability and capacity assessment model. Each step requires forethought, adequate planning and the layering of information in a way that makes it meaningful and visible, at a glance. Also, the successful implementation of the model is dependent upon the continuous review, and amendment and modification of the information to maintain its relevance and appropriateness. This model has been implemented in various countries and programmes yielding positive results, for example integrating community disaster planning programme in the Philippine; targeting the most vulnerable in Canada; understanding vulnerability and distress in Finland; and participatory methods for assessing vulnerable communities in Bolivia and Argentina (Comfort, 2004). The case study of the Swedish programme "Local vulnerability and capacity assessment has a mobilising effect" (Kuban and MacKenzieCarey, 2001) illustrates the benefits of utilising such a model.

Moreover, the Swedish Red Cross (SRC) has been undertaking community-wide vulnerability and capacity assessment since 1994. At the outset, the SRC studied all existing research available such as the standard of living survey. It then examined local assessments of vulnerability and capacity. The main aim of the community-wide vulnerability and capacity assessment was to identify the most vulnerable groups and their capacity to respond. Equally important was the need to raise awareness of the local volunteers and community and to mobilise them to take responsibility for the changing environment challenging their livelihood. Other important aims included the development of local voluntary work and the promotion of improved co-operation with the local authorities and organisations within the community.

Forming the part of the information strategy which included videos and magazine articles, the SRC's chairperson informed the communities about community-wide vulnerability and capacity assessment and actively encouraged them to undertake these assessments. The outcomes achieved were the identification of the most vulnerable groups within the community concerned and better relations between local authorities and other voluntary organisations. In effect, it was clear that this model produced positive results was effective in mobilising relations between government, voluntary organisations, the business sector the community (IFRC, 2006). Although the community-wide vulnerability and capacity assessment model promotes effective community disaster risk assessment, there are certain setbacks that may be encountered in the process.

(b) Obstacles Encountered by this Model

Despite the well-structured and logical flow of activities within the model, there are various challenges (IFRC, 2008) that come to the fore. The major difficulty is that this assessment process is often regarded and used as an end-all-be-all process and is assumed to provide the whole picture. This is certainly not the case nor the intention of this model. More especially with the dynamic nature of risk, the perspective of every analysis changes rapidly and easily with time. The collection of meaningful information must therefore involve process layering and be subjected to continuous review and update. "Layering" involves the use of various analyses to refine the current reality. One layer of analysis-gained information helps clarify or refine previously-gained information. The outcome is a further refinement of the analysis with each successive layer. This indicates that the model should be based on a continuous review and adjustment of information reflecting the changing environment to be relevant and appropriate. Another crucial stumbling block is the quality of data and information available. In most cases the data may not be available in the time period involved, or usually out of date, inaccurate, partial not accessible in a format for analysis, which is essential in stimulating appropriate actions feeding into the planning process. There is a vast quantity of undocumented local knowledge in the field but because of the lack of format with which to systematically collect it and the debate around its unscientific nature; such valuable information is often excluded from the process. Finally, the fact that this model requires a participatory approach implies a greater need for sensitivity, time and resources to conduct the disaster risk assessment process.

The issue of sensitivity begins with securing political will and support to ensure a smooth process. The next stage may be to develop a strategy to sensitise management, staff, volunteers, and all role-players involved. This in turn requires time and resources. During the initiation and planning phases of this model it is critical to secure the necessary resources and take care of all logistical requirements to support such a project. It is also important to take note that the process may be time consuming and costly because of the level and degree of broad participation. However, the "data rich" information derived as a result of this process is invaluable to the success of the model and its outcomes. Contextualisation and examination of the community-wide vulnerability and capacity assessment model, assists in setting the parameters for the next model which is the community-based risk reduction model.

2.9.2 Community-Based Risk Reduction Model

The overarching aim of this model is to reduce vulnerabilities and strengthen people's capacity to cope with hazards. A thorough assessment of a community's exposure to hazards and an analysis of their specific vulnerabilities and capacities from the basis for all activities, projects and programmes directed towards disaster risk reduction (Yodmani, 2002). These issues are further elaborated on within the context of the principles of the model.

(a) Underpinning Fundamentals of the model

This model recognises community risk assessment as an essential precursor to a bottom up decision making process for the development of policies. Strategies and plans towards effective disaster risk reduction. As such, the driving principles are (ISDR, 2007):

- To prioritise the community's risks which need to be reduced through the active participation of the community (Jeggle, 2001). The intent of this model is for the community to address all its disaster risks but its actions and resources need to be prioritised according to frequency, extent of damage and other pertinent considerations which the community members decide on.
- Ensure that the risk reduction interventions are going to be adequate and appropriate in light of the risk assessment process. The risk reduction planning should incorporate a balance between preparedness and long term mitigation planning (Jeggle, 2007).
- Ensure that risk reduction will be cost effective and sustainable. In effect this requires reducing vulnerabilities by increasing the community's capacities. All existing

material, social and attitudinal capacities should be strengthened and areas and strategies for capacity building identified.

- To identify external resources and risk reduction strategies which have to be tapped to address vulnerabilities which the community on its own cannot address. This includes community capacity building through training and education activities and materials, network linkages with relevant government organisations, non-governmental organisations the business sector to access the required resources information (Jeggle, 2001).

These above principles are further substantiated in the discussion that follows on the characteristics and various phases of the model.

(b) Characteristics of the model

The implementation process of the community based risk reduction model points to the following essential features:

- The key resource in disaster risk reduction is the community, both as the main actor as well as the primary beneficiary. The community participates in the whole process from situational analysis to planning and implementation.
- Disaster risk reduction is the foundation of this model. The focus is on reducing vulnerable conditions and the root causes of vulnerability (Aryal, 2003). The primary strategy of vulnerability reduction is to increase the community's capacity, their resources and coping mechanisms.
- The involvement of a multitude of community stakeholders to expand their resource base and promote a multi-sectoral and multi-disciplinary approach towards disaster risk reduction. The local community level links up with the intermediate, national and international levels and related sectors to address the complexity of vulnerability issues.
- Maintain a dynamic framework where the lessons from practice continue to build into the refining of the actions and outcomes of the process.

This flexibility is in correlation with the ever-changing environment and its impact on vulnerabilities and risk factors within the community (Jeggle, 2007). The significance of the above characteristics is best determined within the community based risk reduction processes outlined below. The six sequential stages imply that each step grows out of the preceding

stage and leads to further action (Yodmani, 2002). Together, the sequence builds up a planning and implementation system

Stage: 1 initiating the Disaster Reduction Process

At present, government departments responsible for disaster management, nongovernmental organisations and donor organisations play a key role in activating the process of community risk assessment. This action is usually in response to requests received from vulnerable communities or to identify vulnerable communities where anticipated risk reduction programmes need to be prioritised. This should lead to the close examination of the community and their immediate environment.

Stage: 2 Community Profiling

Here the importance is on creating a picture of the nature, needs and resources of the community as a result of their active participation. It is also a valuable preliminary step in any planning process where the intent is on building rapport and gaining trust of the community through gathering information on the general community profiling (Hamilton, 2008). The next step will then be to undertake the community risk assessment.

Stage: 3 Community Risk Assessment

This is a diagnostic process to balance known disaster risks against available resources. Through the risk assessment process, the community comes to a common understanding of its disaster risks. The dimension of the problem as well as the resources and opportunities involved are identified and analysed. These clarifications facilitate the development of the risk reduction plan.

Stage: 4 Formulation of the Disaster Risk Reduction Plan

The critical factor is to start off the risk reduction process through community mobilisation based on existing capacities and resources within the community's immediate reach (Smith, 2004). The overall objectives and strategies are translated into operational plans, with due consideration given to the resource requirements. At this stage of planning, agreements with intermediary organisations are formalised regarding their support in the implementation process and their commitment to mobilise the required resources. Once the necessary resources are secured and the plan finalised, the implementation process can begin.

Stage: 5 Implementation and Monitoring

The formation and strengthening of organisational arrangements (made up of community organisations, volunteer teams and the like) are useful in the implementation of the plan. This core team is responsible for monitoring the progress of implementation and motivates the community through translation of plan objectives and targets into disaster reduction activities. This group is also instrumental in amending targets and plans to keep on course with the set objectives to reduce vulnerabilities and increase capacities in the immediate and long-term, linking on to the final phase of evaluation and feedback of the disaster risk assessment process.

Stage: 6 Evaluation and Feedback

Evaluation is concerned with the effects of the risk reduction measures in terms of reducing the vulnerability situation of the community determining the impact of risk reduction measures on the community; the overall quality of their life. The lessons drawn are shared with other groups and communities to promote the concept of effective community risk assessment. The above process reveals that community risk assessment is a participatory approach of determining the nature, scope and magnitude of negative effects of hazards to the community and its households within an anticipated period of time. In practice, the community based risk reduction model has been supported for the favourable outputs that it delivers. These are evident in the various projects based on this model, for example, the Bangladesh Urban disaster mitigation project; the Kathmu Valley risk mitigation programme of Nepal; the Community Based Flood mitigation project in Cambodia (AUDMP, 2000), the most recent one being community based risk reduction climate change in Nicaragua (Red Cross Red Crescent, 2009). The benefits of this model had been identified as early as 1998 in the "community based flood mitigation project in Cambodia".

(c) Obstacles Encountered by the Model

One of the most common difficulties is that the community members and external stakeholders usually have differing perceptions of the community's levels of risk and vulnerabilities. The setback here is that the actual resource requirements and intervention measures are determined by the above dynamics (Red Cross and Red Crescent, 2009). Fortunately, this participatory risk assessment process provides the platform to reach consensus on issues and gain a common understanding of local risk issues within the actual

environment. The level and extent of community participation demands a sound knowledge base of disaster risk management in general and a good understanding of the nature and process of disaster risk assessment. This is usually a slow process, especially trying to get the community to comprehend the basics and ensure that everyone involved is on the same page. An added problem is that the community capacity building has resource implications which mean that appropriate steps need to be taken to acquire the necessary tools (Smith. 2004; Comfort, 2004).

Also, negotiations around materials, funding and skilled personnel to undertake training and education of the community create further strain and delays on the time-frames for implementation. This process may therefore prove to be long drawn and time consuming. However, the entire structure and implementation of this model is based on the pivotal role of the community. Community participation cannot be compromised irrespective of the draw-backs that may be experienced (De Guzman, 2003). Finally, getting together a multi-sectoral and multi-disciplinary team in itself is a tall order. The issue of availability is usually linked to the degree of priority they attach to disaster risk reduction. If disaster related issues feature high up on their agenda, then their response and co-operation is easily guaranteed. In other cases, further attempts are required to demonstrate the relevance, importance and impact of their involvement before they can be convinced to engage as partners.

A further dimension to this difficulty is that these different sectors and disciplines view disaster risk reduction from varying spectrums largely influenced by the thinking and practice within their respective disciplines and sectors. This model allows for the gradual integration and participation of all role-players through a collective engagement process lead by a common agenda of disaster risk reduction. The third and final model under review, that is the South African Disaster Risk Assessment Model, also hones in on the participatory approach to disaster risk assessment (NRAAG, 2007).

2.9.3 South African Disaster Risk Assessment Model

As set out in the National Disaster Management Framework (South Africa, 2005), this model provides a generic guideline for undertaking disaster risk assessment within South Africa. Emanating from a progressive piece of legislation (that is, the Disaster Management Act 57 of 2002), the core principles of this model accentuate the current disaster risk reduction concerns and practice.

(a) Underpinning Fundamentals of the model

Fundamentally disaster risk assessment is expected to inform effective disaster planning and risk reduction strategies (NRAAG, 2007). The primary principles of the model may be regarded as strategic enablers towards this end. First and foremost, disaster risk assessment should be conducted in a systematic and sequential manner. This approach allows for the outcomes of the various stages to be in consonance with and directly inform the requirements of the disaster risk planning process (South Africa, 2005). Secondly, disaster risk assessment is to be successively integrated into the development plans of national, provincial and local government so as to ensure that it is considered as part of the strategic planning and resource allocation process. For example, the inclusion of disaster risk assessment requirements and outcomes in the Integrated Development Plans is a means of securing political support and resources for implementation purposes. Thirdly, as a means of increasing the capacity of communities towards minimising the risk and impact of disasters (South Africa, 2002), community based disaster risk assessment is essential.

The active involvement of the community improves the quality of the disaster risk assessment process and findings (Smith, 2004) through the application of local and indigenous knowledge (supplementing the technical and scientific information) and experiences. Fourthly, disaster risk assessment requires a diverse team of experts and relevant stakeholders (De Guzman, 2003). For example, the process of auditing compiling disaster risk information must be inclusive of the various disciplines sectors, government departments, business sector, non-governmental organisations, community based organisations, relevant experts specialists in the field. It could therefore be described as an integrated and multi-disciplinary/sectoral process. Lastly, disaster risk assessment must be reliable and valid in order to inform disaster risk reduction planning. The consultative process of risk assessment methods and findings must be subjected to appropriate quality assurance (South Africa, 2005:77-78) prior to the implementation of the outcomes. These principles encompass the structure aand characteristics of the model as depicted below. Characteristics of the model The South African Disaster Risk Assessment Model reflects the various stages/phases of the disaster risk assessment process (NRAAG, 2007) wherein:

- Stage 1: concentrates on identifying the specific disaster risk to be assessed;
- Stage 2: focuses on analysing the disaster risk concerned;
- Stage 3: involves an evaluation of the disaster risk being assessed;
- Stage 4: pertains to monitoring disaster risk reduction initiatives and disseminating disaster risk assessment information.

These different stages function as a collective whole towards disaster risk reduction. As accentuated in the brief above, the requirements of the various stages as prescribed within the Disaster Management Framework are briefly described.

Stage: 1 Identify the Specific Disaster Risk

This phase involves the clarification of the hazard with respect to its frequency, magnitude, speed of onset, affected area and duration (Tobin and Montz, 1997). It is necessary to analyse and quantify vulnerability to ascertain susceptibilities and capacities. This is undertaken by examining the vulnerability of the people, infrastructure, services, economic activities and natural resources exposed to the hazard. This leads to determining the most likely losses to be suffered from the action of the hazard on those that are vulnerable and to estimate all likely consequences or impacts of the disaster. In preparation, a review of the relevant capacities, methods and resources available to manage the risk, should be undertaken. Once the hazards have been clearly identified and the vulnerabilities/capacities determined, it becomes crucial to consider the level of disaster risk.

Stage: 2 Analyse the Disaster Risk

During this phase the focus is on estimating the level of risk associated with a specific threat so as to determine whether the resulting risk is a priority or not based on its anticipated impact or consequences (Cutter, 1993; Rogers, 1997). The next step then is to evaluate this risk in order to rank them.

Stage: 3 Evaluate the Disaster Risk

This stage entails the further prioritization of disaster risks when there are multiple threats to assess against the background of limited financial and other resources. Risk evaluation is essential as it is not possible to address all disaster risks at the same time (Smith. 2004; Comfort, 2004). Only those classified as absolute priority and marked on the red danger zone are given immediate attention, however, this does not mean that it is the end-all and be-all of

the intervention stage. Rather, it is only the start, which implies that all intervention measures in respect of the risks have to be closely managed and monitored.

Stage: 4 Monitor Disaster Risk Reduction Initiatives, Update and disseminate Disaster Risk Assessment Information

During this phase the emphasis is on continuous monitoring to measure the effectiveness of disaster risk reduction initiatives, recognise changing patterns and new developments in risk profiles. Equally important is the updating and dissemination of the information to inform the disaster risk management planning process. Information is the "life-blood" for the success of the disaster risk assessment process thereby developing effective risk reduction measures for implementation. This model is currently adopted by all spheres of government engaging in disaster risk assessment. The well-defined and clear process facilitates the easy application thereof. In particular, the example of the Western Cape programme on participatory risk assessment for informal settlements bears reference (Holloway and Roomaney, 2008). The main outcomes of this programme are to:

- Involve those most at risk in the consultative process;
- Encourage those most at risk to understand the risk better;
- Enable and support those most at risk to reduce recurrent disaster losses that affect their health.

Hence, the community-based disaster risk management approach is utilised to reduce local risk through participatory assessment and planning methods. Participatory risk assessment is a bottom-up approach that strives to empower communities by engaging them in defining real problems within their environment, deciding on practical solutions, implementing activities and assessing the results of the interventions. This integrated participatory risk assessment and planning process entails three distinct phases (aligned to the South African Disaster Risk Assessment Model) with specific activities and outcomes linked to estimated time frames. The core element is that of a participatory and inclusive process.

In effect, participatory risk assessment is instrumental in guiding immediate risk reduction measures, strengthening cooperation and trust among stakeholders involved in the process, and informing medium to long term planning (that is, integration into the Integrated Development Planning process). The success of this programme has been recognised by the Western Cape Provincial Government as participants in this process. The Western Cape Provincial Government is therefore currently marketing this programme as an example of

disaster risk assessment-good practice in South Africa (Holloway and Roomaney, 2008). In spite of the successful implementation and practice of this model, there are a few critical challenges that need to be recognised and appropriately managed.

(b) Obstacles Encountered the Model

Like all other participatory, community-based disaster risk assessment models, the difficulties challenging the South African model are not that different. In particular, five problem areas may be isolated for discussion within this context as disclosed below:

- Issues surrounding effective community engagement especially where the community is regarded as the most crucial role player in the disaster risk assessment process. The degree of community participation is often hindered by their limited background, understanding and knowledge of disaster risk reduction. Active community participation should be encouraged through a process of education, training and awareness. Such intervention, as necessary as it may be, has major resource implications, for example: materials, finances, personnel, time and generic logistics. Very often this intervention is excluded or forgotten during the planning process and becomes a problem in the implementation phase resulting in unnecessary delays to the approved disaster risk assessment programme of action.
- The diverse and inclusive consultation process hinges on appropriate timing. Given the fact that a right mix of role players are required to ensure the effectiveness of the process implies that the timing of such activities should be suitable and agreed upon by the respective stakeholders. However, in many municipalities, disaster risk assessment is an afterthought, demanding that a schedule of risk assessment activities be drawn up to fit into a specific time frame to meet legislative or policy imperatives before the end of the budget period where remaining funds have to be utilised. This limits participation as some role players may not be available during the identified period impacting negatively on the assessment results.
- The involvement of the different disciplines, government departments and sectors are undertaken on a piece meal approach based on their availability and interest in this process. As much as these multi-disciplinary and multi-sectoral stakeholders recognise their role in disaster risk assessment, their commitment to the process is often lacking, for example, attendance at meetings and workshops is represented by

different person or instead of a dedicated authority. This delays the decision process and follow-up action that is usually required.

- The difficulties experienced with accessing or retrieving the relevant information to commence the risk assessment process is often linked to conventional practices. Within most municipalities, historical data on previous disaster encounters may be available but may not be in a usable format For example, original copies of records may be available but to be useful in the risk assessment process, it would have to be captured in the required format to provide the desired output for ascertaining levels of risk and vulnerabilities and determining the associated consequences thereof. Furthermore, communities do not maintain records of incidents and experiences within their environment, yet they possess rich data that is essential to create the parameters of the disaster risk assessment process. Municipalities are therefore expected to explore strategies to involve the community in the information gathering.
- Staffing problems within the disaster risk management units, like the shortage of staff and the lack of adequately skilled personnel to carry out the disaster risk assessment process. This constitutes one of the major draw-backs of pursuing the core activities of disaster risk reduction. Many municipalities are forced to engage the services of consultants or technical specialists to carry out the disaster risk assessment for their municipality (Holloway and Roomaney, 2008).

By so doing, municipalities are required to specify clear terms of reference (South Africa, 2005) to guarantee the outcomes and output of the process. However, many municipalities, in a haste to fulfil the procurement requirements of government, fail to stipulate specific terms of reference to be adhered to by the service provider. With the omission of such criteria, municipalities usually have limited control over the deliverables and methodology applied in the risk assessment process. The foregoing discussion presented both the positive attributes of the models as well as the various obstacles impacting on their progress. The next logical point of interest is to undertake a comparison of these models. The similarities that they share will be highlighted and the striking differences that set them apart, clarified.

2.10 Comparative Analysis of the Three Models

The purpose of this exercise is to trace the common threads running through these models, to clarify their differences and the resultant effect on the disaster risk assessment process. At the

outset, it is interesting to note that the similarities shared by these models are in consonance with the cornerstones of disaster risk reduction presented as a key component in the previous chapter (Holloway and Roomaney, 2008). Firstly, recognising the value and importance of engaging the political-office bearers and community leaders in securing their political commitment and support in disaster risk reduction is of essential value. This unveiled a host of opportunities by placing disaster risk assessment and risk reduction in the political spot light (Smith, 2004).

Beginning with raising awareness developing a culture of prevention at the community level extending towards a more strategic level of acquiring resource support over-all commitment in encouraging effective disaster risk assessment practice (NRAAG, 2007).. All three models reviewed in this chapter, show strong support for political commitment through the emphasis on the involvement of these political-office bearers and community leaders throughout the disaster risk assessment process. Such engagement is crucial in changing the "mind set" towards disaster preparedness, prevention and risk reduction. By being intimately involved at the practical level, these role players begin to grasp the relevance and merits of disaster risk assessment and risk reduction. As such, they may be instrumental in channelling the outputs of the process into tangible risk reduction initiatives (Cutter, 1993; Rogers, 1997). Since these political-office-bearers serve on government decision-making bodies, they are better informed through their involvement in the process, to clarify any misunderstandings and uncertainties that may arise during deliberations; and rally positive support and commitment for the implementation process. This is however, the intended outcome of soliciting political commitment, but the reality is somewhat different. For example, in the above models, there is no question around political participation but this seems to be confined to the activities within the disaster risk assessment process (Red Cross and Red Crescent, 2009).

It is therefore necessary to link the risk assessment and implementation process to clear actions and responsibilities for follow through and accountability. Secondly, the need to create multi-disciplinary and multi-sectoral teams to promote integrated disaster risk reduction is expressed as non-negotiable. Those diverse teams of experts and relevant stakeholders serve to lead the process of integrated planning thereby ensuring that disaster risk reduction initiatives are cost-effective and sustainable. After all, disaster risk exists in all ambits of society and all segments of their environment (IFRC, 2008). An inclusive, multi-disciplinary or sectoral approach promotes the notion of shared responsibilities as equal partners in this quest to reduce disaster risk. More importantly, the issue of shared

governance is acknowledged within these models and appropriately addressed through a clear understanding and acceptance of roles and responsibilities towards the predetermined goals for effective disaster risk assessment and risk reduction. (Holloway and Roomaney, 2008).

The diverse planning team approach is central to the success of all three models. Specific input from the respective disciplines, sectors and broader stakeholder groups is vital in setting the risk assessment process into motion (Smith. 2004; Comfort, 2004). This type of arrangement based on trust and transparency, encourages "ownership" of the process and its outputs. Hence, there is commitment in integrated planning and sharing of resources and responsibilities (as a team) towards effective risk reduction. Thirdly, the structure and processes of the models allow for flexibility and adaptability. The firm point of departure is that risk assessment issues are dynamic and ever-changing in line with the constantly changing landscape and environment within which it prevails. The true value and relevance of the process can only be maintained through constant and appropriate adaptation. An important component of these models is that of the monitoring, evaluation and feedback. This guarantees the relevancy of the process and its outcomes by reviewing the effectiveness of the risk reduction interventions against set targets by taking into consideration changing climatic conditions and new developments within the broader environment, for example, increasing environmental degradation plagued by new infections and viruses (N1 H1, bird flu, foot and mouth disease) and the escalating cost of living due to the global economic recession resulting in increased poverty levels. Hence, giving rise to the necessary adjustments, amendments and modifications to the action plans and risk reduction strategies to sustain the relevance and effectiveness of these interventions. Fourthly, community participation forms the nucleus of the disaster risk assessment and risk reduction initiatives within all three models (UNDP, 2004; UN, 2005; Kobe Report, 2005 and ISDR; 2005).

The community is identified as a critical resource and is required to guide the disaster risk assessment process through their wealth of local and indigenous knowledge. As such, the community is instrumental in identifying the risk and vulnerability realities within their environment (IFRC, 2008. The focus is a bottom-up approach where the community is afforded the lead role in sketching out the persistent problems, concerns and challenges affecting their safety and livelihood. This serves to ensure that all disaster risk reviews, risk prioritisation subsequent decisions plans of action are grounded within the context of the

community their respective environment fifthly, the models display a genuine intentional drive in empowering the community at risk, towards resilience (UNDP, 2004; UN, 2005; Kobe Report, 2005 ISDR; 2005) . This is initiated through the active engagement of the community throughout the risk assessment process. As partners in the various activities, the community develops a sense of trust and belonging. This becomes evident in the interactive involvement of the community volunteering valuable information and sharing personal experiences and past practices.

Community capacity is further improved through education, training and awareness programmes. Being more informed, the community begins to share ownership of risk reduction initiatives within their environment. More importantly, the community is empowered to recognise that minimising disaster risk is their primary responsibility thus challenging them into a process of self-reflection of daily risk practices within their environment; so that they may equip themselves to cope with and adapt to anticipate risk situations as and when they occur. In addition to the five guiding criteria, these models accentuated two further principles, that is: Information is the essence of successful disaster risk assessment. The risk assessment process is reliant on clear, correct, timely, reliable and valid information; hence risk assessment is only as good as the information that is applied to its process. In turn, the information is only as good as the team that strives to collect, examine, communicate and act on it. This reinforces the concept of a well-represented and inclusive team of relevant stakeholders sharing in the activities. The emphasis is not necessarily on the most expensive highly technical equipment, system methodology being administered in the process; instead the caution is to keep it simple, understandable and reliable (especially within this context of community risk assessment). Also relevant is the promotion of local indigenous knowledge to supplement the scientific and technical information in a logical structured manner. Lastly, disaster risk assessment is described as an iterative process. In this light, the outcomes are construed as a means to an end not an end in itself, that is to say, that the recommended risk reduction strategies may not necessarily be the final product are subject to change adaptation given the ever evolving environment of disaster risk management.

Models encourage process monitoring reviewing of the intended outcomes action plans, thus allowing for the relevant adjustments modifications to be incorporated without unnecessary delays chances of compromising the disaster risk reduction measures. The above analysis reveals that the three models measure positively against the key international agenda initiatives on disaster risk reduction (UNDP, 2004; UN, 2005; Kobe Report, 2005 ISDR; 2005) and the subsequent criteria emanating from them. All five principles were adequately addressed attained by the models. In effect, these models portray an appropriate starting point towards effective disaster risk assessment risk reduction. This is further exemplified in the selected examples of successful practice of these models. To progressively enhance the practice benefits of these models, it is imperative that the challenges confronting them are critically reviewed appropriately sanctioned.

It is important to link the disaster risk assessment process to enabling systems, structures procedures within government (like the reporting decision-making systems structures, the procurement/supply chain procedures) the community (for example, existing community based organisations, volunteer groups active non-governmental organisations). Such mechanisms are vital in providing support facilitating the outcomes actions of the risk assessment process. In light of the above deliberations, all five criteria, that is: political commitment; multi-disciplinary multi-sectorial approach; adaptability; community participation; resilience will be used as the framework in the creation of the proposed model for local government in South Africa. These salient principles are compulsory in the pursuit towards the international agenda on disaster risk reduction. The similarities shared by the above mentioned models crystallises their core principles, characteristics functioning. As such, these similarities overshadow the apparent differences that arise.

The primary differences between these models occur during the planning resource allocation stage. In model one (community-wide vulnerability capacity assessment model), the planning process considers resource needs demands for immediate intervention to reduce vulnerability positively alter the risk profile of the community (UNDP, 2004; UN, 2005; Kobe Report, 2005 ISDR; 2005). The next step of planning dwells on the medium to long-term goals in accordance with priority settings linked to the critical levels of risks vulnerabilities of the community. In model two (community based risk reduction model), during the planning

stage, due cognisance is taken of the resource imperatives for effective implementation of the risk reduction measures. At this point the commitment support of government relevant stakeholders are solicited to guarantee access to ensure the availability of resources, materials equipment, facilitating the implementation of the planned risk reduction interventions. In the third model (South African Disaster Risk Assessment Model), the focus is on the disaster risk assessment process is not so strong on the implementation process (NRAAG, 2007).

Disaster risk reduction initiatives are usually overlooked during the planning budgetary process which implies that risk reduction is usually placed lower down on the political agenda. As such, the limited resource base available to government is usually allocated to priority areas before risk reduction issues are tabled, debated considered for government intervention support Fortunately for integrated planning through the multi-disciplinary multi-sectoral approach currently being encouraged by this model, disaster risk reduction measures may be pursued through for example: environmental management, poverty eradication national social economic development programmes (NRAAG, 2007). The above differences once again strengthen the argument around commitment support as being the driving force of the disaster risk assessment process the lack thereof delays challenges the whole process. The worst case scenario is when the entire process is derailed all hopes of progress success are confined to a beautifully developed disaster risk reduction plan. After all, well-structured carefully devised risk reduction plans lose their value if not timely implemented. During the initiation planning stage, it is imperative to harness the necessary support commitment from all relevant stakeholders who will be crucial in unleashing the resources required to promote effective disaster risk assessment enhance the practice of disaster risk reduction (Holloway and Roomaney, 2008).

2.11 Conclusions

It is highlighted in the above reviews of literature that these two concepts, disaster risk reduction and disaster management, have a number of elements within. These elements includes disaster management strategies and disaster risk reduction strategies. Comparing disaster management practices from the developed economies and developing economies such as South Africa. It also is noted that there is a huge difference in terms of resource allocation, institutional capacity and technology usage. Moreover, the main purpose of the above discussions in this chapter is to provide an overview theoretical review of three

selected disaster risk reduction models. This discussion started from the reviews of literature, and it has furthered by exploring more focused theoretical review. The lessons drawn out of this process will serve as the foundation for the development of the proposed model for Ndwedwe local municipality.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1. Introduction

The purpose of this chapter is to introduce the research design the empirical techniques applied in the study. This chapter outlines how the data was collected. It further provides an insight about the methods that were used as well as analysis techniques. An ultimate plan for collecting utilizing data was significant in this study in order that desired relevant information could be obtained with sufficient precision. It is explained in this chapter why certain methods were considered utilized. This is one of the significant sections of any research study as it assists a researcher to understand which method is best suitable for the study in order to answer questions posed to meet the study's objectives. Methods are utilized in order to provide a precisely completed research paper (Bell, 2010).

3.2 Research design

There are two types of research methods; namely qualitative and quantitative research methods. This study followed qualitative research procedures. Saunders, Lewis and Thornhill (2003) clarify that qualitative studies are subjective. It is an examining method as it focuses on significations of a particular subject. It also identifies and describes implications articulated using words. There is no centralized procedure in analysing and interpreting a qualitative data, there is a variety of data analysis and interpretations, this depends on the type of the study (Neuman, 2000). In order to obtain an in-depth knowledge on a particular subject, using a case study approach is quite appropriate (Marshall and Rossman, 1989). This is the logic why this study used a case study. A case study approach is mostly used when the study asserts a wide-ranged subject matter, therefore a case study approaches the most relevant and researchable example on that particular field. A case study approach is also commonly useful on understudied concepts (Yin, 2009).

The case study used in this study is Ndwedwe Local Municipality. The reason behind the selection of this organization as a case study is that the researcher recognised the necessity to improve the issue of disaster management in this rural municipality as this is the researcher's

workplace. Furthermore, Ndwedwe Municipality is one of the most rural municipality in ILembe District Municipality thus vulnerability caused by disaster in communities is tremendous. Moreover, this is a researcher's workplace. The following paragraphs outline the relevant research type for this study.

3.3 Research Philosophy

The research philosophy is a particular way of thinking and dealing with an issue; it includes a system of beliefs that influence decisions and behaviours (Simon and Usher 2000). The philosophy is an abstraction and knowledge, thinking and attitude on which the methodology is action focused. The approach is somewhat in between and links the philosophy to methods and tools, or thinking and attitude to doing and action (Johnson Onwuegbuzie, 2004). Research philosophy refers to a system of beliefs and assumptions about the development of knowledge. According to Neuman (2000) the discussion of the research philosophy in the research context includes the following:

- Whether it is pragmatism, positivism, realism or interpretivism;
- The reasons behind philosophical classifications of the need to be provided;
- The implications of your research philosophy on the research strategy in general, and the choice of primary data collection methods in particular.

Pragmatism as a research philosophy accepts concepts to be relevant only if they support action (Neuman, 2000). Pragmatists recognise that there are many different ways of interpreting the world and undertaking research, that no single point of view can ever give the entire picture and that there may be multiple realities (Neuman, 2000). Positivism is based on the idea that science is an only way to learn about the truth (Howell, 2012). The researcher is limited to data collection and interpretation through the objective approach, and the research findings are usually observable and quantifiable. Positivism depends on quantifiable observations that lead themselves to statistical analysis (Neuman, 2000).

Critical realism, on the other h, argues that humans do experience the sensations and images of the real world (Sekaran et al, 2010). According to critical realism, sensations and images of the real world can be deceptive, and they usually do not portray the real world (Howell, 2012). A critical realism questions the extent to which a social actor's perceptions give a true picture of the world (Sekaran et al, 2010). Social actors see things differently depending on

the circumstances or situation at h. Saunders et al. (2009) argue that critical realism maintains that human knowledge of reality is based on shared training cannot be expected if the actors are not involved in the learning process. Interpretivism is associated with the philosophical position of idealism and is used to group together diverse approaches, including social constructivism, phenomenology and hermeneutics; approaches that reject the objectivist view that meaning resides within the world independently of consciousness (Neuman, 2000). Thus this study followed the highlighted elements of research philosophy. Moreover, the research philosophy is articulated throughout the study

3.4 Research Methods and Instruments

Scholarly research involves four different types; this includes explanatory research, hypothesis, descriptive research and exploratory research (Saunders et al, 2003). Descriptive research is mostly used when the study asserts a problem in a numerical approach. Hypothesis is commonly used to identify relationships within variables in the study and to identify distinctions in the targeted population of the study. Explanatory research is used to clarify why existing hypothesis appear in a certain way. Exploratory study is commonly applicable for a problem that has not been clearly defined (Neuman, 2000). This study employed exploratory research because most studies present disaster risk reduction strategies, but this scrutinized the effectiveness of disaster risk reduction intervention in addressing reducing the vulnerability factor from disaster occurrences.

3.5 Targeted Population

A population is the entire set of elements that have certain common attributes well-defined by the sampling criteria and well selected by the researcher (Sekaran and Bougie, 2010). Ndwedwe Local Municipality does not operate in isolation, there are different stakeholders involved. The study tried the means to reach these stakeholders in order to obtain neutral and fair information needed for the study. The population for this study include political, administrative and community stakeholders within the municipality. This study thus includes Senior Management, Executive Committee members of the municipality, Local disaster management official, Public Participation Officer and the Ward Committee members. The

research used qualitative research design which aims at gaining in-depth understanding of social phenomena regarding disaster management.

3.6 Sampling strategy and sample size

A sample comprises of the selected participants that possess common qualities with the aim of the study, this may include people or objects (Sekaran et al, 2010). Sampling entails two different techniques, this includes probability and non-probability. These sampling techniques are used in accordance with the nature of the study. Probability sampling ascertains the sample size through numerical selection. The convention of probability sampling reveals that each element or participants have a chance to be part of the selected sample. Probability sampling involves a variety of techniques; this includes systematic sampling, cluster sampling, area sampling and simple rom sampling (Sekaran et al, 2010). Non-probability sampling is commonly used when the study chooses the most relevant population in order to represent the general population. Non-probability sampling entails purposive sampling, quota sampling and convenience sampling. This study followed purposive sampling procedures as it allows the researcher to be judgmental when selecting a sample. This sampling technique empowers the researcher to select the sample that is fully informed about the research problem (Saunders et al, 2003).

The sample for this study selected 10 participants which included (i) His Worship the Mayor, (ii) the Municipal Speaker, (iii) the Municipal Manager, (iv) the Chief Financial Officer, (v) Acting Director Technical and Infrastructure Services/ Project Management Unit Manager, (vi) Director Economic Development and Planning, (vii) Human Resources Manager, (viii) Manager IDP Performance Management System, (ix) Local Disaster Management Officer (x) Public Participation Officer. It was also deemed fair that five focus groups in the form of Ward Committee members from 5 Wards that have always been more vulnerable to disasters are also included in the research. This study purposefully selected these subjects because they contain certain attributes the study considered. These attributes include their capacity capability of having the know-how pertaining the subject in h.

3.7 Pilot Study

As mentioned, the study used semi-structured interviews which are attached at the back of this document. The interview questions were self-administered, done individually analysed through a concept framework. A pilot study to examine validity reliability of the data was

conducted to ensure that data collected was reliable, free of misunderstands, omissions, layout problems and grammar errors. An exploratory stakeholder' consultations was conducted with fourteen people within the Technical Service Department. This included the Director of the Department and thirteen subordinates within the Department. Errors were corrected and recommendations within some questions were considered.

3.8 Administration of Data Collection

Data can be collected through two sources, primary and secondary sources. Primary sources comprise of information that the researcher physically collect at first-h for the study. Secondary sources involve collecting the already existing information (Sekaran Bougie, 2010). There are four main primary sources, this include Individuals, focus groups, panels and unobtrusive methods (Creswell, 2009). Secondary sources include books, journal articles, newspaper articles, statistical data, state publications and internet. This study used all these secondary sources. Furthermore, regarding primary sources, this study employed in-depth interview, focus groups, observation and diary. These kinds of primary source are appropriate when the study involve people's perceptions and experiences in a particular subject line (Saunders et al, 2003). These kinds of primary sources are further highlighted below:

(a) In-depth interviews

In-depth interviews are mostly referred to as semi-structured interviews made up of open-ended questions to extract information from the experiences and knowledge of individuals on the subject matter (Leedy and Ormrod, 2014). The interviews were guided by broad-ranging, instead of rhetorical and pre-determined, questions that were in the process allowed new questions to feature in the discussions. Such interviews allowed and encouraged the respondents to air their opinions and views at length and this assisted in developing an in-depth comprehension of qualitative issues regarding this research.

(c) Focus group discussions (FGDs)

According to Steward and Shamdasani (1990) FGDs are guided, informal discussions on the research topic. This is one of the methods that the researcher utilized to get an indication as to how pervasive certain behaviours, ideas or values are likely to exist in the communities. FGDs were held with Ward Committee members from at least 5 Wards from Ndwedwe Local Municipality. The Wards were selected in terms of their degrees of indigence and geographical positioning in the municipality. These groups were deliberately kept small in

ensuring the participants do not feel intimidated to express their opinions willingly and freely. Moreover, in order to ensure that facts and opinions that can otherwise be missed were captured and also help to explain the context in which the data was collected, a diary was also made use of. Due to most participants' mistrust in the use of audio-recording devices, the researcher decided to only take notes of the responses with the help of the his assistant. The interview notes would then be accordingly transcribed. Hence this did not take any format for recording.

King and Horrocks (2010) argue that interviews and focus group discussions are mostly effective when a researcher wants to collect in-depth information about the subject in h. In this study data was collected through face-to face interviews, focus group discussions, email, telephonic interviews and participant observation. These interviews were 10 semi-structured interviews and data was collected through interview note-taking for the reason that has been cited above. That said, it is noteworthy to mention that Steward and Shamdasani (1990) argue that voice recorders are valuable as a data collection tool; however, they are exposed to obtain backgrounds sounds and noises. Qualitative methods focused on open-ended interviews, and semi-structured questions where topics and issues have been determined, but not in an exact wording of questions. Focus group discussions were initiated where questions were asked, discussed and debated through group dynamics. The qualitative data was collected through face-to-face interviews and focus group discussions.

Table1: Interviewee Details

Interviewee Number	**Date**	**Position**	**Entity**
Interviewee One	19 October 2016	Mayor	Ndwedwe Local Municipality
Interviewee Two	19 October 2016	Speaker	Ndwedwe Local Municipality
Interviewee Three	08 November 2016	Municipal Manager	Ndwedwe Local Municipality
Interviewee Four	17 October 2016	Chief Financial Officer	Ndwedwe Local Municipality

Interviewee Five	10 November 2016	Acting Director Technical Services/ Project Management Unit Manager	Ndwedwe Local Municipality
Interviewee Six	15 November 2016	Director Economic Development Planning	Ndwedwe Local Municipality
Interviewee Seven	20 October 2016	Manager IDP/ Performance Management System	Ndwedwe Local Municipality
Interviewee Eight	17 November 2016	Manager Human Resources	Ndwedwe Local Municipality
Interviewee Nine	17 October 2016	Public Participation Officer	Ndwedwe Local Municipality
Interviewee Ten	18 October 2016	Disaster Management Officer	Ndwedwe Local Municipality
Focus Group	18 November 2016	Ward 05	Ndwedwe Local Municipality
Focus Group	20 November 2016	Ward 12	Ndwedwe Local Municipality
Focus Group	21 November 2016	Ward 14	Ndwedwe Local Municipality
Focus Group	Could not access	Ward 18	Ndwedwe Local Municipality
Focus Group	23 November 2016	Ward 19	Ndwedwe Local Municipality

Source: The Researcher

3.9 Data Analysis

There are different types of data analysis but this study employed thematic analysis because it is a procedure of analysing data through themes developing from the data (Braun and Clarke, 2006). Thematic analysis is a technique that is commonly applied for identifying, analysing

and reporting themes that appears throughout the data (Boyatzis, 1998). This technique precisely sets and asserts collected data in an intensive manner (Leedy and Ormrod, 2014). The reason this research used thematic analysis it is because it captures the important aspects about the data in relation to the research questions and the aim of the study, this makes it represent a certain level of patterned responses with the sample (Braun et al, 2006). Furthermore, this study interpreted data through conceptual framework.

In total the study had 10 interviews, this includes all stakeholders involved in Ndwedwe Local Municipality. In order to bring value to raw material of the data, qualitative studies commonly transcribe the raw material into text and convert it to Microsoft word (Braun et al, 2006). Transcribing into text and converting to Microsoft word makes developing themes and analysis to be much easier (Leedy and Ormrod, 2014). This study followed these qualitative principles, raw data was transcribed and converted to Microsoft word. Therefore codes were utilized in order to develop themes to discuss in the analysis section. To support the discussions and findings the reviews of literature were used. The proceeding paragraphs are reflecting the ethics and procedure that were followed when undertaking this study.

3.10 Elimination of Bias

It well articulated above that purposive sampling allows for sampling cases or participants in a strategic way, so that those sampled are relevant to the research questions. The sample chosen is most relevant to the research topic and questions as it involves key decision makers in Ndwedwe Local Municipality. The participants were specifically chosen from the local municipality and the ward committees representing the community.

3.11 Ethical Consideration

Any research study is required to make ethical considerations, thus the researcher followed this procedure and took certain issues into consideration in this study. Simons and Usher (2000) indicate that ethical issues are defined as an essential element of any knowledge sharing between two or more people. Simon and Usher (2000) further, explain that ethics are related to issues of rightness and justifiability, as these issues involve other people. This entails that a researcher needs to have self-respect while respecting others too and also acting responsibly. This is all due to ethical behaviour, human rights, norms and expectations protection (LeCompte and Schensul, 1999). Ethical clearance is considered as an important

element and the first stage of any study. Considering ethical matters is essential to this study since this is required by the procedures of the University of KwaZulu-Natal. Furthermore, any research should strive to respect the rights of the participants concerned.

3.12 Informed Consent

Simon and Usher (2000) state that informed consent entails the fact that the participants in any study must be free of deception. This includes informing participants how data will be collected, the main aim of the study, and how and where research will be used. This provides protection, assurance and confidence to the participants (Simon and Usher, 2000). A gatekeeper's letter was granted by Ndwedwe Local Municipality to allow this study to continue as the first step in gaining permission and consent to conduct the study. At the beginning of each interview all participants were informed about data collection methods. This involved making them aware of the tools and instruments that were to be employed to collect data, including voice recorders, a paper and a pen. Furthermore, participants were allowed to voice their concerns and ask questions related to the study. In addition, all participants were assured of confidentiality as their names would not be divulged during the research or subsequent write up of the dissertation. Lastly, all participants were informed about the purpose of the study and how the information would subsequently be disseminated.

3.13 Conclusions

This chapter presented and discussed the methods and techniques that were utilized in conducting this qualitative study. Research methods are very significant throughout the research process as they guide the research to provide information that is relevant to the study. Qualitative research is such a complex method that determining underpinning techniques eradicates chances of being vague and deviating from the objectives. This chapter therefore explained the exploratory design using a case study approach employed by the researcher in this study, which enabled the researcher to obtain relevant information from the purposively sampled participants. A discussion of the thematic analysis method which allows for rigorous interpretation of the collected data was also put forth.

CHAPTER FOUR

RESULTS, DISCUSSION AND INTERPRETATION OF FINDINGS

4.1 Introduction

Different disaster risk reduction strategies as well as risk reduction models have been explored in the previous chapters. This chapter attempts to provide a broader insight into the responses that were put together from the participants regarding the effectiveness of the disaster risk reduction strategies or initiatives in rural municipalities. The data was collected from participants that are both from the administrative the political employ of the municipality. The research study further explored the effectiveness of these strategies from the Ward Committees representing the community members in the form of FGD's. The latter was aimed at getting the real feelings the aspirations of the community members regarding the topic in question.

The data was analysed according to the themes that seemed to have emerged from the data namely: current risk reduction strategies, effectiveness of the strategies, barriers to the implementation of strategies, institutional arrangement/framework, municipal disaster management personnel establishment, training development, comprehensive disaster risk assessment, political buy-in, sectorial integration/ multi-sectorial approach, spatial development planning community participation. The data is thus presented according to these themes sub-themes. The first section of this chapter focuses on the current risk reduction strategies that are being employed by the Ndwedwe Local Municipality, also those that the participants also made mention of, during the interactions with the researcher. This is aimed at giving an overview of the disaster risk reduction strategies that can be utilised by the rural municipalities.

4.2 Current Disaster Risk Reduction Strategies

- The establishment of the Local Disaster Management Centres which clearly emanates from the fact that it is the local municipalities that are at the coal-face of the local

service delivery and the idea is aimed at mitigating the disaster issues that periodically haunt the local communities. It also goes without saying that the turn-around time will be improved in terms of the responses that are needed from the municipality, should disaster in any form strike.

- The strengthening of the Disaster Management Offices in terms of the resources, both financial and human, within the local municipalities has also been seen as one of the strategies that should be given priorities as this will assist in the coordination of disaster management activities across the municipality. It was even evident in the interviews and the focus group discussions that there is general unhappiness about the shortage of personnel in the Ndwedwe Municipality Disaster Management office. Thus, the issues of resources, both human financial, are a real bone of contention in the rural municipalities.
- The Municipality also formed a political structure that deals with the issues of disaster management which comprises of Councillors, Municipal Manager, Directors, relevant Line Manager the Representatives from the Traditional Leadership this structure is chaired by one Councillor from the Executive Committee.
- Spatial Development Planning is one of the strategies that municipalities should embark on as one the risk reduction strategies. This will be further looked at in the analysis below.
- Stakeholder involvement which comprises of the Sector Departments, Council Structures and all the other role players that deal with disaster issues has also been seen as one of the strategies. This will assist in the planning, monitoring and the evaluation of the strategies in order to constantly improve on the implementation.
- The training and development of all the stakeholders in terms of the most recent and most feasible disaster risk reduction initiatives.
- The conducting of a comprehensive risk assessment across all the 19 Ndwedwe Municipality Wards. This assists all the stakeholders in terms of the levels of vulnerability of the wards for prioritising on the preparedness aspect.
- Research and Development (R&D) has also been accentuated as an ongoing strategy in the Municipality so that its awareness campaigns are credible and scientific.

4.2.1 Effectiveness of the Current Disaster Risk Reduction Strategies

The cornerstone of this research is the above-mentioned theme and the whole research has revolved around the issue of the effectiveness of these current disaster risk reduction strategies. And in the preceding paragraphs some of these strategies have been alluded to and most of all emanated from the responses that were given by the participants.
The Mayor (19 October 2016) gives an overview as to how prepared he thinks the rural municipalities should be in terms of the strategies to disaster risk reduction. He basically looks at preparedness in terms of the functional Disaster Management Unit within the municipality, risk identification across all the wards and preventative or mitigating factors towards disaster risk reduction. The Mayor (19 October 2016) put it as follows:-

"My understanding of such initiatives as a new political principal in the local municipality is a bit limited, however, with the experience that I had as a previous Chief Whip of the ruling party in the District Municipality there are a few things I can say about those. For instance, all the local municipalities under iLembe District need to prioritise the need to reduce disaster risks within that particular local. This means that there has to be a unit that deals with disaster management within the local.

It is this unit that will need to look at the risks that Ndwedwe is always prone to with regards to disasters, prepare for such risks if possible seek ways means to prevent or minimise them, if they do occur have means to assist the communities that would have been affected, should disasters of any form strike."'2

Whilst on the other side of the coin, the Speaker is of the view that working with communities, volunteers and sectors across all the societal spectrum regarding the disaster risk reduction initiatives is of vital importance. It also points to the world-wide view that for any institution to have a formidable plan or strategy, all stakeholders should be brought on board. It is also noteworthy that this has been advocated by the Disaster Management Amendment Act 16 of '2015 which calls for consolidating all the sector plans with those of the local municipality in order to have a well-coordinated and structured plan towards disaster risk reduction. He also advocates for the identification of vulnerable areas which this analysis later deals with on the theme, 'Comprehensive Disaster Risk Assessment' later on this chapter. The harmonisation of different information from all the stakeholders with that of the Municipality cannot be over-emphasized. And as such the municipal Speaker (19 October 2016) as the Chairperson of the Council suggested:-

"Councillors need to work together with the communities they serve, community volunteers, different sectors in order to plan towards disaster risk reduction, identify vulnerable areas in the wards harmonise all such information be taken up to the relevant Departments the Municipal Disaster Office."

It is also important to note well that the views that have been captured above are the views of politicians. The analysis further looked at the how the Municipal Manager as an administrative Head views the issues around the strategies that her municipality need to embark on. The Municipal Manager (08 November 2016) is of the conviction that a strong institutional basis is needed, she furthermore points out that these strategies are bound to be a failure if a thorough assessment of risks has not been undertaken. She points out to the issues of monitoring and having in their possession as the Municipality early warning systems (EWS) in order to prepare for any hazard that might be coming their way. It was also evident in her response that the issue of the budget is unavoidable regardless of the fact that Ndwedwe Municipality is grant-dependent. She also makes a strong suggestion about putting together plans from all the stakeholders. This is how the Municipal Manager (08 November 2016) extrapolates on the issues that have been mentioned:-

"*Before getting into the initiatives, or strategies, this has always been a very contentious issue within the District itself.'* Why MM? *The strategies that we seem to agree on, as a District, are very good, however, hell breaks loose when those have to be implemented in a rural municipality like Ndwedwe. Let me name but a few:-*

- *Ndwedwe needs to render the disaster management issue a municipal priority with a strong institutional basis. This means we have to have a well-established disaster Unit within.*
- *We have to be able to, not only, identify but do a thorough assessment of risks, monitor them and have means to detect any hazards that might be coming our way.*
- *Embark on programmes that will assist our communities to have knowledge of these risks, how to avert them at all levels, and thereby instil in them a sense of being 'always on their toes' that is PREPAREDNESS at all times.*
- *We need to have on board all the stakeholders with their plans that are budgeted for, consolidate them and solidify all that we embark on.*

However all these things depend on how fat the municipal purse is and unfortunately as you well know we are a grant-dependent municipality with a far meagre revenue base."

4.2.2 Barriers to the implementation of the current strategies

The overarching factor with regards to the barriers or challenges to the current strategies is basically that the research deals with the rural municipality. Being a rural municipality has its own adverse implications. To start with, Ndwedwe Municipality is a rural municipality that is grant dependent and relies on government grants for its capital and operational expenditure, in other words, the municipality does not have a solid revenue base.

In the preceding chapters it has been alluded to the fact that the poorer the community the more vulnerable they are, to disasters. The poor are more likely to reside in hazardous locations and in substandard housing. These kinds of conditions that communities in the rural municipalities live under pose another challenge in terms of resilience. For an example, a household with thatched roof houses are more susceptible to veld fires.

One other aspect is that when disaster strikes these community members, for instance when a house has been burnt down or washed away by floods, more often than not, these affected community members always decide to emigrate to the urban areas and opt for dwelling in slums. This is usually as a result of looking for jobs in the urban areas to revive their lives. Reciprocally, this emigration of community members again brings down the amount of an equitable share grant that the municipality receives from the government. That is, the lesser the population, the lesser the grant. This ultimately and further weakens the municipal financial muscle for the services that need to be rendered to the communities, hence the implementation of the disaster risk reduction strategies will definitely be adversely affected.

Mayor points out to some of the precarious factors that the municipality finds itself in*:-*

"Our municipality does not have much budget and we depend much on the allocation that we get from the equitable share grant. We do not collect much money like the Metros and the urban local municipalities like KwaDukuza Municipality within our District. Now this has very adverse implications for the implementation of these initiatives because there is obviously a shortage of resources, human and otherwise."

The above clearly illustrates that the Municipality is not in a position to have a fully-fledged Disaster Management office in terms of the required human capital which will go h in h with

the personnel tools of trade. This issue poses a great barrier to the implementation of the initiatives.

The implementation of the amendments of the principal Disaster Act across all the stakeholders (Sector Departments and the Council Structures) has not been put in place. However, the implementation of these amendments also depends on the availability of the human capital from the disaster management municipal office.

It has also emanated across almost all the participants and the FGD's that the issue of budget is at the centre of the challenges that a rural municipality faces in terms of the implementation of the risk reduction strategies or initiatives.

4.3 Institutional Arrangement/Framework

According to the Framework for Disaster Risk Reduction (ISDR, 2005) the issue of institutional arrangements is incorporated in the recipe for clear guidance and monitoring of the disaster risk reduction. This illustrates that disaster risk reduction strategies cannot be said to be effective if the institutional capacity of the municipality has not been strengthened. This chapter provides further analysis to municipal Disaster Management personnel establishment and the significance of training and development of Personnel, Councillors and other external stakeholders.

4.3.1 Municipal Disaster Management Personnel Establishment

During the interviews it emanated that the Disaster Management Office has been established by the Municipality but the personnel is not adequate. The Human Resources (HR) Manager (17 November 2016) is of the view that capable human capital in any Department of the Municipality is a strategy on its own and the same is applicable to the Disaster Management Section. He, furthermore, concedes that in the absence of this human capital investment initiative we are defeating the same initiatives the Municipality has set for its own as he elaborates:-

"To be frank and sincere with you, as the municipality we have not yet taken much strides in this regard, that is, in terms of risk minimisation. The reason still revolves around the issue I have already mentioned, because if you do not have people to drive disaster programmes who else will?.....As we speak the section has only one Disaster Management Officer who has to ask for help from the District Municipality to attend to disaster issues, it is cumbersome."

The observation by the HR Manager above again elucidates the ripple effect that the issue of human capital deficit has in the disaster risk reduction strategies in a poor rural municipality. For instance, one of the interview questions dealt at length with how the municipality has disseminated the Amendments of the Disaster Management Act to role-players to assist more in terms of preparedness initiatives. That said, the Municipality is faced with the onus to disseminate these amendments but the conundrum is which personnel will accomplish this tremendous task across the municipal spectrum.

In the same vein, it then becomes inevitable that the issues of current legislation will not be addressed if the municipal institutional arrangement has not been taken care of. One of the critical issues that the Amendments of the Disaster Principal Act is that local municipalities should establish Local Disaster Management Centres it is in such Centres where the personnel will be responsible for the implementation of policies that could have emanated from the consolidated plans from all the stakeholders. The tenets of the Act are thus basically calling for pro-activeness than reactiveness. It is also incumbent upon these Centres to put in place systems to cascade the information that communities need to obtain for the purposes of preparedness for anything that might occur. Hence issues of the Early Warning Systems.

4.3.2 The significance of training development to personnel, Councillors external stakeholders

One of the basic building blocks towards the effectiveness of the strategies is for any municipality to establish relevant structures within and outside the institution in conjunction with the institutional systems. Besides the personnel that this chapter has already alluded to, it is important for Councillors to provide political support within the Council and also to act as a formidable link between the municipality and the community. The external stakeholders that most of the participants have mentioned as crucial are:

- Ward Committees which have been included in the research as focus groups.
  It has also been taken into cognisance that this is a structure that represents the aspirations of the Ward community members. Moreover, this structure is chaired by the Ward Councillor who needs to relay these said aspirations to the municipal Departments through Council structures such as Portfolio Committees, Executive

Committees and to the highest decision-making body of the Municipality, i.e. Council.

- Community Development Workers who are spread across the Wards by the Department of Co-operative Governance and Traditional Affairs in order to offer advice to the local political leadership and what they deem as the needs of the local communities. It is also these community role players that will then work h-in-glove with the disaster management officials to ascertain the effectiveness of the disaster strategies that are in place.

- Community Care Givers/ Community Volunteers who always embark on door-to-door visits in the communities to get to grips with their issues.

The issues of capacity are further emphasised by the Municipal Speaker (19 October 2016) as follows:-

"*The low levels of literacy amongst certain stakeholders although Municipal and Sector Departments Officials can assist on this issue. The other issue is that if the Municipality is not fully capacitated with the adequate human capital, it will still be cumbersome to disseminate such information, and hence such will hinder the implementation.*
Remember these are new amendments to the existing (PRINCIPAL) *Act, it is incumbent upon the officials to workshop Councillors on these amendments so that the Council may be in position to review our Disaster Management Policy, improve our implementation plans going forward. But I must admit that I heard of these Amendment Act during the District Disaster Management Forum that was held sometime in the Municipality in 2015. But we need to simplify such government legislation and make sure every stakeholder has it in their possession."*

4.3.3 Training and development of other stakeholders within the community

The training the development of the stakeholders within the community should be aimed at promoting a culture of risk avoidance by capacitating these role players through integrated education, training general public awareness programmes informed by scientific research.

An integrated capacity building and public awareness strategy therefore also needs to be developed and continuously implemented to encourage risk-avoidance behaviour by all role players, including all Sector departments, and especially in schools and in communities known to be at risk. Such a strategy will then promote an informed, alert and self-reliant society capable of playing its role in supporting and co-operating with the local municipality in all aspects of disaster risk and vulnerability strategy.

This intervention will again enable a rural municipality like Ndwedwe to strengthen the collaboration of the various disciplines and sector departments to forge a partnership approach.

The Public Participation Officer (17 October 2016) also alluded to this with regards to capacity building as follows:-

"*The Public Participation actually works h in glove with Councillors, Ward Committee, Department of Co-operative Governance and Traditional Affairs. I must also mention that Ward Committees are trained in different ways as to how they should work with the communities, however, maybe much effort still needs to be put on the capacitating them regarding these strategies in particular"*

4.3.4 Community foot-soldiers as the basic source of information

For the purposes of who should be capacitated order for the Municipal Disaster Office to obtain critical information from the ground, the following foot soldiers, but not limited to, are worth mentioning. It should also be clear that the following role players in a rural municipality have been mentioned by the participants as well as during the focus group discussions

- Community Development Workers
- Ward Committees
- Community Care-Givers
- Non-Governmental Organisations
- War Rooms in each Wards where all the information about the ward is collated.
- Traditional Leadership as per the Disaster Management Amendment Act 16 of 2015

5.3.5 Monitoring, Evaluation and Improving the effectiveness of the strategies

For any strategies to be effective it is a must that they should be monitored and evaluated in order to effect improvements. This will mean that there should be people on the ground who will work h in h with the Disaster management office. It panned out during the interviews that the foot soldiers are of vital importance. These foot soldiers are, but not limited to:- (i) Community Development Workers, (ii) Ward Committee Members (iii) Community Care Givers, (iv) Community Non-Governmental Organisations (v) Traditional Leadership.

The above issue regarding stakeholders has been emphasized by the municipal Speaker during the interview as follows:-

"The same stakeholders mentioned above are the ones who are community-based stakeholders and who are in constant communication with the Councillors who are then able to bring to the municipality the community needs. It is through this exercise that the Municipality can be able to do the M&E do more in order to further improve on the effectiveness of these initiatives."

4.4 Comprehensive Disaster Risk Assessment

The Disaster Management Amendment Act 16 of 2015 (DMA Act 16 of 2015) describes risk assessment as a methodology aimed at determining the nature extent of risk through the analysis of potential hazards evaluation of existing conditions of vulnerability that together could have a potential to harm exposed people, property, services, livelihoods the environment on which they depend.

Amongst the five challenges that UN/ISDR (2010) identified as facing the local municipalities in implementing successful disaster risk reduction strategies, one of them has been identified as the lack of understanding local risk vulnerabilities where a municipality lacks knowledge about disaster risks vulnerabilities. It also emanated from the interviews that this exercise has not been undertaken by the municipality as the Municipal Manager responds in the negative when asked whether the municipality has conducted such an exercise;

"To be frank and sincere with you, a big NO! Even if we could get consultants to do this exercise we would need to source funds somewhere else. This is so because there are so many other priorities but I am not implying that this is not a priority, however, our political

principals still need to be sensitised on these issues so that they also form part and parcel of the IDP. But I do concede as the Head of the Administration that this is a 'must' if we need to know what we should be budgeting on."

The above suggested an alternative to hire consultants also has its own disadvantage, more especially if they are not being closely monitored by an internal employee, and also consultants are notorious for doing desktop exercises.

On the political side of the coin the Speaker is adamant that such an assessment will give each Councillor a clear picture of his or her ward in terms of each ward vulnerability. This is reaffirmed by the Speaker as follows:-

"*I suppose for starters, we as Councillors should already be having in our possession such an assessment. Reason being is that; that assessment would paint a clear picture for us as new Councillors as to how prone or vulnerable our wards are to certain hazards. It would give us a picture of how prepared we should be. HOWEVER, I have not come across that assessment report. Maybe politicians who sit in a Portfolios that deal with community and social services should push for that assessment."*

The above assertion clearly insinuates that there is a political will for the municipality to be forearmed. This will also enable the municipality to be proactive than reactive. An example that can be cited, is a ward that will have been assessed as prone to lightning. Such a ward can swiftly be assisted with lightning conductors. In this way, the municipality will be put in a proactive rather than a reactive path in terms of preparedness.

4.5 Political Buy-in

Ndwedwe Local Municipality does have a functional Political Committee that amongst other issues deals with disaster management issues and that Committee is known as the Safety, Security and Amenities Portfolio Committee. It is composed of the Directors, Municipal Manager, Councillors and Representatives from the Traditional Leaders and a relevant Line Manager. This Portfolio Committee is chaired by one member of the Executive Committee. One of the primary objectives of this study was also to look at the current municipal practices regarding the disaster risk reduction initiatives. As Municipalities have their own political principals, it then becomes of vital importance that the initiatives that are embarked on by the

municipality do get a political blessing. However, much more commitment is called for, from each of the members of this Portfolio Committee.
The Municipal Speaker again commits to the prioritisation of the issues of disaster thus:-

"Though, I would not be very specific as to the real initiatives but I do have picture as to which direction the municipality wants to head to, with regards to the risk reduction initiatives.
Firstly, as politicians, we need to be aware of the fact that the issues of disaster should be taken seriously and they should get prioritised within the wards. As the Chairperson of the Council my Office needs to advocate for a wider political commitment and not take the disaster issues in the wards as just petty issues."

During the research, the Municipal Manager was also asked about the platforms that have been utilised to disseminate the amendments of the Disaster Management Amendment Act 16 of 2015 in her response it does appear that it is mostly in the political structures where the municipality needs to intensify the dissemination of information. She further alludes to the suggestion that platforms that are led by Councillors should be utilised but still concedes that attempts in the dissemination of the Act have not yet been embarked upon:-

"Firstly we need to workshop all the Municipal structures on the amendments of the principal Act of 2002 if I am not mistaken. But so far we have not started! After that we need to cascade it down to the lower structures bring all our stakeholders on board more especially the Sector Departments, e.g. Social Development, Agriculture, Health, etc.
The platforms that we can use are Full Council Meetings, District and Local Advisory Forums and relevant other Council Structures like Portfolio, Ward Committees, and so forth."

4.6 Sectorial Integration/ Multi-sectorial Approach.

Expressed within the Hyogo Framework for Action (in Chapter Two of the thesis) a need has arisen for the disaster management and risk reduction to be an integral part of the wider concerns of sustainable development. And hence to ensure that risk assessment is done at various levels and vulnerability reduction initiatives are taken into cognisance in different aspects, a multi-sectorial approach needs to be employed towards disaster risk reduction.

One of the roles that the Disaster Management Amendment Bill, 2015 is reaffirming the role of the municipalities in establishing capacity for the development co-ordination of a multi-sector disaster plan the implementation of a disaster management function for the municipality. Also quoted in the earlier chapters is Van Niekerk's (2006) confirmation that disaster management is actually the activity for all spheres of government relating to an integrated, multi-disciplinary approach aimed at reduction of risks associated with hazards and vulnerability. Yodmani (2001) suggests in Chapter 2 of this dissertation that disaster management practices have evolved from largely a top-down relief and response approach to a more intersectorial risk management approach. It is further extrapolated that disaster risk management encapsulates all disaster management components which are prevention, preparedness, mitigation, response, recovery and rehabilitation rather than in the past where response and recovery were only being dealt with.

In the light of the above analysis of the importance of the training of personnel, Councillors and the external stakeholders; it is evident that different sectors of the state, more especially with functions related to disaster risk management, municipal departments, private sector and even consultants should be involved in the disaster risk reduction process. Nowadays, the government has always accentuated a co-operative and an integrated approach and therefore a need for a multi-disciplinary composed team can be over-emphasized.

All four focus groups that were involved in the research also emphasized the bringing together of all the sector departments and advocated for the discouraging operating in 'silos'.

This multi-sectorial approach with regards to the roles of Sector Departments Council Structures was furthermore expatiated on in the FGD's as follows:-

- It transpired that almost all Sector Departments need to be part of the Ward War Rooms so that when households have been profiled, activities will then be presented to the responsible Departments.
- The following Departments were mentioned: - Social Development, Health, Agriculture, Human Settlements, Transport, SASSA and also Home Affairs.
- Apart from the Sector Departments, Council Structures need to be informed by the Councillor as the Chairperson of the War Room of the activities that need to be embarked on by the Municipality itself through the Office of Disaster Management.

All and sundry were, therefore, in agreement in terms of this approach during the research.

4.6.1 The role of the Sector Departments and Council Structures in the implementation of the initiatives

The Disaster Management Amendment Act 16 of 2015, *inter alia,* clarifies the roles and responsibilities of organs of state to give assistance in the Disaster Management Structures. It further advocates on solidifying Intergovernmental Relations Structures to strengthen a consolidated reporting on the implementation of policies on concerted efforts of disaster risk reduction, relief, recovery as well as rehabilitation. Much has been observed by the Ward Committees in the (FGD's) in terms of the role that needs to be played by the other stakeholders in an attempt to implement disaster risk reduction initiatives. They generally have a feeling that engaging the Sector Departments for example during the time when drought was raging throughout the Province, in this case Agriculture, engaging the Department of Cooperative Governance and Traditional Affairs when floods and thunderstorms were experienced, has assisted the municipality a lot. They feel that the Municipality may not have as much resources as it would love to but working together with the other stakeholders has proved to be of much assistance.

The municipal Speaker (19 October 2016) attests to the unity that can render the disaster risk reduction strategies effective is through the following:-

"For me, the Local and District Forums have served as some of the measures wherein the Municipality attempts to engage all the stakeholders, from National, Provincial, District, Locals within the District on these practices. We need to invite officials from the Department of Cooperative Governance and Traditional Affairs to capacitate the Council on the several issues, policies, and recent innovations on Disaster Management"

"I suppose the spirit of working together with the other stakeholders within the Municipality has yielded some success to some extent. However, we cannot be oblivious of the fact that our plans with the other Sector Departments still need to be synchronised. The role of the Traditional leadership needs to be taken seriously because they do not only possess indigenous knowledge but also have a huge influence amongst their sub-ordinates."

The above observation about the inclusion of the Traditional leadership is also advocated for in the Disaster Management Amendment Act 16 of 2015. The amendments are also very clear on the roles of the Sector Departments.

4.6.2 Spatial Development Planning

In the disaster risk reduction strategies, the issues of spatial development planning have also been commended as of vital importance. The municipal planning Department should pull no punches in advocating for the proper use of the l by the members of the community as one of the initiatives to minimise these risks. In the research, one of the strategies that the Director, Economic Development and Planning (EDP) alluded to was also the issue of spatial development planning. One general example that can be cited is where communities build houses along riverbanks. But the question that a rural municipality like Ndwedwe gets faced with is how effective is its planning in spatial development. Is the Planning Department as effective as it is supposed to be to ensure that this is one of the strategies that is of assistance to its communities? However, the Director, Economic Development Planning is adamant that it is in this Department that spatial development planning will be ensured as one of the strategies this is what he had to say:-

"*For me, the strategies are multi-faceted if not supposed to be, as a Department that deals with Economic Development these strategies should see to it that the little economy we are trying to create through agriculture, as an agrarian community, does not get destroyed by adverse effects of disaster when it strikes. Hence our planning Section should deal with the issues of l use management (LUMS) and now recently known as Spatial Planning and Land Use Management Act (SPLUMA). This Act actually looks at how l should be used whereby Traditional Leadership and the Municipality play a pivotal role.*

That said, it means the manner in which l should be used means we have to look at a number of issues, for instance, which l is suitable residential purposes, which l is suitable for farming and so forth. The municipality cannot for instance build residential houses on wetlands that would be disaster in the making. If this planning could be properly done as a risk reduction strategy much more vulnerability can be minimised."

In the above assertion, it becomes evident that the issues of l use management are indeed 'multifaceted' in the sense that they do not only focus on where people should build their

houses but also where they can be able to carry on with their agricultural activities and vice versa. It further indicates the fact that a multi-disciplinary approach is inevitable because in this case the municipality has to work closely with the Department of Agriculture and the Department of Land Affairs and Rural Development. And also within the municipality, Economic Development Planning Department also has to work closely with the municipal Department of Infrastructure Technical Services that was illustrated in during the interview session as follows:-

"*To some extent because our Planning Department has been hard at work in terms of sensitising communities about the l use and thereby circumvent disaster. Our Department has been able to identify areas that are prone to drought liaised with the Department of Infrastructure for boreholes we have been advising co-operatives as to where they can start sustainable gardens in their respective wards taking into cognisance the most suitable l that is not vulnerable to floods."*

The above assertion also talks to the issue of reducing the drought effects, food sustainability and also the prevention of whatever that has been sown not to be washed away should there be floods.

4.7 Community Participation

Local Government: Municipal Systems Act 32 0f 2000, Chapter 4 (16) ss. (1) clearly encourages a development of culture of community participation that needs to be developed by a municipality in the affairs of municipal governance.

Two of the most basic tenets of disaster risk reduction strategy (put forward in Chapter Two of the dissertation as purported by Maskrey (1990) are both community participation and resilience. It is also of importance to note that all these strategies are aimed at serving the community. On the same token it would be suicidal not to involve the community that the municipality intends to assist with the strategies. The community members of the municipality are always the first ones on the 'firing line' of disaster and reciprocally they should be the first ones to play a role in ensuring the effectiveness of the disaster risk reduction strategies.

This legislative imperative thus calls for the need for community participation as one of the strategies to improve stakeholder participation. It also means that the strategies that the

municipality will come up with will be acceptable and responsive to their needs rather than being imposed on them (Maskrey, 1990; Gurr and Harff, 2003).

That said, it is also noteworthy to also mention in this research that all focus groups unreservedly endorsed their unwavering support for community participation. However, they were also very particular that the municipality should not only embark on that exercise only for compliance purposes. Mention was also made as to who should be the strategic link between the community members and the municipality. Councillors, ward committee members and other community volunteers were made as rather obvious suggestions as the leaders of the community on the ground. It is the same leaders that were also suggested for the continuous feedback between the community and the municipality. And periodically the municipality needs to conduct workshops with these community representatives who carry their aspirations. This bottom-up approach will then strengthen local capacity, sustainability and cost-effectiveness in terms of the disaster risk reduction strategies or initiatives rather than hiring the consultants to do community risk assessments.

4.8 Conclusion

This chapter has presented a discussion of the results that are relevant to the aims and objectives of the research study. The study aimed at exploring the effectiveness of the disaster risk reduction strategies in rural municipalities using the Ndwedwe Local Municipality as a case study. The study critically explores these disaster risk reduction strategies as whether they are just paying lip-service to the Ndwedwe communities or they are really effective. It also explores the barriers through various participants and focus group discussions that hinder the effectiveness. The issues were examined through primary data collected during semi-structured interviews with respondents from Ndwedwe Local Municipality administrative and political wings. Focus group discussions were also held with four ward committees in order to get the general aspirations of the community members. Each section in the findings above addressed the aim and objectives of the study.

The first section of the chapter examined the disaster risk reduction strategies that the municipality is armed with, irrespective of how implementable they are, in Ndwedwe rural municipality. This section also intended to give a picture of the initiatives that the respondents ardently think can save the municipality from the harsh realities that disaster

risks pose to the communities of this rural municipality. However, the purpose for tabulating the strategies was to juxtapose them with the reality that a rural municipality like Ndwedwe faces as an institution in its daily operations.

The second section also closely examined the barriers or challenges that the municipality faces in the implementation of these strategies. This section further examined the conundrum that community members get faced with, when affected by disasters. This is usually when they decide to emigrate to urban areas in order to revive their lives. On the same token, when the municipal population decreases, the grants from the government decrease. Such a 'social direct proportion effect' always poses a strain in the implementation of the disaster risk reduction strategies in rural municipalities.

The final section of this chapter examined various themes and sub-themes that respondents filtered in as some of the solutions that rural municipalities should put in place in terms of risk reduction initiatives. The themes that emanate from the responses tend to drive this research towards a community-based risk reduction model that was also dissected in Chapter 3 of this thesis. The following chapter provides the overall conclusions to the study and suggests recommendations based on the discussions from this chapter.

CHAPTER FIVE

RECOMMENDATIONS AND CONCLUSIONS

5.1 Introduction

This study was conducted to explore the effectiveness of the disaster risk reduction strategies in rural municipalities using the case study of Ndwedwe Local Municipality. The chapter also aims to consolidate different sections of the study to ascertain if the aims and the objectives of the study were met. It also aims to provide conclusions and recommendations based on the different aspects that were explored in the research study. And the following recommendations and conclusions are aimed at ratifying the deductions that have been put together through the findings of the research study.

5.2 Summary of the study

This section provides an overview of the study, extracting from the aim of the study to the findings. The first chapter of the study provided a background regarding national, provincial and local legislations, as well as guidelines for disaster management and disaster risk reduction initiatives. These provided a lay-out on what the research study explored in the

context of disaster risk reduction strategies in rural municipalities. The study critically examined the role that local municipalities are supposed to play in the implementation of these strategies since this is a constitutional mandate and local municipalities are at the coalface of service delivery. Furthermore, the study investigated the effectiveness of these strategies in the rural municipalities. And to support the arguments and context in this research study, the researcher used the case study of Ndwedwe Local Municipality in order to collect primary data.

The aim of the study was aligned with the objectives of the study in the first chapter. The literature chapter provided a broader insight into disaster management, disaster risk reduction strategies as well as disaster risk reduction models. The literature and the broader strategies were used to examine the role that local municipalities should play in juxtaposition to the abilities and capabilities of a rural municipality using Ndwedwe as a case study. The disaster risk reduction models were also examined in order to determine which could best suit rural municipalities in terms of the resources they possess, and how best such resources can be optimally utilised in the most effective way of implementing the disaster risk reduction strategies.

The reviews of literature were later used to analyse and discuss the data collected from respondents from Ndwedwe Municipality. In order to ensure that relevant data collection methods were line with the aim and objectives, the methodology outlined the research design and data collection techniques used by the researcher. The methodology chapter provided an insight into methods and techniques that were used in conducting this study. This study used a qualitative design in which ten semi-structured interviews and four focus group discussions were conducted. Furthermore, the reviews of literature were utilized in order to obtain supporting context. The data obtained from participants at Ndwedwe Municipality and the data obtained from the secondary sources was analysed through thematic analysis, which is a qualitative analysis method. The results of the study focused on main themes.

5.3 Conclusions

The community-based risk reduction model is one of the purposive perspectives that holistically addresses different aspects in terms of a variety of challenges, barriers and gaps that actually hinder the effectiveness of the disaster risk reduction strategies addressed herein, in the previous chapters.

As it has been alluded to in chapter 3 of this dissertation, the aim of this model is to reduce vulnerabilities and strengthen the community capacity to prepare, mitigate and cope with hazards. Moreover, it advocates for a comprehensive risk assessment in those particular communities in terms of exposure to hazards, vulnerabilities and capacities towards disaster risk reduction.

In this regard, the model focuses on the following fundamental elements that have also emanated from the analysis in the previous chapter:-

- The prioritisation of the risk assessment as an essential and initial process or precursor in order to effect a bottom-up approach in the strategies and plan towards effective risk reduction strategies or initiatives.

Hence the model's intention for the communities of Ndwedwe Municipality is for them to assess and address all their disaster risks, its actions and resources prioritised according to frequency any other considerations the community members decide on.

- Total community participation in the whole process is key and that refers to the process from its inception stage which is the situational analysis to planning as well as ultimately the implementation.
- The strategy in this model regarding vulnerability reduction is to increase the community's capacity, their resources and coping mechanisms.
- The involvement of a multitude of community stakeholders to expand their resource base and promote a multi-sectorial and multi-disciplinary approach towards disaster risk reduction.
- A dynamic framework also needs to be maintained in order to build on lessons learned towards the refining of actions and the outcomes of the process.

All of these elements of the community based risk reduction model are geared and intended towards integrating, complementing and enhancing an ultimate achievement of the existing disaster risk reduction initiatives.

In corroborating the above assertion, the research findings from the respondents advocated mostly for the community-based disaster risk reduction model. The arguments actually afforded much recognition to the value of this model as:-

- Advocating for a co-ordinated standardised approach in the implementation of the disaster risk reduction strategies in line with what Disaster Management Amendment Act 16 of 2015 requires all involved in the disaster reduction initiatives to do;
- Sharing harmonising all the resources from all the role-players towards the achievement of a common goal;
- Encouraging community participation in the risk assessment processes integrating activities from different community stakeholders;
- Training developing the community stakeholders in order for them to be able to monitor, evaluate improve on the implementation of the disaster risk reduction initiatives;
- Adopting a multi-sectorial multi-disciplinary approach risk reduction initiatives; also;
- Involving the community leadership such as Amakhosi (Tribal Councils), Councillors, Ward Committees and encouraging all the other stakeholder participation.

However, the picture of the reality that is portrayed from the research findings is that there are still more underlying problems that still need to be addressed by the municipality before this model is implemented successfully.

As a rural municipality that is grant-dependent and depends on a meagre budget, it is still incumbent upon the leadership to source funding to establish a local Disaster Management Centre. This Centre will also not operate without the full complement of the Disaster Office personnel. This office has to have systems like Early Warning Systems to assist in making the disaster risk reduction strategies more implementable. It is in this office that the municipality will be able to interact with the other stakeholders the other sector departments to co-ordinate integrate plans towards a much uniform a standardised approach to disaster risk reduction.

The issue of resource planning, acquisition and provisioning is pivotal if the municipality needs to also adopt a multi-sectorial and multi-disciplinary approach towards a more integrated, co-ordinated planning and the implementation of the disaster risk reduction strategies. The inclusion of the disaster risk management plans into the Integrated

Development Plan (IDP) should not only be regarded as a legislated requirement, but also as a means to unlock potential for more resources to be injected into the disaster risk reduction strategies. This inclusion will also position the disaster risk management plans with the other service delivery issues onto the municipal political agenda, and thereby earn legitimacy and political buy-in, in the eyes of the political principals.

The issues of conducting awareness campaigns to, training and development of all stakeholders was extensively accentuated in the findings of this research study. This strategy should also act as a precursor to the implementation of the strategies as it will provide extensive knowledge and information to all the stakeholders. Such will promote a decisive, vibrant and a knowledgeable cohort throughout the disaster risk reduction processes and the notion of stakeholder participation will be legitimised.

Lastly, the belief that disaster risk management only belongs to a municipal disaster office should be done away with. The inclusion and the support of the senior management in the municipality and across all sectors of government coupled with the political buy-in will further solidify the disaster risk management. The support of all these decision-making role-players may also have a fruitful effect in terms influencing policy on the higher echelons of governance to the disaster risk reduction implementation and its outcomes in this rural municipality.

once the above desired outcomes materialise, the disaster risk reduction strategies should be implemented the stakeholders on the ground (i.e. community development workers, community care-givers, ward committees, councillors, so forth) should start to embark on a continuous monitoring evaluating in order gather information that will assist the municipality to improve on these strategies.

The overall purpose of this research study is to explore, dissect and unlock the potential for the disaster risk reduction strategies to be as effective as humanly possible. A further aim is to render the strategies more practical, cost-effective for a rural municipality and above all, effective to the communities of any rural municipality like Ndwedwe.

5.4 Recommendations

- Ndwedwe Local Municipality should strive to periodically conduct disaster risk reduction assessments. This will assist them to be aware which parts of the municipality are most vulnerable and in this way, they will be increase their

preparedness. On the same token, much more resources will accordingly allocated in terms of the levels of vulnerability.

- The stakeholder participation should be holistic in the sense that everybody is less taken by surprise if anything happens. This means that all the stakeholders, sector departments, the municipality and community leadership should always be on the same wavelength with regards to the implementation of the disaster risk reduction strategies.
- A bottom-up approach is of vital importance and hence extensive community participation should be a prerequisite.
- The Head of Departments from all the sector Departments and the Municipality should motivate for budget to acquire early warning system technology.
- The political leadership should be at the forefront in embracing the disaster management risk reduction strategies so that implementation by the officials will not be stifled.
- Public-private partnership need to be encouraged in order to order to augment the issues of the constrained budget
- Traditional Leadership and the elderly should also be brought on board with regards to indigenous knowledge.

5.5 Scope for further research

Further research should look at the effectiveness of the community based risk reduction model that the research study suggested. This study should examine if the model does contribute to disaster management in terms of the risk minimisation. Taking also into cognisance that even rural municipalities are not similar in terms of the levels of development, it is thus important to look further at this model for future studies. The other reason for this further research could be the spatial development of such municipalities despite being rural.

5.6 Conclusion

This research study, at this juncture, thus concludes that any strategies that lack support structures, systems and mechanisms for implementation are just as good as non-existent. The lack of a structure and a co-ordinated framework to guide the implementation of the disaster risk reduction strategies in rural municipalities has proven to be the underlying factor in this

research study. The formation of strategies in the absence of a particular implementation model and modes of operation render these disaster risk reduction strategies futile in the poor rural municipalities. Thus, assessing the disaster risks that are inherent in a rural municipality and developing integrated disaster risk reduction strategies using an appropriate model, are of vital importance. Disaster risk reduction strategies are just not a size-fits-all.

After a rigorous analysis of the findings, it pans out that a rural municipalities' disaster risk reduction management should be guided by a co-ordinated and integrated planning and implementation. That model should be flexible to the conditions of rural municipalities but simultaneously accommodate the other role players across the sectorial divide of the government. This assists the municipality to ultimately have a formidable plan towards the implementation of its strategies, and resources are utilised to their full potential.

The successful implementation of the disaster risk reduction strategies requires full involvement of the key decision makers, political and administrative, within the municipality and across the sector departments' spectrum. The role of the capacitated community stakeholders cannot be overemphasized.

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College of Law and Management

Graduate School of Business and Leadership

Masters Research Project

Researcher: Nkanyiso Mkhwanazi (0829575084)

Supervisor: Dr. Emmanuel Mutambara (031 260 82440)

Semi-Structured Interview Questions

A. To explore the effectiveness of the current practices in the municipality regarding the risk reduction strategies or initiatives.

1. Could you please share with me the current risk reduction strategies or initiatives the municipality is currently using?

2. Considering the most prevalent hazards experienced by Ndwedwe communities in the last five years, to what extent have these strategies minimised their vulnerability?

B. To identify critical success factors and barriers or challenges in the current municipal practices regarding disaster risk reduction.

3. How do you think the Municipality needs to improve on the strategies or initiatives that have so far proven to be a success?

4. Can you identify what seem to be the major challenges within the organization pertaining to the implementation of these initiatives?

C. To determine the measures that need to be embarked on, in order to improve on these Local Municipality's Disaster Management practices.

5. What capacity building initiatives has municipality put in place with regards to such strategies?
6. Has the municipality conducted comprehensive disaster risk assessments amongst all the stakeholders to gauge and improve the effectiveness of these initiatives?

D. To explore how the municipality intends to implement the Disaster Management Amendment Act 16 of 2015.

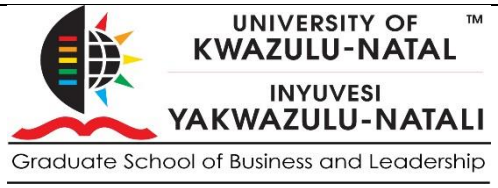
7. What platforms have you utilised as the rural municipality to disseminate the amendments of the principal Act to role-players to assist more in terms of preparedness initiatives?

8. What difficulties do rural municipalities, like Ndwedwe, face in the implementation of the new legislation, and can such be minimised?

E. To make recommendations on the most effective risk reduction strategies for this rural local municipality.

9. What role(s) should the Sector Departments and other Council Structures, but not limited to, play in a rural municipality in terms of the planning and implementation of these strategies or initiatives?
10. How can a rural municipality periodically get feedback from its communities in order to constantly measure, monitor, evaluate and improve on the effectiveness of these strategies?

Informed Consent Letter 3C



UNIVERSITY OF KWAZULU-NATAL

GRADUATE SCHOOL OF BUSINESS AND LEADERSHIP
Masters Research Project
Researcher: Nkanyiso Mkhwanazi (082 957 5084)
Supervisor: Dr. Emmanuel Mutambara (031 260 8244)
HSSREC RESEARCH OFFICE: Mariette Snyman (031 260 8350)

Dear Respondent,

I, **Nkanyiso Mkhwanazi**, am a Master of Commerce in Leadership (Full Research) student, at the Graduate School of Business and Leadership, of the University of KwaZulu-Natal. You are invited to participate in a full research project entitled: **"Exploring Effectiveness of Disaster Risk Reduction strategies in Rural Municipalities: A case study of Ndwedwe Local Municipality."** The main aim of the study is to explore the effectiveness of the current practices in the municipality regarding the risk reduction strategies or initiatives. Furthermore to also identify critical success factors and barriers or challenges in the current municipal practices regarding disaster risk reduction.
It wants to ultimately make recommendations on the most effective risk reduction strategies for this rural local municipality**.**

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

If you have any questions or concerns about participating in the interview or about participating in this study, you may contact me or my supervisor at the numbers listed above.
The interview should take about 45 minutes to an hour. I hope you will take the time to participate.

Sincerely

Researcher's signature_____ Date_____

This page is to be retained by the participant

UNIVERSITY OF KWAZULU-NATAL
GRADUATE SCHOOL OF BUSINESS AND LEADERSHIP

UNIVERSITY OF KWAZULU-NATAL

GRADUATE SCHOOL OF BUSINESS AND LEADERSHIP
Masters Research Project
Researcher: Nkanyiso Mkhwanazi (082 957 5084)
Supervisor: Dr. Emmanuel Mutambara (031 260 8244)
Research Office: Dr S Naidoo (031 260 3093)

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.

I hereby consent/do not consent to record the interview.

SIGNATURE OF PARTICIPANT DATE

.....

This page is to be retained by the researcher

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

6 October 2016

Mr Nkanyiso Brighten Mkhwanazi 941339644
Graduate School of Business and Leadership
Westville Campus

Dear Mr Mkhwanazi

Protocol reference number: HSS/1513/016M
Project Title: Exploring effectiveness of Disaster Risk Reduction strategies in Rural Municipalities: A case study of Ndwedwe Local Municipality

Full Approval – Expedited Application

In response to your application received 13 September 2016, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL.**

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

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

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

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

Yours faithfully

.....

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

/pm

cc Supervisor: Dr Emmanuel Mutambara
cc. Academic Leader Research: Dr M Hoque
cc. School Administrator: Ms Zarina Bullyraj

Humanities & Social Sciences Research Ethics Committee
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CHAPTER ONE INTRODUCTION 1.1 Introduction The ever-increasing scale of human plight periodically becomes evident when disaster, in any manner or fashion, rears its ugly head in communities that are especially based in rural municipal areas (Carrivick and Tweed, 2016). Disasters in different forms; which could be thunderstorms, lightning, hailstorms, drought, veld-fires, fires, and any other form; always strike communities when least expected. When such happens communities, become faced with the deterioration in their livelihoods, socioeconomic conditions, environment and food security in times of droughts (Lindell and Prater, 2003). On the other hand, communities, worldwide, are being negatively impacted by climate change, which further exacerbates these conditions. It is from this particular premise that municipalities should always be forearmed with community-based disaster risk reduction strategies (Carrivick and Tweed, 2016). This study is primarily intended to explore the effectiveness of disaster risk reduction strategies within the rural Ndwedwe Local Municipality, which forms part of the family of iLembe District Municipality. iLembe District Municipality comprises of four local municipalities, namely KwaDukuza, Ndwedwe, Maphumulo, Mandeni local municipalities. 1.2 Background to the Study The study emanates from the Constitution of the Republic of South Africa of 1996 in Schedule 4. Schedule 4 clearly advocates for the functional areas of concurrent national and provincial legislative competences, and one of such competences is disaster management (iLembe District Municipality, 2015.). The

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