

DURBAN UNIVERSITY OF TECHNOLOGY

**“DISASTER RISK MANAGEMENT IN LOCAL GOVERNMENT: A CASE STUDY
OF FOREMAN AND KENNEDY ROAD INFORMAL SETTLEMENTS, ETHEKWINI
MUNICIPALITY, KWAZULU-NATAL”**

BY

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SYNOPSIS

Disasters have inflicted a heavy cost on human, materials and physical resources, and degradation to the environment. Furthermore, disasters have negative physical impacts (which include casualties and property damage) and social impacts (which include psych-social, socio-demographic, socioeconomic, and socio-political). A comprehensive review of the literature has revealed that the development of disaster management strategies must be undertaken before the event strikes. Moreover, disaster management requires effective community-based strategies which will include programmes and measures to prevent, prepare, mitigate and recover from the impacts of disasters.

The purpose of the study is to contribute to the formulation of a robust disaster management framework and plan including the creation of a fully equipped disaster management centre within the eThekweni Municipality. Moreover, to enable the disaster management department within the eThekweni Municipality to function effectively and efficiently by applying new systematic strategies in disaster risk reduction. Furthermore, to add value to the body of knowledge in South Africa as there are limited number of research on disaster management, and to add value to policy, promote investment and protect vulnerable communities by implementing disaster prevention, preparedness and mitigation.

The research was undertaken at Foreman and Kennedy Road informal settlements located in Clare Estate within Ward 25. A disaster management survey was self-administered to the population size of 220 respondents from which 140 respondents completed the questionnaires thereby generating a response rate of 63.6%. Interviews were also conducted amongst eThekweni Municipality officials dealing mainly with disaster reduction. The dimensions of the study are disaster preparedness, prevention, response, recovery and rehabilitation, financial implications and future expectations.

The data was analysed using Statistical Packages for Social Scientists (SPSS). Associations between variables were determined using Pearson chi-square. This study presents the research findings on disaster management by using frequency

tables, graphs and cross-tabulations tables which have been compiled for each question.

Analysis of the data revealed significant differences between the biographical variables (age, gender, marital status, education, occupation, income, number of children, number of dependants, race and tenure) and the five dimensions (disaster preparedness, mitigation, response, recovery and rehabilitation, financial implications and future expectations) respectively. Interpretation of results indicated that there exists significant relationships amongst the key variables of the study relating to disaster management.

This study contributes to various academic disciplines, local government and society at large as it suggests strategies and recommendations that may be implemented to overcome disaster management challenges and attain disaster risk reduction.

The study recommends that eThekweni Municipality should comply with the Disaster Management Act 57 of 2002 which requires the establishment of a disaster management centre, disaster management framework and the plan. Furthermore, the study recommended that the council should develop a system to classify hazard mitigation strategies in terms of five categories which are hazard source control, community protection works, land-use practices, building construction practices and building contents protection.

The study recommends that the eThekweni Municipality should recognise recovery period mitigation and incorporate this objective into recovery planning. On the financial implications aspect, the study recommends that eThekweni Municipality should provide financial assistance on the disaster management prevention and preparedness strategies.

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CONTENTS

TITLE PAGE	i
DECLARATION	ii
ABSTRACT	iii
ACKNOWLEDGEMENTS	v
CONTENTS	vi
LIST OF TABLES	xi
LIST OF FIGURES	xii
ABBREVIATIONS	xvii

CHAPTER ONE

1.1 Introduction and overview	1
1.2 Background and reasons for study	2-4
1.3 Research objectives	4
1.4 Rationale for the study	5
1.5 Hypothesis	5
1.6 Methodology	5-6
1.7 Scope of the study	6-7
1.8 Study Area	7
1.9 Study limitations	10
1.10 Clarifications of terms	10-12
1.11 General outline of chapters	12-13
1.12 Summary	13

CHAPTER 2

THEORETICAL AND COMPARATIVE ANALYSIS OF DISASTER MANAGEMENT

2.1 Introduction	14
2.2 Background to disaster management	14-17
2.2.1 Impact of disasters on communities	17
2.2.2 Effect of disasters on economies	17-18
2.2.3 Government accountability to its citizens	18-19

2.3 Components of disaster management	19-20
2.3.1 Disaster prevention	20-21
2.3.2 Disaster mitigation	21-26
2.3.2.1 Disaster management tools	26
2.3.2.1.1 Hazard identification and mapping	26-27
2.3.2.1.2 Design and construction	27-28
2.3.2.1.3 Land-use planning	28-29
2.3.2.1.4 Financial incentives	29-30
2.3.2.5 Insurance	30-31
2.3.2.6 Structural control	31
2.3.3 Disaster preparedness	32-33
2.3.3.1 Business continuity planning	33
2.3.3.2 Emergency preparedness practices	33-34
2.3.3.3 Community protection works	34-35
2.3.4 Disaster response, recovery and rehabilitation	35
2.3.4.1 Disaster response	35-36
2.3.4.2 Disaster recovery and rehabilitation	36-37
2.4. Disaster risk management (disaster risk reduction)	37-40
2.4.1 Risk identification	40-41
2.4.2 Hazard assessment	42
2.4.3 Vulnerability assessment	42-43
2.4.4 Vulnerability analysis	43-44
2.4.4.1 Vulnerability analysis conceptualisation	44-45
2.4.4.2 Assessing and mapping social vulnerability	45
2.4.4.3 Assessing demographic vulnerability	46
2.4.4.4 Assessing political vulnerability	46
2.4.4.5 Assessing neighbourhood social vulnerability	46-47
2.4.4.6 Vulnerability evaluation	47-48
2.5 Summary of chapter	48

CHAPTER 3

DISASTER MANAGEMENT WITHIN THE CONTEXT OF PUBLIC ADMINISTRATION

3.1 Introduction	49
3.2 Definition of public administration	49-50
3.3 Disaster Management in South Africa	50-52
3.4 New public management (NPM)	52-55
3.5 Public administration principles within the constitution of South Africa	55-60
3.6 Public administration and disaster management	60-61
3.7 Evolution of disaster management legislation with reference to three spheres of government	61-67
3.8 Local government	67
3.8.1 Disaster management and municipal Systems Act	67-69
3.9 Summary	69

CHAPTER 4

INTERNATIONAL TRENDS

4.1 Introduction	70
4.2 Background to international disaster management	70-71
4.3 Case study: Southern Africa floods	71-72
4.4 Case study: Gujarat Earthquake	72-73
4.4.1 Impact on infrastructure	73-74
4.4.2 Damage caused	74
4.4.3 Impact on humans	74
4.4.4 Response, recovery and rehabilitation	75-76
4.4.5 Rehabilitation	76
4.4.6 USA Intervention	76-77
4.4.6.1 Role of non-profit organisations	78-79
4.5 Case Study: Tulsa Safe Room Program	79-80
4.6 The Castaic Union School District (USA)	80
4.6.1 Projected economic impacts	80-81
4.6.2 Responses and rehabilitation	81

4.6.3 Rehabilitation	81
4.6.4 Funding	81
4.7 Case study: Participatory infrastructure upgrading Hanna Nassif	82
4.7.1 The approach	82
4.7.2 Results and impacts	83-84
4.7.3 Participatory settlement regularisation	84-85
4.7.4 Replication	85
4.7 Analysis of case studies	86-87
4.8 International disaster management	87-88
4.8.1 The International Decade for Natural Disaster Reduction 1990-1999 (IDNDR)	88-91
4.8.2 Building a better future: Yokohama Strategy (1994)	91-92
4.8.3 International Strategy for Disaster Reduction (ISDR)	92-93
4.8.4 Hygo Framework for Action 2005-215	93-95
4.8.5 Disaster reduction and Recovery Programme (DRRP)	95-96
4.8.6 Global Platform for Disaster Risk Reduction	96-97
4.8.7 Global Assessment Report on Disaster Risk Reduction	97
4.8.8 United Nations Children's Fund	97-98
4.8.9 World Food Programme (WFP)	98
4.8.10 World Health Organisation (WHO)	98
4.8.11 The role of Non-Governmental Organisations and the International Red Cross	99-100
4.8.12 Assistance provided by the US government	100-102
4.9 Summary	102

CHAPTER 5

DISASTER MANAGEMENT IN SOUTH AFRICA

5.1 Introduction	103
5.2 Disaster management in South Africa	103-104
5.3 National Disaster Management Centre (NDMC)	104-106
5.3.1 Emergency Operations Centre (EOC)	106
5.3.2 Department of Agriculture (DA)	107
5.3.3 National Department of Health (DH)	107

5.3.4 Department of Minerals and Energy (DME)	107-108
5.3.5 Department of Public Works (NDPW)	109
5.3.6 Department of Science and Technology (DST)	109
5.3.7 Department of Water Affairs and Forestry (DWAF)	109
5.3.8 South African National Defence Force (SANDF)	109
5.3.9 South African Police Service (SAPS)	109-110
5.3.10 South African Qualifications Authority (SAQA)	110
5.3.11 South African Urban Search and Rescue (SAUSR)	110-111
5.3.12 South African Weather Service (SAWS)	111
5.4 Hazards and disasters in South Africa	112-114
5.5 The nature of informal settlements: A case of Foreman and Kennedy Road informal settlements	115-116
5.6 Informal settlements and vulnerability to disasters in South Africa	116-119
5.6.1 Disaster and technology	119-120
5.7 Disaster management institutional arrangements in South Africa	120-121
5.7.1 The national government sphere	121-122
5.7.1.1 Intergovernmental committee on disaster management (ICDM)	122
5.7.1.2 The national disaster management framework (NDMF)	122-123
5.7.1.3 The national disaster management advisory forum (NDMAF)	123-124
5.7.1.4 The national interdepartmental committee on disaster management (NICDM)	124
5.7.2 The provincial government sphere	124-125
5.7.2.1 The provincial disaster management framework (PDMF)	125
5.7.2.2 The provincial disaster management centre (PDMC)	125-126
5.7.2.3 The provincial disaster management advisory forum (PDMAF)	126
5.7.1.5.4 The provincial interdepartmental committee on Disaster Management (PICDM)	126
5.10 Summary	126-127

CHAPTER 6

RESEARCH DESIGN

6.1 Introduction	128
6.2 Research aim and problem	128
6.3 Research objectives	129
6.4 Qualitative research designs	129-130
6.5 Quantitative research designs	130
6.6 Survey methods	130-131
6.7 Case study	131-132
6.8 Literature review	132-133
6.9 Observation	134
6.10 Semi-structured interview	133-134
6.11 Sampling procedure and description of the sample	134
6.11.1 Sampling for quantitative research method	134-135
6.11.2 Sampling for qualitative research method	135
6.11.3 Description of the sample	135
6.11.4 Composition of the sample	135-136
6.12 Data collection	136-137
6.12.1 Questionnaire structure and design	137-138
6.12.2 Description and purpose of a questionnaire	138
6.13 Piloting	138-139
6.14 Data analysis	139
6.14.1 Descriptive statistics	139
6.14.2 Frequency and percentage	139-140
6.14.3 Inferential statistics	140
6.15 Ethical considerations	140-141
6.16 Summary	141

CHAPTER 7

EMPIRICAL PRESENTATION AND DATA ANALYSIS

7.1 Introduction	142
7.2 Biographical analysis	144-153
7.3 Quantitative analysis	153
7.3.1 Disaster preparedness	153-162
7.3.2 Mitigation	162-165
7.3.3 Response, recovery and rehabilitation	165-169
7.3.4 Financial implications	170-171
7.3.3 Local government sphere: eThekweni Municipality management	171-174
7.3.3.1 Information derived from councillor and staff interviews	174-175
7.3.3.1.1 Disaster prevention and preparedness	175-177
7.3.3.1.2 Disaster mitigation	177-179
7.3.3.1.3 Response, recovery and rehabilitation	179-180
7.3.3.1.4 Financial implications	180-181
7.3.3.1.5 Challenges	181
7.3.3.1.6 Future expectations	182-182
7.3.5 Observation of Findings	182
7.3.6 Respondent's expectations from municipality	182-184
7.4 Empirical findings	183-185
7.5 Summary	184-188

CHAPTER 8

RECOMMENDATIONS AND CONCLUSION

8.1 Introduction	189
8.2 Overview	189-191
8.3 Recommendations	191
8.3.1 Disaster preparedness	191-193
8.3.2 Disaster mitigation	193-195
8.3.3 Response, recovery and rehabilitation	195-196
8.3.4 Financial implications	196-197

8.4 Future research imperatives	197
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BIBLIOGRAPHY	xviii
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ANNEXURE 1	SURVEY QUESTIONNAIRE
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LIST OF TABLES

TABLE NUMBER	DESCRIPTION	PAGE
3.1	Key stages in the evolution of South Africa's	65
6.2	Sample Size	136
7.1	Composition of sample disaster management legislation	143-144
7.2	Relationship between income and occupation (males)	148
7.3	Relationship between income and the occupation of females	149
7.4	Relationship between income and the reason to migrate to Durban	151
7.5	Relationship between tenure and reason to choose to stay here	152
7.6	Relationship between the reason to migrate to Durban and gender	154
7.7	Relationship between occupation (male) and the reason to migrate to Durban	155
7.8	Relationship between kinds of disasters (emergencies) experienced in the past few years and the adequate protection from floods	157
7.9	Relationship between kinds of disasters and preventative measures in place	158
7.10	Relationship between protection from floods and types of materials used for building the shack	160
7.11	Relationship between types of materials used for building a shack/house and the protection from fires	161
7.12	The role of communities in disaster or emergency management before and after the disaster	162
7.13	Relationship between things done to	163

	reduce risks after the disaster and the resources of acceptable standard used to build a house or shack	
7.14	Relationship between mitigation information provided in writing and the emergency preparedness handouts and other information distributed to the community on disaster or emergency management	165
7.15	Relationship between government agencies available during and after a disaster and the role of civil society during and after the disaster	167

LIST OF FIGURES

FIGURE NUMBER	DESCRIPTION	PAGE
1.1	eThekweni Municipality areas	8
1.2	Foreman and Kennedy Road	9
7.1	Age	145
7.2	Gender	145
7.3	Marital status	146
7.4	Education	146
7.5	Race	147
7.6	Occupation (Males)	147
7.7	Occupation (females)	149
7.8	Income	150
7.9	Number of children	151
7.10	Tenure	152
7.11	Reasons to come to Durban	153
7.12	Occupation Types	156
7.13	Kinds of disaster experienced in the past five years	156
7.14	Protection from floods	159
7.15	Types of materials used to build your shack or house	162
7.16	Community protection works available in communities	164
7.17	Kind of warnings	166
7.18	Availability of government official's after a disaster	166
7.19	The role of civil society	168
7.20	Assistance received after the disaster	168
7.21	Activities performed by eThekweni municipality	169
7.22	Category needing special attention	169
7.23	Present income and the payment of the services	170
7.24	The financial costs caused by disasters	170

7.25	The repair or replacement cost of your dwelling after the disaster	171
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ABBREVIATIONS

ABBREVIATION	MEANING
ARC	Asian Disaster Reduction
AU	African Union
BHR	Bureau of Humanitarian Response
CBD	Central Business District
CBOs	Community Based Organizations
CDA	Community Development Association
CDBG	Community Development Block Grant
CDBG	Community Development Block Grant
CDRC/N	Citizens' Disaster Response Centre or Network
CHEs	Complex Humanitarian Emergencies
CRED	Centre for Research on the Epidemiology of Disasters
DA	Department of Agriculture
DART	Disaster Assistance Response Team
DBSA	Development Bank of Southern Africa
DH	Department of Health
DM	District Municipalities
DMC	Disaster Management Centre
DME	Department of Minerals and Energy
DMIS	Disaster Management Information Systems
DoD	Department of Defence
DPLG	Department of Provincial and Local Government
DRD	Disaster Response Division
DST	Department of Science and Technology
DSWD	Department of Social Welfare and Development
DWAF	Department of Water Affairs and Forestry
EDA	Economic Development Administration
EIA	Environmental Impact Assessment
EOC	Emergency Operations Committee
EPM	Environmental Planning Management
EPWP	Expanded Public Works Programme

FBO's	Faith Based Organizations
FEMA	Federal Emergency Management Agency
FHA	Federal Housing Administration
FHMO	Federal Hazard Mitigation Officer
FMA	Flood Mitigation Assistance
GAR/DRR	Global Assessment Report on Disaster Risk Reduction
GDP	Gross Domestic Product
GG	Government Gazette
GIS	Geographical Information Systems
HAZUS	Hazard United States
HMGP	Hazard Mitigation Grant Program
HSRC	Human Science Research Council
ICDM	Intergovernmental Committee on Disaster Management
ICRC	International Committee of the Red Cross
IDEA	Instituto de Estudios Ambientales
IDMC	Interdepartmental Disaster Management Committee
IDNR	International Decade for Natural Disaster Reduction
IDP	Integrated Development Plan/Planning
IDRM	Institute for Disaster Risk Management
IFRC	International Federation of Red Cross and Red Crescent Societies
ILO	The International Labour Organisation
IMD	Indian Meteorological Department
IMF	International Monetary Fund
INK	Inanda, Ntuzuma and KwaMashu
ISDR	International Strategy for Disaster Reduction
IT	Information Technology
KPAs	Key Performance Areas
KPIs	Key Performance Indicators
KZN	KwaZulu-Natal
MANDISA	Monitoring, Mapping, and Analysis of Disaster Incidents in South Africa
MDGs	Millennium Development Goals

MEC	Member of Executive Committee
NAM	Non-Alliance Movement
NCDP	National Centre for Disaster Prevention
NDCC	National Disaster Coordinating Council
NDMAF	National Disaster Management Advisory Forum
NDMC	National Disaster Management Centre
NDMF	National Disaster Management Framework
NDPW	National Department of Public Works
NEHRP	National Earthquake Hazard Reduction Program
NFIP	National Flood Insurance Program
NGO's	Non Governmental Organizations
NIDMC	National Interdepartmental Committee on Disaster Management
NIGP	National Income Generating Programme
NPM	New Public Management
OCHA	Office of the Coordination of Humanitarian Affairs
OECD	Organisation for Economic Co-operation and Development
OFDA	Office of Foreign Disaster Assistance (United States of America)
OS	Operations Support
PDM	Pre-disaster mitigation`
PDMAF	Provincial Disaster Management Advisory Forum
PDMC	Provincial Disaster Management Committee
PDMCs	Provincial Disaster Management Centres
PIC	Provincial Interdepartmental Committee
PICDM	Provincial Interdepartmental Committee on Disaster Management
PIE	Prevention of Illegal Evictions Act
PMP	Prevention, Mitigation and Preparedness
PPP	Public Private Partnership
PS	Program Support
RBM	Results-Based Management
RDP	Reconstruction and Development Programme
SABS	South African Bureau of Standards
SANDF	South African National Defence Force

CHAPTER ONE

1.1 INTRODUCTION AND OVERVIEW

For the purpose of this study, the term disaster is reserved for events that produce more losses than a community can handle. A community struck by disaster can cope only with help from local, provincial and national government, civil society and bodies such as Red Cross. Lindell, Prater and Perry (2007:3) argue that disasters cause many casualties, much property damage, and significant environmental damage. According to the South African Disaster Management Act 57 of 2002, disaster management means a continuous and integrated multi-sectoral, multi-disciplinary process of planning and implementation of measures aimed at preventing or reducing the risk of disasters, mitigating the severity or consequences of disasters, emergency preparedness, a rapid and effective response to disasters and post-disaster recovery and rehabilitation. Disaster management in the South African context aims to incorporate all elements of disaster risk reduction such as vulnerability analysis. This thesis is concerned with disaster management in South Africa, placing special emphasis on the emerging pressure on risk reduction.

Drawing on cases from the developing world, scholars such as O'Keefe, Westgate and Wisner (1976:45), Hewitt (1983:45) and Wisner *et al.* (2004:65) argue that people's behaviour in the face of natural hazards is constrained by social, economic and political forces rather than individual risk perception. Political neglect, social marginalization and limited access to resources compel helpless people to live and work in hazard-prone areas. The temporary construction materials (such as wood, cardboard, plastic and zinc used by eThekweni Municipality's Foreman and Kennedy Road informal settlements) exacerbate fire problems, making access to them difficult in times of need. Furthermore, lack of adequate services, leading to the use of gas, paraffin and fossil fuels, has meant that people are obliged to use these potentially hazardous fuel sources.

Cannon (1994:12) and Wisner (2004:24) emphasize people's vulnerability to disasters in their local context. The eThekweni Municipality's area is prone to emergencies and disasters such as floods, fires and storm surges which impact negatively, especially on people who are living in vulnerable areas such as the Foreman and Kennedy Road informal settlements.

1.2 BACKGROUND AND REASONS FOR STUDY

It is important to distinguish a disaster from an emergency as eThekweni Municipality is affected by both catastrophes. According to Lindell *et al.* (2007:2), the term emergency is used in two slightly different ways. First, it is used to describe minor events that cause a few casualties and a limited amount of property damage and secondly the term refers to an imminent event. The term disaster has been described as any event (happening with or without warning) causing or threatening death, injury or disease, damage to property, infrastructure or environment, which exceeds the ability of the affected society to cope using only its own resources (Lindell *et al.*, 2007:2).

eThekweni Municipality often fails to prevent and mitigate the impact of disasters and emergencies because of the absence of disaster management frameworks, policies and plans as mandated by the Disaster Management Act of 2002. eThekweni Municipality needs sustained systematic strategies for disaster prevention, preparedness, mitigation, response, recovery and rehabilitation which will reduce the risk of emergencies and disasters to people and property. To implement effective and efficient disaster contingency plans, international experience on strategies and models in response to emergencies and disasters is required within eThekweni Municipality mainly for disaster reduction with the aim to curb the costs associated with the implications of disasters.

Haddow and Bullock (2006:57) argue that over the last decade, social and economic costs of disasters to the United States and throughout the world have grown significantly. From the period of 1990 to 1999, the Federal Emergency Management Agency (FEMA) spent more than \$25.4 billion to provide disaster assistance in the United States. Disasters such as severe strong storms, powerful earthquakes, volcanic eruptions, run away fires and floods can wipe out years of development by destroying economies and causing extensive damage to lives and properties both in developed and developing countries. On 12 January 2010, an earthquake of magnitude seven smashed up the capital, Port-au-Prince in Haiti, killing more than 200 000 people and leaving more than a million homeless. During the 1990s, the economic toll of natural disasters increased to \$608 billion worldwide (Haddow *et al.*, 2006:57), more than the previous four decades combined. Lindell *et*

al. (2006:57) further state that the causes of economic growth are myriad as climatic changes such as hurricane EL Nino caused by global warming impact to sea level rise causing disasters.

There is a high rate of industrialization in many parts of eThekweni because of its geographical location along the Indian Ocean which is accessible to developed countries such as Japan for transportation in relation to exportation and importation which increases temperatures which can impact to global warming formation. Global warming results in causing droughts, storm surges along coastline cities and it also causes tropical cyclone or more severe and unpredictable weather events. Furthermore, global warming results to the loss of property, destruction of municipal infrastructure and most of all lost of lives. Modern strategies and models for disaster risk reduction within eThekweni Municipality are mandatory to mitigate the impact of disasters. Risk reduction as a significant disaster management strategy is gaining important attention, as it can identify the probable risks the community faces and the capacity to withstand.

Limited primary and secondary sources of data in South Africa on disaster management in local government resulted in the researcher using the United States of America published resources. This is a highly resourced country; it has practitioners and specialists who have published on disaster management strategies and models. History has depicted that despite ever-increasing knowledge and technological sophistication, losses from both natural and man-made hazards continue to rise as fast as global wealth and population. Some of the earliest published ideas on disasters under the ambit of social sciences were expressed by Forster (1980:2), who questioned that this paradox is not inevitable and that losses can be contained. The author pioneered the systematic approaches and models on disaster management and further focused on the most important aspects which deal with the risk reduction and disaster management comprehensive plans, the development and the spatial distribution of risk and disaster models. Such interventions failed to include the role of disaster management contingency plans in disaster risk reduction. Van Niekerk (2005:117) proclaims that disaster management as an activity of all levels of government relates to an integrated, multi-sectoral, multi-disciplinary approach aimed at reducing the risks associated with hazards and

vulnerability.

Stewart (1991:56) published a handbook on disaster management which deals specifically with information and skills to respond effectively and confidently to the needs of disaster survivors, the post disaster recovery, but rehabilitation was left out. The September 11, 2002 terrorist attacks in the United States of America attracted authors such as Haddow *et al.* (2006:18), Hyndman and Hyndman (2006:67) and Lindell *et al.* (2007:34) who argue that disaster management strategies and models which can play an important role in disaster reduction globally.

Apart from the work of the above researchers, the International Federation of Red Cross and Red Crescent Societies play a tremendous role in assisting countries such as South Africa in training programs on disaster management strategies. Most non-governmental organizations (NGOs) in South Africa and all spheres of government rely mostly on the manuals of the Red Cross and Red Crescent Societies.

1.3 RESEARCH OBJECTIVES

The research objectives of the study were to investigate and develop new strategies for disaster reduction that can be of importance for eThekweni Municipality's informal settlements.

In summary, the objectives of the study include the following:

- Investigate and define disaster management strategies within the international and South African context in connection with planning and management of disasters.
- Investigate the disaster management components (prevention, preparedness, mitigation, recovery, response, rehabilitation and disaster risk reduction) within eThekweni Municipality, with particular reference to their implementation.
- Investigate funding and socio-economic implications of the disasters within eThekweni municipality's informal settlements.
- Provide recommendations for strategic direction and improvement in reducing disaster risks.

1.4 RATIONALE FOR THE STUDY

This research seeks to investigate new systematic strategies that can be utilized for disaster risk reduction in the local government environment. The importance and value of the study are as follows:

- To contribute to the formulation of robust disaster management framework, policy and business plans including the creation of a fully equipped disaster management centre.
- To assist the disaster management department within the eThekweni Municipality to function effectively and efficiently by applying new systematic strategies in disaster risk reduction.
- To add value to the body of knowledge in South Africa as there are limited number of studies that contribute to disaster risk reduction.
- To add value to policy, promote investments and to protect vulnerable communities.

1.5 HYPOTHESIS OF THE STUDY

Hypothesis 1

There exists a significant relationship amongst the key variables of the study relating to disaster management (disaster preparedness, mitigation, response, recovery and rehabilitation and financial implications).

Hypothesis 2

There is a significant difference in the perceptions of the disaster management victims varying in each biographical variable (age, gender, marital status, education, occupation, income, number of children, number of dependants, race and tenure) respectively.

1.6 METHODOLOGY

The study intends to use both qualitative and quantitative research methods. The study focuses on both the survey and case study research strategies. Questionnaire is to be used for data collection with the population size of 220 people residing in Foreman and Kennedy Road informal settlements. Statistical Packages for Social Scientists (SPSS) is to be used for data analyses. Furthermore, semi-

structured interviews are to be conducted to 10 eThekweni Municipal employees. Furthermore, participatory observation is also to be conducted.

1.7 SCOPE OF THE STUDY

The study on disaster management at a local government level is based within the jurisdiction of eThekweni Municipality. This is an amalgamation of diverse races and cultures with African, Indian and European influences creating a vibrant cosmopolitan society. The African community makes up the largest sector (68%) of the population mostly living in areas prone to disasters. The municipal area is characterized by diverse topography, from steep escarpments in the west to a relatively flat coastal plain in the east. This landform supports a wide variety of torrential rains during summer seasons causing flash floods. According to eThekweni Municipality's Annual Report (2005: 6-8) there is a 98 kilometres coastline, 18 catchment areas, 17 estuaries, 4000 kilometres of rivers and 63 114 hectares of open space.

The focus of the study is confined to two areas (Foreman and Kennedy Road informal settlements) within eThekweni Municipality specifically because it is South Africa's major port-city and the second largest industrial hub after Gauteng (see Figure 1.1 and 1.2). Industries increase air pollution, contributing to global warming which impacts negatively on the vulnerable people and cause unusual climatic variations which also perpetuate fires and floods in informal settlements because of poor disaster management strategies in place.

In July 1991 the eThekweni Municipality resolved to develop the largest settlement in the city in Kennedy Road, in partnership with the Urban Foundation, a Non-Governmental Organisation (NGO) aimed to improve the lives of the poor in urban areas. This was a pilot project for the Foundation. Kennedy Road informal settlement has existed for at least thirty years, an entirely African settlement in the Indian neighborhood of Clare Estate in Ward 25. Foreman and Kennedy Road informal settlements residents migrate to the city and build shacks or rent those that have been built. These settlements are a transitional space, where people come only temporarily for job opportunities and better schools at which children can learn English, develop skills and make personal advancements.

These informal settlements are located on the side of a steep hill squeezed between the city's main dumpsite and the big fortified houses of suburban Clare Estate and tumble down to the ugly big box stores of Springfield Park. Both Foreman and Kennedy Road informal settlements comprise of nearly 14 000 residents who are often devastated by fires which destroys thousands of wood and zinc shacks.

1.8 THE STUDY AREA

The Foreman Road area covers 2.5 hectares and Kennedy Road covers 9.3 hectares of urban land; 6km from the centre of Durban under ward 25 outlined in Figure 1.1. Both Foreman and Kennedy Road informal settlements comprise nearly 14 000 residents.

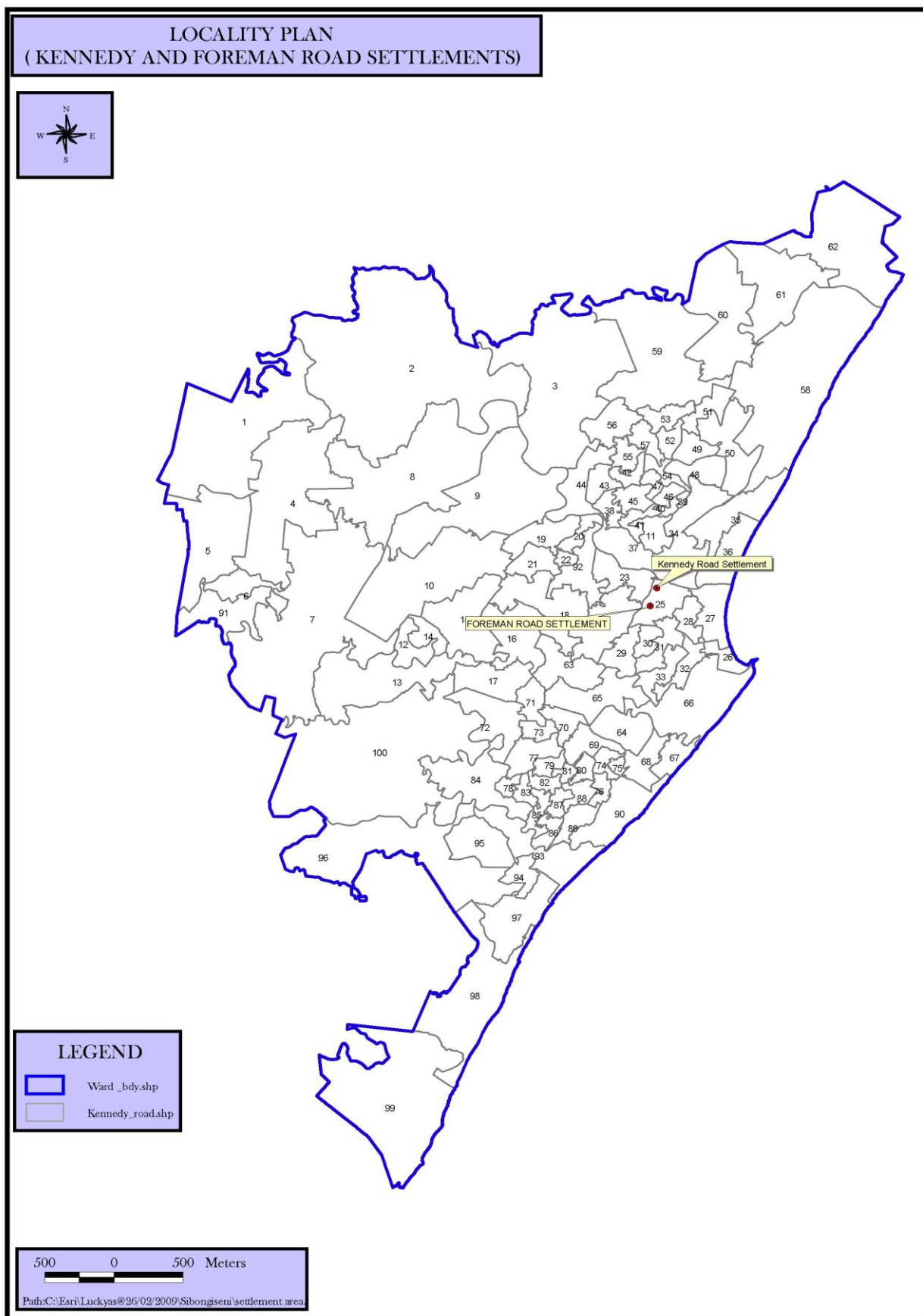


FIGURE 1.1 eThekweni Municipal areas

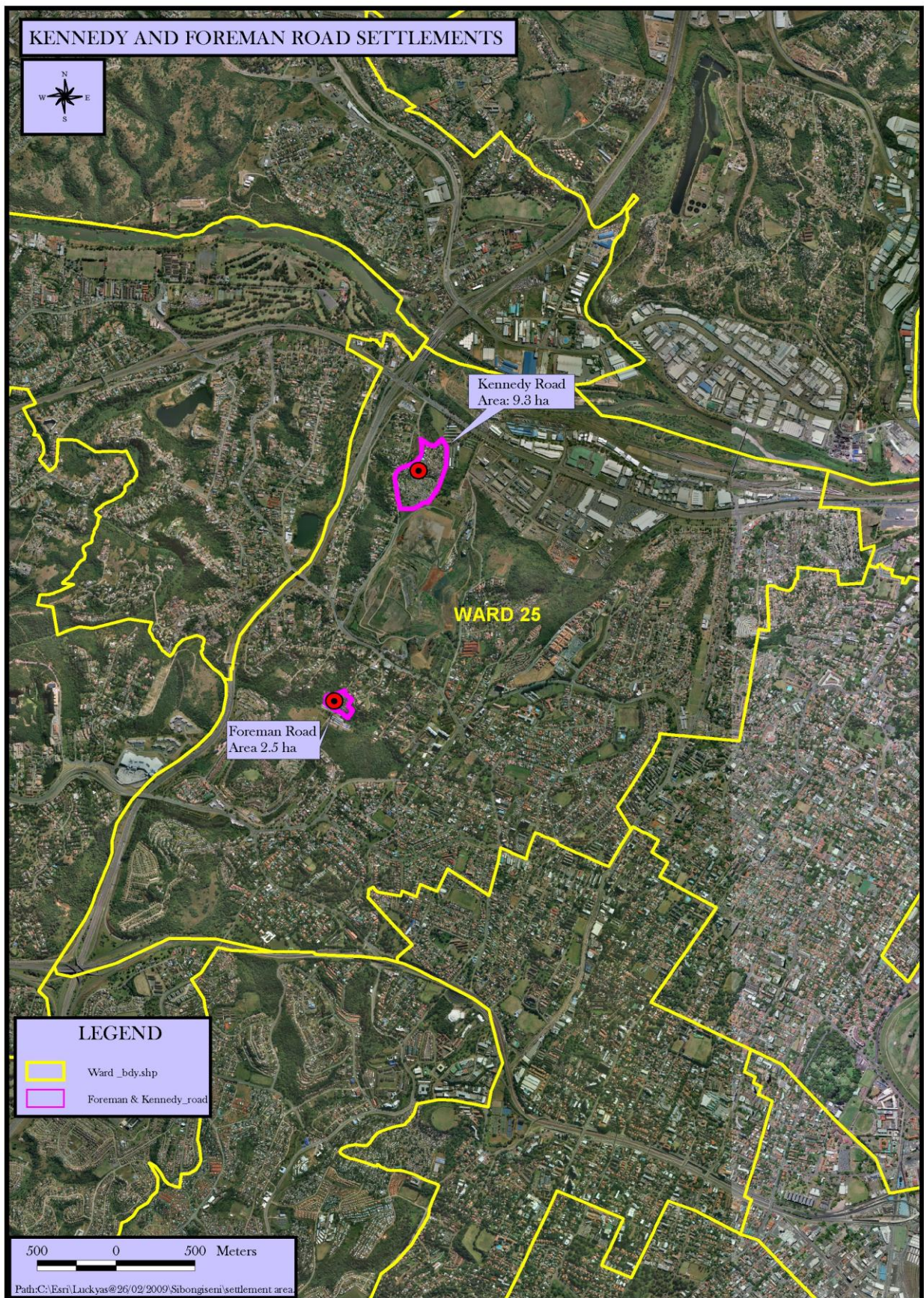


FIGURE 1.2: Foreman and Kennedy Road

1.9 STUDY LIMITATIONS

People at Foreman and Kennedy road have built their houses illegally on steep slopes with improper infrastructure and sanitation. Nucleated shacks without planned streets make it difficult to gain access, thus hindering the data collection process.

In Kennedy Road, victims of fires in the informal settlements also hindered high response rate as the victims relocated after fires to other areas within eThekweni Municipality. The details of victims of emergencies and disasters within informal settlements were not recorded and published which makes it difficult to gain access to the victims. Lack of published literature on disaster management in South Africa and lack of information within the eThekweni Municipality disaster management department was a big limitation of the study.

1.10 CLARIFICATION OF TERMS

Key concepts used in this thesis are clarified below:

- **Disaster** - *“A serious disruption of the functioning of a community or society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community/society to cope using its own resources”* (Holloway, 2003:4).
- **Disaster management** - *“The organization, management of resources and responsibilities for dealing with all aspects of emergencies (including disaster prevention and mitigation), but especially disaster preparedness, response and rehabilitation/recovery”* (Holloway, 2003:4).
- **Disaster risk management** - *“refers to integrated, multisectoral and multidisciplinary administrative, organisational, and operational planning processes and capacities aimed at lessening the impacts of natural hazards and related environmental, technological and biological disasters”* (NDMC, 2006/2007).
- **Disaster Risk Reduction** - *“The systematic development and application of policies, strategies, and practices to minimize vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) adverse impact of hazards, within the broad context of sustainable*

development” (United Nations International Strategy for Disaster Reduction, 2002a :25).

- **Emergency Management** - *“The discipline dealing with risk and risk avoidance”* (Haddow et al., 2006:1).
- **Integrated Planning** - *“Planning which takes into account all the conditions and circumstances that play a part in the successful outcome of a plan, and which are impacted upon by the plan”* (Republic of South Africa, 1996:178).
- **Intergovernmental Relations** - *“encompasses the complex and interdependent administrative and fiscal relations among various spheres of government* (Fox and Meyer, 1995:66).
- **Law** - *“Directives by legislatures, which are binding on the population”* (Republic of South Africa, 1996:178).
- **Metropolitan Government** - *“Metropolitan councils replaced the former Regional Services Councils in metropolitan areas. Metropolitan councils consist of two spheres: Metropolitan Council itself and Metropolitan Local Councils, which are also called Primary Local Authorities”* (Republic of South Africa, 1996:178).
- **Non-Governmental Organisations** - *“Any organization which is funded voluntarily and without any statutory provisions. They are independent of government institutions and often operate with international institutions such as the United Nations (UN) and other donor organizations”* (Fox and Meyer, 1995:66).
- **Vulnerability** - *“A set of conditions and processes resulting from physical, social, economic and environmental factors, which increase the susceptibility of a community to the impact of hazards”* (United Nations International Strategy for Disaster Reduction, 2002a:24).
- **Risk** - *“The probability of harmful consequences, or expected loss (of lives, people, property, livelihoods, economic activity disrupted or environmentally damaged) resulting from interactions between natural or human induced hazards and vulnerable/capable conditions. Conventionally, risk is expressed by the equation=Hazards x Vulnerability/Capacity”* (United Nations International Strategy for Disaster Reduction, 2002a:24).
- **Prevention** - *“Activities to provide outright avoidance of the adverse impact of hazards and related environmental, technological and biological disasters”* (United Nations International Strategy for Disaster Reduction, 2002a:25).

- **Mitigation** - *“Structural and non-structural measures undertaken to limit the adverse impact of hazards, environmental degradation and technological hazards”* (United Nations International Strategy for Disaster Reduction, 2002:25).
- **Preparedness** - *“Activities and measures taken in advance to ensure effective response to impact of disasters, including the issuance of timely and effective early warnings and the temporary removal of people and property from a threatened location”* (United Nations International Strategy for Disaster Reduction, 2002a:25).

These working definitions reveal approaches and activities which help to explain why disaster prevention, preparedness, mitigation, recovery, response and rehabilitation have not received greater programmatic priority despite a growing profile in disaster management in South Africa. Disaster preparedness and mitigation are largely a developmental activity, which, through sustained initiatives, minimizes the likelihood of a disastrous occurrence by reducing either the intensity of external threats (hazards) or the vulnerability of those at risk.

1.11 GENERAL OUTLINE OF CHAPTERS

- i. Chapter one serves as the orientation and provides an explanation of background, as well as an indication for the study in the form of a problem statement, purpose, goals and objectives. In this chapter, concepts and abbreviations underlying the study are used. The contribution of research to the disaster management body of knowledge is given. A brief description of the study area (eThekweni Municipality’s Foreman and Kennedy Road informal settlements) is provided.
- ii. Chapter two provides a theoretical analysis of disaster management. It further discusses the necessity for disaster management, the effects of disasters on the community and economy, as well as government accountability to its citizens. This chapter finally deals with disaster risk management (disaster risk reduction) processes.
- iii. Chapter three deals with disaster management operations within the context of public administration including new public management approaches in relation to disaster management.

- iv. Chapter four examines international disaster management trends. Disaster management is contextualised from an international perspective with reference to international standards such as the United Nations. Case studies in both developing and developed countries are discussed.
- v. Chapter five examines the South African disaster management legislative reforms. Hazards and disasters that struck South Africa in the past few years are discussed. This chapter further analyses vulnerability, disasters and informal settlements in South Africa and the role of technology as a strategy for disaster risk reduction in South Africa.
- vi. Chapter six provides the reader with insight into the methodology followed in order to draw conclusions and make recommendations on new disaster management strategies.
- vii. Chapter seven deals with the presentation and analysis of the findings, using descriptive and inferential statistics to test variables which impact on each of the aforementioned objectives.
- viii. Chapter eight outlines the conclusions as well as recommendations for effective and efficient disaster management within the eThekweni Municipality.

1.12 SUMMARY

The main aims of the study were set out in respect of local disaster management strategies and related components within the eThekweni Municipality's informal settlements. Stratified random sampling technique was used to identify research subjects to inform the study.

It was established that the rationale underpinning the study is the absence of disaster management strategies and plans in place for informal settlements. To assist the reader in understanding this study, an explanation of the abbreviations and some of the technical terms used in the study is offered.

CHAPTER 2

THEORETICAL AND COMPARATIVE ANALYSIS OF DISASTER MANAGEMENT

2.1 INTRODUCTION

This chapter aims to critically discuss theoretical and comparative analysis of disaster management. It further discusses the necessity for disaster management, the effects of disasters on communities, financial implications and government accountability. Furthermore, it discusses disaster management components and strategies. This chapter finally deals with the disaster risk management processes. The discussion which follows is based on a review of some of the literature available.

2.2 BACKGROUND TO DISASTER 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, and crops are important measures of physical impacts and these are rising exponentially in developed countries such as the United States of America (USA) (Mileti, 1999:8), but the rate of increase is even greater in developing countries such as India and Kenya (Berke, 1995:42). Disasters have economic effects which are direct, indirect and secondary, which exacerbates 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 (2007:600) suggests that disaster effects can be lessened with insightful mitigation or planning efforts. Yodmani (2001:23) suggests that disaster management practices have evolved from largely a top-down relief and response approach to a more inter-sectoral 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 and 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, 2005:10). 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, 2005:10).

Developing countries such as South Africa have often failed to implement disaster management strategies such as preparedness, prevention, mitigation response, recovery and rehabilitation. This impacted negatively on the well being of people and the economy of this country. Van Niekerk (2005:1) 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 *et al.* (2006:57) 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.* (2006:57) 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 social economic costs. Furthermore, the International Bank for Reconstruction and Development (1999:9) stated that extreme natural events such as fires, floods, earthquakes and droughts, have always been part of the natural cycle where all parts of the world are exposed to them to some degree or other.

The catastrophic losses experienced by eThekweni Municipality are mainly caused by societal actions such as deforestation and clear-cutting of sugar cane

plantations meant for property development and industrial construction. Immigration and migration of people to coastal areas and build informal settlements in flood plains are other contributing factors. Migration and Immigration resulted in uncontrolled urbanisation on vacant land that is unsuitable for safe housing. In addition, informal settlements have been subjected to rapid spread of fires and flash floods.

International experiences of disasters is 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. 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) (2006:1) 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 and that most of these warnings came from family and friends (CRED, 2006:2). The implementation of disaster management is essential to all countries as it 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 (2008:15) asserts that the public health objectives of disaster management can be stated as follows:

- i. prevent unnecessary morbidity, mortality, and economic loss resulting directly from the disaster; and

- ii. eliminate morbidity, mortality, and economic loss directly attributed to mismanagement of disaster relief efforts.

Disaster management has a role to play as it includes measures to provide not only emergency relief and recovery (rehabilitation and reconstruction) but also disaster risk reduction in communities.

2.2.1 IMPACT OF DISASTERS ON COMMUNITIES

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, and isolation of vast areas of the country due to destruction of vital social and economic infrastructure, including bridges, roads, power stations, water supply systems, hospitals and schools. Disasters contribute to the retardation of development in the affected regions (Dunne and Mhone, 2003:34). According to Dunne and Mhone (2003:3), the impact of disasters at the household level, disrupts normal livelihoods, displaces families, destroys infrastructure and disentangles social and community networks. Syed (2008:111) 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.

2.2.2 EFFECT OF DISASTERS ON ECONOMIES

Huigen and Jens (2006:2) 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 land), 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 some time after the disaster. Huigen and Jens (2002:3) state that secondary effects include an increase in disparity between individual and family income, ecological changes or negative changes in the balance of payments (Bull, 1994; Clay, 2004; Jovel, 1989; UNDRO, 1979; and Zpata-Marti, 1997). According to Rasmussen (2004:8) the aforementioned impacts may cause spillovers 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 (2008:112) 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 (2006:23) 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 and, 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, and about 40 000 head of cattle were washed away (Croward, 2006:23-24).

Sudden fast onset disasters such as floods have been particularly costly, both in terms of loss of human life and financially. It is estimated that the 2008 KwaZulu-Natal storm surges, which was declared a disaster, cost the South African government millions of rand in relief aid, and considerably more in terms of road and other infrastructural repairs, apart from the huge social costs of the disaster (Syed, 2008:111). According to Syed (2008:112), 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 and certainty to be encouraged to risk their money.

2.2.3 GOVERNMENT ACCOUNTABILITY TO ITS CITIZENS

Armstrong (2005:1) 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. 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, 2005:1). 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 and accountable government to local communities; ensure the provision of services to communities in a sustainable manner; promote social and economic development; promote a safe and healthy environment; and encourage communities and community organizations in matters of local government matters (Armstrong, 2005:2). Government accountability to all citizens translates to improving the lives of the poor and the vulnerable.

2.3 COMPONENTS OF DISASTER MANAGEMENT

Some disasters can be avoided and minimized through enhancing the national disaster management capacities to address the various aspects of prevention, preparedness, mitigation, response, rehabilitation and recovery. Holloway (2003:34) argues that disaster risk reduction is the systematic development and application of policies, strategies and practices to minimise vulnerabilities and disaster risks throughout society to avoid (prevent) or limit (mitigate and be prepared for) the adverse impact of hazards, within the broad context of sustainable development. Haddow *et al.* (2006:167) emphasizes that there are three sets of actions that can reduce losses which includes hazard mitigation, emergency preparedness and recovery preparedness practices. A hazard mitigation and emergency preparedness practice directly reduces a disaster’s physical impact and indirectly reduces its social impacts. Recovery preparedness practices directly reduce a disaster’s social impacts. Haddow *et al.* (2006:57) in discussing the mechanisms for minimizing disasters and emergencies, state that:

“the function of mitigation differs from the other emergency management disciplines because it looks at long-term solutions to reducing risk as opposed to preparedness

for hazards, the immediate response to a hazard, or the short-term recovery from a hazard event”.

All components of disaster management such as mitigation and preparedness should be modelled in order to simplify all risk reduction processes in local government. In South Africa, local government (municipalities) is responsible for the implementation and maintenance of an all-hazard, full-spectrum comprehensive disaster management programme, ensuring the following components of disaster management prevention; mitigation; preparedness; response; relief; and rehabilitation Van Zyl (2006:23).

2.3.1 DISASTER PREVENTION

According to Syed (2008:104), 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 (2006:24) 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.* (2007:193) 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 eThekweni Municipality, 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.* (2007:195) found that source control for structural fires can be achieved by confining fuel to prevent it from mixing with oxygen. Ashford *et al.* (1993:198) further argue that *“you can also prevent fires by keeping any fuel or air mixture that cannot develop away from an*

ignition source". Source control for chemical releases can be achieved by using non-toxic chemicals (Haddow *et al.*, 2006:195).

According to Haddow *et al.* (2006:195), 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.

2.3.2 DISASTER MITIGATION

Disaster mitigation can be defined as preimpact actions that protect passively against casualties and damage at the time hazard impact (as opposed to an active emergency response) and include community protection works, land use practices, and building construction practices works, land-use practices, and building construction practices (Lindell and Perry, 2000:3).

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.* (2006:158) indicate that mitigation is the cornerstone of disaster management as it includes keeping homes away from floodplains, engineering bridges to withstand earthquakes, creating and enforcing effective building codes to protect properties from hurricanes, earthquake, floods, and landslides. According to FEMA (1999:13) 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.*, 2006:168). Hazard mitigation does not require people to take action when disaster strikes. Hazard mitigation involves:

- i. 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,
- ii. community protection works, such as dams and levees, confining or diverting materials flows,
- iii. land-use practices, reducing or eliminating development on land that has high hazard exposure,
- iv. building construction practices using strong materials and hazard-resistant design, such as window shutters that protect against wind pressure and debris impact, and
- v. building contents protection preventing damage to furniture and equipment such as furnaces, air conditioners, washers, and dryers (Haddow *et al.*, 2006:167).

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.* (2006:57) 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:

- i. disasters set back development programmes, destroying years of development initiatives,
- ii. rebuilding after a disaster provides significant opportunities to initiate development programme,
- iii. development programmes can increase an area's susceptibility to disasters, and

- iv. development programmes can be designed to decrease the susceptibility to disasters and the negative consequences (Syed, 2008:111).

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 (2008:111) 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 (2002:30) 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:

- i. development of staff training and education programmes,
- ii. public education on responsibilities,
- iii. the efficient and effective management of resources,
- iv. threat and resource analysis, and
- v. identification of resource requirements, resource availability and shortfalls.

Von Kotze and Holloway (1996:14) 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.* (2006:194) argue that local governments often feel that federal and state (USA) mandates overlap restrictively and do not provide enough funding. Local governments, as the direct regulators of land-use and building construction practices, are politically vulnerable to blame for withholding land from development and 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 mandates that local jurisdictions apply traditional land-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, eThekweni Municipality 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.* (2007:193) 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, land-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 (2002:12), 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 land-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 land-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, 1998:24).

The Manitoba Health Department (2002:12) 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. 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 and McBean (2004:13) state specific examples of disaster mitigation which include better design and construction, enforced through enhanced building codes; more advanced warning mechanisms to alert people about impending hazards (such as, weather warnings) and the modification of socio-economic activities to reduce vulnerability of at-risk populations.

Yodmani (2001:7) 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 and insignificant in comparison with money spent by donors and development banks on humanitarian assistance and relief, as well as on post disaster reconstruction.

The United States of America mitigation strategies are socio-technical oriented in nature. This indicates that social aspects of disasters are quantified using Statistical Packages for Social Scientists (SPSS) and spatially modelled using Geographical Information Systems (GIS). The American federal government have six accepted tools used for disaster mitigation which include hazard identification and mapping, design and construction applications, land-use planning, financial incentives, insurance and structural controls (Haddow *et al.*, 2006:59).

2.3.2.1 DISASTER MANAGEMENT TOOLS

2.3.2.1.1 HAZARD IDENTIFICATION AND MAPPING

Under the ambit of hazard identification and 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 and natural disasters in the form of a map. Bullock *et al.* (2006:59) argue that the federal government has extensive programmes that map virtually every hazard, and these products are available to communities. This is quite evident because FEMA's National Flood Insurance Program (NFIP) provides detailed flood maps and studies, and the U.S. Geological Survey (USGS) provides extensive earthquake and landslide studies and maps.

Bullock *et al.* (2006:59) confirm that Geographical Information Systems (GIS) have become ubiquitous and staples for all local planning organisations. The hindrance of GIS is that it fails to superimpose the human and 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.*, 2006:59). It also allows users to compare results from different study case scenarios, including mitigation actions. Cutter (2003:442) indicates HAZUS as being touted as an “off the shelf” application, the default inventories of buildings and structures, geology, and economic values included in the model is derived from very general national overviews and inventories and 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 and providing data on local building inventories, geology, and critical infrastructure.

2.3.2.1.2 DESIGN AND CONSTRUCTION

Design and 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 and Tipple (2002:163), sustainable land-use policies for the mitigation of natural disasters should be complemented by appropriate housing design, construction methods and use of building materials. These policies should be tailored to strengthen structural conditions of the dwellings and reduce physical vulnerability, and to create employment and generate income for the poor. Moreover, they should reduce construction costs and employ locally available materials and construction methods and enhance community participation and quality control.

Haddow *et al.* (2006:59) emphasize that this strategy is governed by building codes, architecture and design criteria, and 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 and Faen (2007: 95) argue that poor communities have few resources for sturdy construction, inadequate disaster warning systems, communications technology or disaster response. Roads and bridges may be unable to withstand earthquakes or floods in developing countries. Buildings are often

constructed of the most economical materials, predisposing them to the collapse of houses and 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, landscapes, climate, types of soils and underlying rocks vary.

2.3.2.1.3 LAND-USE PLANNING

History has shown clearly that land-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 and the high chance of avoiding eviction, as well as proximity to employment opportunities in surrounding commercial and industrial areas. The high costs of urban land, low levels of affordability, inappropriate land policies and speculative developments by the private sector are some of the problems to build low cost houses (El-Masri and Tipple, 2002:163). Ironically, public housing schemes for the poor, with their high costs and standards, have in general been ineffective in meeting people's needs in both qualitative and quantitative terms. The solution is to improve access to land 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 land available to volcano victims at a safe distance of 20 km from the vulnerable site (IDNDR, 1996: 19). Also, a relocation process has been established to reduce risks of landslide and flooding in Lima, Peru (Leandro & Miranda, 2000:7). 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.* (2006:60), 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 land-use planning and management in the coastal zone was the National Flood Insurance Programme (NFIP) administered by the Federal Insurance Administration (FIA). The following examples show how land-use planning is applied to promote risk reduction (Bullock, 2006:61):

- i. moving structures out of harmful zone through property acquisition is clearly the most effective tool, although it is costly,
- ii. the North Carolina coastal setback ordinance seeks to preserve the fragile and eroding coastlines of its barrier islands, and
- iii. 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.* (2006:63) state that strategies for land-use planning offer many options for the implementation of mitigation which include acquisition, easements, storm water management, annexation, environmental review and floodplain management plans. Haddow *et al.* (2006:63) state that land-use planning encompasses a myriad of zoning options such as density controls, special use permits, historic preservation, coastal zone management, and subdivision controls. This means that land-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.

2.3.2.1.4 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.*, 2006:61). Linnerooth-Bayer and Kunreuther (2003: 636) 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:

- i. Community Development Block Grant (CDBG) – has been useful to communities that are interested in incorporating mitigation into their recovery process,
- ii. Housing and Urban Development (HUD) - provides flexible grants to help cities, countries, and states to recover from presidentially declared disasters, especially in low-income areas.
- iii. Small Business Administration (SBA) – provide financial incentives for mitigation, and
- iv. Economic Development Administration (EDA) – administers programmes and provides grants for infrastructure development, business incentives, and other forms of assistance designed to help communities alleviate conditions of substantial and persistent unemployment in economically distressed areas and regions (Haddow *et al.*, 2006:142).

Haddow *et al.* (2006:61) claim that the above tools provide incentives to developers as a means of promoting good risk-reduction development practices.

2.3.2.1.5 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.*, 2006:61). 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.*, 2006:61-62):

- i. flood Mitigation Assistance (FMA) - this is a fund for flood planning, flood mitigation grants, and additional policy coverage for meeting the tougher compliance requirements such as building elevation, and
- ii. 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.

2.3.2.1.6 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.*, 2006:62-63).

Haddow *et al.* (2006:62) 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.

In the United States, new designs and strategies to implement wetland-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.*, 2006:62).

2.3.3 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 (2002:13) 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 (2002:29) mentions two aspects of preparedness which focuses on management response which are as follows:

- i. emergency response plan - deals with meeting the special demands created by an impact on the community, and
- ii. 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, 2002:30).

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, 2002:31):

- i. identifies and develops the organisational structure that will direct and manage an emergency response,

- ii. identifies who has the authority and responsibility relating to different aspects of the response,
- iii. develop the procedures and guidelines that will ensure effective and coordinated action,
- iv. create a written plan as a means of documenting the decisions that are made during the process, and
- v. 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.

2.3.3.1 BUSINESS CONTINUITY PLANNING

Business continuity planning aims to prepare an organisation's human resources and physical environment to acclimatize and act quickly, effectively, and efficiently in response to a sudden disaster. Manitoba Health Department (2002:30) in its discussion reveals that this type of planning includes succession and delegation processes, alternative work locations, technologies, intentional redirection of resources to address specific needs, possibly resulting in a loss or degradation of other services and infrastructure or systems maintenance.

2.3.3.2 EMERGENCY PREPAREDNESS PRACTICES

Bullock and Perry (2000:34) cited in Haddow *et al.* (2007:168) found another way to reduce a disaster's physical impact by adopting emergency preparedness practices, which can be defined as pre-impact actions that provide the human and material resources needed to support active responses at the time of the hazard impact.

The first step in emergency preparedness is to use the community hazard vulnerability analysis to identify the emergency response demands that must be met by performing four basic emergency response functions which includes the following:

- i. emergency assessment actions, such as projecting a hurricane wind speed to define the potential disaster impact,
- ii. hazard operations, such as sandbagging around structures, which are short term actions that protect property,
- iii. population protection actions, such as warning and evacuation, to protect people from impact, and
- iv. incident management actions, such as communication among responding agencies and activities and coordinating the emergency response (Haddow *et al.*, 2007:168).

Daines (1991) cited in Bullock *et al.* (2007:168) state that each of these functions must be assigned to emergency response organisations that develop plans and procedures for responding quickly and effectively. The organisations must also obtain the resources they need to perform the functions and continue with training, drills and exercises as preparation for recovery.

2.3.3.3 COMMUNITY PROTECTION WORKS

According to Wu and Lindell (2003:2), 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.*, 2007:196). eThekweni Municipality is dominated by very high density drainage systems whereas its geographical location is in a valley flow and large numbers of houses are built on floodplains without any community protection works, especially in poor informal townships. Bullock *et al.* (2007:196) 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.*, 2007:196-197):

- i. **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.
- ii. **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.
- iii. **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.
- iv. **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 eThekweni Municipality. 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.

2.3.4 DISASTER RESPONSE, RECOVERY AND REHABILITATION

2.3.4.1 DISASTER RESPONSE

Syed (2008:153) 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.

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: 77), the first responder's jobs is to rescue and attend to those injured, suppress fires, secure and police the disaster area, and begin the process of restoring order. In South Africa, they are supported in this effort by local emergency management personnel and community government officials.

2.3.4.2 RECOVERY AND REHABILITATION

Geis (1996), Gawronski (1998), Olson, Olson and Schab *et al.* (1991) cited in Wu and Lindell (2004:44) found that recovery from a major disaster takes much longer and involves much more conflict than people expect. 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:

- i. define disaster recovery organisations that include major stakeholders from land-use and building construction agencies, business groups, and neighbourhood associations,
- ii. identify the location of temporary housing. This is a difficult issue and usually causes conflict. Resolving this before a disaster speeds up recovery,
- iii. 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 and to use trained volunteers such as local engineers, architects, and planners, and
- iv. recognize the recovery period as a unique time to implement policies for hazard mitigation and incorporate this objective into the recovery planning recovery (Lindell, 2004:69).

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 (2008:168) states that

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.

2.4. DISASTER RISK MANAGEMENT

According to Mitchell (2003:1), 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 understanding 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, 2003:13).

Jegillos (1999; 2003) cited in Van Niekerk (2005:78) 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, and adequacy of these practices need to be considered.

Van Niekerk (2005:79) further argues that reform and change in different sectors must be established in order to include disaster risk management

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 and 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 centre (Van Niekerk, 2005:80). The author is of the opinion that such a centre 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, 2005:81).

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, 2005:79).

Apart from the national and regional focus of disaster risk management, (Van Niekerk, 2005:81) further emphasizes the support for traditional and indigenous measures of risk reduction. The recognition of coping mechanisms of individuals and

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 (2004:34) assert that disaster risk reduction should be conceived as taking place within the broad context of sustainable development. Yamin (2004) and Thomalla *et al.* (2006) cited in Yohe *et al.* (2007:820) argue that in practice, however, there has been a disconnection between disaster risk reduction and sustainable development, due to a combination of institutional structures, lack of awareness of the linkages between the two and perceptions of 'competition' between hazard-based risk reduction, development needs and emergency relief.

Schipper and Pelling, (2006) cited in Yohe *et al.* (2007:820) emphasise 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 and short-lived disasters, such as floods, storms, earthquakes and volcanic eruptions, and 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) cited in Yohe *et al.* (2007:820) 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

practices. This approach is followed in most developed countries, and adaptation to climate change can be implemented by changing guidelines and procedures.

Allen (2006) *cited in* Yohe *et al.* (2007:820) 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, 2006:51). Actions in this approach include dissemination of technical knowledge and training, awareness raising, accessing local knowledge and resources, and mobilizing local communities. Blanco (2006) *cited in* Yohe *et al.* (2007:820) 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 (1999:9) the processes of disaster risk management include risk identification, hazard assessment, vulnerability assessment and vulnerability analysis.

2.4.1 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 (1999:9), hazard assessment requires scientific understanding of relevant natural phenomena and interpretation of historical records of the occurrence of events. As Coburn *et al.* (1991:19) point out there are three essential components in the determination of risk, each of which should be separately quantified. These components are as follows:

- i. **The hazard occurrence probability:** the likelihood of experiencing any natural or technological hazard at a location or in a region;
- ii. **The elements at risk:** identifying and making an inventory of people or buildings or other elements which would be affected by the hazard if it occurred, and when required estimating their economic value; and
- iii. **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 (1999:17) 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, 1999:17).

The International Bank for Reconstruction and Development (1999:17) 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 (1999:9) confirms that when hazard assessments and vulnerability assessments are combined, it is possible to develop estimates of potential losses.

2.4.2 HAZARD ASSESSMENT

The International Bank for Reconstruction and Development (1999:9) 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 (2001:18) 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.

2.4.3 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, and landslide hazards assessments are handled by the National Centre for Disaster Prevention (CENAPRED) and units of the National Autonomous University of Mexico (International Bank for Reconstruction and Development, 1999:14).

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, 1999:16).

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

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, 1999:17). 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, 1999:17).

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.

2.4.4 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.*, 2007:170). eThekweni Municipality does 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.* (2007:170) argue that communities vary in their exposure to environmental hazards. In the United States e-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

others. One way of identifying areas exposed to multiple hazards is to use a Geographical Information System (GIS) to overlay the areas subject to these different hazards (Bullock *et al.*, 2007:172).

2.4.4.1 VULNERABILITY ANALYSIS CONCEPTUALIZATION

It is important to any sphere of government to embark on vulnerability analysis as a road map to effective and efficient implementation of disaster management initiatives. Vulnerability analysis is a continuing, dynamic process of people and organizations assessing the hazards and risks they face and determining what they wish to do about them. Coburn *et al.* (1991:33) assert that vulnerability analysis also includes structured data collection geared toward understanding the levels of potential threats, needs and immediately available resources. Coburn *et al.* (1991:33) state that risk combines the expected losses from all levels of hazard severity, taking into account the risk occurrence probability. The vulnerability of an element is usually expressed as a percentage loss (or as a value between 0 to 1) for a given hazard severity level. The measure of loss depends on the element at risk, and accordingly may be measured as a ratio of the numbers killed or injured to the total population, as a repair cost or as the degree of physical damage defined on an appropriate scale. In a large number of elements, like building stock, it may be defined in terms of the proportion of buildings experiencing some particular level of damage (Coburn *et al.*, 1991:33)

The International Federation of Red Cross and Red Crescent (2000:6) indicate that vulnerability analysis is useful because information is needed in the pre-disaster phase including collecting and analysing information necessary for preparedness planning. Coburn *et al.* (1991:33) point out that, assessment includes two general categories of information:

- i. static infrastructure information that provides the basis for determining the extent of development, types of physical advantages and disadvantages faced by communities residing in an area, and a “map” of available structures (such as roads and hospitals) that might be useful in times of emergencies; and
- ii. relatively dynamic socioeconomic data indicating causes and levels of vulnerability, demographic shifts and types of economic activity.

The objective is to establish a database that focuses on the effects of potential hazards, relief needs and available resources. Vulnerability assessments should be linked with development interventions. When communities are identified as vulnerable, development assistance may obviate the need for emergency assistance (Coburn *et al.*, 1991:6). The International Federation of Red Cross and Red Crescent Societies (2000:6) indicate that disaster program planners increasingly use vulnerability information to refine their preparedness plans. Furthermore, vulnerability analysis ideally provides indications of where the effects of disasters are likely to be the most pronounced (for example by region and population).

2.4.4.2 ASSESSING AND MAPPING SOCIAL VULNERABILITY

Bullock *et al.* (2007:177) differ with the International Bank for Reconstruction and Development, 1999:14) because they separate vulnerability assessment into four areas which are as follows: mapping, demographics, economic and neighbourhood social vulnerability. According to Coburn *et al.* (1991:6), the magnitude of disasters varies with individuals, families and infrastructural locations. Bullock *et al.* (2007:177) understand that social vulnerability arises from the potential for extreme events to cause changes in people's behaviour.

Ozer and Weiss's research cited in Bullock *et al.* (2007:177) pointed out that the people who are most likely to develop serious psychological conditions such as post-traumatic stress disorder (PTSD) are those who have:

- i. predisposing characteristics (e.g. very low intelligence, previous psychological trauma),
- ii. severe personal impacts,
- iii. continuing stress, and
- iv. Low social support after the traumatic event.

The groups most likely to have psychological vulnerability are the very young (who have limited verbal skills), the very old (who tend to be more isolated), and those with pre-existing psychological problems. However, some people have problems related to coping skills to solve such problems. Instead, they use emotion-focused coping strategies such as alcohol and drug abuse, to get through psychologically painful situations.

2.4.4.3 ASSESSING DEMOGRAPHIC VULNERABILITY

Heller-Paz, Nigg, and Turner (1986) cited in Bullock *et al.* (2007:177) maintain that older, wealthier homeowners are likely to be tied to their community and seek permanent housing there, even if their homes have been destroyed. Coburn *et al.* (1991:6) confirm that in most instances, a researcher can identify particular geographical areas or communities that are predicted as under threat from hazards. These may include traditionally drought-prone areas, or communities living near volcanoes or in flood-prone areas. It could be informal settlements in which housing structures are known to be vulnerable to hurricanes, or communities unprotected from industrial waste.

However, communities will experience migration of families if people cannot find temporary housing, especially if the local economy is already in decline before the disaster.

2.4.4.4 ASSESSING POLITICAL VULNERABILITY

Political vulnerability is created when people consider the response and recovery to be ineffective or, worse yet, deliberately intended to neglect them. Government agencies that are believed to lack legitimacy, expertise and adequate information for making decisions about the allocation of public resources prove vulnerable in the aftermath of disaster. The absence of political vulnerability measures most especially in developing countries such as Africa exacerbates social vulnerability as these countries are often affected by political and tribal wars.

2.4.4.5 ASSESSING NEIGHBOURHOOD SOCIAL VULNERABILITY

Social vulnerability is not randomly distributed. There are predictors that clearly point to parts of the population that are most likely to be vulnerable. These factors include gender, age, education, income, and ethnicity (Bullock *et al.*, 2007:178). The neighbourhoods that have the highest percentages of these vulnerable groups are ones that should concern emergency managers the most. Neighbourhoods need special attention if they are high in hazard exposure, structural vulnerability, and social vulnerability. This is because households which are socially vulnerable often occupy the area's most likely to be hit by a disaster (Bullock *et al.*, 2007:178).

Coburn *et al.* (1991:38) argue that the most vulnerable societies are often also economically marginalized. The worst locations to live in are the steep landslide-prone hillsides and the riverside flood plains. Houses built at minimal cost are most vulnerable to wind storms, floods, fires or earthquakes.

The underlying mechanisms that cause vulnerability have to be well understood in order to reduce it. Vulnerability is largely a developmental issue, and vulnerability reduction needs to be carried out within a developmental context. Protection of the resources and improvements in the economic potential of a community or group may be as critical as reducing their vulnerability (Coburn *et al.*, 1991:38).

In South Africa, a major constraint has been the ability of local authorities to effectively and efficiently spend monies allocated for natural disaster relief. A key concern in South Africa is the fact that vulnerability to various natural disasters is partly a consequence of the legacy of apartheid as Black populations were generally placed in the most vulnerable locations and have economic difficulties that make them highly vulnerable to natural disasters (Mhone, 2003:4).

2.4.4.6 VULNERABILITY EVALUATION

People's lives and health are at risk directly from the destructive effects of a hazard. Incomes and livelihoods are at risk because of the destruction of buildings, crops and livestock. Each type of hazard positions a somewhat different set of elements at risk. Most disaster mitigation work is focused on reducing vulnerability and to act to reduce vulnerability. Development planners need an understanding of which elements are most at risk from the principal hazards which have been identified (Coburn *et al.*, 1991:32).

It is important for development planners to make some effort to quantify the tangible aspects of vulnerability and loss to assist mitigation and preparedness planning. Local experience is a good guide to what is vulnerable in a society, and the list of potentially vulnerable elements should be supplemented by a study of written reports and the knowledge (often never recorded) of those who lived through

previous disasters (Coburn *et al.*, 1991:32). This indicates that tacit (indigenous) knowledge received on previous disasters in a particular area needs to be recorded and converted to explicit knowledge for future use.

2.5 SUMMARY OF THE CHAPTER

The chapter critically analysed the theoretical perspectives on disaster management as well as giving comprehensive background. It further discussed the necessity for disaster management and the effects of disasters on communities and the economies, as well as financial implications and government accountability to its citizens. The components of disaster management were discussed extensively. This chapter discussed disaster risk management and its strategies. It also provided examples drawn from a large number of case studies.

This chapter extensively discussed the causes of informal settlements in urban areas more especially in coastal cities. The impact of disasters is shown as disrupting normal livelihoods and results to direct, indirect and secondary economic effects. This chapter emphasized strategies of avoiding and minimizing disasters through the national disaster management capacities to address various aspects of prevention, preparedness, mitigation, response, rehabilitation and recovery. Disaster risk management as the extension of disaster management is depicted with the establishment of a permanent organization and planning centre functioning as the focal point to identify, plan for and implement various types of risk reduction measures.

CHAPTER 3

DISASTER MANAGEMENT WITHIN THE CONTEXT OF PUBLIC ADMINISTRATION

3.1 INTRODUCTION

According to Fox and Meyer (1995:105), public administration relates to the executive branch of government, civil service and bureaucracy, which are charged with the formulation, facilitation, implementation, evaluation and modification of government policy such as Disaster Management Act 57 of 2002. This chapter discusses disaster management within the context of public administration. It is important to be aware that disaster management has become an important function of government in South Africa and other countries; therefore it does fall within the framework of disaster administration as a discipline. Public administration is concerned with the management of disasters and more especially in a local government level and the people would like to hear about government strategies to respond to disasters.

3.2 DEFINITION OF PUBLIC ADMINISTRATION

There is an important distinction between public administration as an academic discipline and public administration as a profession. According to Botes and Roux (1997:257) cited in Brown and Roux (2003:68) public administration is concerned with the study of all disciplines that have a bearing on the contemporary administrative and managerial practices in the public sector. These comprise a comprehensive series of activities that require knowledge derived from several disciplines. The subject in which the intrinsic and interdependent aspects of state institutions are studied exclusively is called Public Administration (Botes *et al.*, 1997:257).

Public administration is a discipline that has produced and continues to produce knowledge that can be analysed and applied universally in the context of enhancing theories, knowledge and understanding of public administration in the practical and theoretical sense (Botes *et al.*, 1997:257). Botes *et al.* (1997:260); vide Cloete, (1967:35-40) and vide Pfifner and Presthus (1967: 4-6) have identified four

essential qualities that firmly establish the qualifications of public administration as a discipline in its own right:

- public administration is a science because it contains a corpus of knowledge, which has repeatedly been proven to be valid, can be analysed systematically and contains aspects of universality applicability,
- public administration is an academic discipline, which can be dissected into systematic steps of study and research,
- public administration is a universal subject, which enjoys universal acknowledgement, and
- public administration finds application in the public administration system.

Coetzee (1991:96-98) also identifies similar aspects or “relevant areas”, including Public Administration as an academic discipline, an activity, a subject for teaching at university level, an applied science to be taught at academic level, and an opportunity to educate and train civil servants. Coetzee (1988:2) cited in (Darkey, 2003:24) views administration as consisting of the processes and actions necessary for setting and achieving objectives. The author categorises the wide-ranging set of processes (activities) which constitute administration, into six main groups which include: policy-making, organizing, financing, staffing (personnel provision and utilization), determining work procedures, and the exercise of control over progress being made to ensure that the target will be attained.

Fox *et al.* (1995:105) further argue that the term public administration represents a wide and amorphous combination of theory and practice, aimed at clarifying a conception of government and its relationship to society. In the last two decades, fundamental changes have been transforming societies all over the world. These changes include the development of a global economy, the end of the Cold War and the rapid progress and widespread adoption of information technology. The public sector too is being transformed, leading to the emergence of what has been called the New Public Management (NPM) (Fox *et al.*, 1995:105-6).

3.3 DISASTER MANAGEMENT AND PUBLIC MANAGEMENT IN SOUTH AFRICA

Mthembu (2001:3) argues that public management appears to be a strategy to meet the challenges of globalization and to promote professionalism,

accountability, transparency and a service-oriented public service. Apartheid legislation on disaster management was administered under traditional public administration which has been widely criticised on the basis of its outdated application in 'modern' governance (Mthembu, 2001:4). Civil Protection Act 67 of 1997 under traditional public administration could not promote a results-based management (RBM) model, a model that ensures that a linkage between input-output outcomes is crystal clear and implemented (Mthembu, 2001:4). Section 7(m) of the Disaster Management Act provides key performance indicators in respect of the various aspects of disaster management. These key performance indicators include policy formulation, implementation and evaluation, planning, financial management, methods and procedures, personnel management, organising, and control. This suggests that the new act requires government officials working under disaster management departments to have their performance be measured and achieve set performance indicators.

In the local government environment before 1994, the disaster management function was seen to be a reactive one, with some officials within the local authority environment perceiving themselves to fall within the ambit of either the emergency services environment or even the traffic environment. Section 152 (1) (d) of the 1996 Constitution of South Africa requires that local government "ensures a safe and healthy environment". A Policy Framework for Disaster Risk Management in South Africa (2005:180) states that the Constitution assigns exclusive or concurrent functions to different spheres of government (s23 (7)). Schedule 4 of the Constitution, 1996 designates disaster risk management as both national and provincial competence.

Influenced by New Public Management (NPM), the South African government embarked on legislative transformation with the promulgation of the Disaster Management Act 57 of 2002. The public sector in general and public officials were also expected and encouraged to be results-oriented. Governmental managers have to increasingly evaluate and make necessary adjustments to all developmental projects so that they are able to:

- assess the risks involved,
- assess vulnerabilities, and

- assess capacities (Dwivedi, 1994:4).

Government managers will have to consider all other aspects of disaster management which include relief operations, rehabilitation, reconstruction, mitigation, development and preparedness planning, should their developmental projects be affected by any disaster. They would further have to participate in joint consultation and co-operation with other departmental heads, NGOs and other stakeholders to ensure that every disaster management issue is addressed.

Dwivedi (1994:4) holds the view that public representatives, political-office-bearers and public officials have an important role to play in reconciling the opposing views based on the concept of a democratic ethos. The afore-mentioned promotes the need for South African communities' participation and not be merely by-standers of developmental initiatives involving their community. The development of integrated development plans is therefore a partnership, between the authorities, who have resources such as human, material, communities and laws.

3.4 NEW PUBLIC MANAGEMENT (NPM)

According to Anderson (2000:1), NPM is a label used to define a general trend toward changing the style of governance and administration in the public sector and to describe a number of reforms that were carried out in several countries during the 1980s and the 1990s. Larbi (1991:12) argues that NPM has become convenient in shorthand for a set of broadly similar administrative doctrines which have dominated the public administration reform agenda of most Organisation for Economic Co-operation and Development (OECD) countries from the late 1970s (Hood, 1991; Pollitt, 1993 and Ridly, 1996:47). It captures most of the structural, organizational and managerial changes taking place in the public services of these countries. To quote Politt (1999:1), NPM has variously been defined "*as a vision, an ideology or (more prosaically) a bundle of particularly management approaches and techniques, many of them borrowed from the private for profit sector*". NPM is thus seen as a body of managerial thought (Ferlie *et al.*, 1996:9) or as an ideological thought system based on ideas generated in the private sector and imported into the public sector (Hood, 1995:34).

NPM shifts the emphasis from traditional public administration to public management (Lane, 1994:34). New Zealand and Australia have been highlighted as countries where extensive NPM reforms have been implemented (Lane, 1994:34). Most studies of this trend cover only countries of the OECD and many studies are based on OECD data. Similar reform attempts have been reported from a number of other countries around the world (OECD, 1999a; World Development report, 1997).

The mentioned OECD countries have emphasized that changes in the economic, social, political, technological and administrative environments have combined to prompt and drive radical changes in public administration and management systems. Larbie (1991:2) states that one common feature of countries adopting the NPM route is their concern about balance of payments, the size of public expenditure and the cost of providing public services (Greer, 1994; Mascarenhas and Zifcak, 1994 and Walsh, 1995). The fiscal crisis in the United Kingdom, for example, led to an International Monetary Fund (IMF) intervention in the 1970s with a demand for financial reforms and some of the blame placed on the “unreformed” civil service (Caiden, 1991:19).

The influence of neoliberal ideas and criticism of the old public administration was also a factor in OECD countries leading them to change to the public management. By the late 1970s there was increasing criticism by the new right or neoliberals of the size, cost and the role of government, and doubts about the capacity of governments to rectify economic problems. According to the neoliberal view, it is only through market competition that economic efficiency can be achieved and the public can be offered free market choice (Bereton, 1994:14).

The NPM has come to dominate thinking about public sector reform by practitioners and academics alike. Some have hailed it as a new paradigm (Osborne and Gaebler, 1992; Borins, 1994 and Hughes, 1998). According to Polidano (1999:1) NPM reforms, are a common response to common pressures such as public hostility to government, shrinking budgets, and the imperatives of globalization. There are differing interpretations of what the common response consists of. But there is general agreement that key components include deregulation of line management, conversion of civil service departments into free standing agencies or enterprises;

performance based accountability, particularly through contracts; and competitive mechanisms such as contracting out and internal markets (Aucoin, 1990:31 and Hood, 199:43). Various authors include privatization and downsizing as part of the package (Ingraham, 1996 and Minogue, 1998:24).

Furthermore, Larbi (1999:12) confirms that NPM is pushing the state toward managerialism. The traditional model of organisation and delivery of public services, based on the principles of bureaucratic hierarchy, planning, centralization, direct control and self-sufficiency, is apparently being replaced by a market-based public service management (Stewart and Walsh, 1992; Walsh, 1995 and Flynn, 1993), or “enterprise culture”(Mascarenhas,1993:56).

Changes in political and ideological contexts resulted in the development of information technology, growth and role of management consultants. The literature on public management reforms also points to the development and availability of information technology in providing the necessary tools and structures to make workable managerial reforms in the public sector (Greer, 1994:24). NPM reforms have also been “globalised” by change agents. These include large international management consultants, accountancy firms and international financial institutions, all of which have been instrumental in the increasing “importation” of new management techniques from the private into the public sector.

NPM has new selected applications which include decentralizing management. Decentralizing management, disaggregating and downsizing of public services are strands of NPM derived from “managerialism” (Mellon, 1993; Hood, 1991 and Ferlie *et al.* 1996:34). The trend toward decentralized management in public services is part of the effort to “debureaucratize” the public services (Ingraham, 1996:255) as well as “delay” the hierarchies within them. The key concern here is “*whether managers are free to manage their units in order to achieve the most efficient output*” (Mellon, 1993:26, Hood, 1991:5-6). This aspect of NPM has taken several forms, which are breaking up monolithic bureaucracies into agencies, devolving budgets and financial control, downsizing, separating production and provision functions and new forms of corporate governance and the board of directors’ model (Mellon, 1993:26 and Hood, 1991:5-6).

Moreover, as part of the effort reconfigures state-market relations in order to give more prominence to markets and the private sector, contracting out of the provision of public services is increasingly advocated in crisis states. Contracting out refers to the out-sourcing or buying in of goods and services (for example information technology and management services) from external sources instead of providing such services in-house (Walsh, 1995 and OECD, 1993a).

Before the reforms in the 1980s social services, such as public education and public health care, in most developing countries were based on free access, financed from direct support via the budget. Short of outright privatization, one of the major developments in the provision of public services under adjustment programmes has been the introduction of user fees or charges (Walsh, 1995; OECD, 1993a).

3.5 PUBLIC ADMINISTRATION PRINCIPLES WITHIN THE CONSTITUTION OF SOUTH AFRICA

The 1996 Constitution (Act 108 of 1996) sets out many of the main features of the country's system of public administration. The constitution provides for three distinct spheres of government which are national, provincial and local. Each of these spheres has to a certain degree, executive, legislative as well as judiciary authority. In South Africa, each sphere of government is autonomous but also interlocked with other spheres (Venter, 2001:171). This "interlocking" of spheres implies equality between these spheres that contrasts with the more explicit hierarchical conception implied by "levels" of government as might be the case in a unitary state. Each of these spheres is given certain powers and functions according to the constitution of the Republic of South Africa (Republic South Africa, 1996).

South Africa consists of nine provincial governments. The current nine provinces adhere to the nine geographical development areas identified by the Development Bank of Southern Africa in the 1980s. Within provinces, there are municipalities as required by the Constitution of the Republic of South Africa (1996).

The Constitution and the Municipal Structures Act 17 of 1998 specify categories of municipalities and accordingly allocate certain powers and duties to them. According to section 1 of the Act, municipalities are divided into three categories: metropolitan municipalities are classified as “A” municipalities; local municipalities are classified as category “B” municipalities; and category “C” municipalities are district municipalities. Category C municipalities have a number of category B municipalities within its area of responsibility. Category A municipalities have full control of their area and have no category B municipalities within their jurisdiction.

The importance of a constitution in directing and steering the affairs of a state is captured by Cloete (1967:80), in the following statement:

“The constitution is a policy statement because it declares the action to be taken by specific institutions and office-bearers that follow stated procedures and respect prescribed conduct guidelines and values (particularly where the constitution contains a bill of rights) for the creation and the maintenance.”

The implication of the above statement is that a country’s constitution ought to spell out the basic values and principles which should govern the administration of public resources. According to Thornhill (2006:317), the constitution demands that local government must provide democratic and accountable government for local communities; ensure the provision of services to communities in a sustainable manner; promote social and economic development; promote a safe and healthy environment; and encourage the involvement of communities and community organisations in matters of local government.

Thornhill (2006:318) further argues that it is imperative to note that new municipalities have to operate within the constitutional guidelines provided in terms of the Constitution. The most significant sections relating to the operation of the local sphere of government are as follows:

1. Section 2: the Constitution is the supreme law of the Republic and inconsistent with it is invalid;

2. Section 151 (2): the executive and legislative authority of a municipality is vested in its municipal council.
3. Section 153 (3): a municipality has the right to govern, on its own initiative the local government affairs of its community, subject to national and provincial legislation, as provided on the Constitution;
4. Section 152 (1) (a): The objects of local government are to:
 - Provide democratic and accountable government for local communities;
 - Ensure the provision of services to communities in a sustainable manner;
 - Promote social and economic development; and
 - Encourage the involvement of communities and community organisations in matters of government (Thornhill, 2006:318).

The total physical, social and economic environments of the local sphere of government have changed drastically because of the aforementioned constitutional provisions. The Constitution of South Africa (Act 108 of 1996) places a legal obligation on the government of South Africa to ensure the health of people, environmental protection and safety of its citizens. Section 24 of the Constitution provides the following rights: *“everyone has the right-*

- (a) to an environment that is not harmful to their health or well-being; and*
- (b) to an environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that-*
 - (i) prevent pollution and ecological degradation;*
 - (ii) promote conservation; and*
 - (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”*

Moreover, section 41 (1) (b) of the Constitution, states that all spheres of government are required to *“secure the well being of the people of South Africa”*.

Furthermore, section 156 (5) of the constitution states that a municipality has the right to exercise any power concerning a matter reasonably necessary for, or incidental to, the effective performance of its function. Section 26 (1) of the Constitution stipulates that *“everyone has the right to have access to adequate*

housing.” Subsection 2 states that “the state must take reasonable legislative and other measures, within its available resources, to achieve the progressive realization of this right.” The aforementioned section state that, it can be argued, people who are residing in informal settlements have a democratic right to a formal house. To avoid future natural disasters and violation of people’s democratic rights adequate houses are needed.

It further provides in section 152(e) that “the objects of local government are to encourage the involvement of communities and community organisations in the matters of local government. Municipalities have an obligation to capacitate civil society through training and skills related to different hazards such as first aid, fire-fighting and communication. Section 152 (2) states that “a municipality must strive, within its financial and administrative capacity, to achieve the objects set out in subsection (1). The aforementioned sub-section confirms that municipalities are obliged to finance locally declared disasters that strike in areas within their jurisdiction.

Section 156 of the South African Constitution deals with the powers and functions of the municipalities. Section 1 argues that a municipality has an executive authority with, and the right to administer:

- (a) local government matters listed in part B of Schedule 4 and part B of Schedule 5, which include air and noise pollution, fire-fighting services, storm-water management, water and sanitation services, health services, municipal planning and waste disposal.
- (b) any other matter assigned to it by national or provincial legislation.

Section 156 (5) of the constitution says that “*a municipality has the right to exercise any power concerning a matter reasonably necessary for, or incidental to, the effective performance of its functions.*” This indicates that municipalities have rights to exercise any power on matters like disasters depending on the magnitude of the disaster. Local government ministers should main-stream all legal and administrative matters related to disasters.

Public administration is interwoven within the Constitution. Chapter 10

stipulates that, public administration must be governed by democratic values and principles enshrined in the Constitution (Republic of South Africa, 1996a:83). Section 195 (2), states that the main practitioners of public administration in South Africa are the spheres of government, organs of state, and public enterprises (Republic of South Africa, 1996a:83). The constitution prescribes the principles, which the public administration practitioners should abide by. These nine basic principles are as follows (Republic of South Africa, 1996a:195):

- i. A high standard of professional ethics must be promoted and maintained.
- ii. Efficient, economic and effective use of resources must be promoted.
- iii. Public administration must be development-oriented.
- iv. Services must be provided impartially, fairly, equitably and without bias.
- v. People's needs must be responded to, and the public must be encouraged to participate in policy-making.
- vi. Public administration must be accountable.
- vii. Transparency must be fostered by providing the public with timely, accessible, and accurate information.
- viii. Good human resources management and career development practices, to maximize, and accurate information.
- ix. Public administration must be broadly representative of the South African people, with employment and personnel management practices based on ability, objectivity, fairness, and the need to redress the imbalances of the past to achieve broad representation (Republic of South Africa, 1996).

Apart from the above principles, the development of the concept of governance, as a new dimension, was added in the area of the operation of the public sector. Thornhill (2006:317) argues that governance requires co-operation among the governmental bodies, the administrative or managerial sectors and society in providing services in public services. Chapter 10 section 196(1) of the constitution states that there is a single Public Service Commission for the Republic. Section 196 (2) states that the commission is independent and must be impartial, and must exercise its powers and perform its functions without fear, favour or prejudice in the interest of the maintenance of effective and efficient public administration and a high standard of professional ethics in the public service (Roux, 2003:69). Section 197 (1) of the constitution states that within public administration

there is a public service for the Republic, which must function, and be structured, in terms of national legislation, and which must execute the lawful policies of the government of the day (Republic of South Africa, 1996a:86).

Roux (2003:69) asserts that public administration is essentially a series of actions carried out by people in public institutions on behalf of other people. It is essentially an activity inspired by the need to apply policies and deliver services and outputs of those policies as determined by the executive and approved by the legislature; or, one might argue, as directed by the constitution. Public administrators in government institutions are charged with the task of achieving the policy objectives, which have been set by the government of the day, in the most effective, efficient and ethical manner. As public policy-makers, the government-of-the-day endeavours to establish a generally preferred future for the community (Raga, 2001:251).

3.6 PUBLIC ADMINISTRATION AND DISASTER MANAGEMENT

It is often argued that local government is indeed government closest to the people. Thornhill (2006:470) attests that it is required to establish the local sphere of government, established since the democratic system of government came to power in 1994, actually succeeds in bringing people closer to the governing function and whether they are fully recognized in the municipal administration and management. In the mid 1990s, the term “disaster management” became widely used in South Africa to refer to the guiding principles in the management of disastrous situations. Van Niekerk (2004: 108) argues that disaster management’s early development, body of knowledge and expertise responsible for the safeguarding of lives in the event of a disaster was still vested in civil protection.

One of the most important aspects of the post-apartheid reconstruction project was the establishment of a decentralized local government. Parnell and Pieterse (2002:79) have noted that the imperative of radically transforming the apartheid system of segregated municipal government provided an excellent opportunity to totally redefine the goals and operational procedures of local government in South Africa. The devastating floods that occurred in the Cape Flats in June 1994 and the emergence of the new imperative were the catalysts that heralded the paradigm shift

in South Africa in terms of protecting our communities against natural disasters (South Africa, 1998a).

The majority of the South African population now have a chance to decide on the future of South Africa. Developments in the field of democratic and co-operative governance (South Africa, 1996), such as Integrated Development Planning (South Africa, 2000a), Land Development Objectives (South Africa, 1995), Municipal Service Partnerships (South Africa, 2000a), the Green Paper/White Paper on Disaster Management (South Africa, 1998 and South Africa, 1999) and the Disaster Management Act of 2002, contributed directly and indirectly to the field of disaster management in South Africa.

3.7 EVOLUTION OF DISASTER MANAGEMENT LEGISLATION WITH REFERENCE TO THE THREE SPHERES OF GOVERNMENT

Previously in South Africa, the legislative framework for managing disasters and hazards was extremely confusing because of the many levels at which decisions were taken. There was no clear delineation of authority and inappropriate process or criteria for disaster declarations. The Civil Protection Act No. 67 of 1977 empowered the Minister for Provincial Affairs and Constitutional Development to declare a "state of disaster" but it did not instruct other relevant ministries of the actions they should take.

Owing to the floods in the Cape Flats and the extreme hardship suffered by the poorest of the poor, government realized that the mechanisms espoused by the Civil Protection Act 67 of 1977 were woefully inadequate. The Department of Constitutional Affairs (now the Department of Provincial and Local government) was given responsibility to administer the Civil Protection Act of 1977. Cabinet further resolved that a National Disaster Management Committee be created at national level. Such a committee was created in 1996, but never became fully functional. In 1977, a task team was created and government established an Inter-ministerial Committee for Disaster Management (IMC) to replace the National Disaster Management Committee (South Africa, 1999). To deal with the immediate effects which certain natural and human-made hazards might have on the Republic, the IMC created the Interim-Disaster Management Centre (IDMC) which comprised ten

national government departments. The main aim of the IDMC was to disseminate information and design strategies to deal with disasters.

The Fund-raising Act, No. 107 of 1978, also provided for the "declaration of a disaster" by the President in order to provide relief to victims of disasters. Disaster Management Act 57 of 2002 nullified the Civil Protection Act of 1997 and the Fund Raising Act of 1978, historically managed hazards and disasters. The Civil Protection Act and the Fund Raising Act did not provide an adequate comprehensive framework for dealing with hazards and disasters in a holistic or proactive manner. It is unclear whether the Disaster Management Act will be applied more effectively.

The Inter-Ministerial Committee for Disaster Management (IMC) was tasked with producing a Green Paper for Cabinet approval before the end of 1997 (Department of Constitutional Development, 1998). According to Stoforth (1999:62), the main objective of the Green Paper was to analyze the problems with South Africa's then current disaster management system and to consider how to proceed to be proactive and preventative (United Nations, 1999:228). In order to accomplish these aims, a Disaster Management Task Team comprising of 33 experts from national departments and various research institutes was established and instructed to solicit the views of all stakeholders involved in disaster management (Ministry of Provincial Affairs and Constitutional Development, 1998:6). The task team accomplished this task and the Green Paper was formally launched on the 11th of February 1998.

The Green paper highlighted two key points. First, it states the South African government's support for the International Decade for Natural Disaster Reduction (IDNDR) perspective that disasters with a natural trigger are embedded in complex social, economic and environmental processes. It follows that the South African government agrees that disaster risk reduction is a multi-disciplinary process, involving the environment, human settlement, human behaviours, health, and public administration considerations (Ministry for Provincial Affairs and Constitutional Development, 1998:11).

Second, the Green paper notes that it is cost effective to prevent, mitigate and respond to disasters (Ministry for Provincial affairs and Constitutional Development,

1998:9). As such, the Green Paper recommends that disaster prevention and preparedness should become an integral part of every national development policy (Ministry for Provincial Affairs and Constitutional Development, 1998:10).

The Green paper also highlights a number of prevailing weaknesses with South Africa's then current disaster management system. First, and perhaps most importantly, the Green Paper notes, in some cases, a "total lack" of a legislative framework governing both the public and private emergency services (Ministry for Provincial Affairs and Constitutional Development, 1998:37).

A White Paper on Disaster Management was published in 1999 that provides the framework for the government's Disaster Management policy, highlighting both national and provincial governments' powers and responsibilities. The White Paper advocates a risk reduction approach to disaster management, especially the reduction of a risk of economic loss and vulnerability and the protection of the environment.

In his foreword to the White Paper on Disaster Management (1999), Mohammed Valli Moosa, former Minister for Provincial Affairs and Constitutional Development, states that; *"The White Paper on Disaster Management"* outlines government's new thinking in relation to disaster management. The White Paper (1999) indicates that it aims to:

- i. provide an enabling environment for disaster management,
- ii. promote proactive disaster management through risk reduction programmes,
- iii. improve South Africa's ability to manage emergencies or disasters and their consequence in a coordinated, efficient and effective manner,
- iv. promote integrated and coordinated disaster management through cooperative relations between all spheres of government,
- v. ensure that adequate financial arrangements are in place, and
- vi. promote disaster management training and community awareness.

In line with international trends and national objectives for the management of the nation's resources, priority is given in this new approach to prevention. Unlike previous policies (Disaster Relief Fund and Fund-raising Act) focused predominantly on relief and recovery efforts. The White Paper underscores the importance of

preventing human, economic and property losses, and avoiding environmental degradation. Van Niekerk (2004:116) states that the White Paper (1999) indicates that *“in line with international trends and our national objectives of efficient and effective management of nation’s resources, priority is given in this new approach to prevention”*. The author further argues that preparedness measures for more efficient rescue operations will remain necessary. Much greater attention must be directed to the introduction of preventive strategies aimed at saving lives and protecting assets before they are lost.

According to NDMC (2006/2007:33), changes to South Africa’s disaster management policy and legislation unfolded a period of massive legislative reform in post-Apartheid South Africa. It transverses a period of 11 years, from June to April 2005 in which the country’s political, social and administrative landscape was dramatically transformed.

In 2000, devastating floods that affected Mozambique as well as other southern African countries, generated severe losses, especially in South Africa’s Limpopo Province. During this eleven year period, recurrent wildfires and informal settlement fires became more severe in South Africa while urban flooding in the country’s densely congested informal settlements emerged as a critical urban development concern. Key stages in the evolution of South Africa’s disaster management legislation are shown in Table 3.1.

Table 3.1: Key stages in the evolution of South Africa's disaster management legislation

Stage	Dates	Outcomes	Focus Areas
I.	June 1994- January 1999	<ul style="list-style-type: none"> February 1998: Green Paper on Disaster Management January 1999: White Paper on Disaster Management 	<p>National discussion paper</p> <p>National Policy document</p> <p>Focus on broad stakeholder consultation and policy reorientation</p>
II.	February 1999- January 2003	<ul style="list-style-type: none"> January 2000: Disaster Management Bill September 2001: Disaster Management Bill (58-2001) May 2002: Disaster Management (B21-2002) January 2003 Disaster Management Act (No. 57 of 2002) 	<p>Drafting of legislation and public comment</p>
III.	February 2003- April 2005	<ul style="list-style-type: none"> April 2004 National Disaster Management Framework (NDMF) April 2005 National Disaster Management Framework 	
IV.	May 2005+	<ul style="list-style-type: none"> Piloting of roll-out of implementation framework 	

Source: Inaugural Annual Report, 2006/2007. **National Disaster Management Centre:** Department of Provincial and Local Government of South Africa: 69.

The South African Disaster Management Act, promulgated in January 2003, has been applauded internationally as a groundbreaking example of national legislation that promotes disaster risk reduction (National Disaster Management Centre (NDMC), 2006/2007:33). It took place during a time of intensified disaster risk in southern Africa. The evolution of the country's disaster management policy was significantly influenced by international developments on disaster management and management disaster risk reduction. These included the UNDP's Disaster Management Training Programme in the early mid 1990s, as well as the International Decade for Natural Disaster Reduction and the International Strategy for Disaster Reduction from 2000 onwards.

However, the Disaster Management Act is an improvement in two major respects. First, the previous legislation did not provide a clear delineation of authority and process for the declaration of a "state of disaster" (Ministry for Provisional Affairs and Constitutional Development, 1998:55). The new legislation identifies the National Disaster Management Centre (NDMC) as ultimately responsible in the event of a disaster, with a Chief Executive Officer acting under a political head of the Command Centre who is responsible to Cabinet and the public. In the event of a disaster, the Minister may declare a disaster, but the national executive is responsible for the coordination and management of disasters and impending disasters. The Disaster Management framework of 2005 is much more comprehensive than in the previous legislation. The second policy improvement concerns the funding of disaster response. Under the previous legislation, in the event of a disaster, fund raising and the provision of financial disaster relief to victims could not be undertaken within the framework of the Civil Protection Legislation. It had to be addressed under a separate Fund Raising Act (No. 107 of 1978) (Ministry for Provincial Affairs and Constitutional Development, 1998:55). This caused unnecessary confusion, which often hindered the relief process.

Under the new Disaster Management Act of 2002, the funding of post-disaster recovery and rehabilitation is clearly explained in Section 56 and 57. This should hasten the transfer of funds to the victims of disasters and emergency relief organisations. Furthermore, in the Policy Framework for Disaster Risk management, GN 654 of 2005's key performance area 3 on disaster risk reduction clearly states that in terms of funding arrangements, this KPA can be separated into disaster risk

management planning and disaster risk management implementation. The Act requires all spheres of government to develop disaster management frameworks that guide disaster risk management activities, including planning and implementing disaster risk reduction projects and programs.

3.8 LOCAL GOVERNMENT

The most important sphere of government in this study is local government where disasters are prevalent. Section 25 (1) of the Municipal Systems Act 32 of 2000 stipulates that each municipal council must, within a prescribed period after the start of its elected term, adopt a single inclusive and strategic plan for the development of the municipality which:

- i. links, integrates and co-ordinates plans and takes into account proposals for the development of the municipality,
- ii. aligns the resources and capacity of the municipality with the implementation of the plan,
- iii. forms the policy framework and general basis on which annual budgets must be based,
- iv. complies with the provisions of this Chapter, and
- v. is compatible with national and provincial development plans and planning requirements binding on the municipality in terms of legislation.

Section 42 of the Disaster Management Act stipulates that each district and metropolitan municipality must establish a Municipal Disaster Management Framework (MDMF) and a Disaster Management Centre (DMC). Section 51 of the Disaster Management Act states that the municipality may establish a Municipal Disaster Management Advisory Forum (MDMAF) and a municipal Interdepartmental Disaster Management Committee (MIDMC).

3.8.1 DISASTER MANAGEMENT AND THE MUNICIPAL SYSTEMS ACT OF 2000

The Minister of Provincial and Local Government formally requested on 10 October 2001, that the Financial and Fiscal Commission (FFC) provide an assessment of the financial implications of the proposed Disaster Management Act. The following primary legislation provides the context within which funding arrangements for disaster risk management were to be designed:

- Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996).
- Disaster Management Act, 2002, (Act No. 57 of 2002) itself.
- Public Finance Management Act, 1999 (Act No. 1 of 1999 (PFMA)).
- Municipal Systems Act, 2000 (Act No. 32 of 2000).

This request was made in accordance with Section 9(4) of the Municipal Systems Act of 2000, which requires the Cabinet member initiating the assignment of a function to municipalities to request that the FFC provide an assessment of the financial implications. In terms of section 10A of the act, as amended, the disaster risk management function imposes new obligations on local government.

The Municipal Systems Act, 32 of 2000 section 26 (g) includes “*applicable disaster management plans*” as a core component of the Integrated Development Plan. Each municipal entity is required by Act to develop an integrated development plan, which includes a consultative process with all stakeholders prior to its publication. In giving effect to section 26 (g), the Disaster Management Act provides the framework and direction for the implementation in disaster management at all spheres of government and includes the need for consultation with communities and stakeholders in order to reduce disaster risk.

Previously, South African legislation could not deal adequately with disaster management. The major shortcoming was that it focused on dealing with disasters post occurrence and largely ignored prevention, preparedness and risk reduction which includes community consultation and awareness. The Disaster Management Act indicates that community participation and consultation are key elements, which must be adhered to in the development of Integrated Development Plans.

The Disaster Management Act stresses the importance of a municipality’s role in disaster management while the Municipal Systems Act determines that “*applicable disaster plans*” are a “core” component of the IDP. eThekweni Municipality’s Integrated Development Plan (IDP) programme four: “Safe from disasters” under plan four (Safe, Health and Secure Environment) stipulates the city’s strategy to establish disaster management (IDP 2010 and beyond: 29).

Chapter 5 of the Disaster Management Act highlights the importance of research and educational institutions in the field of disaster management. This

depicts that scientific and indigenous knowledge should be encouraged and utilized in determining disaster risk, vulnerability and capacity and to ensure that communities and other stakeholders are adequately informed and educated to make inputs into disaster risk reduction strategies and actions.

Hy and Waugh (1990:23) suggest that during a natural disaster, there is a need to reduce uncertainty by anticipating problems and solutions: probabilities of human behaviours need to be projected; collective human behaviours need to be anticipated; communication success and failures need to be expected; events need to be anticipated. Disasters are not primarily rare occurrences managed by emergency rescue services. Rather, there needs to be a common awareness and shared responsibility for risk reduction in every aspect of our lives. This means that every facet of governance (national, provincial and local) should focus its attention on the role the disaster management plays on daily activities.

3.9 SUMMARY

The focus of this chapter was on the relationship between disaster management, public administration, and new public administration. It clarified different discussion and positions on the conceptualization of public administration, public management and new public management.

It has clearly demonstrated that disaster management can be seen as having a place within the ambit of the public administration sphere as a discipline. This field of study constitutes one of the most important aspects of the South African public sector.

CHAPTER 4

INTERNATIONAL TRENDS

4.1 INTRODUCTION

This chapter examines international disaster management strategies. Disaster management is contextualized from an international perspective with reference to organizations such as the United Nations. The first part presents case studies in both developed and developing countries to illustrate issues of relevance.

The next part deals with international declarations and proposals by the United Nations Development Programme and other organisations dealing with disaster risk reduction. The role of Non Governmental Organisations (NGOs) such as the International Red Cross and the role played by the United States of America (USA) in disaster prevention, preparedness, mitigation, response, recovery, rehabilitation and reconstruction are also explored.

4.2 BACKGROUND TO INTERNATIONAL DISASTER MANAGEMENT

Disaster management strategies are traced back to antiquity when early hieroglyphics depict cavemen trying to deal with disasters. The Holy Bible speaks of the many disasters that hindered civilisations. Haddow and Bullock (2006:1) mention the account of Moses parting the Red Sea which can be interpreted as the first attempt at flood control. Genesis 6 verse 14 (Zodhiates, Baker and Kemp, 1996: 10) speaks about Noah and the Ark, when he built an ark from cypress wood, coated it with pitch inside and out, as a mitigation strategy for the forthcoming predicted floodwaters. Moreover, the holy Bible speaks of many disasters that hindered civilisations.

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 *et al.*, 2006:2). Another notable example is that of the cold war era where the nuclear war was seen as a potential disaster threat.

Haddow *et al.* (2006:2) 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.*, 2006:4-5).

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.* (2006:17) explain that after the terrorist attacks of September 11, FEMA and the newly formed Department of Homeland 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 (2001:1), the Philippine government's inadequacy and the limitations of the prevailing view of disaster management compelled NGO's and people's organizations to promote and 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.

4.3 CASE STUDY: SOUTHERN AFRICA FLOODS

Between February and March 2000, several southern African developing countries were struck by a series of tropical storms and cyclones along the Indian Ocean, resulting in disasters. Such storms caused several waves of flooding in Madagascar, southern Mozambique, Zimbabwe and Swaziland as well as South Africa. The catastrophic conditions were perpetuated in Mozambique because districts were located in low-lying areas. Districts were submerged for weeks under

meters of water, which swept away virtually all infrastructures. Hundreds drowned and large populations were displaced and destitute. The outbreak of malaria, dysentery and cholera added to the high mortality rates. Development in this extremely poor and indebted country had been set back by several years. A major international rescue and relief operation was mounted, and reconstruction efforts started immediately.

Responses to the southern African floods were rapid in certain places, but the scale of the unfolding disaster and poor communications left many people on their own. According to Donohue *et al.* (2000:461), the southern African floods were not adequately reported in the first weeks. Images of broken bridges and raging rivers held limited interest, until television pictures showed helicopter rescues from trees and rooftops in Mozambique. In South Africa, major roads and bridges were re-opened and larger water supply schemes repaired in the first few months.

Reliance on inappropriate technology with expensive water purification tables and mosquito coils could not be distributed to the whole population at risk. Such weaknesses are common in developing countries such as India, where poor communities are struck by disasters yearly and often no disaster management strategies are in place.

4.4 CASE STUDY: GUJARAT EARTHQUAKE

In January 26, 2001 an earthquake struck the state of Gujarat, in India. This was the largest earthquake to occur in India since an 8.5 magnitude event hit the state of Assam in 1950. The Indian Meteorological Department (IMD) recorded a Richter magnitude of 6.9 with location being northeast of Bhuj, although the U.S. Geological Survey (USGS) maintained that the magnitude was 7.9, and the epicentre lay north of Bachau in a location, 50 kilometres from the IMD site. Gujarat's location in the west of India, bordering Pakistan, lies within the Himalayan collision zone where two surface plates (the Indo-Australian Eurasian) are slowly crashing to form the world's youngest and tallest mountain chain at a pace of about two centimetres per year. Bullock *et al.* (2006:243) indicate that cyclones, floods, droughts and earthquakes characterize Gujarat's history.

In the past 25 years, more than 3 000 people and 350 livestock have been killed and more than 1 million houses destroyed by yearly cyclones. Floods inundate an average of 300 000 hectares of land, damaging an average of 37 000 houses, killing 135 people and affecting two million human lives each year. In terms of earthquakes, there have been many, with incidents measuring over 6.0 or greater on the Richter scale occurring in 1819 (8.3), 1903 (6.0), 1940 (6.0), and 1956 (7.0) (Haddow *et al.*, 2006:246). In the case study, it is revealed that, although high vulnerability to these disasters has been long established, there was no formalised government management plan to mitigate, prepare, or respond when the Gujarat quake struck. According to Haddow *et al.* (2006:246), the government of India had no formal disaster management plan that defined the responsibilities of different government agencies.

The case study shows that a dramatic increase in housing development in Gujarat with little or no building code enforcement exacerbated a much higher level of casualties, even with a lower intensity of tremor. Haddow *et al.* (2006:244) argue that there was little surface deformation because of the depth, with no clearly discernable cracks on the surface such as those seen with more shallow quakes. However, the liquefaction phenomenon was widespread because of the intensity, and in some cases, rivers that had been dry for more than a century, became activated (Haddow *et al.*, 2006:244).

4.4.1 IMPACT ON INFRASTRUCTURE

Most of the communication infrastructure was immediately destroyed and 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 and 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 bare hands and personal tools (Haddow *et al.*, 2006:245).

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 and 257 000 of the houses were damaged or destroyed. However, in the city of Ahmedabad, 179 buildings were destroyed (Haddow *et al.*, 2006:245).

4.4.2 DAMAGE CAUSED

The World Bank and Asian Development Bank estimated that India's losses exceeded \$2.1 billion. The following list summarises damages (Haddow *et al.*, 2006:246):

- i. the government death toll, based on family registrations of death was 20,005 people; 166,812 were injured, about 20,000 seriously injured,
- ii. about 400 000 structures collapsed, and an additional 500,000 to 800,000 were damaged. In the Kuchchh district alone, 300 primary healthcare centres and 1,300 child nutrition centres were lost,
- iii. several of the sustained damages included telecommunications with 82 000 damaged phone lines, sanitation and irrigation systems. Approximately 9, 600 primary schools, 2,040 secondary schools, and 140 technical institutions needed to be rebuilt, and
- iv. further than that, 70% of the workers in the handicraft industry, more than 3,000 small-scale and cottage industries and 20 medium to large-scale enterprises lost their jobs.

The damage was perpetuated because government officials for example fire, police and health officials were either dead, injured, or attending to family emergencies, which diverted attention away from the greater relief effort.

4.4.3 IMPACT ON HUMANS

The district of Kuchchh sustained 90% of deaths and an overall 78% of the injuries were reported. In many of the areas that were isolated, there was no food or medical relief for up to five days, and people began looting what they could in desperation. In Bachhau, where 30,000 people were cut off from relief aid, armed gangs formed and began attacking survivors for money or food. Although these problems ceased upon the arrival of assistance, illustrating the effect of a timely response can have on the security of an affected region (Haddow *et al.*, 2006:245-6).

4.4.4 RESPONSE AND RECOVERY

There was poor response from the state government of Gujarat with a complete lack of preparedness which resulted in chaos. Police and fire brigades, the personnel who often respond first during disasters, were occupied with duties related to security and logistics for flag raising ceremonies and parades and most government officials were on holidays. The government built an interim rescue team which constituted the following:

- i. a team of five officials headed by the additional chief secretary,
- ii. government officials who were on vacation,
- iii. engineers, retired government officials, and others with applicable skills who volunteered, and
- iv. students from colleges and schools which were closed.

This team made it possible for a state control room to be functional on the first day which improved communication lines, Radio, satellite and cell phone stations functioned effectively. Local emergency operation control rooms were established as collection, tracking and distribution centres at Gujarat College and at a town hall (Haddow *et al.* 2006: 246).

A government survey team was created and examined the status of the buildings that remained standing to determine their safety. Fifteen thousand Indian military service personnel and significant heavy equipment were deployed to provide transportation and distribution support to relief operations and to repair the airports and bridges that had been damaged. Basic needs were supplied including shelter, water supply and food. Moreover, grass was distributed to cattle owners in the regions worst hit (Haddow *et al.*, 2006:246).

The empowered Group of Central Ministers was created to co-ordinate an emergency response which consisted of the following department representatives: home affairs, railways, civil supplies, health, rural development, housing and agriculture, communication and power. The purpose of the team according to Haddow *et al.* (2006:247) was to:

- i. consider the report of the Crisis Management Group and give such directions as considered appropriate,

- ii. decide on all actions necessary to provide immediate relief to the victims,
- iii. consider measures necessary for relief and rehabilitation of the affected, and
- iv. consider long-term institutional and organisational measures that are necessary for management and mitigation of such natural disasters.

Government interdepartmental groups can help during a disaster in all countries in order to apply their field of expertise with regard to response, recovery and rehabilitation.

4.4.5 REHABILITATION

The Gujarat Rehabilitation Fund was created to raise money for reconstruction. Grants were distributed according to the financial and physical damage. The government of Gujarat created the Disaster Management Authority to better enable the reconstruction efforts, heralding \$1 billion in aid mostly from USA to assist 300 000 families according to the level of damage, distance from the epicentre and original house value. A national Department of Earthquake Relief was also created as part of general administration (Haddow *et al.*, 2006:248).

4.4.6 USA INTERVENTION

The United States of America government, as part of the largest donor, provided aid through the Department of Defence (DoD), the USA Agency for International Development (USAID) and the Office of Foreign Disaster Assistance (OFDA). USA contributed \$13.1 million to the response effort for the DoD to provide airlifts for all donated goods. A six-person military assessment team consisting of experts in communications, logistics and technical support, was provided to advice the government departments. OFDA provided assistance through donated commodities and through grants via organisations such as CARE, Catholic Relief Services and the World Food Programme (Haddow *et al.* 2006:248).

Three airlifts by OFDA (valued at \$2,426,463), supplied relief to more than 450,000 people. The airlifts carried technical equipment, shelters, blankets, sleeping bags, water and sanitation equipment and other goods. The USAID Disaster Assistance Response Team (DART) of 11 people was dispatched to conduct emergency needs assessments and coordinate the distribution of all relief supplies

donated by the USA government. The USA government gave \$100,000 to the Prime Minister's Gujarat Rehabilitation Relief Fund. An allocation of \$10 million was granted from the USAID budget resources to be used by various NGOs and multilateral organisations like the United Nations. The fund was meant to be used for NGOs programs to repair roads, clear away debris and rubble and repair public facilities, survey support (to assess damages) and to support municipalities and local NGO to develop community renewal programs that will reconstruct devastated communities. The USA provided a total of \$90 million to support the relief and reconstruction of Gujarat (Haddow *et al.*, 2006:248-9).

4.4.6.1 ROLE OF NON-PROFIT ORGANISATIONS

NGOSs

There were more than 200 NGOs engaged in response because there was no built in government mechanism to organise the relief measures. NGOs worked out a system of coordination and increased the effectiveness and efficiency of response to the greatest number of those in need. The NGOs were CARE, the Catholic Relief Services and the Red Cross (Haddow *et al.* 2006:249).

CARE mobilised and performed initial assessment of the Kuchchh district, providing medical equipment as well as trauma counselling. With the help of USAID they assisted 50,000 people with food and survival kits. CARE helped people with \$175,000 in remote villages, 118 community services facilities and 105 water systems and access to employment and training for 6,000 people and rebuilt damaged irrigation systems and watershed management schemes (Haddow *et al.* 2006:249).

CATHOLIC RELIEF SERVICES as the recipient of \$650 000 in USAID grants, roped in technical staff in Africa and in Bosnia to install temporary shelter and to meet personal hygiene needs of more than 65,000 people in 73 villages. Mental health units were established providing trauma counselling for the injured and the most vulnerable (including women, children, ageing and injured) (Haddow *et al.*, 2006:249).

The **AMERICAN RED CROSS** is the most experienced organisation in responding to international disasters. It was the first organisation to the ground in Gujarat with a team of 11 American experts trained in logistics, communication, mental health, and family tracing. This organisation distributed almost \$2 million in supplies. The main plans of the Red Cross was to assist the state of Gujarat in the reconstruction which also included the provision of basic needs, development of a trained network of Indian mental health professionals and provision of community health education. The total amount of \$15 million was implemented in aid provided by the International Federation of Red Cross or Red-Crescent Societies (IFRC) of which high technological emergency hospital was built in Bhuj.

4.4.6.2 ROLE OF THE UNITED NATIONS (UN)

The UN, through their established in-country presence, had in place the United Nations Development Programme (UNDP), World Food Programme (WFP), United Nations Children Fund (UNICEF), the Office of the Coordination of Humanitarian Affairs (OCHA), International Labour Organisation (ILO) and World Health Organisation (WHO). The UNDP coordinated the UN needs assessments, activity identification, project proposal design and implementation, monitoring, and quality control (Haddow *et al.*, 2006:250).

The **UNDP** provided \$100, 000 for relief through a women partnership project in Gujarat (SEWA) and NGOs. The UNDP continues to be the UN coordinating arm for the construction of resistant houses to any risk and works with the provincial and state government. **WFP** launched a \$4.14 million project that provided relief food rations to 300,000 people for four months and it targeted a group of 1788 children below the age of five years as well as pregnant and nursing mothers (Haddow *et al.*, 2006:250).

UNICEF supplied 30,000 people in three months with basic needs and an additional \$600,000 in medical equipment. It continued to work with government of Gujarat to rebuild schools and helped in communicating emergency preparedness plans (Haddow *et al.*, 2006:250).

OCHA provided an emergency grant of \$150,000 from its own resources and from prepositioned funds from the government of Denmark and Norway to purchase blankets. **ILO** created short-term opportunities for cleanup, rebuilding the infrastructure and housing and protecting vulnerable groups. It established programs relating to the effect on the job market from losses in employees and employment, migration flows, and the skills of the victims and provided trained people to be self reliant. **WHO** sent a group of public health experts to Gujarat to perform a rapid health assessment of the region. A disease surveillance desk was established and they also provided emergency health materials.

There were international development banks that worked with the government of India. These institutions played a role in the preliminary and final assessment of the damage and reconstruction needs resulting from the quake, but did not perform any duties related to response (Haddow *et al.*, 2006 250).

4.5 CASE STUDY: TULSA SAFE ROOM PROGRAMME (USA)

Tulsa is prone to tornadoes because of its location in the heart of ‘Tornado Alley’. A tornado in 1999 killed 44 people and destroyed communities throughout Oklahoma (USA), which as a result thereof, was declared a disaster area (Haddow *et al.* 2006:69).

A new construction technology to mitigate the effects of tornadoes such as “safe room” was initiated as a mitigating strategy. FEMA financially funded safe room construction which was developed and pilot-tested in 1998 by the Wind Engineering Research Centre of the Texas University. These safe rooms provided shelters during tornadoes which all home owners were encouraged to build. Tulsa formed a coalition of partners (including FEMA, Oklahoma State Emergency Management, Home Builders of Greater Tulsa, Tulsa Public Works, State Farm Insurance) responsible for setting construction standards, permitting, certification and compliance procedures, public education and awareness programmes (Haddow *et al.*, 2006:70).

This programme was supported through public and private funding. The programme expanded to other states and communities in “Tornado Alley” and safe rooms were built in public buildings and schools. Even though there were resistance

from communities on size, access, and quantity of space, the Tulsa safe room programme provided a practical and feasible example of taking advantage of the opportunity afforded in a post disaster climate (Haddow *et al.*, 2006:69-70).

4.6 THE CASTAIC UNION SCHOOL DISTRICT (USA)

A disaster risk reduction strategy (risk assessment) was conducted in the Castaic Union School District to identify areas of high susceptibility. The study was undertaken by the school and the causal problem was that the San Andreas and San Gabriel fault systems, two of the most active faults in the country, pass through the area in which the district is located. Moreover, the district's risk assessment study indicated that the school buildings were located within the inundation area of the Castaic dam located only 1.7 miles upstream (Haddow *et al.*, 2006:71).

It is asserted that if the dam was to fail, the school buildings and their occupants would be devastated through flooding. The 200 acre reservoir above the dam could release nearly 105 billion gallons of water, sub-merging the area below the dam with 50 feet of water. The district's risk assessment concluded that the probability that the Castaic Dam will fail, is never zero. The study also revealed that the buildings were at high risk of damage from fire and explosion if nearby pipelines failed (Haddow *et al.*, 2006:71-72).

4.6.1 PROJECTED ECONOMIC IMPACTS

The district's risk analysis concluded that economic costs were high if either the dam failed or the oil pipeline gone away. An earthquake impact would be enormous and the projected impact was as follows:

- i. replacement of the school buildings would cost an estimated \$7.7 million,
- ii. alternative school facilities would have to be located and rented at an estimated cost of more than \$500,000 per year,
- iii. the community would have to absorb the costs of losing the educational services provided by the district in the time period between the actual loss of the facilities and the relocation to temporary facilities, and
- iv. The community would have to absorb the costs of losing the educational services provided by the district in the time period between the actual loss of the facilities and the location to temporary facilities (Haddow *et al.* 2006:72).

The school district calculated a daily cost of loss which was estimated at \$28,601. On the most active faults, the United States Geological Survey (USGS) concluded that significant new earthquake activity may occur along in both systems. With the expected seismic damage, the study revealed two additional threats which were the flooding from the Castaic Dam and fire or explosion from a rupture in nearby oil pipelines (Haddow *et al.*, 2006:72-73). .

4.6.2 RESPONSES AND REHABILITATION

Through a cost benefit analysis, the district determined that the most feasible method was to relocate its campus to a low risk area. The selected location for the campus was completely out of the dam inundation area and far removed from the high pressure oil pipelines. Even though the new campus was constructed on the earthquake fault area, it conformed to the 1995 building codes and provisions, thus making them more resistant to seismic damage than buildings being replaced (Haddow *et al.*, 2006:73).

4.6.3 REHABILITATION

The old school (Castaic Union School District) property was located above two active wells which the district used to supply their customers in Castaic. They even changed the property deed to restrict human habitation and development to turn the site into natural open space (Haddow *et al.*, 2006:69).

4.6.4 FUNDING

The school financed the relocation effort through the combination of grant money from FEMA to an amount of \$7.2 million and \$20 million generated from school bonds. The new middle school opened in 1996 and the new elementary school opened in August 1997. The financial implications for mitigation strategies are very costly and a case study analysis in developed countries is very important as the way of benchmarking and establishing the best practices on disaster management in developing countries.

4.7 CASE STUDY: Participatory Community Infrastructure Upgrading Hanna Nassif

Hanna Nassif in Tanzania is one of the informal settlements that prior to 1996 suffered from lack of basic community services including storm water drains, subsequently, the housing area was experiencing frequent floods.

Following a request from the local community, the Government of Tanzania in collaboration with donor agencies and with participation of the residents initiated Hanna Nassif Community Based Upgrading. The project took an innovative approach in both its institutional set-up and the use of labour-based community contracting and community management in an urban context.

4.7.1 The Approach

The overall project concept and approach was well conceived to meet the needs of the local population particularly in terms of addressing the basic infrastructure (environmental) problems and not least alleviating poverty. The project was built on the conception that for the improvement of community infrastructure to be sustainable, improvement initiatives should hinge on building local capacity both in socio-economic and technical (imparting skills) terms. The implementation of the approach also took into account the revised National Urban Development Policy (1995) which recognises and provides a framework for regularising informal settlements. Needless to add that the approach deployed in this project directly complements the recent government policy on Employment Generation and Poverty Reduction. The latter provides for, and requires public, popular and private sectors to among other things, put concerted efforts in deploying labour intensive approaches in infrastructure improvement programmes as well as supporting micro-enterprise economic initiatives.

The specific elements or features of the project approach were:

- Community participation through the democratically elected Community Development Association (CDA) and wider involvement of residents in supporting all levels of the project from planning to implementation, maintenance and evaluation.

- Design of infrastructure in collaboration/negotiation with community so as to adapt to the existing built environment i.e. without demolition of existing houses.
- The use of construction modes and techniques that maximise the benefits to the local community such as labour-based methods and community contracting in the execution of civil works.
- Implementation of the project through partnership between local institutions (community, non-governmental organisations, local government, research training institutions) and international organisations. The approach therefore, recognises the varying roles and capabilities of the collaborating partners and appreciates the need for building synergies through linkages.

The University College of Lands and Architectural Studies (UCLAS) provided the required Technical Support while the local government (Dar es Salaam City Council) played the role of the facilitator and promoter. The International Labour Organisation (ILO) was the associate agency. The overall management of funds was by the National Income Generating Programme (NIGP) and funding was by the United Nations Development Programme (UNDP), the Ford Foundation and the Local Community contributions.

Parallel with the infrastructure improvement programme, a micro credit scheme support was established to improve household income and generated employment opportunities.

4.7.2 Results and Impacts

The impacts that stem from the approach and overall community infrastructure improvement include:

- More than 23,000 people who live in Hanna Nassif do not experience floods any more.
- Improved accessibility and the overall physical environment
- Water borne diseases reduced drastically from 4,137 cases before 1996 to less than 2000 in year 2000.
- Women and children do not any longer have to que for water nor do households pay dearly for tap water. The six water kiosks installed in the

area are now providing drinking water at a reasonable price. Water price has decreased from 0.06US\$ per 20 litre before 1998 to about US\$0.025 per 20 litre bucket in year 2000.

- In total over 60,000 worker days were generated between 1977-2000. Out of these over 50 percent were women worker days.
- A number of skills including community-based projects management, accounting and artisan training were imparted to various residents. The trained artisans have secured jobs within and outside the settlement.
- Apart from increased operations among 296 micro-enterprises which existed in 1994, the number of micro-enterprise income generating activities were raised to over 350 in 2000. The overall socio-economic environment has therefore changed remarkably.
- Unlike most other informal settlements in the city, by the end of 2000 over 70 percent of the property owners were paying property tax, as compare to less than 30 percent before 1996.
- The number of community based organisation increased from one in 1996 to 4 in year 2000. Besides, the skills imparted to the various CBOs have created capacity and put in place a strong institution that is playing a leading role in training members from other CBOs in the city. The morale and initiatives of the civic society particularly participation of residents in matters that concern their living environment has increased remarkably.

4.7.3 Participatory Settlement Regularisation

In the course of implementing the infrastructure project, a need to carry out settlement regularisation to clearly define private, semi-public and public land was deemed necessary. This was done to facilitate land registration and processing of title deeds, and not least checking further unauthorized land subdivision and building. Unlike the hitherto practice where plans are often prepared without involvement of the affected residents, in this case the process proceeded through intensive dialoguing and negotiations with the land holders and property owners.

The first step entailed discussing with the residents and local leadership their ideas and vision about the settlement layout. The ideas were translated by the planners into a conceptual plan which was thereafter discussed with the residents with a view

to strike agreements. The discussion aimed at, inter alia, ensuring that all private land (spaces) which were used for common functions, were negotiated so that ownership would be transferred to the community. Other important negotiations focused on agreeing on the requirement for access roads and footpaths network as well as modalities for securing land for the same.

Having agreed on the conceptual plan the next step was to facilitate neighbours (adjoining land owners) to authenticate their plot/property boundaries as well as sign agreements confirming acceptance of the mapped boundaries. This process was undertaken plot after another until the entire settlement was covered. The layout plan has been submitted to the municipal council for approval. Meanwhile, the community is mobilising resources for cadastral survey, a necessary step towards land registration.

Since this exercise was completed year ago, several other communities are seeking for similar support. Needless to emphasize that, through partnership and substantive participation of the residents, land for critical community requirements has been freely donated i.e. without any compensation.

4.7.5 Replication

The government of Tanzania has embarked on process of replicating the approach in the other Municipalities in the country. Already over nine Municipal officials, councillors and Mtaa/Ward leaders have visited and learnt from Hanna Nassif. Equally important is the formation of numerous CBOs dealing with environmental issues in other informal settlements in Dar es Salaam and in the upcountry municipalities. Besides, the government has adopted the participatory community-based settlement upgrading approach in the National Human Settlements Development Policy (National Urban Development Policy, 1995).

4.8 ANALYSIS OF CASE STUDIES

The case studies discussed in both developing and developed countries depict clearly that in developing countries people are more severely affected by disasters than those in developed countries. The poor in the case of Mozambique constitute a clear example of vulnerability because of the more hazardous location of

their dwellings, including the poor quality of their houses, different perceptions or lack of knowledge on disaster management strategies.

Incorrect housing construction methods, without sturdy materials used are shown in India. Houses are built without building codes, poor construction that increased the chances of death or injury during and after disasters. Unlike in the case of the Castaic Union school district (USA) where preparedness and mitigation strategies were used by relocating the school and conforming to the building codes. In developing countries houses are often built in low lying areas and disaster management is more response and recovery oriented compared to developed countries such as the Tulsa Tornado and Castaic Union School district case whereby disaster mitigation strategies were applied.

There were commonalities in both the Gujarati earthquake and the southern African floods, as there was no comprehensive government plan and poor communication amongst government spheres and other agencies. The difference was that in southern Africa, governments responded to the disasters without international assistance. In India, the USA through FEMA, assisted with the relief fund of more than \$20 million and international organisations such as United Nations (UN) agencies. Moreover, in these countries national governments were alerted later while in developed countries, risk assessments and mitigation are undertaken before the disaster struck.

In the Tanzanian case study major lessons were identified which include the following:

- Without credit financing mechanisms for community infrastructure improvement, contribution from local communities can hardly be relied upon.
- Despite the efforts to ensure ownership by the community, maintenance of the provided infrastructure remains a challenge. Unless deliberate measure are taken to effect financial decentralisation to the local community this challenge is unlikely to be resolved.
- Substantive community participation facilitated acquisition of land required for community infrastructure upgrading without compensation.

- Micro-credit support and deployment of labour-based approach significantly enhanced community interests and benefits, particularly alleviation of poverty.

In developed countries, the social implications of disasters are not severe because disaster management and disaster risk reduction strategies are in place. For instance, the Tulsa safe room programme provided mitigation and preparedness. The FEMA and private organisations funded the building of safe rooms to provide shelters during tornadoes as a mitigation strategy. Another case is the implementation of disaster risk reduction which is risk assessment, in the case of the relocation of the Castaic Union school district which was located at the quake belts zone and also built below the dam and the reservoir. In developed countries there are some good public-private partnerships as is shown during disaster mitigation programmes.

Cronin (1998:5) indicates that economic loss is greater in developed countries due to far higher density, cost of infrastructure and production levels. However, less developed countries suffer higher levels of relative loss when seen as the proportion of Gross Domestic Product (GDP) (UNDP, 2004:20). For example, the 1995 earthquake in Kobe, Japan, caused damage totalling \$100 billion, or approximately 2% of the country's GDP. However, the damage incurred by the 2001 earthquake in El Salvador amounted to just \$1.2 billion, but this equalled 10% of the national GDP (GTZ, 2002:11). Developing countries suffer significantly (as in the case of India and southern African countries) from economic effects.

4.9 INTERNATIONAL 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 emphasise 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 characterised 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 and regional preparedness (Haddow *et al.*, 2006:222).

4.9.1 THE INTERNATIONAL DECADE FOR NATURAL DISASTER REDUCTION 1990-1999 (IDNDR).

A United Nations disaster risk reduction strategy in the form of an international relief and humanitarian system is to reduce loss, disaster-related death and disability. Housner, (1989:45-46), Lechat, (1990:2) and Smith, (2002:348) indicate that the main aim of the International Decade for Natural Disaster Reduction (IDNDR) was to ensure a shift in the reactive approach toward 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 (Housner, 1989:45-46; Lechat, 1990:2 and Smith, 2002:348):

- i. 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 and in the establishment of early warning systems and disaster-resistant structures when and where needed,
- ii. develop appropriate guidelines and strategies for applying existing scientific and technical knowledge, taking into account the cultural and economic diversity of different countries,
- iii. foster scientific and engineering endeavours aimed at closing critical gaps in knowledge in order to reduce the loss of life and property,
- iv. disseminate existing and new technological information related to measures for the assessment, prediction and mitigation of natural disasters, and
- v. 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 and 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 toward a recognition that disasters are a function of both natural and human drivers (ISDR, 2004; UNDP, 2004:23). According to Van Niekerk (2005:53) cited in Smith (2002:348), 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 (2004:6) cited in Van Niekerk (2005: 55)., the committees of different nations focal points differed in their capacities and effectiveness with less than one-quarter becoming fully active most in South Asia, due to the impetus and activities of the Asian Disaster Preparedness Centre, and only a few in Africa.

Van Niekerk (2005: 55) cited in Bates, Dynes and Quarantelli (1999:288-289) 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.

McAntire (1997:221-231) cited in Van Niekerk (2005:55-56) indicates that beside the dilemmas of development, some other weaknesses during the IDNDR by the international community include the following:

- i. the violation of human rights in disasters,
- ii. a low degree of relief coordination and collaboration, and
- iii. difficulties in providing aid.

Some of the weaknesses listed above were, however, recognised 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, 2005:56).

Van Niekerk (2005:56-57) states that in the concluding forum of the IDNDR held in Geneva, Switzerland in July 1999, a document 'A Safer World in the 21st Century': Disaster and 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, 2004:12):

- i. conduct a national audit or assessment process of existing functions necessary for a comprehensive and an integrated national strategy of hazard, risk and disaster prevention, projected over 5-10 and 20 years time period,
- ii. conduct dynamic risk analysis with specific consideration for demography, urban growth and the interaction or compound relationships between natural, technological and environmental factors,
- iii. build, or where existing, strengthen regional or sub-regional, national and international approaches and collaborative organisational arrangements that can increase hazard, risk and disaster prevention capabilities and activities,
- iv. establish coordination mechanisms for greater coherence and improved effectiveness of combined hazard, risk and disaster prevention strategies at all levels of responsibility,
- v. promote and encourage know-how transfer through partnership and among countries with particular attention given to the transfer of experience to those countries exposed to risks,
- vi. establish global, national, and regional or sub-regional information exchanges, facilities or websites dedicated to hazard, risk and disaster prevention linked by agreed communication standards and protocols,
- vii. link efforts of hazard, risk and disaster prevention more closely with the Agenda 21 implementation process enhanced synergy with environmental and sustainable development issues,
- viii. focus multi-year risk reduction strategies on urban concentration and mega-city environments,
- ix. institute comprehensive application of land-use planning and programmes in hazard-prone environments,
- x. develop and apply standard forms of statistical recording of risk factors, disaster occurrences and their consequences to enable more consistent comparisons,
- xi. undertake periodic reviews of accomplishments in hazard, risk and disaster reduction efforts at all levels of engagement and responsibility, and

- xii. study feasibility of specific alternative funding and resource allocation modalities that can ensure continued commitment to sustained risk and disaster prevention strategies (ISDR, 2004 and UNDP, 2004:12-13).

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.

4.9.2 BUILDING A BETTER FUTURE: YOKOHAMA STRATEGY (1994)

The **Yokohama Strategy** was adopted by the United Nations at the World Conference on Natural Disaster Prevention, in Yokohama, Japan in 1994. The Strategy affirmed that those most affected by natural and other disasters are the poor and socially disadvantaged (Cronin, 2008:9). The strategy was a ten year plan with the following key elements:

- i. include disaster risk reduction in community development,
- ii. enhance resilience of individuals and communities to prevent and deal with disasters, and
- iii. actively engage individuals and communities in disaster risk reduction (Cronin, 2008:9).

This strategy emphasized that disaster prevention, mitigation and preparedness are better than disaster response in achieving the goals and objectives of vulnerability reduction. The Yokohama Strategy for Disaster Reduction centred on the objective of saving human lives and protecting property (www.egyakosh.ac.in: 2009-09-12).

The Yokohama strategy focused on:

- i. development of a global culture of prevention,
- ii. education and training in disaster prevention, preparedness and mitigation,
- iii. development and strengthening of human resources and material capabilities, capacities of research and development institutions,
- iv. involvement and active participation of the people,
- v. priority to programmes that promote community-based approaches to vulnerability reduction,

- vi. effective national legislation and administrative action,
- vii. integration of the private sector in disaster reduction efforts,
- viii. involvement of non-governmental organisations, and
- ix. strengthening the capacity of the United Nations system in disaster reduction.

Poor private-public partnerships, stakeholder involvement as well as inadequate training on disaster preparedness, mitigation, recovery, response and rehabilitation hinder the smooth implementation of initiatives and programmes especially in developing countries.

4.9.3 INTERNATIONAL STRATEGY FOR DISASTER REDUCTION (ISDR)

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, 2008:10). 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:

- i. increasing public awareness,
- ii. obtaining commitment from public authorities,
- iii. stimulating interdisciplinary and intersectoral partnerships and expanding risk reduction networking at all levels, and
- iv. 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.* (2006:224) attest that the above mentioned strategies are carried out through the UN country offices and governments, focussing 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 *et al.*, 2007:96).

4.9.4 HYGO FRAMEWORK FOR ACTION 2005-215

The World Conference on Disaster Reduction held in January 2005 at Hygo, Japan identified the specific gaps arising out of the Yokohama strategy. These are:

- i. governance: organisational, legal and policy frameworks,
- ii. risk identification, assessment, monitoring and early warning,
- iii. knowledge management and education,
- iv. reducing underlying risk factors, and
- v. preparedness for effective response and recovery (McMahon *et al.*, 2007:96-97).

The conference adopted the Framework for Action for 2005-2015 as building the resilience of communities to disasters. It promoted a strategic and systematic approach to reducing vulnerabilities and risks from hazards. The conference identified the following strategies:

- i. effective integration of disaster risk considerations into sustainable developmental policies, planning and programming at all levels, with a special emphasis on prevention, mitigation, preparedness, and vulnerability reduction,
- ii. development and strengthening of institutions, mechanisms and capacities in particular, at the community level that can systematically contribute to resilience to hazards, and
- vi. systematic incorporation of risk reduction approaches into the design and implementation of emergency preparedness, response and recovery programmes and the reconstruction of affected communities (McMahon *et al.*, 2007:96-98).

The framework was adopted by 168 Governments at the World Conference on Disaster Reduction with paragraph 19 focussing on the “Priority for Action 4: Reduce the underlying risk factors”, which includes the following:

- i. encourage the sustainable use and management of ecosystems,

- ii. Implement integrated environmental and natural resource management approaches that incorporate disaster risk reduction such as integrated flood management and appropriate management of fragile ecosystems,
- iii. promote the integration of risk reduction associated with existing climate variability and future climate change into strategies for the reduction of disaster risk and adaptation to climate change, and
- iv. incorporate disaster risk assessments into urban development planning and management of disaster prone human settlements, rural development and major infrastructure including considerations based on social, economic and environmental impact assessments (McMahon *et al.*, 2007:97).

McMahon *et al.* (2007:96) postulate that initiatives for development and poverty reduction must include efforts to reduce disaster risk. The expected outcome by 2015 is a substantial reduction of disaster losses, in lives, in the social, economic, and environmental assets of communities and countries.

The goals of the framework are as follows:

- i. to integrate disaster risk reduction into sustainable development policies and planning, and
- ii. to incorporate risk reduction the implementation of emergency preparedness, response, and recovery (McMahon *et al.*, 2007:98).

The priorities for action are as follows:

- i. to make disaster risk reduction a national and local priority,
- ii. to identify, assess, and monitor disaster risks and enhance early warning,
- iii. to use knowledge, innovation, and education to build a culture of safety and resilience at all levels, and
- iv. strengthen disaster preparedness for effective response at all times (McMahon *et al.*, 2007:97).

McMahon *et al.*, (2007:96) perceive the outcome of the Hygo Framework for Action as a massive undertaking requiring commitment by an enormous number of individuals and organisations. The UNEP (United Nations Economic Programme) led ISDR Working Group on Environment and Disaster Reduction discussion paper

“Environment and Vulnerability” has made recommendations to environmental authorities to undertake environmental action to reduce disaster risks and support the implementation of the Hygo Framework. The main activities include according to Cronin (2008:9):

- i. ensure that strategies for environment and disaster risk are compatible and that the relevant managers are fully engaged in both environment and disaster risk reduction mechanisms,
- ii. include risk reduction criteria in the environmental regulatory framework such as Environmental Impact Assessment (EIA) and ensure that longer term climate change impacts are considered,
- iii. engage the scientific community in environmental and disaster risk reduction research and promote innovative environmental technologies and designs for structural defences,
- iv. facilitate the development and use of new technologies and processes for managing natural resources and risks, including local and new knowledge of the ecological, social and cultural dimensions of resource management and risk associated with natural hazards,
- v. integrate environmental and disaster risk considerations in development planning, and
- vi. strengthen environmental capacities for post disaster response and include environmental considerations in post disaster recovery.

According to Cronin (2008:10), the ISDR conference provided a unique opportunity to promote a strategic and systematic approach to reducing vulnerabilities and risks from hazards.

4.9.5 DISASTER REDUCTION AND RECOVERY PROGRAMME (DRRP)

In 1997, under the United Nations Programme for Reform, the responsibilities and operational activities of the Emergency Relief Coordinator, regarded as being part of national capability or capacity, were formally transferred to the UNDP. In response, the UNDP created the Disaster Reduction and Recovery Programme (DRRP) within the Emergency Response Division (ERD). The broad – ranging duties of this programme pertaining to disaster mitigation, prevention, and preparedness were defined as follows (Haddow *et al.*, 2006:224-225):

- i. mainstream disaster reduction into development policy, strategies, plans, and programmes,
- ii. strengthen capacity of institutions at all levels for enhanced disaster management,
- iii. develop innovative approaches to accelerate sustainable post disaster recovery, promoting the inclusion of disaster reduction measures, rehabilitation and reconstruction,
- iv. build partnerships, promote networks, and facilitate cooperation at international, regional, and national levels,
- v. facilitate the development and delivery of high-quality training and human resource development activities,
- vi. promote and develop disaster reduction policies and strategies,
- vii. represent UNDP at inter-organisational forums, and
- viii. provide direct substantive support to multi-sectoral integrated country programs (Haddow *et al.*, 2006:225-226).

Governments are still failing to include disaster management strategies (prevention, preparedness, mitigation, response, recovery, rehabilitation and reconstruction) during policy development as well as in their organisational strategies. Participation and cooperation of international organisations such as the United Nations is another gap that all spheres of government need to fill.

4.9.6 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:

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

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

4.9.7 GLOBAL ASSESSMENT REPORT ON DISASTER RISK REDUCTION

Cronin (2008:11) 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:

- i. establish a credible and widely accepted reference point for information on global disaster risk patterns and trends,
- ii. increase understanding 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 and
- iii. 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.

4.9.8 UNITED NATIONS CHILDREN'S FUND

Haddow *et al.* (2006:228) state that before the onset of disasters, it is not uncommon for UNICEF to have established itself as having a permanent in-country presence with regular budgetary resources. In situations of disaster or armed conflict, UNICEF is well poised to serve an immediate role as aid provider to specific target groups. This rapid response is important because young mothers and children are often the most marginalised groups in terms of aid needed (Haddow *et al.*, 2006:229).

UNICEF maintains that humanitarian assistance should include programmes aimed specifically at child victims. Relief projects generally work to provide a rapidly needed response in the form of immunizations, water and sanitation, nutrition, education and health. UNICEF also works through recovery and reconstruction projects providing for the basic rights of children (Haddow *et al.*, 2006:229).

4.9.9 WORLD FOOD PROGRAMME (WFP)

In rapid-onset events such as natural disasters, the WFP is activated as a major player during the response to the immediate nutritional needs of the victims. Food is transported to the affected location and delivered to storage and distribution centres. The distribution is carried out according to pre established needs assessments performed by the Office for the Coordination of Humanitarian Affairs (OCHA) and UNDP (Haddow *et al.*, 2006:229).

4.9.10 WORLD HEALTH ORGANISATION (WHO)

WHO was established to serve as the central authority on sanitation and health issues throughout the world. It works with national governments to develop medical capabilities and healthcare and assist in the suppression of epidemics. WHO supports research for the eradication of disease and provides expertise on these subjects when requested. They provide training and technical support and develop standards for medical care (Haddow *et al.* 2006:220). WHO works with host country's key stakeholders including NGOs as well as International Red Cross.

The success of disaster management contingency plans in the form of strategies does not only rely on the administrative (such as UN) and political body, but only Non-Governmental Organisations (NGO's) such as the International Federation of Red Cross and Red Crescent Societies, Faith Based Organisations (FBO), Community Based Organisations (CBO), Business Organisations as well as civil society which play an important role before and after the catastrophes (Haddow *et al.*, 2006:220).

4.9.11 THE ROLE OF NON-GOVERNMENTAL ORGANISATIONS AND THE INTERNATIONAL RED CROSS

According to Haddow *et al.* (2006:230), the number of non-governmental organisations (NGOs) focusing on international humanitarian relief has grown exponentially in the past few decades. These organisations have come to play a pivotal role in the response and recovery of disasters, filling gaps left by national and multilateral organisations. They have significantly improved the ability of international relief efforts to address the needs of victims with a diverse range of skills and supplies. Some of the larger NGOs, like the International Committee of the Red Cross (ICRC), have established an international presence similar to that of the United Nations and have developed a strong local institutional partnership and capacity to respond immediately with great effectiveness. The grassroots level organisations are so successful in their activities that the major funding organisations such as USAID, OFDA, and UN regularly arrange for relief projects to be implemented by them rather than their own staff (Haddow *et al.*, 2006:230).

The International Red Cross or the Red Crescent Movement consists of the International Federation of Red Cross and Red Crescent Societies (IFRC) and the International Committee of the Red Cross (ICRC). The IFRC is heavily engaged in disaster preparedness and has identified several strategies toward mitigation to achieve by 2010. These activities, which relate to reducing the impact of disasters whenever possible and working toward predictive and preventative methods, are becoming a fundamental component of local Red Cross or Red Crescent Society programs. The IFRC has recognised the following four points of action as most vital:

- i. reducing the vulnerability of households and communities in disaster-prone areas and improving their ability to cope with the effects of disasters,
- ii. strengthening the capacities of national societies in disaster preparedness and post disaster response,
- iii. determining a role and a mandate for National Societies in national disaster plans, and
- iv. establishing regional networks of national societies that will strengthen the Federation's collective impact in disaster preparedness and response at the international level (Haddow *et al.*, 2006:231).

The IFRC aims to accomplish these results through their regular local capacity-building projects, performed in conjunction with research and analysis, which include the following:

- i. hazard prediction,
- ii. risk and vulnerability assessment of individual groups or regions,
- iii. assessment of local strength and capacity in disaster response,
- iv. response network development, and
- v. assessing of national society disaster mitigation and response capacity; and assessing national government preparedness and response plans (Haddow *et al.*, 2006:232).

According to the Geneva Mandate on Disaster Reduction, which was adopted in 1999, the IFRC declared (Haddow *et al.*, 2006:233):

“We shall adopt and implement policy measures at the international, regional, sub-regional, national and local levels, aimed at reducing the vulnerability of our societies to both natural and technological hazards through proactive rather than reactive approaches. These measures shall have as main objectives the establishment of hazard resilient communities and the protection of people from the threat of disasters. They shall also contribute to safeguarding our natural and economic resources and our social well being and livelihoods”.

Governments should plan and formulate healthy policies on disaster risk management by involving all stakeholders.

4.9.12 ASSISTANCE PROVIDED BY THE US GOVERNMENT

The United States has several means by which it provides assistance to other nations requiring such aid in the aftermath of a disaster, accident (nuclear, biological, or chemical) or conflict. The U.S. agency tasked with providing development aid to other countries, the U.S. Agency for International Development (USAID), has also been tasked with coordinating the U.S. response to international disasters. One branch of USAID, the Bureau of Humanitarian Response (BHR), manages the various mechanisms with which the United States can respond to humanitarian

emergencies of all types. The office under BHR specifically addresses the needs of disaster and crisis victims by coordinating all non-food aid provided by the government, is the Office of U.S. Foreign Disaster Assistance (OFDA) (Haddow *et al.*, 2006:236-7).

The OFDA is divided into four distinct subunits: Disaster Response Division (DRD), Prevention, Mitigation, Preparedness (PMP), Operations Support (OS), and Program Support (PS). According to McMahon *et al.* (2007:96) USAID's Disaster Mitigation Strategy has the following components:

- i. increase community preparedness to mitigate and manage disasters,
- ii. improve capacity of public and private partners to meet critical needs of vulnerable groups in disaster situations, and
- iii. facilitate and expedite reconstruction and rehabilitation in accordance with sound and equitable standards.

The Prevention, Mitigation and Preparedness (PMP) as a subunit of OFDA assists foreign nationals with assistance to develop skills to mitigate and prepare for disasters. The OS division handles the technical and logistical support of all OFDA projects and the PS division works with the OFDA financial and accounting systems (Haddow *et al.*, 2006:236-7).

If the disaster is considerable in size, a Disaster Assistance Response Team (DART) is deployed to the country to assess the damages and recommend the level of assistance that should be made by the U.S. government. The OFDA recently developed a Technical Assistance Group (TAG) to increase its capabilities in planning and programming. TAG consists of scientists and specialists in agriculture and food security, emergency and public health, water and sanitation, geosciences, climate, urban planning, contingency planning and cartography. In addition to the direct aid and logistical and operational support offered, the OFDA provides grants for relief assistants' projects. The projects are carried out primarily by PVOs and NGOs, as well as IOs, and other various organisations (such as a pilots' club that is hired to transport supplies) (Haddow *et al.*, 2006:237-8).

The U.S. Military is often involved in relief efforts of natural and technological disasters and CHEs (Haddow *et al.*, 2006:237-8). Moreover, international financial

institutions such as the World Bank and the International Monetary Fund provide loans for development and financial cooperation throughout the world.

International disaster management declarations, proposals, USA support, disaster planning interventions and responses challenges developing countries such as South Africa to comply with standards set. The South African government's proneness to man-made and natural disasters obliges it to implement resilient and healthy disaster risk management policies and frameworks.

4.10 SUMMARY

This chapter discussed the history of international disaster management. The case studies (Southern African floods, Gujarat Earthquake, Tulsa Safe Room Programme, and Castaic Union School District) both in developing and developed countries were discussed taking into consideration the causes of disasters, planning, responses, recovery, rehabilitation, reconstruction and the role of international aid.

The chapter discussed international disaster management commitments, plans, declarations, strategies and programmes. Particular emphasis was placed on how organisations such as the UN have brought risk management to the fore in the last two decades.

CHAPTER 5

DISASTER MANAGEMENT IN SOUTH AFRICA

5.1 INTRODUCTION

Chapter four examines South African disaster management plans and processes in a historical context. The historical background to disaster management is gleaned through the evaluation of the various pieces of legislation over the years. The National Disaster Management Centre (NDMC)'s function in three spheres of government and other government departments is also discussed. Furthermore, hazards and disasters that struck South Africa in the past few years are discussed. This chapter further analyses vulnerability, disasters, state of informal settlements in South Africa and the role of technology as a strategy for risk reduction. Although South Africa is the primary focus, reference is also made to aspects of the broader Southern African experience, since disasters tend not to always fall neatly inside neighbouring countries boundaries. The chapter concludes by discussing disaster management strategies within eThekweni Municipality, with particular emphasis on the current and future strategic programmes and projects.

5.2 DISASTER MANAGEMENT CONTEXT IN SOUTH AFRICA

In the South African context, the term 'disaster risk management' refers to the integrated, multi-sectoral and multidisciplinary administrative, organizational, and operational planning processes as well as capacities aimed at lessening the impact of natural hazards and related environmental, technological and biological disasters. This broad definition encompasses the definition of 'disaster management' as it is used in the Disaster Management Act, No. 57 of 2002. However, the terms disaster risk management and disaster management are used interchangeably in this thesis (National Disaster Management Centre (NDMC), 2006/2007:12).

According to the NDMC (2006/2007:12-13), natural disasters such as devastating floods, violent hailstorms, heavy snowfalls and gale-force winds are regular occurrences in South Africa. Consequently, the South African Weather Service maintains a record of significant weather events of the past and captures information such as the actual date of occurrence, the extent of the damage and areas affected, as well as the frequency of a particular type of disaster occurring in a

specific region. Such records are essential to government departments dealing with the implementation of disaster management strategies (prevention, preparedness, mitigation, response, recovery and mitigation) in vulnerable areas.

Disaster management in the past was reactive and based on the Civil Protection Act No. 67 of 1997 and the Fundraising Act No. 107 of 1978. After the historic elections of 1994, the South African government applied for and received recipient status with the United Nations Development Programme (UNDP). As a result of consultations with the government, the first Country Co-operative Framework for South Africa was agreed upon, which covered 1997-2001. Between 1997 and 1998 the UNDP supported South Africa on the most significant activities which included: national policy development, establishment of a National Disaster Management Centre, a disaster management plan and a proposal which was later submitted to parliament for approval.

The changes in South Africa's disaster management policy and legislation unfolded during a period of massive legislative reform in post-apartheid South Africa. Disaster management legislative reforms in South Africa took 11 years to evolve, from June 1994 to April 2005. There were a number of distinct phases in this development, namely the Green Paper on Disaster Management (February 1998); the White Paper on Disaster Management (January 1999); the Disaster Management Bill (58-2001 in September 2001); Disaster Management Bill (B21-2002 in May 2002); the Disaster Management Act (No. 57 of 2002 promulgated in January 2003) and the National Disaster Management Framework (April 2005). The major accomplishment of this legislative reform process in South Africa was its nation-wide transformation of the policy of disaster risk management (NDMC, 2006/2007:25).

5.3 NATIONAL DISASTER MANAGEMENT CENTRE (NDMC)

The NDMC is the highest administrative and executive authority for disaster management in South Africa. The objective of the NDMC is to promote an integrated and coordinated system of disaster management, with special emphasis on prevention and mitigation by national, provincial and municipal organs of state, statutory functionaries and other role-players involved in disaster management and

communities (NDMC, 2006/2007:12). Through its strategic objective of building and strengthening the capability and accountability of provinces and municipalities in order to implement their constitutional mandate, the NDMC aims to contribute to the overall resilience of communities and infrastructure to reduce disaster risks, to strengthen the capacity of provinces and municipalities in pre-empting and responding to disasters, as well as ensuring cross-functional disaster management in all spheres of Government (NDMC, 2006/2007:13).

The NDMC functions as the supreme body in the monitoring, implementation and review of disaster management legislation and is also involved in the recognition of indigenous knowledge, disaster database management, development of guidelines in the compilation of disaster management plans and strategies. The 2010 FIFA World Cup is viewed by the NDMC as a catalyst for fast-tracking the implementation of the Disaster Management Act. The soccer world cup attracted thousands of football fans and tourists to South Africa. The NDMC is working closely and collaboratively with provincial and local governments to fast-track their compliance to the Act. The South African government is also involved in a number of professional contingents which function outside the government sphere.

The NDMC complies with the Disaster Management Act of 2002 as it resulted in the formation of the National Disaster Management Advisory Forum (NDMAF) during the reporting period. Furthermore, various projects are currently implemented, including the development of regulations and guidelines. These regulations and guidelines contribute to the development of Unit Standards under the leadership of the South African Qualification Authority (SAQA). The SAQA's main task is to establish a career path for disaster risk management practitioners and to support the development of and implementation of disaster management plans down to the local level. To justify the compliance of the NDMC, a project and programme management programme called Monitoring, Mapping and Analysis of Disaster Incidents in South Africa (MANDISA) was purchased and customised to comply with the requirements set by the NDMC (NDMC, 2006/2007:26).

The South African Disaster Management Directorate participates in the following forums on a regular basis:

- i. Provincial Disaster Management Committee (PDMC),
- ii. International Strategy for Disaster Reduction (ISDR,
- iii. African Union (AU), and
- iv. United Nations Disaster Assessment and Co-ordination Committee (UNDAC),
and
- v. United Nations Environmental Programme (UNEP).

The involvement of the South African disaster management directorate in the aforementioned institutions indicates that all strategies implemented respond to the resolutions adopted at the United Nations level. The section following this discusses the different government input to international standards compliance.

5.3.1 EMERGENCY OPERATIONS COMMITTEE (EOC)

The Emergency Operations Committee (EOC) was established in 2004 to co-ordinate international response to disasters as and when required. Furthermore, the use of technology is used as an early warning systems and its translation into understandable language to the communities at risk. Geographical Information Systems (GIS) plays a critical role in the development of the National Disaster Management Centre (NDMC), which also enhanced the formulation of the Disaster Management Information Systems (DMIS). The system can be seen as an all encompassing Information Technology (IT) solution that relates to various aspects of hazard analysis, vulnerability assessment, risk reduction, contingency planning, incident reporting systems as well as early warning systems (NDMC, 2006/2007:26-27).

The Disaster Management Act gives priority to the application of the principle of cooperative governance for the purpose of disaster risk management and emphasizes the involvement of all stakeholders in strengthening the capabilities of national, provincial and municipal organs of state to reduce the likelihood and severity of disasters.

5.3.2 DEPARTMENT OF AGRICULTURE (DA)

Agriculture is a risky business due to the inherent variability of climatic parameters. This is especially true in South Africa where droughts and floods alternate frequently. Precipitation is mainly unreliable and erratic with drought becoming a major recurrent problem that results in inferior crops and poor veld conditions (NDMC, 2006/2007:81).

Country experiences escalating losses from biological and natural disasters, the Department of Agriculture has embarked on pre-disaster mitigation and the use of incentives to promote meaningful steps and measures to reduce the vulnerability of farming communities to flooding, drought, veldfires as well as other severe weather and disease outbreaks. The Department of Agriculture has rolled out an awareness programme to raise awareness and educate farming communities about disaster risk reduction principles. Furthermore, the department issues early warning information (National Airways Corporations monthly advisories) and daily extreme weather warnings including precautionary measures for different hazards which are loaded on the National Development Agency (NDA) and Agricultural Geo-referenced Information System (AGIS) (NDMC, 2006/2007:82).

5.3.3 NATIONAL DEPARTMENT OF HEALTH (NDH)

The National Department of Health oversees the Provincial Department Health's disaster management policies and plans as well as its implementation. The National Department of Health Disaster management policy and plan is complete in order to be implemented in hospitals countrywide. Furthermore, the 2010 Disaster Management Sub-Committee was established and is meeting on a two-monthly basis from October 2006 with an emphasis on pre-hospital, forensic pathology and in-hospital disaster preparedness sign-offs, policies and procedures as well as training with an emphasis on institutional capacity and institutional disaster management or preparedness planning (NDMC, 2006/2007:83).

5.3.4 DEPARTMENT OF MINERALS AND ENERGY (DME)

In terms of the Disaster Management Act, 2002 the Department of Minerals and Energy (DME) is the "National Organ of State" for the co-ordination and

management of matters relating to nuclear disaster management at the national level (NDMC, 2006/2008:83).

In South Africa, the mineral industry is mainly regulated by two Acts. The Minerals Act, 1991 (Act 50 of 1991), regulates, *inter alia*, the prospecting for and optimal exploitation of minerals, and the rehabilitation of the surface of land during and after prospecting and mining operations. The Mine Health and Safety Act, 1996 (Act 29 of 1996) provides for protection of the health and safety of employees and other persons at mines. These Acts are administered by the Department of Minerals and Energy (DME).

As far as safety management in South African mines are concerned, a safety mine management system to work effectively has been established. It needs a total management ownership, so that management are held accountable when audits are performed. Another promising approach in terms of getting complete employee participation in safety management, incentives are provided to staff by directly linking annual bonuses to lost-time injuries, for example, bonuses decrease as lost-time injuries increase. In terms of the Constitution of the Republic of South Africa, 1996 all laws and matters relating to mineral and energy are administered under the control of the Minister of Minerals in the National Government.

5.3.5 DEPARTMENT OF PUBLIC WORKS (NDPW)

The National Department of Public Works is the custodian of an extensive asset register with properties located in many of the 70 magisterial districts and 126 local authorities situated on dolomite. The Minister of Public Works has created a National Dolomite Risk Management Working Committee consisting of different departments. This Committee has, *inter alia*, established the need for co-ordination with the Disaster Management Programme, creation and implementation of national standards, liaison with local authorities and utilities, and motivating for the establishment of a National Dolomite Development Authority.

The department has fully implemented a risk management strategy on its own assets in Gauteng and is currently extending the strategy to all assets and infrastructure on its register in the dolomite areas of South Africa. The department

has through extensive training programmes in its head office, regional offices and Client Departments, involving staff, consultants, technical personnel developed a level of awareness and vigilance (NDMC, 2006/2007:85).

5.3.6 DEPARTMENT OF SCIENCE AND TECHNOLOGY (DST)

The Department of Science and Technology (DST) is involved with the following activities which have linkages with disaster management:

- learnership programmes focussing on early warning systems and disaster management,
- the South African Observation Strategy, and
- development of a Technology Needs Assessment for Climate Change (NDMC, 2006/2007:86).

5.3.7 DEPARTMENT OF WATER AFFAIRS AND FORESTRY (DWAF)

The Department of Water Affairs and Forestry (DWAF) is the custodian of the country's forest and water resources. The Department has formulated Veld-Fire management strategies, developed systems such as the National Fire Danger Rating System as well as management of water resources (NDMC, 2006/2007:87).

5.3.8 SOUTH AFRICAN NATIONAL DEFENCE FORCE (SANDF)

The South African National Defence Force (SANDF) is mandated to provide humanitarian aid and support to departments during states of emergency or disaster situations in order to prevent loss of lives and property of the country's citizens. The mandate of the SANDF is derived from the Constitution of the Republic of South Africa, the Public Service Act (Proclamation 103/4), the Defence Act 42 of 2002, the Disaster Management Act 57 of 2002 and the Public Finance Management Act No.1 of 1999 Sections 38(1), 44, 45, and 76(1)(d) (NDMC, 2006/2007:88).

5.3.9 SOUTH AFRICAN POLICE SERVICE (SAPS)

The South African Police Service as a national organ of state has already taken initiatives to ensure compliance with the Disaster Management Act and Framework by developing a disaster management strategy, disaster management policy and a contingency plan. All provincial representatives are involved in planning sessions as well as other activities being undertaken in terms of the Act and the

Framework. A total number of 36 provincial representatives and 30 divisional representatives were involved in the formulation of the Disaster Management Strategy and have also participated in various work sessions pertaining to Disaster Management. Various provinces have also been involved in providing support during floods and fire disasters that took place countrywide and have been working in close cooperation with various stakeholders (NDMC, 2006/2007:90).

5.3.10 SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

The South African Qualifications Authority (SAQA) is a statutory body responsible for overseeing the implementation of the National Qualifications Framework (NQF). Part of SAQA's responsibility is to generate and register qualifications specifically in areas where needs are identified, and to oversee the quality of the delivery of the registered qualifications. The Department of Provincial and Local Government (DPLG) Standard Setting and Development worked closely with the NDMC to establish a standard generating body for the development of national qualifications standards in disaster management. The SAQA registered the National Certificate: Disaster Risk Management on level 7 of the NQF (NDMC, 2006/2007:90)

5.3.11 SOUTH AFRICAN URBAN SEARCH AND RESCUE (SAUSR)

South African government has been involved in foreign Urban Search and Rescue (USAR) response since 1999 when a volunteer team sponsored by the medical assistance company, Medical Rescue International, and consisting of volunteers from the Boksburg and Johannesburg Fire Services, responded to the Izmet earthquake in Turkey. A training course was also developed whereby responders were trained on aspects of technical rescue, rope rescue, confined space rescue, swift water rescue, trench collapse rescue and structural collapse rescue (NMDC, 2006/2007:90).

These courses provided South Africa with a pool of trained persons able to be utilised for response to foreign disasters and major incidents taking place within South Africa. South African teams have subsequently responded to disasters in Mozambique (2000), India (2001), Algeria (2003), Iran (2003) and Pakistan (2005). The team has always been "heavy rescue" capable, meaning that they are able to

stabilise and enter major structural collapses (heavy construction). The team which responded to the earthquake in India in 2001 was also the largest foreign disaster team in the region (38 persons). South Africa is the only country in the SADC region with a USAR capacity and has been improving the system to a standard whereby it is able to respond within eight hours to disaster occurring outside South Africa (depending on the availability of air transport). An important feature of South Africa's capacity, which sets it apart from similar international teams, is its ability to respond to a wide variety of incidents such as floods and chemical incidents (NMD, 2006/2007:90-91).

5.3.12 SOUTH AFRICAN WEATHER SERVICE (SAWS)

The South African Weather Service (SAWS) plays an integral role in disaster risk reduction activities in South Africa. The SAWS is mandated by its Act (South African Weather Service Act No. 8 of 2001) to be the sole provider of severe weather-related warnings over South Africa in order to ensure that there is a single authoritative voice in this regard. The SAWS has therefore, established links for dissemination of advisories and warnings to the National Disaster Management Centre and a number of provincial and municipal disaster management centres (NMD Report, 2006/2007:91).

Training workshops and capacity building programmes are conducted with government officials, non-governmental organizations (NGOs), and academic institutions which deal with disaster contingency planning and its linkages between disaster and development. The United Nations Development Programme (UNDP) played a pivotal role in sensitising government officials to the new developing disaster management paradigms and the UNDP also contributed \$250 000 from Terrebone Readiness and Assistance (TRAC) funds. Bullock *et al.* (2006:219) argue that the capacity to respond to disasters and achievement by individual nations can be linked to several factors, including propensity for disasters, local and regional economic resources, organisation of government and availability of technological, academic and human resources. However, it is becoming increasingly common that the response ability of individual nations (such as South Africa) is insufficient in the face of large-scale disasters, and outside assistance must be called upon.

5.4 HAZARDS AND DISASTERS IN SOUTH AFRICA

South Africa is mostly affected by floods, droughts, veld-fires as well as fires in informal settlements. The Climate Information Project summarized South African natural and technological disasters between 1975 and 2001. During this period, there were nine droughts and famines which affected over half a million people. Furthermore, there were 16 floods, which led to the loss of 1179 lives, directly affecting another 76 300 people and leaving 22 835 people homeless. Other events which had less impact was earthquakes (usually caused by collapsing mines affecting miners) (34 deaths), landslides (34 deaths), epidemics such as cholera outbreaks (32 deaths), extreme temperature variations (30 deaths), wild fires (29 deaths) and wind storms (127 deaths) (Napier and Rubin, 2002:460).

In South Africa in 2000, flash floods swept away roads and bridges, destroying crops, domestic animals and homes across much of the North-East Lowveld. Worst hit were poor rural communities in the former homelands of Venda and Gazankulu. Water and sewerage systems were destroyed, and at least a million people were left without clean water. Major roads such as the N1 and N4 and access to the Kruger National Park were cut. The Limpopo River overflowed its banks and 100 deaths were directly attributable to drowning, collapsed buildings and accidents (Napier and Rubin, 2002:461).

There is little evidence to show that a comprehensive plan existed to deal with any of the floods (Donohue, Masilela and Gear, 2000:460). Temporary refuge places and repair to roads, bridges and buildings were washed out soon afterwards. Attempts to replant destroyed crops met the same fate. In the Northern Province, Joint Operations Centres at Pietersburg and in each region were set up, led by security forces and involving several government departments. Initial responses were simply to rescue stranded people, distribute food and clothing parcels and repair essential infrastructure (Napier and Rubin, 2002:461).

Government departments played a vital role, as Regional Disaster Management Units under various local governments and were responsible for assessment and aid distribution. The Health and Welfare Department set up its own Operations Centre to deal with concerns of disease outbreaks, to restore health and

welfare services, and to focus on planning for longer term problems such as malnutrition. Donohue *et al.* (2000:461) state that the lack of sufficient international or government funding for reconstruction was a profound setback to economic development, resulting in further poverty, malnutrition and disease in South Africa.

Literature reveals the strengths and weaknesses during response to the catastrophe in southern African countries (such as Guileid, Artan and Miguel Restrepo, 2002 and Jumbare, 2000). Responses were well managed centrally; NGOs were mobilised as well as academic institutions. Public health interventions were largely successful and public education on water and sanitation as well as training with new disease control protocols. There were weaknesses such as in the peripheral places with inadequate communications, information and transport capacity, as existed prior to the floods.

The NDMC (2006/2007) indicates that during the reporting period a number of incidents and disasters were received from various authorities. In 2006, the Greater Taung located in North West Province experienced severe flooding during which 1 032 houses collapsed or had serious structural damage. Replacement of these houses using the Peoples Housing Process was estimated at approximately R35 000 000. The Department of Local Government and Housing in the North West Province had approved an emergency housing project of 2000 houses to replace damaged and destroyed houses to the value of R82 000 000. To repair municipal access roads, National Government approved R11 400 000 for repairs to municipal road infrastructure. The Development Bank of Southern Africa (DBSA) donated R500 000 to help victims of the flood disaster to rebuild their houses. A total of R1 300 000 received for the Greater Taung Disaster Fund was used to benefit seriously affected areas with local economic development projects run from the office of the Mayor to address the high unemployment rates in the affected areas (NDMC, 2006/2007).

In 2006, the Nelson Mandela Bay in the Eastern Cape Province was struck by heavy storms causing extensive flooding. The community experienced electricity outages, roads destroyed and flooded and 25 000 families residing in shacks in the low-lying floodplain areas were affected. The response was overwhelming with the

private sector making massive donations and National Government making more than R100 million available for reparations (NDM, 2006/2007: 131).

Western Cape Province was affected by compound flood disasters which damaged roads, informal and formal housing, bridges, commercial and subsistence farms, storm water drains, municipal sewage works, holiday resorts and dams. Emergency funding was allocated to cater for rehabilitation and reconstruction within the affected areas and an amount of 274 million was approved within a period of six weeks after the event occurred (NDM, 2006/2007: 131).

In 2006, KwaDukuza Municipality (KwaZulu-Natal) was affected by floods, where strong winds and heavy rains accompanied by hail, struck part of KwaDukuza. The hailstones caused extensive damage, primarily to homes with asbestos roofing. The department of housing was the lead disaster management agency in this case. The assessment of damage was done in tandem with the KwaDukuza Housing Department and was finalised within a short period of time. However, the processing of claims and issuing of vouchers to beneficiaries took almost six months to complete (NDMC, 2006/2007: 131).

In 2007 the Ilembe District (KZN) was struck by a coastal tidal disaster and damages included excessive soil erosion and damage to primary sand dunes and vegetation, beachfront retaining walls, properties, home fixtures and furniture, lifeguard buildings and equipment, restaurants and ablution blocks (NDMC, 2006/2007: 131).

The Ugu District Municipality (KZN) in 2007 was severely affected by storm surges and heavy wave action which resulted in loss of beach sediments and destruction of both private and public property. A claim of R113 million was lodged through the Provincial Disaster Office, which was supported by the Provincial Cabinet and submitted to National Treasury to consider (NDM, 2006/2007: 131).

KZN disasters have similarities with other provinces in terms of financial sustainability since responding to disasters is difficult due to financial constraints which restrict progress to restore normality soon after the disaster occurring.

5.5 THE NATURE OF INFORMAL SETTLEMENTS: A CASE OF FOREMAN AND KENNEDY ROAD INFORMAL SETTLEMENTS

Foreman and Kennedy Road informal settlements are characterized as a transitional space, where people come only temporarily, in hopes of getting a job and then a formal house to which they bring their family from rural areas. Many of these families come to look for better schools, and because their children can now attend schools in this (mostly Indian) neighborhood that have opened up to black children with the end of school segregation, some suggest that this precipitated the demographic shift in the settlement from mostly migrant laborers to entire families (Bryant and Pithouse, 2005:10).

Foreman and Kennedy Road informal settlements are mired in squalor on the periphery of society. Estimated 14000 people live in these settlements have long attracted predators such as politicians, shacklords, academics, journalists, Non-Governmental Organizations (NGOs), tavern owners to make a quick buck from human misery. As Ballard (2003:5) notes, this distinguishes South Africa where, unlike the United States and Great Britain in the late 1950s and early 1960s in which the poor were 'rediscovered' by social scientists, the poor have "re-entered the national scene because they have made themselves visible again by their capacity to fight and resist."

These settlements are represented by an organisation called Abahlali baseMjondolo (People living in shacks). It is this organization that the people living in this area rely on. The organization acts as the councilors of this area. At Foreman and Kennedy Road, the movement began with a convergence of people's frustration over a series of events which they saw as broken promises from the eThekweni Municipality. Abahlali BaseMjondolo marched frequently as a movement and as individual settlements within the movement detailing Ward 25 grievances, which ranges from ownership to houses, employment, HIV/AIDS treatment, access to municipal basic services, disasters such fires to breeding of diseases. The KwaZulu-Natal Elimination and Prevention of Re-emergence of Slums Bill, 2006 was imposed to the people who are living in the informal settlements throughout the province. Abahlali baseMjondolo resisted the Bill based on the fundamental flaws in the positioning of the Bill as there is no consensus in South Africa or internationally on

the desirability 'to introduce measures which seek to enable control and elimination of slums, and the prevention of their re-emergence'. The need for the Bill was to focus on fulfilling Constitutional state obligations, rather than trying to achieve the elimination of slums. On 14 October 2009, the South African Constitutional Court found the law to be in conflict with the Constitution and struck it down. Costs were awarded to Abahlali baseMjondolo. According to the judgment, the legislation would have allowed for the possibility of mass evictions without the possibility of suitable alternative accommodation and would have therefore violated the Prevention of Illegal Evictions Act (PIE Act 19 of 1998) and South Africa's Constitution.

According to Bryant and Pithouse (2005:8), the underlying conviction rests in the idea that social movements and revolutions are shaped by the broader set of political constraints and opportunities unique to the national context in which they are embedded. Understandably, the people at Kennedy Road do not see their protests as a function of political opportunities, but speak instead of the frustration that they felt and the way that they wanted to make that frustration known. These frustrations then converged through the mass-meetings the community holds, and were mobilized through the elected formal leadership structure as well as through the informal friendship and kinship networks within and beyond the settlement. The movement has been sustained, though, not only by the power of people's frustrations, but by a democratic, consultative culture that involves as many people as possible in its decisions – what some call 'bottom-up democracy'.

5.6 INFORMAL SETTLEMENTS VULNERABILITY TO DISASTERS IN SOUTH AFRICA

Informal settlements are deemed by the United Nations as areas where groups of housing have been constructed on land to which the occupants have no legal claim. These areas are characterised by rapid, unstructured and unplanned developments. They are common features in developing countries and are typically the product of an urgent need for shelter by the urban poor (Huchzermeyer, 2001; Mason and Baltsavias, 1997 and United Nations, 2004). According to the South African 1996 census, 6, 11% of households lived in freestanding informal settlements, and a further 4.5% lived in shacks in the backyards of formal houses in Townships. Over 16% of households were living in urban informal housing, and a

further 18% lived in traditionally constructed houses which are located mostly in rural areas. Napier *et al.* (2002:4) argue that these figures are only broadly indicative of exposure to risk, because the location of the settlements and the quality of the construction materials are not all evident.

Informal settlement growth in metropolitan areas of South Africa has increased in the past decade as a result of the abolishment of legislation implemented by the apartheid government that prevented urbanisation (Ferreira, de Meyer *et al.*, 2002:23). As a result of the sudden post apartheid increase in urbanisation, metropolitan areas in South Africa have come under housing pressure, resulting in rapid changes to spatial patterns and land use associated with such areas.

The 11.6% households living in freestanding informal housing settlements are most often located on the far distant peripheries of cities (SA Census, 1996). Vulnerability to disaster is increased as a result of certain qualities of the location, such as settlements on steep slopes (Inanda, Durban), within flood plains (Alexandra, Johannesburg), close to mine dumps (East Rand, near Johannesburg), close to heavy industrial areas (Wentworth, Durban), or even on landfill sites (Foreman and Kennedy Road, Durban). Other hazards arise from the nature of the settlement itself, such as risks of rapidly spreading fire, or health risks from rising dampness, poor indoor air quality and collapsing structures.

A number of initiatives draw attention to the need for a responsive approach to informal settlements. South African local government has adopted varied approaches. Some may be considered problematic, for example hiring private security firms to patrol vacant land, spying and reporting on potential invasions, and carrying out evictions when residents resist relocation.

Many people in South Africa originate from rural areas and from neighbouring poor countries to urban areas and are absorbed into informal settlements. South African municipalities, such as eThekweni, are preventing any new informal land occupation. eThekweni Municipality as well as the City of Cape Town are intending to deliver basic services to informal settlements, until budgets and plans are secured

for final formalisation. eThekweni Municipality has entered into a partnership with the Homeless People's Federation, for data-gathering (enumeration) in the settlements and management of communal facilities. The municipality has also developed a partnership with Sao Paulo Municipality (Brazil), on the informal settlement upgrades. Cape Town City, in turn, recently sent a delegation of councillors and officials to Brazil, to learn from the Brazilian experience of upgrading informal settlements (Huchzermeyer, 2003:2).

There is no policy that gives provincial and local governments a new direction in dealing with the large number of households living in informal settlements, under insecure tenure and other forms of discomfort. The absence of policy has misled provincial and local governments on how to treat those that are driven to make this insecure form of shelter their home through illegal invasion. Huchzermeyer (2003:3) argues that there are a number of very common political objections to legislation and in-situ upgrading settlements which are discussed below:

- In a policy context that has focussed on equality of delivery, in the form of the 30m² houses on 250-300 m² individually serviced plots through the capital subsidy; some objection was voiced if informal settlement upgrading were to deliver a different or non-standardised product.
- The view was often held that in-situ upgrading rewards land invaders; for those patiently on the waiting list for green fields' delivery it represents queue-jumping; and some argue that upgrading would encourage new land invasions.
- It is also held that upgrading (in proximity to middle to high income areas) is unfair to surrounding property owners (due to depreciation of land values, in comparison to other forms of development that enhance land values), and to owners of the invaded land. Linked to this perception is the demand that re-housing of informal settlement residents needs to be coupled with the prevention of new land invasions, for example patrolling of vacant land and the repression of any unauthorised attempts at erecting shacks.
- Further, it is believed by many that informal settlements are a haven to criminals, and therefore should be relocated to areas that can be better controlled or from which middle income areas are less accessible (Huchzermeyer, 2003:3).

It must be noted that these objections largely represent the views of those with established stakes in the formal urban market. There was evidence on the other end of the social, economic and political spectrum of beneficiary dissatisfaction with relocations to distant green field developments. Loss of livelihoods, new costs incurred by the formal environment, particularly transport costs, and the disruption of social life and schooling for learners are aspects that frequently come to the fore (Huchzermeyer, 2003:4).

The South African government is the signatory to the United Nations Millennium Development Goals, one of which includes a commitment “*by 2020 to achieve significant improvement in the lives of at least 100 million slum dwellers*” (<http://www.undp.org/mdg/:2008:06-08>). In support of this goal, the 2003 Global Report on Human Settlements is titled “The Challenge of Slums”. This Millennium Development Goal is to be achieved “by scaling up participatory slum upgrading and poverty reduction programmes” (UN-Habitat, 2003:7). In South Africa, informal settlements largely overlap with the UN definition of slum dwellers, which is based on criteria of overcrowding, poor quality of the built environment, inadequate access to water and sanitation and tenure insecurity (Badiane, 2003:34).

Exposure to environmental health risks can link to levels of access to urban services. Some 12% of South Africa’s population did not have access to clean water in 1999. 30% of people are still dependent on pit latrines and a further 14% used bucket toilets or had no access to sanitation. In informal settlements the situation was much worse, with 44% using pit latrines, 12,5% using the bucket system and 10% having no access to sanitation (Napier *et al.*, 2002:5).

5.6.1 DISASTERS AND TECHNOLOGY

Hindson and McCarthy (1994:3) state that informal settlements in South Africa are dense comprising communities housed in self-constructed shelters under conditions of informal or traditional land tenure (O’Leary, 2007:34). Generating spatial models of informal settlements using remote imagery has been a popular means for monitoring them. Currently in South Africa, spatial modelling of informal settlements has been carried out using mostly aerial photogrammatic mapping methods (Mason and Baltsavias, 1997:22).

Disaster preparedness tries to forecast extreme events, attempt to mitigate the impact of disasters, respond to disasters and cope with consequences of disasters. Strategies for disaster preparedness include awareness of event that is most likely to happen at a particular time and at a specific geographical location, risk and vulnerability assessment, response mechanisms, coordination, information management, and early-warning systems (IFRC, 2000:34).

Van Zyl, Parbhoo, Moodly, Cwela, Umkhoza, Shabangu and Vahed (2009:2) devised a monitoring flood lines Sensor Web technology which can play a major role in achieving a suitable early warning mechanism, and thus improve disaster preparedness. The attempts have been made to assess flood risk potential throughout Africa, these efforts have focussed more on the social aspects including gender, age, education, income and ethnicity (Khady, 2007; Kundzewicz *et al.*, 2002).

The Mail and Guardian (2009: 14-20) reported a collaboration between civilian high power computing centres in Africa which can help improve disaster response times and track epidemics. The one partner is the Centre for High Performance Computing, based at the Council for Scientific and Industrial Research's Meraka Institute in Cape Town. The centre is capable of downloading information within seven seconds and pass the satellite taken over the African continent. Another partner is Egypt's National Authority for Remote Sensing and Space Sciences; which runs a receiving station at Aswan, 100 000 km from south of Africa, Arabia and southern Europe. The chief scientist at Purdue's Rosen Centre for Advanced Computing (Indiana) argued that the project should process bandwidth-hungry satellite data that can be used to monitor floods, drought and global warming (Mail and Guardian, 2009: 14-20).

5.7 DISASTER MANAGEMENT INSTITUTIONAL ARRANGEMENTS IN SOUTH AFRICA

After 1994, the democratic government realised the need and significance for implementing government structures dealing with disaster management. First, the emphasis was on the establishment of a national disaster management centre (White Paper, 1999a) to have ultimate responsibility for disaster management in the

republic as a whole. As the legislative process developed, more emphasis was placed on the importance of increasing the function of disaster management at local government level through the provinces (White Paper, 1999).

The following section will provide an in-depth discussion on the function of disaster management at all three spheres of government which involves both political and administrative actors.

5.7.1 THE NATIONAL GOVERNMENT SPHERE

The Green Paper (1998) on Disaster Management indicates that the national government must set out its objectives in order to ensure certain objectives for disaster management are met. These objectives include:

- i. risk reduction measures to be incorporated into development planning, leading to sustainable development,
- ii. addressing environmental degradation within the disaster management area of responsibility,
- iii. ensuring a reduction in the loss of life, damage and destruction of essential resources and property on which communities depend,
- iv. ensuring effective coordination, participation and cooperation amongst role-players at all levels of government, civil society as well as the international arena, and
- v. creating the necessary infrastructure for disaster risk reduction (Green Paper, 1998b).

The White Paper on disaster management (1999) indicates that it aims to:

- i. provide an enabling environment for disaster management,
- ii. promote proactive disaster management through risk reduction programmes,
- iii. Improve South Africa's ability to manage emergencies or disasters and their consequences in a coordinated, efficient and effective manner,
- iv. promote integrated and coordinated disaster management through cooperative relations between all spheres of government,
- v. ensure that adequate financial arrangements are in place, and
- vi. promote disaster management training and community awareness.

The South African government has implemented these objectives with the Department of Provincial and Local Government (DPLG) which has the overall responsibility for disaster management at national level. The DPLG, which manages the Disaster Management Centre (DMC), is responsible for the implementation of the strategic objectives of disaster management for the entire country. The Disaster Management Framework (NDMF), as the ultimate national policy on disaster management (as per the Disaster Management Act, Section 7) spells out the correct course of action in order to achieve the aims of disaster management and disaster risk reduction. The Disaster Management Act clearly stipulates different structures that must be created at national level which includes: Intergovernmental Committee on Disaster Management (ICDM), National Disaster Management Framework (NDMF), National Disaster Management Centre (NDMC), National Disaster Management Advisory Forum (NDMAF) and National Interdepartmental Committee on Disaster Management (NIDMC).

5.7.1.1 INTERGOVERNMENTAL COMMITTEE ON DISASTER MANAGEMENT (ICDM)

Section 4 of the Disaster Management Act of 2002 specifies that the President must establish an Intergovernmental Committee on Disaster Management (ICDM). This committee consists of cabinet members, members of Provincial Executive Councils and representatives of local government, involved in disaster management. The Minister of the DPLG serves as the chairperson on this committee. The functions of this committee are to advise Cabinet on issues concerning disaster management and to assist and advise the minister on the establishment of a national framework for disaster management. Furthermore, the ICDM ensures that mechanisms are in place to enhance the principles of good governance and compliance with the Disaster Management Act which prescribes that the Minister (provincial and local government) designs a national disaster management framework.

5.7.1.2 THE NATIONAL DISASTER MANAGEMENT FRAMEWORK (NDMF)

The National Disaster Management Framework (NDMF) is *“a legal instrument specified by the Disaster Management Act of 2002, 7(1) to address needs for consistency across multiple interest groups, by providing a coherent, transparent and*

inclusive policy on disaster management which is appropriate for the republic as a whole” (South Africa, 2004:6 and South Africa, 2003:7). The NDMF is divided into four key performance areas (KPAs) and three “enablers” (South Africa, 2005:2). Each of the KPAs is informed by specific objectives as set out in the Disaster Management Act. The three enablers are aspects which need to be present in all four of the KPAs so that they can be implemented successfully. To measure the successful implementation of the different KPAs, the framework specifies key Performance Indicators (KPIs) for each of the KPAs and enablers which are as follows:

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

The Disaster Management Act specifies that the NDMF must the types of disasters, hazards and risks that can occur in southern Africa, as well as the severity thereof. The NDMF deals with the implementation of developmental programmes and strategies in southern Africa. The National Disaster Management Centre manages both disaster management strategies and administrative matters (executive).

5.7.1.3 THE NATIONAL DISASTER MANAGEMENT ADVISORY FORUM (NDMAF)

The Disaster Management Act of 2002 (section 5) stipulates that the responsible Minister for provincial and local government (PLG) must establish a National Disaster Management Advisory Forum (NDMAF). The NDMAF is a national body where all spheres of government and external role-players consult and coordinate their actions (South Africa, 2004:25). The forum also advises the NDMC, and different organs of state, statutory functionaries, the private sector, NGOs and communities on any matter relating to disaster management.

Besides the legislative responsibility of the NDMAF to provide expert technical advice to the NDMC, the NDMF does provide for the establishment of ad hoc committees for purposes of integrated and coordinated planning (South Africa, 2004:28). One such committee is the National Interdepartmental Committee on Disaster Management (NIDMC).

5.7.1.4 THE NATIONAL INTERDEPARTMENTAL COMMITTEE ON DISASTER MANAGEMENT (NICDM)

Reid (2003:267) argues that although not a statutory body, it is widely recognised that an Interdepartmental Disaster Management Committee on Disaster Management (IDMCMDM) must be established in order to facilitate interaction between different government departments. The aim of the NICDM is to provide a forum where different government departments can coordinate and integrate their actions and activities relating to disaster management. This committee allows professionals to compile disaster plans and strategies and provides accountability mechanisms between departments (Reid, 2003:267).

5.7.2 THE PROVINCIAL GOVERNMENT SPHERE

According to the Constitution (1996:68), the provincial sphere plays a facilitating and coordinating role for the implementation of national government policy within the provinces. The sphere should therefore focus on functional policies, strategies, objectives and budgets for disaster management in its area of responsibility such as what is needed, relevant and within the competency of the specific province to provide.

The role of the political or portfolio committee on disaster management is to provide advice on national government disaster management policy in line with that of the provincial government in question. This portfolio committee will also provide the strategic direction for disaster management for each province in line with national policy.

Moreover, each provincial government must compile a Provincial Disaster Management Framework (South Africa, 2003). This framework must be consistent and in line with the provisions of the NDMF. Furthermore, Chapter 4 of the Disaster

Management Act provides for the establishment of Provincial Disaster Management Centres (PDMCs). As with the NDMC, various provinces have already established these centres within their administration. The roles and responsibilities of the PDMC are similar to that of the NDMC. The Provincial Disaster Management Advisory Forum (PDMAF) and the Provincial Interdepartmental Committee on Disaster Management (PIDMC) present not legally bound even though the NDMF states that the absence of such bodies may impede the functioning of disaster management in the provinces. In KwaZulu-Natal, the Disaster Management Centre is under the Member of Executive Committee (MEC) for Local Government and Traditional Affairs.

5.7.2.1 THE PROVINCIAL DISASTER MANAGEMENT FRAMEWORK (PDMF)

The Disaster Management Act of 2002, 28 (1) and (2) states that *“each province must establish and implement a framework for disaster management in the province, aimed at ensuring an integrated and uniform approach to disaster management in the province by all provincial organs of state, provincial statutory functionaries, non-governmental organizations involved in disaster management in the province and by the private sector”*. Section 28 (2) of the Act further states that the provincial disaster management framework must be consistent with the provisions of this Act and the national disaster management framework.

The KwaZulu-Natal province established the provincial disaster management framework which is in line with the national legislation which comprises four key performance areas (KPA's) and three supportive enablers required to achieve the objectives set out in the KPA's. The KPA's and enablers are informed by specified objectives and, as required by the Act and key performance indicators (KPIs) to guide and monitor progress.

5.7.2.2 THE PROVINCIAL DISASTER MANAGEMENT CENTRE (PDMC)

The KwaZulu-Natal province established a Disaster Management Centre to fulfil the requirements of the Disaster Management Act section 29 (l) which states that *“each province must establish a disaster management centre”*. The prime function of the centre is to assist District Municipalities (DM) when incidents occur.

This includes the identification of role players and functions of support mechanisms. The centre also provides relief, collects information and reports from District Municipalities, details of an incident and prepares reports.

The Centre has also recently transferred grant funding to the district municipalities for the establishment of their centres, advisory forums and the preparation of their disaster management plans. Four of the ten district centres have dedicated operational disaster management centres. Six district municipalities are in the process of establishing their centres and should soon be fully operational.

5.7.2.3 THE PROVINCIAL DISASTER MANAGEMENT ADVISORY FORUM (PDMAF)

The Disaster Management Act 37 (1) states that *“the Member of Executive Committee (MEC) responsible for disaster management in a province may establish a provincial disaster management advisory forum consisting of the head of the disaster management centre and other senior managers from different department”*. KwaZulu-Natal has established a Disaster Management Advisory Forum which reports through the MEC to Cabinet and convenes quarterly meetings.

The NDMF stipulates that the absence of such a body will greatly impede the functioning of disaster management in the provinces, and that it is strongly recommended that each province considers the establishment of a PDMAF.

5.7.2.4 THE PROVINCIAL INTERDEPARTMENTAL COMMITTEE ON DISASTER MANAGEMENT (PIDMC)

The PIDMC is less of a legal obligation than the PDMAF. But, as in the case of the NIDMC, the role of the provincial IDMC is to provide it with an internal disaster management committee consisting of all the government departments that will serve on the PDMAF (or similar structure). The roles and responsibilities of the PIDMC are similar to the NIDMC but as it pertain to the provincial sphere of government.

5.8SUMMARY

The focus of this chapter was on the South African disaster management legislative and structural reforms in the post apartheid context, up to the promulgation of the Disaster Management Act. It has clearly indicated the link

between development and disasters in such a way that the impact of disasters might result in increasing the existing infrastructural development challenges in the country by building houses.

This chapter discussed hazards, disasters that occur regularly in South Africa as well as the level and rate of vulnerability. It concluded with conditions in the informal settlements in South Africa and the use of technology in Africa through remote sensing as a valid disaster response system. In the conclusion of this chapter,

CHAPTER 6

RESEARCH DESIGN

6.1 INTRODUCTION

In this chapter, the research methodology for the collection and organising of appropriate research data for this study is discussed. The research methodology used in this study begins with the research design which dwells on the plan used to conduct the research. Due to the fact that the research focuses on numeric and textual data, orientations of the research design which are both qualitative and quantitative research strategies (case study and survey) are discussed.

The next part of the chapter looks at the different types of literature on the chosen research methodology and other methods of data collection. Probability and non-probability sampling is discussed in this chapter as the researcher used both survey and case study strategies. Sampling procedures (probability and non-probability) are followed, with structured questionnaire which was used. Piloting is also dealt with and the chapter concludes with the exploration of ethical considerations for the study.

6.2 RESEARCH AIM AND PROBLEM

McDaniel and Gates (1998:25) argue that the research process begins with the recognition of a problem or opportunity. According to Sekaran (1992:4) research can be described as a systematic and organised effort to investigate a specific problem that requires a solution. This means that the first step identifies a problem and clarifies the aims and objectives (research questions) of the study that the researcher intends to achieve. The aim of this study was to establish disaster management strategies in response to informal settlements that are affected by fires and floods in Foreman and Kennedy Road settlements within the eThekweni Municipality.

6.3 RESEARCH OBJECTIVES

The following objectives were identified as relevant to the study:

- Investigate and define disaster management strategies within the international and South African context in connection with planning and management of disasters.
- Investigate the disaster management components (prevention, preparedness, mitigation, recovery, response, rehabilitation and disaster risk reduction) within eThekweni Municipality, with particular reference to their implementation.
- Investigate funding and socio-economic implications of the disasters within eThekweni municipality's informal settlements.
- Provide recommendations for strategic direction and improvements in reducing disaster risks.

6.4 QUALITATIVE RESEARCH DESIGNS

This study used a qualitative approach as a means of data analysis, to study Municipal officials who are working directly or indirectly on disaster management as well as on communities who are susceptible to fast-onset disasters in their natural setting were interviewed. An interview can be conducted individually (individual depth interview) or in groups. According to Lewis *et al.* (2008:282), participant observation is qualitative and derives from the work of social anthropology earlier in the 20th century. In this study semi-structured interviews were conducted with eThekweni Municipality officials and interviewer-administered questionnaires were used for the informal settlements victims of disasters.

Qualitative data are collected to know more about that which cannot be directly observed and measured such as feelings, thoughts and intentions. It is also used to identify methodological problems which can be rectified before quantitative studies are undertaken. Qualitative research methods are less structured but are more intensive. The data has more depth and richness and provides more insights and perceptions. According to Lewis *et al.* (2007:145), a qualitative research method is used predominantly as a synonym for any data collection (such as an interview) or data analysis procedure (such as categorising data) that generates or uses non-

numerical data. This study used semi-structured interviews directed at the eThekweni Municipality officials as authoritarian sources on disaster or emergency occurrence.

6.5 QUANTITATIVE RESEARCH DESIGNS

Quantitative research is described as the collection of numerical data and exhibiting a view of the relationship between theory and research (Bryman, 2004:3). Quantitative research is associated with close-ended questions. The data analysis proceeds by using statistics, tables, charts and graphs in relation to the hypothesis. Furthermore, quantitative research is predominantly used as a synonym for any data collection technique (such as a questionnaire) or data analysis procedure (such as graphs or statistics) that generates or uses numerical data. This study used structured questionnaires distributed to respondents in the Foreman and Kennedy Road informal settlements.

Questionnaires were self-administered to a population size of 220 respondents from which a sample size of 140 respondents completed the questionnaires, thereby generating a response rate of 63.6%. Interviews were also conducted with municipality officials involved in disaster management. There are two categories of data collected that include biographical profiles (age, gender, marital status, education, occupation, income, number of children, race and tenure) and disaster management strategies (preparedness, mitigation, response, recovery and rehabilitation). Data was analysed in the form of frequency distribution and cross-tabulation tables.

6.6 SURVEY METHODS

Lewis *et al.* (2007:135) mention the following research strategies: experiment; survey; case study; action research; grounded theory; ethnography; and archival research. This study is based on both survey and case study research strategies, as Lewis *et al.* (2007:135) state that these strategies should not be thought of as being mutually exclusive. For example, it is quite possible to use the survey strategy as part of a case study.

The study used the survey method as a tool for data collection. Gates and McDaniel (1998:155) state that survey research entails the use of a questionnaire to

gather facts, opinions, and attitudes and it is the most popular way to gather primary data. Survey research strategy involves the structured collection of data from a sizeable population. Although the term 'survey' is often used to describe the collection of data using questionnaires, it includes other techniques such as structured observation and structured interviews (Lewis *et al.* 2007:138).

According to Babie *et al.* (2004:232) surveys may be:

- Descriptive and explanatory,
- Used in studies that has individual people as the units of analysis, and
- Used by social scientists interested in collecting original data for describing a population too large to observe directly.

Data collected using a survey strategy can be used to suggest possible reasons for particular relationships between variables and to produce models of these relationships (Lewis *et al.* 2007:138). For this study, its main focus was to create strategies for disaster management within the eThekweni Municipality informal settlements. Babie *et al.* (2004:231) confirms that one of the important factors that contribute to the popularity of surveys relates to advances in computer technology, which has made the analysis of large data sets possible.

This study used probability sampling whereby a survey was conducted to 220 households in the Forman and Kennedy Road informal settlements. The independent variable was disaster management and the independent variables were disaster preparedness, mitigation, response, recovery and rehabilitation. The researcher collected data in the form of a questionnaire with a population size of 220 respondents from which a sample size of 140 was collected.

6.7 CASE STUDY

According to Babie *et al.* (2002:281), a case study is an intensive investigation of a single unit. The single unit in this case is Foreman and Kennedy Road informal settlements within eThekweni Municipality. Robson (2002:78) defines a case study as a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence. Sarantakos (1997:191) defines a case study as an empirical inquiry that

investigates a contemporary phenomenon within its real life context when the boundaries between the phenomenon and context are not clearly evident and in which multiple sources of evidence are used. According to Babie *et al.* (2002:281), a case study is an intensive investigation of a single unit. In this study Foreman and Kennedy informal settlements in the eThekweni Municipality constitute the unit of study.

Babie *et al.* (2004:281) define these types of case studies as studies of organisations and institutions where the focus is on a firm, company, corporation or trade unions. Welman and Kruger (1999:21), assert that case study helps to investigate the dynamics of some single-bounded system typically of a social nature such as a family, group, a community, participants in a project or institution.

6.8 LITERATURE REVIEW

The main purpose of the literature review is to help a researcher to develop a good understanding and insight into relevant previous studies and the trends that emerge in a particular field of study (Lewis *et al.*, 2008:57). According to Lewis *et al.* (2008:57), reviewing the literature critically provides the foundation on which research is built. A literature review discusses published information in a particular subject area, and sometimes information in a particular area within a certain time period. A literature review can be a simple summary of the sources of information. It usually has an organisational pattern and combines both summary and synthesis. A summary is a recap of the important information of the source, whilst a synthesis is a re-organisation, or a reshuffling of that information (Lewis *et al.*, 2008:57). It might provide a new interpretation of old material or combine new with old interpretations. Additionally the intellectual progression of the field, including major debates may be traced (Lewis *et al.*, 2008:57). This study identified and discussed literature on disaster management evolving from pre to post-apartheid South Africa until the enactment of the Disaster Management Act 2002, National Disaster Management Framework of 2005. Major debates on the literature have been highlighted the conceptualisation of disaster management, its strategies as well as the perception of communities and stakeholders who are at risk.

Moreover, literature reviews are known to provide a researcher with a handy guide to a particular topic. It is useful for professionals to keep them abreast with what is currently discussed and debated in the field. In this study, secondary data sources such as journals, book chapters, scientific reports, newspaper articles, unpublished dissertations and technical reports were consulted and critically analysed.

6.9 OBSERVATION

This study collected primary data through observation which is a somewhat neglected aspect of research in other studies. Lewis *et al.* (2008:282) argue that observation can be rewarding and enlightening to pursue and add considerably to the richness of the researcher's data. It involves the systematic observation, recording, description, analysis and interpretation of people's behaviour. The researcher can play one of two roles while gathering field observation data which are non-participant observer and participant observer.

The researcher in this study played the part of a non-participant observer. This study was also collected by observation and was greatly enhanced by the opportunity to observe the conditions before and after burning down of shacks in the Foreman and Kennedy Road informal settlements. The researcher spent a great deal sitting with shack settlements dwellers with the aim to obtain a thorough understanding their knowledge on preparedness, mitigation, response, recovery and rehabilitation. Sampled shacks were visited early in the mornings and in the afternoons during the weekends.

6.10 SEMI-STRUCTURED INTERVIEW

According to Kahn and Cannell (1957:11) an interview is a purposeful discussion between two or more people. The use of interviews can help the researcher to gather valid and reliable data that are relevant to the research question(s) and objectives (Kahn *et al.*, 1957:11). The semi-structured interview generally starts with a few specific questions and then follows the individual's tangents of thought with interviewer probes. Lewis *et al.* (2008:312) argue that in semi-structured interviews the researcher will have a list of themes and questions to be covered, although these may vary from interview to interview. In the case of this

study, the researcher used semi-structured interviews with eThekweni Municipality officials and questions varied because of the task and roles that they are performing are not the same (for example, the case of the councillor and disaster management officer). eThekweni Municipality official's research questions were formulated as follows:

- i. What are the current disaster preparedness strategies or programmes in place for Foreman and Kennedy Road informal settlements?
- ii. What are the current disaster mitigation strategies or programmes in place for Foreman and Kennedy Road informal settlements?
- iii. Are there any disaster response, recover and rehabilitation plans in place?

The Ward 25 councillor questions were premised to the aforementioned questions but emphasised on the effectiveness and efficiency of eThekweni Municipality's strategies and programmes during implementation periods.

6.11 SAMPLING PROCEDURE AND DESCRIPTION OF THE SAMPLE

According to Anderson, Sweeney and Williams (2006:259), a sample means providing an estimate of a population mean, and a sample proportion provides an estimate of a population proportion. Gates and McDaniel (1998:33) define a sample as a subset from a larger population and the authors further argue that is the only realistic way to obtain the desired data. As it is impractical to collect data from the entire population, sampling saves the researcher costs and time. Questionnaires are used to collect data from the sampled population but only a sample size of the data collected are analysed. Henry (1990:24) argues that using sampling makes possible a higher overall accuracy than a census.

There are two major types of sampling designs (both used in this study) which are probability and non-probability sampling which can be linked to research methods (qualitative and quantitative).

6.11.1 SAMPLING FOR QUANTITATIVE RESEARCH METHOD

Quantitative researchers tend to use a type of sampling based on theories of probability derived from numbers, standardised data, diagrams and statistics. Quantitative researchers use a probability sample framework because they often

associated with survey and experimental research strategies. There are five most appropriate sampling techniques to select a probability sample which are simple random, systematic, stratified (of the study focuses on) cluster and multi-stage. This thesis focussed on the stratified random sampling which is a modification of random sampling in which a research divides the population into two or more relevant and significant strata based on one or number of attributes (Lewis *et al.* 2008:215-223).

6.11.2 SAMPLING FOR QUALITATIVE RESEARCH

Many research situations often make probability sampling impossible or inappropriate. Non-probability sampling techniques are often the most appropriate (Babie *et al.*, 2004:166). Qualitative research involves non-probability sampling techniques, where little attempt is made to generate a representative sample. Sample sizes for qualitative research vary by technique, but are generally small (Babie *et al.*, 2004:166). The purpose of qualitative research is based on “*researcher immersion in the phenomenon to be studied*”, gathering of data with a detailed description of events, situations and interaction between people and things, providing depth and detail. The researcher intended to elicit disaster management strategies in place pre and post disaster events in the Foreman and Kennedy Road informal settlements. The purposive sampling technique was used which enabled the researcher to use judgement to select cases (220) that will best enable the research to answer the research questions to meet the researcher’s objectives.

6.11.3 DESCRIPTION OF THE SAMPLE

The total of sampled population within Foreman and Kennedy Road informal settlements were 220.

6.10.4 SAMPLING FRAME

The random selection of 220 households for inclusion in the study represented the selection of 60% of the shacks under survey. The additional 22 households (victims) ($\pm 2\%$) were selected to provide for any possible dropout that might occur during the project. Households directly affected by disasters in the settlement were included in the sample, with no exclusion criteria being used. A map for the informal settlement, which was obtained from the eThekweni Municipality, was

used. Every third household was selected for inclusion in the sample and shack owner (breadwinner) was requested to answer research questions.

The composition of the sample comprises the biographical variables of the 140 respondents of the Foreman and Kennedy Road informal settlements, who responded to the questionnaires. A response rate achieved was 63.6% and it was sufficient to test the validity and reliability of the results.

This study conducted semi-structured interviews with key stakeholders in the Disaster Management Department of the eThekweni Municipality such as the Safety and Security Cluster (fire and disaster management departments' officials), housing, electricity, ward 25 councillors, and the chairperson of the housing and infrastructure committee (shown in Table 6.2).

TABLE 6.2: Sample Size

Deputy City Manager (Safety and Security Cluster)	1
Manager: Disaster Management	1
Manager: Fire services	1
Senior Manager: Housing (planning)	1
Senior Manager: Electricity Revenue Protection Division	1
Disaster Management Officer	1
Fire Safety Officer	1
Chairperson of the Sub-committee: Housing	1
Chairperson of the Sub-committee: Infrastructure	1
Councillor (ward 25)	1
TOTAL	10

6.12 DATA COLLECTION

The questionnaire was self-administered in the Foreman and Kennedy Road informal settlements. The data was collected over a four week period. Questionnaires were disseminated to 220 people and a response rate achieved was 63.6% and which was sufficient to support the validity and reliability of the results. The total number of questionnaires collected was 140 and there were no errors. The questionnaires were completed with the assistance of four trained fieldworkers who

spoke the various indigenous languages of South Africa and who were recruited from among Durban University of Technology postgraduate students.

Furthermore, semi-structured interviews were undertaken with to ten eThekweni Municipality disaster management stakeholders mentioned in Figure 6.2 above.

6.12.1 QUESTIONNAIRE STRUCTURE AND DESIGN

The questionnaires in this study were designed for the communities who were the victims of disasters or emergencies. Gates *et al.* (1998:265) define a questionnaire as a set of questions designed to generate the data necessary for accomplishing the objectives of the research project. Lewis *et al.* (2008:355) defines a questionnaire as a general term to include all techniques of data collection in which each person is asked to respond to the same set of questions in a pre-determined order. Because each person (respondent) is asked the same set of questions, it provides an efficient way of collecting responses from a large sample for quantitative analysis. Gates *et al.* (1998:265) list three roles of questionnaires which are as follows:

- i. It formalises the schedule for collecting information from respondents,
- ii. It provides the standardisation and uniformity in the data-gathering process, and
- iii. It plays a critical role in the data-collection process.

Questionnaires play a crucial role as it provides factual information as final output to management for decision-making.

The interviewer-administered questionnaires were used in this study whereby the interviewer recorded on the basis of each respondent's exposure to disasters. In this study, the researcher followed the questionnaire development process when designing the questionnaire such as determining survey objectives, resources, and constraints; determining data collection method(s); determines question response format; question wording; establishing questionnaire flow and layout; evaluating the

questionnaire and layout; obtaining approval from all relevant parties; pretesting and revising; preparing the final copy and implementation.

6.12.2 DESCRIPTION AND PURPOSE OF A QUESTIONNAIRE

The questionnaires for this study were structured according to the specific research objectives. The questionnaire was distributed to the victims of disasters and emergencies in Foreman and Kennedy Road informal settlements (within eThekweni Municipality) and it comprised six sections which are as follows:

SECTION A: Biographical data

SECTION B: Disaster preparedness

SECTION C: Disaster mitigation

SECTION D: Disaster recovery, response and rehabilitation.

SECTION E: Financial implications

SECTION F: Future expectations

The questionnaire also comprised of one open-ended question which allowed the respondents to include any comments on disaster management expectations that the questionnaire did not accommodate.

6.13 PILOTING

Piloting plays an important role in research; especially if the researcher uses questionnaires for data collection. According to Lewis *et al.* (2008:386), the purpose of the pilot test is to refine the questionnaire so that respondents will have no problems in answering the questions and there will be no problems in recording the data. This study used ten questionnaires as a pilot and its main intention was to obtain some assessment of the questions validity and the likely reliability of the data that was considered. The questionnaire was pilot-tested on households previously affected by disasters, to which it was administered during one weekend between the age levels of 18-24 and 35-44. Furthermore, questionnaires were divided equally into male and female.

As part of the pilot, the researcher checked each completed pilot questionnaire from the respondents from Foreman and Kennedy Road informal settlements to ensure that respondents have had no problems understanding or answering

questions. For self-administered questionnaires, additional information about problems can be obtained by giving respondents a further short questionnaire (Bell, 2005:16). In this study, the researcher identified coding errors in section D (Disaster, response and rehabilitation) of the questionnaire.

Lewis *et al.* (2008:187) suggest that interviewer-administered questionnaires need to be tested with the respondents for all these points other than layout. In this study, questions wording was tested with the aim to see whether questions were understood by all classes of respondents.

6.14 DATA ANALYSIS

The questionnaire was analysed statistically using SPSS. Statistical analyses are the principal tools for extracting, highlighting, and organising information for developing theories, testing hypothesis and drawing conclusions from current investigations (Rosenberg and Daly, 1993:54). In this thesis, descriptive and inferential statistics were used as a measure for the chosen sample of respondents.

6.14.1 DESCRIPTIVE STATISTICS

Descriptive statistics are those statistics or statistical procedures that summarise and or describe the characteristics of a sample of scores (Graziano and Rawlin, 2000:12). Descriptive and inferential statistics were used for data analysis and interpretation. Under the ambit of descriptive statistics, frequencies were presented in the form of a bar chart. Tabular and graphical presentation of data which includes bar, line and pie charts, and cross-tabulation tables were used.

6.14.2 FREQUENCY AND PERCENTAGE

Frequencies are the number of objects (for example, participants in a study) that fall into a specified category. The frequencies for each question, as well as for each biographical variable in the questionnaire, namely, age, gender, marital status, education, occupation males and females, income, number of children, number of dependants, race and tenure, were depicted using tabular and graphical representation.

The frequency counts can be converted to percentages which are helpful in interpreting the relative numbers of observations in each category (Lenham, 19991:11). A percentage distribution may then be formed by multiplying each relative frequency or proportion by 100. Berenson and Levine (1996:2) state that the use of a percentage distribution becomes essential whenever one batch of data is being compared with another, especially when the numbers of observation in each batch differ.

6.14.3 INFERENCEAL STATISTICS

If the aim is to determine the relationship between two variables, differences in a variable among different subgroups, how several independent variables might explain the dependant variable, then one apply inferential statistics in order to determine this information (Sekaran, 1992:25). The inferential statistics components were conducted in this study including correlation and chi-square test. According to Melville and Goddard (1968:78), the chi-square is used for dependence of two qualitative variables. Chi-square is used when the data captured is qualitative or discrete and they do not assume anything about the underlying distribution of the population.

6.15 ETHICAL CONSIDERATIONS

Ethical issues are critical for any research study as they are required during the planning phase. The researcher sought access to organisations and to individuals during planning, data collection, analysis and reporting phases of the study. According to Lewis *et al.* (2008:178), ethics refers to the appropriateness of the researcher's behaviour in relation to the rights of those who become the subjects. Blumberg, Cooper and Schindler (2005:124) define ethics as the 'moral principles, norms or standards of behaviour that guide moral choices about our behaviour and our relationships with others'.

Cooper *et al.* (2005:124) further state that research ethics therefore relates to questions about how the researcher formulates and clarifies the research topic, design research and gain access, collect data, process and store data, analyse data and write up research findings in a moral responsible way. This study on disaster

management considered research ethics. The following key ethical issues across the stages and duration of the study was followed:

- i. Voluntary participation and the right to withdraw partially or completely from the study.
- ii. The interviewees had the right to privacy and were not pressurised or coerced into participating.
- iii. Effects on participants in order to avoid embarrassment, stress, discomfort, pain and harm.

6.16 SUMMARY

This chapter dealt with the research methodology as well as the research design. Both qualitative and quantitative methods were used in this study. The study further focussed on both survey and case study research strategies as the methodology used. Disaster management in the informal settlements cannot be truthfully and correctly represented. This chapter applied survey and case study comprehensive research strategies which was the most adequate because it allowed an investigation to retain the holistic and meaningful characteristics of real events.

Sampling types, data collection methods including interviews used and data analysis techniques used were explained and were justified for their use. The chapter concluded by revealing the importance of piloting and ethical issues that were considered.

CHAPTER 7

DATA ANALYSIS

7.1 INTRODUCTION

This chapter focuses on the collation, summarisation, analysis and presentation of data. Statistics represent an important tool in transforming masses of raw data into meaningful, useful and usable information for decision-making by organisations. It is also a decision support tool in that it supports the decision process by strengthening the quantifiable basis from which to make a well-informed decision.

The columns labelled either Frequency or Count indicate the number of respondents that selected the particular option for the question. The population size of 220 respondents was selected. A sample size of 140 respondents completed the interviewer-administered questionnaires thereby generating a response rate of 63.6%. Thereafter, each of the biographical variables of the sample is graphically depicted in Table 7.1.

TABLE: 7.1 COMPOSITION OF SAMPLE

VARIABLE	FREQUENCY	PERCENT
AGE		
18-24	37	26.4
25-34	56	40.0
35-44	28	20.0
45+	19	13.6
	140	100
GENDER		
Male	60	42.9
Female	80	57.1
TOTAL	140	100
MARITAL STATUS		
Single	124	88.6
Married	12	8.6
Divorced	2	1.4
Widowed	2	1.4
TOTAL	140	100
EDUCATION		
Below matric	115	82.1
Matriculation	23	16.4
Diploma	1	0.7
Degree	1	0.7
TOTAL	140	100
RACE		
Black	137	97.9
White	2	1.4
Other	1	0.7
TOTAL	140	100
TENURE		
Less than 1 year	17	12.1
0-5 years	53	37.9
6-10 years	36	25.7
11-15 years	22	15.7
20 and above	12	8.6
TOTAL	140	100
OCCUPATION MALES		
Employment Full-time	9	6.4
Self-employed	4	2.9
Part-time/Contract/Temporary	18	12.9
Unemployed	105	75.0
Pensioner	2	1.4
Student/Scholar	2	1.4
TOTAL	140	100
OCCUPATION FEMALES		
Employment Full-time	8	5.7
Self-employed	2	1.4
Part-time/Contract/Temporary	22	15.7
Unemployed	99	70.7

Pensioner	6	4.3
Student/Scholar	3	2.1
TOTAL	140	100
INCOME		
None	47	33.6
R500-R1000	73	52.1
R1001-R1500	9	6.4
R1501-R2000	1	0.7
R2001-R2500	6	4.3
Over R3000	4	2.9
TOTAL	140	100
NUMBER OF CHILDREN		
0	26	18.6
1	33	23.6
2	34	24.3
3	18	12.9
4	12	8.6
5+	17	12.1
TOTAL	140	100
NUMBER OF DEPENDENTS		
0	33	23.6
1	23	16.4
2	17	12.1
3	17	12.1
4	12	8.6
5+	38	27.1
TOTAL	140	100

7.2 BIOGRAPHICAL ANALYSIS

The following section contains statistical analysis pertaining to personal details of the respondents relating to age, gender, marital status, education, occupation, income, number of children, number of dependants, race and tenure and further correlate it with other variables. Thereafter, each of the biographical variables of the sample is graphically depicted and discussed.

FIGURE 7.1: AGE

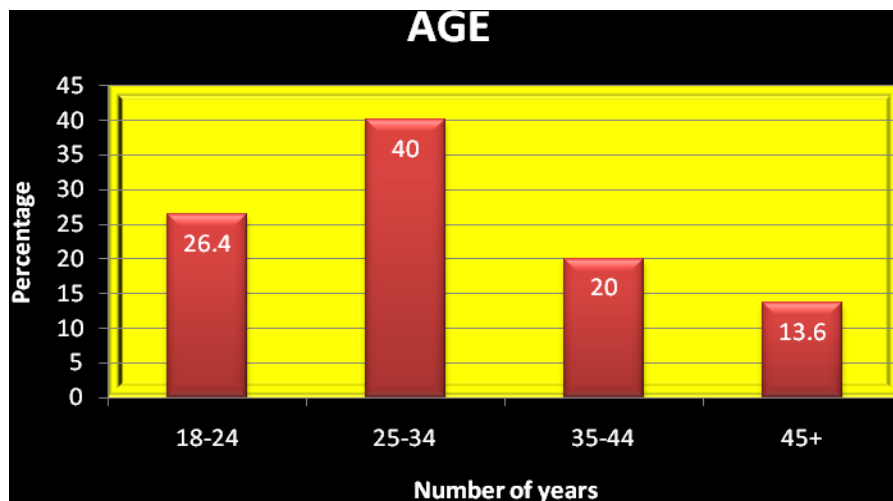


Figure 7.1 reflects the age distribution of the respondents. Figure 7.1 shows that 26.4% of the respondents were between 18-24 years, 40% were between 25 and 34 years and 20% were between 35 and 44 years. The findings of the study show the difference in percentage between the respondents who are at 45 and above and those who are at the ages between 25 to 34 years respectively.

FIGURE 7.2: GENDER

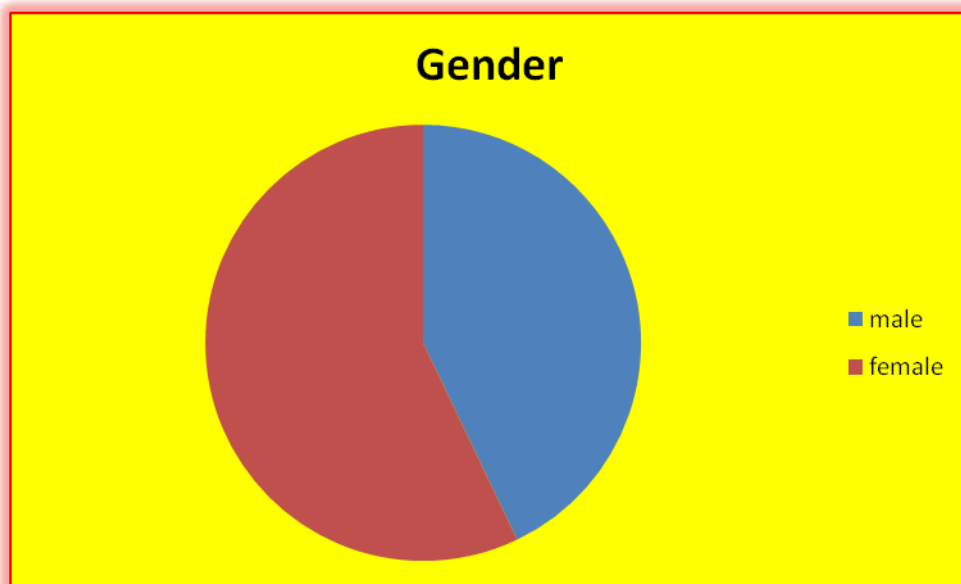


Figure 7.2 indicates that, of the total sample 42.9% were male and 57.1% were female respectively. This percentage roughly corresponds to the gender profile of the population as a whole in the two areas surveyed.

FIGURE 7.3: MARITAL STATUS

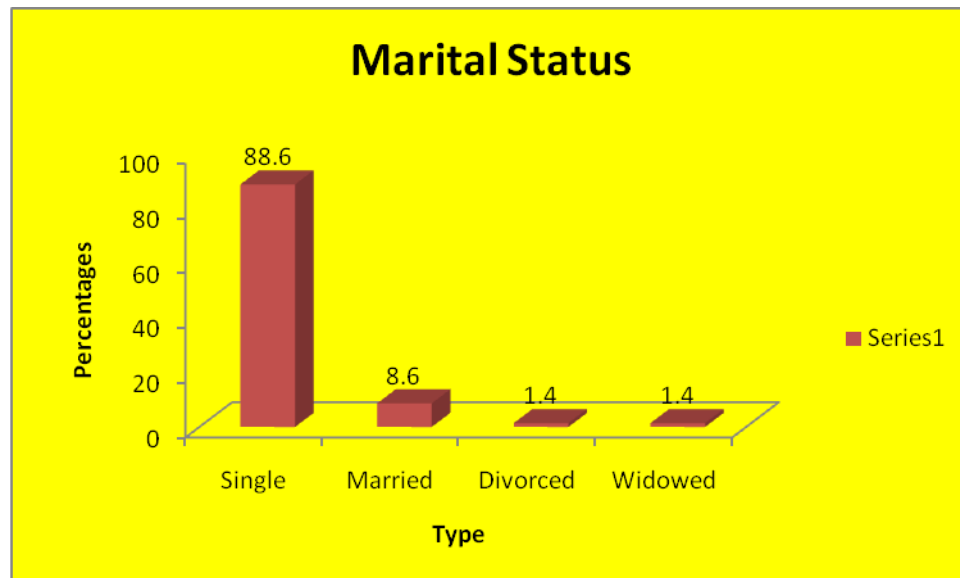
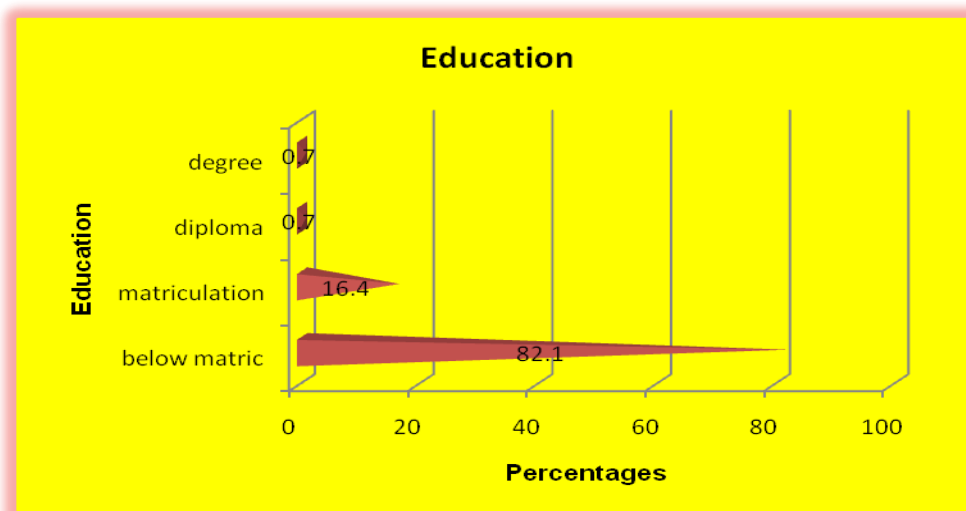


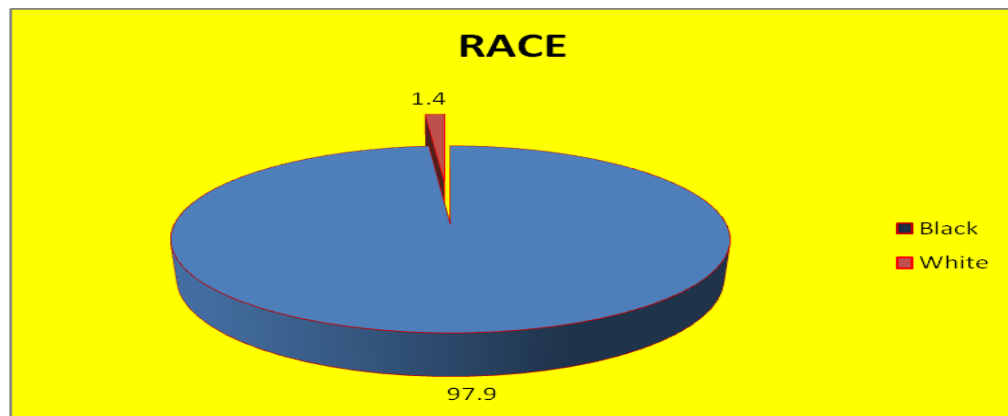
Figure 7.3 shows a high percentage of respondents (88.6) who are single, while 8.6% were married and 1.4% are either divorced or widowed respectively.

FIGURE 7.4: EDUCATION



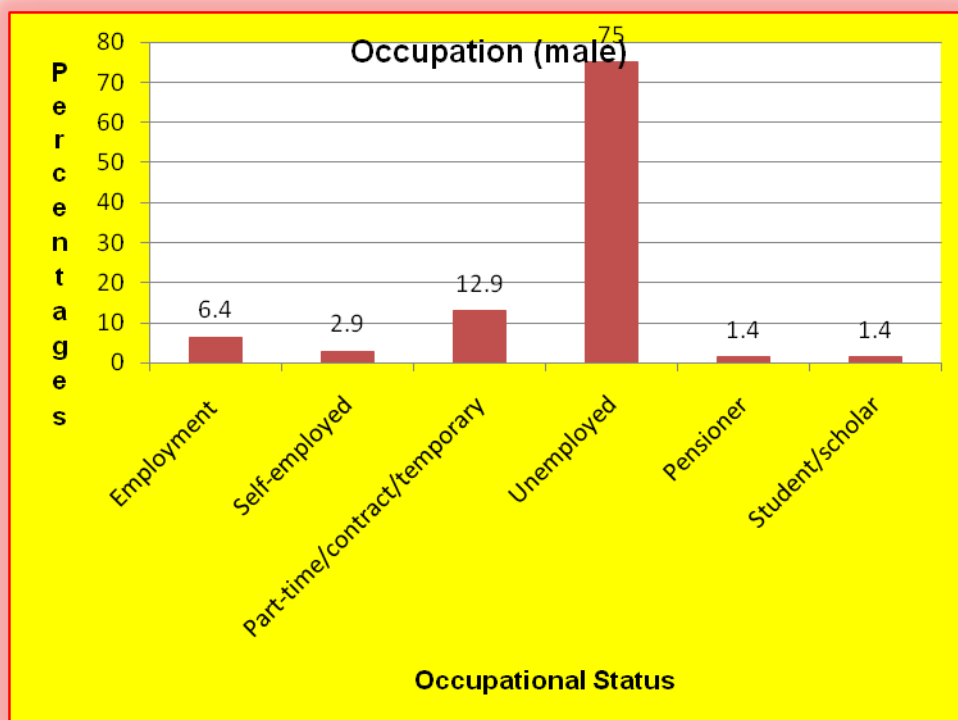
The illiteracy rate to Foreman and Kennedy Road informal settlements are very high with a total sample of 82.1% of respondents below matric with only 16.4% having a matric level qualification.

FIGURE 7.5: RACE



The results in Figure 8.5 indicate that 97.9% of respondents were Black and 1.4% Whites.

Figure 7.6: OCCUPATION (MALES)



The results in Figure 7.6 reflect that 6.4% of respondents are employed full-time while 2.9% are either self-employed and 12.9% are part-time, contract or temporary employment.

TABLE 7.2: Relationship between income and occupation (males)

Occupation Males	Income												Total	
	0		R500- R1000		R1001- R1500		R1501- R2000		R2001- R2500		Over R3000			
	N	%	N	%	N	%	n	%	n	%	N	%	N	%
Employment Full-time	0	0.0%	1	0.7%	3	2.1%	0	0.0%	2	1.4%	3	2.1%	9	6.4%
Self-employed	1	0.7%	2	1.4%	1	0.7%	0	0.0%	0	0.0%	0	0.0%	4	2.9%
Part-time/ Contract/ Temporary	1	0.7%	13	9.3%	1	0.7%	0	0.0%	3	2.1%	0	0.0%	18	12.9%
Unemployed	44	31.4%	55	39.3%	3	2.1%	1	0.7%	1	0.7%	1	0.7%	105	75.0%
Pensioner	1	0.7%	1	0.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	1.4%
Student/Scholar	0	0.0%	1	0.7%	1	0.7%	0	0.0%	0	0.0%	0	0.0%	2	1.4%
Total	47	33.6%	73	52.1%	9	6.4%	1	0.7%	6	4.3%	4	2.9%	140	100.0%
Pearson Chi-square = 82.973, df=25, p=0.000														

**p<0.01

Table 7.2 reflects the cross-tabulation between income and the occupation of males. A total of 33.6% had no income. Pearson's chi-square probability value (p), as per Table 7.2 whereby p= 0.000 is less than (<) 0.05, indicating that there is a significant difference in the proportion of respondents on the income and occupation levels of males. The relationship between income and occupation of males is significant at the 95% level (p<0.05).

Table 7.2 shows that a total percentage of 2.1 males are employed full-time and has an income of over R3000 per month. Figure 7.2 indicates that 1.4% of respondents who are self-employed have an income between R500-R1000 per month. A high percentage of 9.3 of part-time employees either on contract or temporary position have an income of between R500-R1000 per month. A disproportionately high percentage of 39.3% of unemployed respondents has an income of between R500-R1000 per month.

Figure 7.7: Occupation (females)

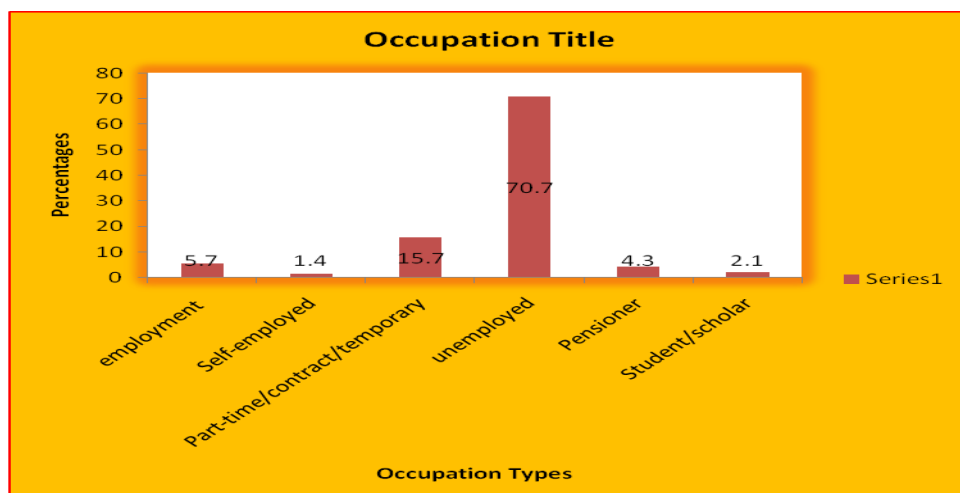


Figure 7.7 indicates that 5.7% are employed full time, 1.4% self-employed, 15.7% part-time or contract or temporary, 70% unemployed, 4.3% pensioners and 2.1 are students/scholars respectively.

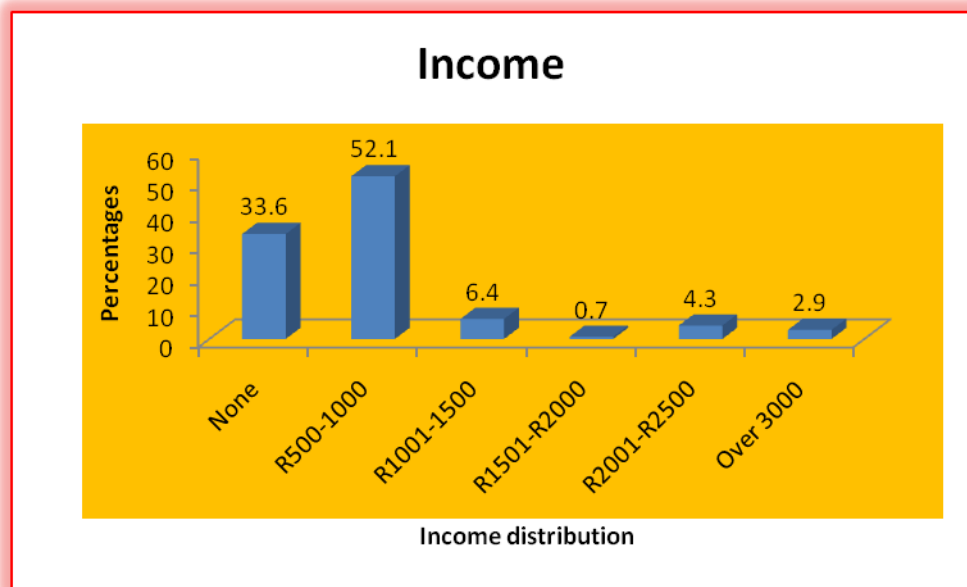
Table 7.3: Relationship between income and the occupation of females

Occupation Females	Income												Total	
	0		R500- R1000		R1001- R1500		R1501- R2000		R2001- R2500		Over R3000			
	N	%	N	%	N	%	n	%	N	%	n	%	N	%
Employment Full-time	1	0.7%	5	3.6%	2	1.4%	0	0.0%	0	0.0%	0	0.0%	8	5.7%
Self-employed	0	0.00%	2	1.4%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	1.4%
Part-time/ Contract/ Temporary	2	1.4%	19	13.6%	1	0.7%	0	0.0%	0	0.0%	0	0.0%	22	15.7%
Unemployed	42	30.0%	40	28.6%	6	4.3%	1	0.7%	6	4.3%	4	2.9%	99	70.7%
Pensioner	1	0.7%	5	3.6%	0	0.0%	0	0.0%	0	.0%	0	0.0%	6	4.3%
Student/Scholar	1	0.7%	2	1.4%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	3	2.1%
Total	47	33.6%	73	52.1%	9	6.4%	1	0.7%	6	4.3%	4	2.9%	140	100.0%
Pearson Chi-square = 28.017, df=25, p=0.307														

Table 7.3 indicates the cross-tabulation between income and the occupation of females. A total of 52.1% earn between R500 and R1000. Of these, 28.6% were

temporary/unemployed. The relationship between income and occupation of females is not significant at the 95% level ($p>0.05$).

FIGURE 7.8: INCOME



The sample composition by income is reflected in Table 7.8 of the total sample 33.6% have no income, 52.1% were between R500-R1000, 6.4% were between R1001- R1500, 4.3% were R2001-R2500 and 2.9% were over R3000. The high percentage of respondents who had no income corresponds to the high unemployment rate of male and female at an average of 72.75%.

Table 7.4: Relationship between income and reasons to migrate to Durban

		Income														Chi-square	df	P
		0		R500-R1000		R1001-R1500		R1501-R2000		R2001-R2500		Over R3000		Total				
N	%	N	%	n	%	N	%	N	%	n	%	N	%					
Live close to or with family	Yes	4	2.9%	14	10.0%	1	0.7%	0	0.0%	0	0.0%	0	0.0%	19	13.6%	4.756	5	0.446
	No	43	30.7%	59	42.1%	8	5.7%	1	.7%	6	4.3%	4	2.9%	121	86.4%			
Job opportunities	Yes	41	29.3%	59	42.1%	9	6.4%	1	0.7%	6	4.3%	3	2.1%	119	85.0%	4.321	5	0.504
	No	6	4.3%	14	10.0%	0	0.0%	0	0.0%	0	0.0%	1	0.7%	21	15.0%			
Safer environment	Yes	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	.0%			
	No	47	33.6%	73	52.1%	9	6.4%	1	0.7%	6	4.3%	4	2.9%	140	100.0 %			
Better quality education	Yes	4	2.9%	2	1.4%	0	0.0%	1	0.7%	1	.7%	0	0.0%	8	5.7%	20.505	5	0.001*
	No	43	30.7%	71	50.7%	9	6.4%	0	0.0%	5	3.6%	4	2.9%	132	94.3%			
Provision of housing	Yes	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%			
	No	47	33.6%	73	52.1%	9	6.4%	1	0.7%	6	4.3%	4	2.9%	140	100.0 %			
Provision of water & sanitation	Yes	1	0.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	0.7%	1.993	5	0.850
	No	46	32.9%	73	52.1%	9	6.4%	1	0.7%	6	4.3%	4	2.9%	139	99.3%			

P<*0.001

Table 7.4 indicates that there exists significant correlation between income and better quality education at the 95% level of significance. Furthermore, Table 7.4 indicates no significant difference between income and job opportunities.

FIGURE 7.9: NUMBER OF CHILDREN

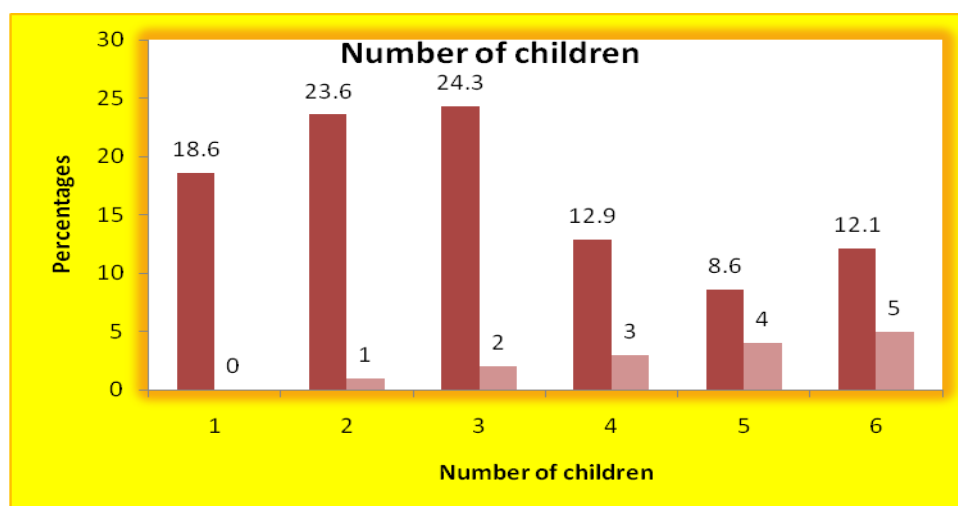


Table 7.9 indicates that 18.6% of respondents live without children, 23,6% live with 1 child, 24,3% live with 2 children, 12.9% live with 3 children, 8.6% live with 4 children and 12.1% live with 5 or more children.

FIGURE 7.10: TENURE

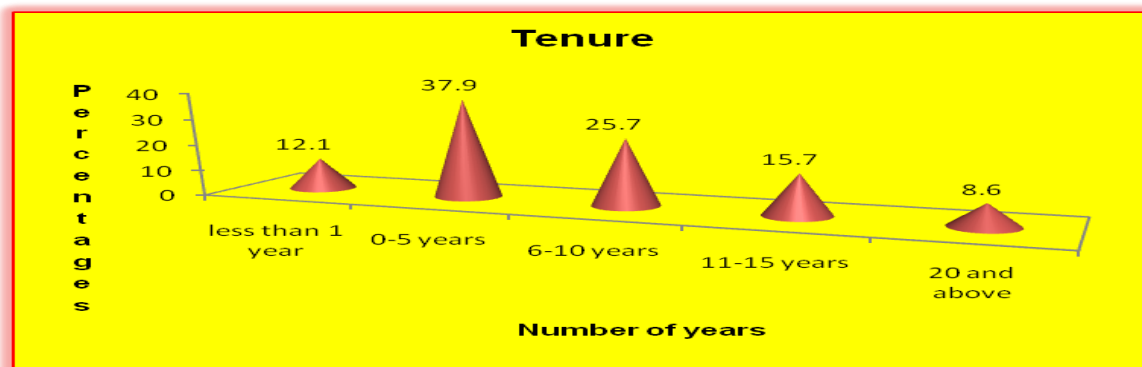


Table 7.10 indicates that 12.1% have stayed in these informal settlements less than a year, 0-5 years (37.9%), 6-10 years (25.7%), 11-15 years (15.7%) and 20 and above (8.6%).

Table 7.5: Relationship between tenure and reason to migrate to stay here

		Tenure												Chi-square	Df	P
		Less than 1 year		0-5 years		6-10 years		11-15 years		20 and above		Total				
		N	%	N	%	n	%	N	%	N	%	N	%			
Live close to or with family	Yes	4	2.9%	7	5.0%	3	2.1%	3	2.1%	2	1.4%	19	13.6%	2.383	4	0.666
	No	13	9.3%	46	32.9%	33	23.6%	19	13.6%	10	7.1%	121	86.4%			
Job opportunities	Yes	14	10.0%	43	30.7%	32	22.9%	20	14.3%	10	7.1%	119	85.0%	1.771	4	0.778
	No	3	2.1%	10	7.1%	4	2.9%	2	1.4%	2	1.4%	21	15.0%			
Safer environment	Yes	0	.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%			
	No	17	12.1%	53	37.9%	36	25.7%	22	15.7%	12	8.6%	140	100.0%			
Better quality education	Yes	0	0.0%	3	2.1%	1	0.7%	4	2.9%	0	0.0%	8	5.7%	8.681	4	0.070
	No	17	12.1%	50	35.7%	35	25.0%	18	12.9%	12	8.6%	132	94.3%			
Provision of housing	Yes	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%			
	No	17	12.1%	53	37.9%	36	25.7%	22	15.7%	12	8.6%	140	100.0%			
Provision of water & sanitation	Yes	0	0.0%	0	0.0%	0	0.0%	1	0.7%	0	0.0%	1	.7%	5.402	4	0.248
	No	17	12.1%	53	37.9%	36	25.7%	21	15.0%	12	8.6%	139	99.3%			

Table 7.5 reflects the cross-tabulation between tenure and reason for staying in the informal settlements. The associations between these variables are not statistically significant at the 95% level ($p > 0.05$).

7.3 QUANTITATIVE ANALYSIS

The following section shows disaster management components frequency tables, graphs and cross-tabulations tables which have been compiled for each question. The columns labelled either Frequency or Count indicate the number of respondents that selected the particular option for the question.

7.3.1 DISASTER PREPAREDNESS

Figure 7.11: Reasons to migrate to Durban

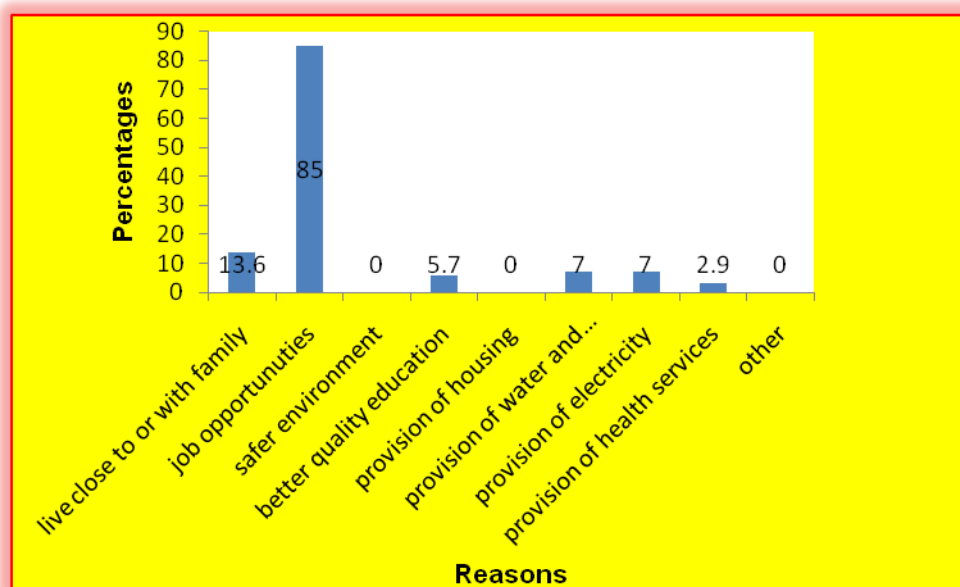


Figure 7.11 shows that 85% of respondents come to Durban in search for employment opportunities. The study shows a big difference between employment opportunities and other reasons which led them to migrate to Durban.

Table 7.6 Relationship between the reason to migrate to Durban and gender

Why did you come to Durban?		Gender				Chi-square	df	P
		Male		Female				
		N	%	N	%			
Live close to or with family	Yes	8	5.7%	11	7.9%	0.005	1	0.943
	No	52	37.1%	69	49.3%			
Job opportunities	Yes	50	35.7%	69	49.3%	0.229	1	0.632
	No	10	7.1%	11	7.9%			
Safer environment	Yes	0	0.0%	0	0.0%	0	0	0
	No	60	42.9%	80	57.1%			
Better quality education	Yes	4	2.9%	4	2.9%	0.177	1	0.674
	No	56	40.0%	76	54.3%			
Provision of housing	Yes	0	0.0%	0	0.0%	0	0	0
	No	60	42.9%	80	57.1%			
Provision of water & sanitation	Yes	1	0.7%	0	0.0%	1.343	1	0.247
	No	59	42.1%	80	57.1%			

Table 7.6 shows that there was no significant relationship between people coming to Durban and gender at the 95% level ($p > 0.05$) respectively. Table 7.6 further shows 35% males and 49,3% females migrate to Durban mainly for job opportunities. Table 7.6 shows that there was no relationship between living closely to or with family and gender at the 95% level ($p > 0.05$) respectively.

Table 7.7: Relationship between occupation (males) and the reason to migrate to Durban

Why did you come to Durban?	Occupation Males														Chi-square	df	P	
	Employment full-time		Self-employed		Part-time/Contract/Temporary		Unemployed		Pensioner		Student/Scholar	Total						
	N	%	N	%	N	%	N	%	N	%	N	%	n	%				
Live close to or with family	Yes	0	0.0%	2	1.4%	3	2.1%	13	9.3%	1	0.7%	0	0.0%	19	13.6%	8.789	5	0.118
	No	9	6.4%	2	1.4%	15	10.7%	92	65.7%	1	0.7%	2	1.4%	121	86.4%			
Job opportunities	Yes	8	5.7%	3	2.1%	15	10.7%	89	63.6%	2	1.4%	2	1.4%	119	85.0%	1.170	5	0.948
	No	1	0.7%	1	0.7%	3	2.1%	16	11.4%	0	0.0%	0	0.0%	21	15.0%			
Safer environment	Yes	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%			
	No	9	6.4%	4	2.9%	18	12.9%	105	75.0%	2	1.4%	2	1.4%	140	100.0%			
Better quality education	Yes	1	0.7%	0	0.0%	0	0.0%	6	4.3%	0	0.0%	1	0.7%	8	5.7%	9.221	5	0.101
	No	8	5.7%	4	2.9%	18	12.9%	99	70.7%	2	1.4%	1	0.7%	132	94.3%			
Provision of housing	Yes	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%			
	No	9	6.4%	4	2.9%	18	12.9%	105	75.0%	2	1.4%	2	1.4%	140	100.0%			
Provision of water & sanitation	Yes		0.0%	1	0.7%	0	0.0%	0	.0%	0	0.0%	0	0.0%	1	0.7%	34.245	5	0.000*
	No	9	6.4%	3	2.1%	18	12.9%	105	75.0%	2	1.4%	2	1.4%	139	99.3%			

**p< 0.01

The results in Table 7.7 shows that 60% of unemployed males chose to stay in Durban because of perceived employment opportunities. There was no significant relationship between employment opportunities and occupation for males at the 95% level ($p>0.05$) respectively. The findings of the study shows that 15% of respondents chose to stay here because the land was vacant, 82.1% for employment opportunity, 22.9% close to transportation, and 5% due to the prevalence public schools for their children and 3.6% relatives lives in the area.

Table 7.7 indicates that there is a significant difference in the perceptions of respondents varying in occupation (male) regarding the provision of water and sanitation at the 1% levels of significance respectively.

Figure 7.12: Occupation Types

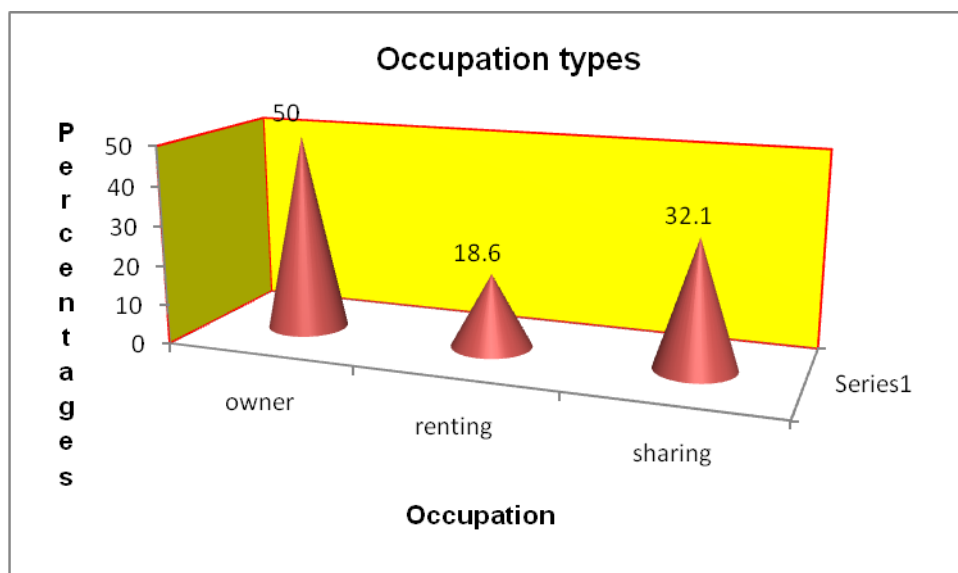


Figure 7.12 indicates that 50% are owners, 18.6% are renting and 32.1% are sharing respectively.

Figure 7.13: Kinds of disaster experienced in the past five years

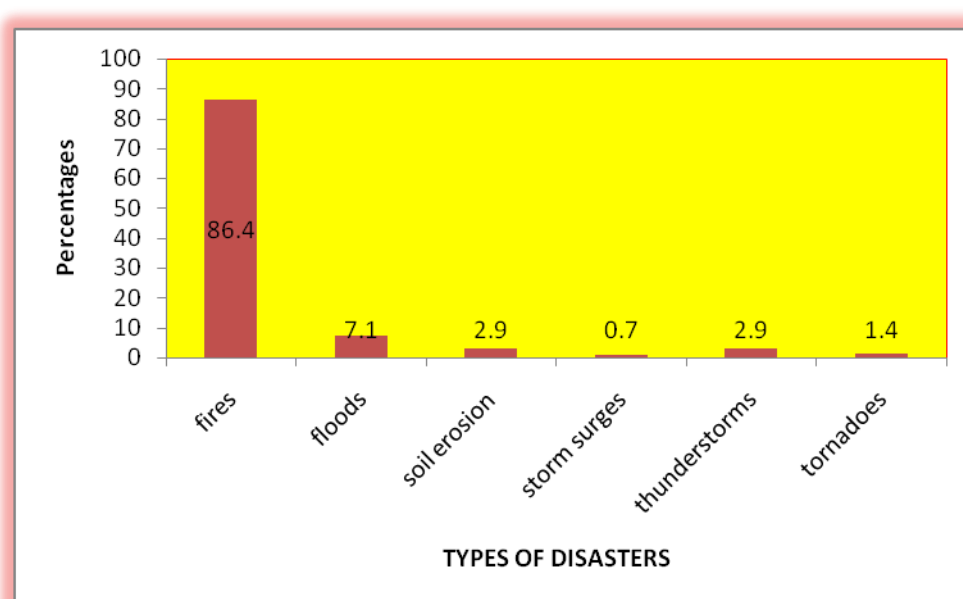


Figure 7.13 indicates that 86.4% of disasters are caused by fires, 7.1% floods, 2.9% soil erosion, 0.7% storm surges, 2.9% thunderstorm and 1.4% tornadoes respectively.

Table 7.8: Relationship between kinds of disasters (emergencies) Experienced in the past few years and the adequate protection from floods

Kinds of disasters		How adequately protected are you from fires?												Chi-square	df	p
		Very safe		Safe		Neither safe nor unsafe		Unsafe		Very unsafe		Total				
		N	%	N	%	n	%	n	%	N	%	N	%			
Fires	Yes	4	2.9%	5	3.6%	2	1.4%	8	5.7%	102	72.9%	121	86.4%	3.452	4	0.485
	No	0	0.0%	0	0.0%	0	0.0%	0	0.0%	19	13.6%	19	13.6%			
Floods	Yes	0	0.0%	0	0.0%	0	0.0%	1	0.7%	9	6.4%	10	7.1%	1.208	4	0.877
	No	4	2.9%	5	3.6%	2	1.4%	7	5.0%	112	80.0%	130	92.9%			
Soil erosion	Yes	0	0.0%	0	0.0%	0	0.0%	0	0.0%	4	2.9%	4	2.9%	0.647	4	0.958
	No	4	2.9%	5	3.6%	2	1.4%	8	5.7%	117	83.6%	136	97.1%			
Storm surges	Yes	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	0.7%	1	0.7%	0.158	4	0.997
	No	4	2.9%	5	3.6%	2	1.4%	8	5.7%	120	85.7%	139	99.3%			
Thunderstorms	Yes	0	0.0%	0	0.0%	0	0.0%	0	0.0%	4	2.9%	4	2.9%	0.647	4	0.958
	No	4	2.9%	5	3.6%	2	1.4%	8	5.7%	117	83.6%	136	97.1%			
Tornados	Yes	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	1.4%	2	1.4%	0.319	4	0.989
	No	4	2.9%	5	3.6%	2	1.4%	8	5.7%	119	85.0%	138	98.6%			

Table 7.8 indicates that 72.9% of the respondents are not protected from fires. The relationship between protection of the informal settlement dwellers from fires is not significant at the 95% level ($p > 0.05$). The research findings show that 97.1% of respondents say that in the Foreman and Kennedy Road informal settlements there are no preventative measures to alleviate fires.

The research findings suggest that 86.4% of respondents felt very unsafe due to from the outbreak of fires in these informal settlements. High densities might be the cause of such insecurity because informal settlements are constructed close to each other. Another factor that causes people to feel unsafe from the impact of fires is the absence of a 24 hour community warning devices and procedures.

Table 7.9: Relationship between kinds of disasters and preventative measures in place

Kinds of disasters		Preventative measures in place						Chi-square	Df	P
		Yes		No		Total				
		n	%	N	%	N	%			
Fires	Yes	4	2.9%	117	83.6%	121	86.4%	0.647	1	0.421
	No	0	0.0%	19	13.6%	19	13.6%			
Floods	Yes	0	0.0%	10	7.1%	10	7.1%	0.317	1	0.574
	No	4	2.9%	126	90.0%	130	92.9%			
Soil erosion	Yes	0	0.0%	4	2.9%	4	2.9%	0.121	1	0.728
	No	4	2.9%	132	94.3%	136	97.1%			
Storm surges	Yes	0	0.0%	1	0.7%	1	0.7%	0.030	1	0.863
	No	4	2.9%	135	96.4%	139	99.3%			
Thunderstorms	Yes	0	0.0%	4	2.9%	4	2.9%	0.121	1	0.728
	No	4	2.9%	132	94.3%	136	97.1%			
Tornados	Yes	0	0.0%	2	1.4%	2	1.4%	0.060	1	0.807
	No	4	2.9%	134	95.7%	138	98.6%			

Table 7.9 indicates that there is no significant relationship between kind of disasters and preventative measures in place at the 95% level ($p > 0.05$). There appears to be no preventive measures in place to stop or prevent fires or other disasters within eThekweni Municipality's Foreman and Kennedy Road informal settlements.

Figure 7.14: Protection from floods

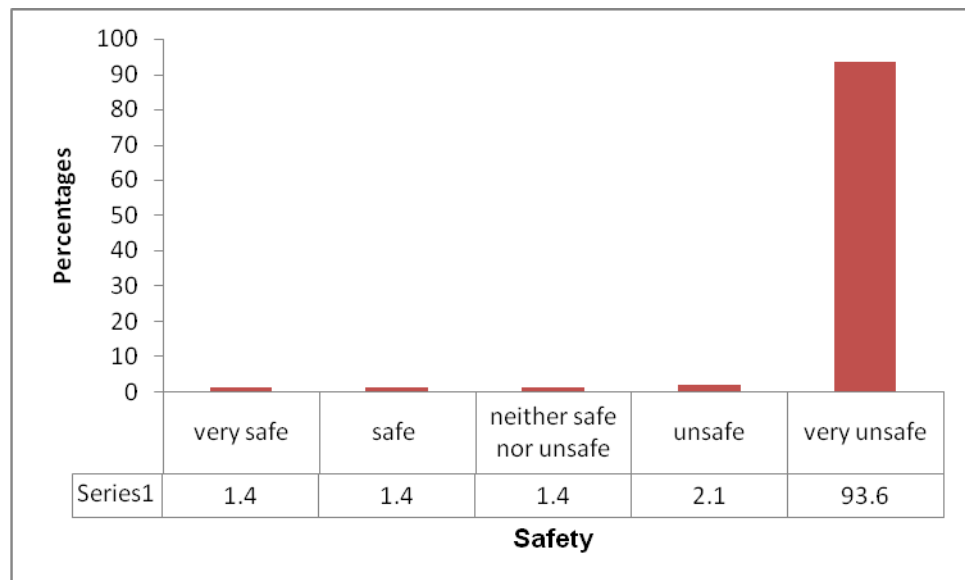


Figure 7.14 indicates that 93.6% of the respondents felt they were very unsafe from floods, 2.1% unsafe, 1.4% very safe and safe were at 1.4%.

Table 7.10: Relationship between protection from floods and types of materials used for building the shack

Type of building materials		Protection from floods												Chi-square	Df	p
		Very safe		Safe		Neither safe nor unsafe		Unsafe		Very unsafe		Total				
N	%	n	%	n	%	n	%	N	%	N	%					
Cardboard	Yes	1	0.7%	0	0.0%	0	0.0%	0	0.0%	52	37.1%	53	37.9%	4.578	4	0.333
	No	1	0.7%	2	1.4%	2	1.4%	3	2.1%	79	56.4%	87	62.1%			
Timber	Yes	1	0.7%	0	0.0%	0	0.0%	0	0.0%	80	57.1%	81	57.9%	10.215	4	0.037*
	No	1	0.7%	2	1.4%	2	1.4%	3	2.1%	51	36.4%	59	42.1%			
Zink	Yes	1	0.7%	1	0.7%	1	0.7%	1	0.7%	85	60.7%	89	63.6%	1.759	4	0.780
	No	1	0.7%	1	0.7%	1	0.7%	2	1.4%	46	32.9%	51	36.4%			
Wood	Yes	2	1.4%	1	0.7%	1	0.7%	3	2.1%	97	69.3%	104	74.3%	2.970	4	0.563
	No	0	0.0%	1	0.7%	1	0.7%	0	0.0%	34	24.3%	36	25.7%			
Concrete blocks	Yes	0	0.0%	0	0.0%	0	0.0%	0	0.0%	14	10.0%	14	10.0%	1.069	4	0.899
	No	2	1.4%	2	1.4%	2	1.4%	3	2.1%	117	83.6%	126	90.0%			

* p<0.05

The cross-tabulation in Table 7.10 indicates that there is a significant relationship between types of building materials used and protection from floods at the 95% level ($p < 0.05$). A total percentage of 57.1% of respondents felt very unsafe to build a house using timber. Table 7.10 indicates that 60.7% of the respondents felt very unsafe from using zink as building materials.

Table 7.11: Relationship between types of materials used for building a shack/house and protection from fires

		Protection from fires												Chi-square	df	P
		Very safe		Safe		Neither safe nor unsafe		Unsafe		Very unsafe		Total				
		N	%	n	%	N	%	n	%	N	%	n	%			
Cardboard	Yes	3	2.1%	3	2.1%	0	0.0%	1	0.7%	46	32.9%	53	37.9%	6.794	4	0.147
	No	1	0.7%	2	1.4%	2	1.4%	7	5.0%	75	53.6%	87	62.1%			
Timber	Yes	3	2.1%	3	2.1%	0	0.0%	1	0.7%	74	52.9%	81	57.9%	10.528	4	0.032*
	No	1	0.7%	2	1.4%	2	1.4%	7	5.0%	47	33.6%	59	42.1%			
Zink	Yes	3	2.1%	4	2.9%	0	0.0%	3	2.1%	79	56.4%	89	63.6%	6.801	4	0.147
	No	1	0.7%	1	0.7%	2	1.4%	5	3.6%	42	30.0%	51	36.4%			
Wood	Yes	3	2.1%	2	1.4%	1	0.7%	3	2.1%	95	67.9%	104	74.3%	10.494	4	0.033*
	No	1	0.7%	3	2.1%	1	0.7%	5	3.6%	26	18.6%	36	25.7%			
Concrete blocks	Yes	0	0.0%	1	0.7%	0	0.0%	1	0.7%	12	8.6%	14	10.0%	1.279	4	0.865
	No	4	2.9%	4	2.9%	2	1.4%	7	5.0%	109	77.9%	126	90.0%			

* p<0.05

The cross-tabulation depicted in Table 7.11 indicates that there is a significant relationship between timber (building material) and protection from fires at the 95% level ($p<0.05$) respectively. The cross-tabulation further indicates that there is a correlation between wood as a building material used and very unsafe protection from fires at the 95% level ($p<0.05$) respectively. The research finding indicates that 96.4% of the respondents never used South African Bureau of Standards (SABS) approved building materials in building their informal settlements respectively.

The cross-tabulation Table 7.11 shows that there is no significant relationship between using concrete blocks and protection from fires because only 10% of respondents used blocks to build their houses in both Foreman and Kennedy Road informal settlements. The association between the variables is not significant at the 95% level ($p>0.05$). The use of these types of building materials which perpetuates fires is mainly caused by the fact that people are not allowed to formalise their informal settlements and if a respondent replaces plastic or zinc shack with a brick, the Land Invasions Unit destroys the shack.

Table 7.12: The role of communities in disaster or emergency management before and after the disaster

	Frequency	Percent
Very important	78	55.7
Somewhat important	23	16.4
Not at all important	39	27.9
Total	140	100.0

Table 7.12 indicates that 55.7% of the Foreman and Kennedy Road informal settlements respondents agree that they can play an important role in disaster or emergency management before and after the disaster.

7.3.2 MITIGATION

Figure 7.15: Types of materials used by respondents to build a shack or house

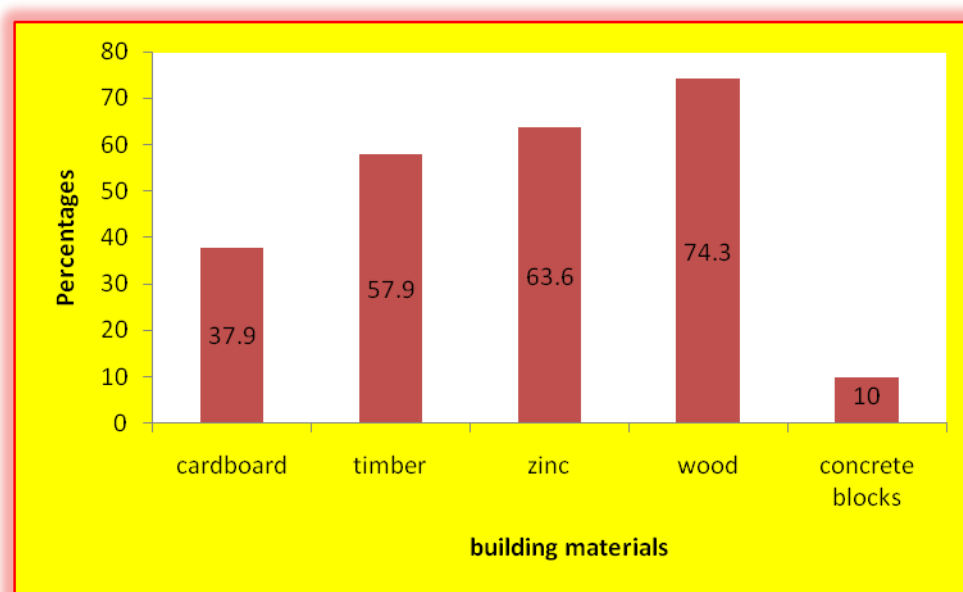


Figure 7.15 indicates that 62.1% of respondents used cardboard in building their houses, whilst 42.1% used timber, followed by 36.4% used zinc, 25.7% used wood and 10% used concrete blocks.

Table 7.13 Relationship between things done to reduce risks after disaster and the resources of acceptable standard used to build a house or shack

Done things to reduce risk after disaster		Were resources of acceptable standard used to build your house?						Chi-square	Df	P
		Yes		No		Total				
		n	%	N	%	N	%			
Building resistant houses	Yes	1	0.7%	6	4.3%	7	5.0%	2.456	1	0.117
	No	4	2.9%	129	92.1%	133	95.0%			
Building embankments	Yes	0	0.0%	3	2.1%	3	2.1%	0.114	1	0.736
	No	5	3.6%	132	94.3%	137	97.9%			
Building dam walls	Yes	1	0.7%	1	0.7%	2	1.4%	12.700	1	0.000*
	No	4	2.9%	134	95.7%	138	98.6%			
Installing drainage system	Yes	2	1.4%	9	6.4%	11	7.9%	7.400	1	0.007*
	No	3	2.1%	126	90.0%	129	92.1%			

**p<0.001

*p<0.005

The cross-tabulation in Table 7.13 shows that there is a significant association between building dam walls and acceptable standards respectively at 1% level of significance. There is a significant association between installing a drainage system and acceptable standards respectively at the 95% level ($p<0.05$).

Figure 7.16: Community protection works available in communities

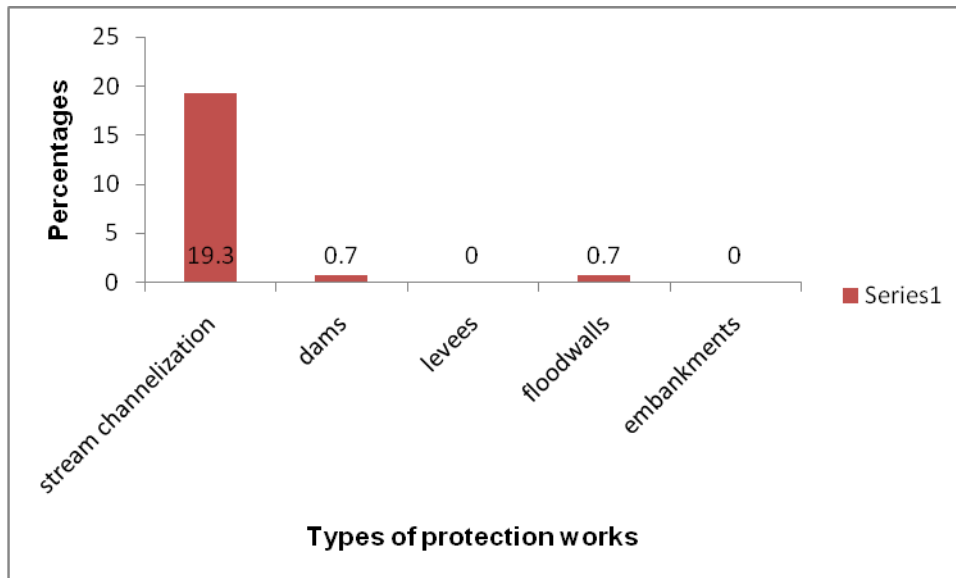


Figure 7.16 indicates that 19.3% of the respondents agree that in the Foreman and Kennedy Road informal settlements there are stream channelization, 0.7% dams and 0.7% floodwalls respectively

Table 7.14 Relationship between mitigation information provided in writing and the emergency preparedness handouts and other information distributed to the community on disaster or emergency management

Mitigation	Are there emergency preparedness handouts and other information distributed to your community on disaster or emergency management?						Chi-square	Df	P
	Yes		No		Total				
	N	%	N	%	N	%			
Has mitigation information been provided in writing to you?	0	0.0%	3	2.1%	3	2.1%	0.114	1	0.736
	5	3.6%	132	94.3%	137	97.9%			
Total	5	3.6%	135	96.4%	140	100.0%			

Table 7.14 shows that the association between variables is not significant at the 95% level ($p > 0.05$). The research findings reveal that 94.3% receive no information regarding disaster mitigation. The respondents agreed that there were no emergency preparedness handouts and other information distributed to their informal settlements on disaster or emergency management.

7.3.3 RESPONSE, RECOVERY AND REHABILITATION

Figure 7.17: Kind of warnings

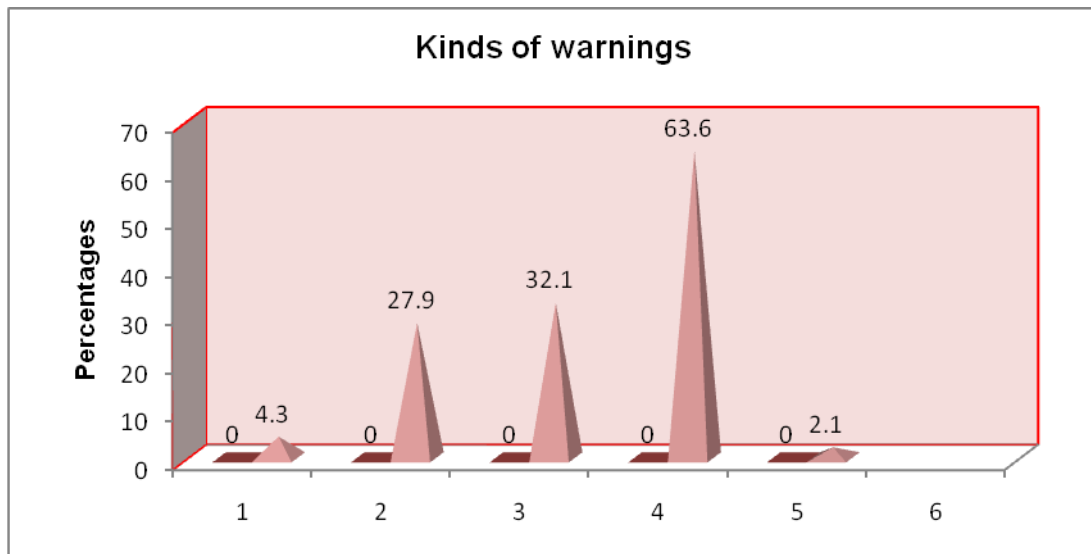


Figure 7.17 indicates that 4.3% of the respondents agree that pamphlets are distributed to communities as an awareness strategy to disasters. The research findings indicates that 27.9% of the respondents receive disaster warning from newspapers, 32.1% television, 63.6% radio and 2.1% municipal officials respectively.

Figure 7.18: Availability of government officials after a disaster

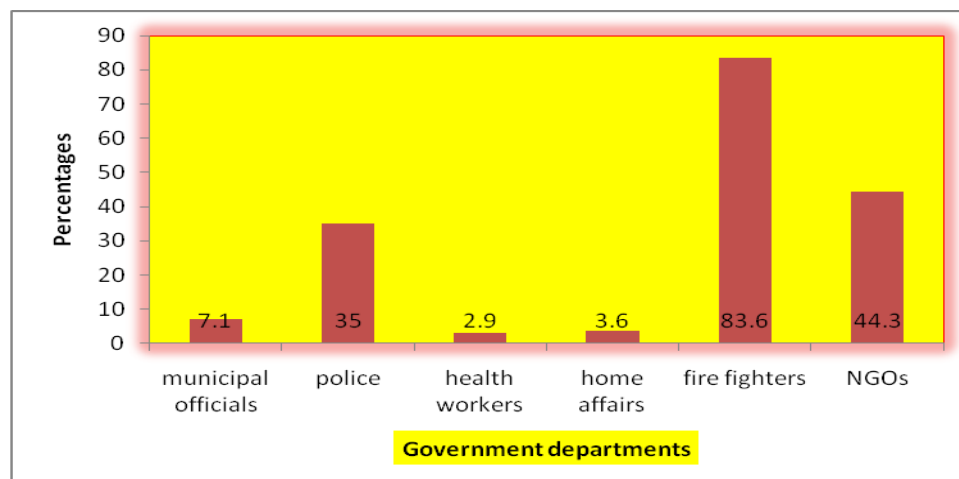


Figure 7.18 indicates that 83.6% of the respondents agree that fire fighters visit areas affected by fires. Figure 7.18 reflects that 44.3% of NGOs are available during disasters, 35% police force, 7.1% are municipal officials, 3.6% are home affairs officials and 2.9% are health workers respectively.

Table 7.15 Relationship between government agencies available during and after a disaster and the role of civil society during and after the disaster

		How do you rate the role of civil society during and after the disaster?										Chi-square	df	P
		Very important		Somewhat important		Not at all important		Don't know		Total				
		N	%	N	%	N	%	n	%	N	%			
Municipal officials	Yes	3	2.1%	1	0.7%	5	3.6%	1	0.7%	10	7.1%	7.923	3	0.048*
	No	71	50.7%	19	13.6%	39	27.9%	1	0.7%	130	92.9%			
Police	Yes	18	12.9%	8	5.7%	22	15.7%	1	0.7%	49	35.0%	8.476	3	0.037*
	No	56	40.0%	12	8.6%	22	15.7%	1	0.7%	91	65.0%			
Health workers	Yes	2	1.4%	1	0.7%	1	0.7%	0	0.0%	4	2.9%	0.450	3	0.930
	No	72	51.4%	19	13.6%	43	30.7%	2	1.4%	136	97.1%			
Home affairs workers	Yes	2	1.4%	1	0.7%	2	1.4%	0	0.0%	5	3.6%	0.476	3	0.924
	No	72	51.4%	19	13.6%	42	30.0%	2	1.4%	135	96.4%			
Fire fighters	Yes	61	43.6%	18	12.9%	37	26.4%	1	0.7%	117	83.6%	2.322	3	0.508
	No	13	9.3%	2	1.4%	7	5.0%	1	0.7%	23	16.4%			
NGOs	Yes	39	27.9%	12	8.6%	9	6.4%	2	1.4%	62	44.3%	16.770	3	0.001*
	No	35	25.0%	8	5.7%	35	25.0%	0	0.0%	78	55.7%			

**p<0.01

*p<0.05

Table 7.15 reflects a significant association between the rating of civil society and municipal officials, police and NGOs at the 95% level ($p<0.05$) respectively. Furthermore, Table 8.15 indicates that there exists a significant relationship between the rating of the role of civil society and the NGOs respectively at 1% level of significance. A total of 3.6% rated municipal officials as not at all important while 2.1% rated municipal officials as very important. A total of 15.7% rated police as not at all important while 12.9% rated police as very important and 5.7% rated police as somewhat important. A total 27.9% rated NGOs as very important while 8.6% rated NGOs as somewhat important and 6.4% rated NGOs as not at all important respectively.

Figure 7.19: The role of civil society

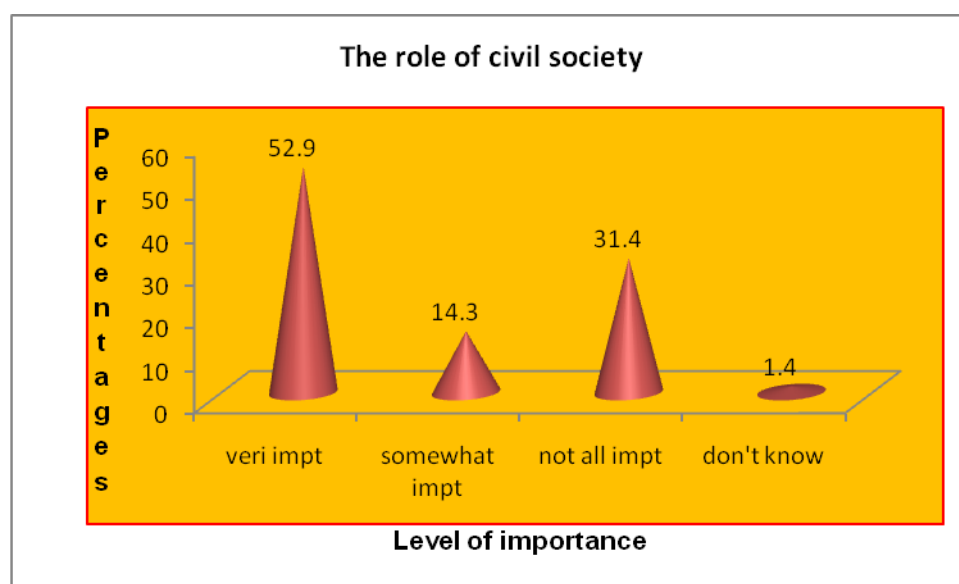


Figure 7.19 indicates that 52.9% rate the role of civil society as very important, 14% as somewhat important, 31.4% not all important and 1.4% don't know.

Figure 7.20: Assistance received after the disaster

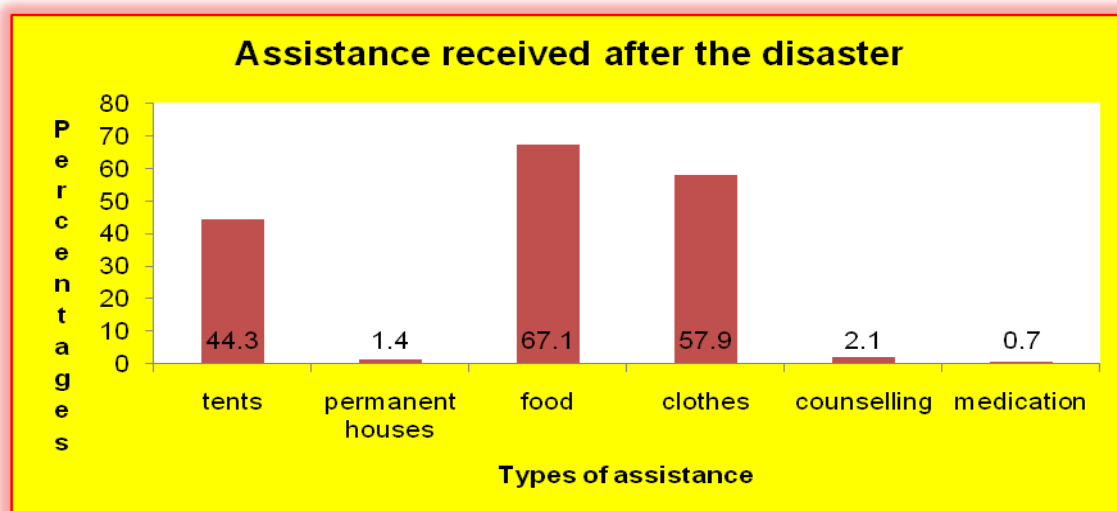


Figure 7.20 indicates that 67.1% of the respondents agree that food is distributed to the victims after disasters, 1.4% permanent houses, 67.1% food, 57.9% clothes, 2.1% counselling and 0.7% medication respectively.

Figure 7.21: Activities performed by eThekwini municipality

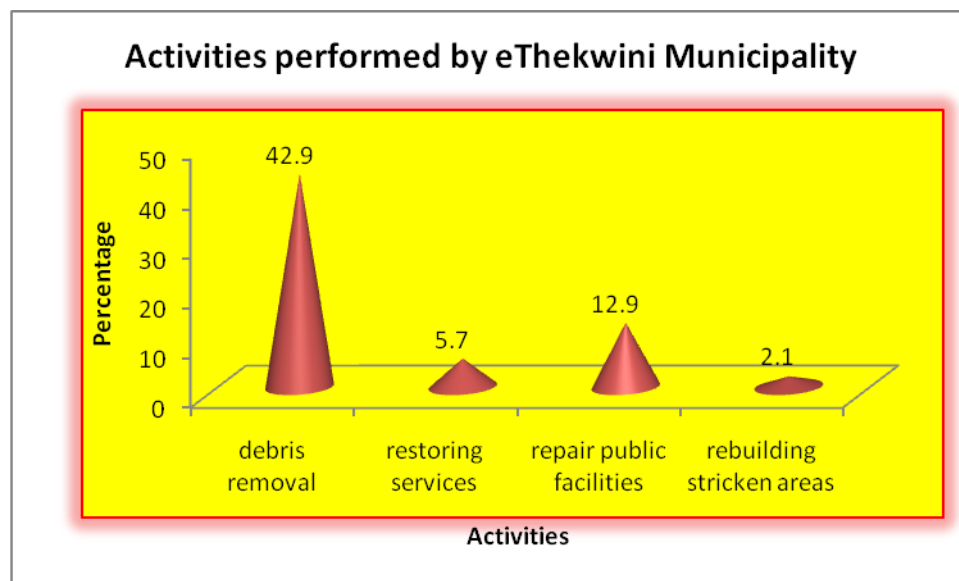


Figure 7.21 indicates that after the disaster 42,9% of the respondents agree that the eThekwini municipality remove debris, 5.7% restoring services, 12.9% repair public facilities and 2.1% rebuilding stricken areas.

Figure 7.22: Category needing special attention

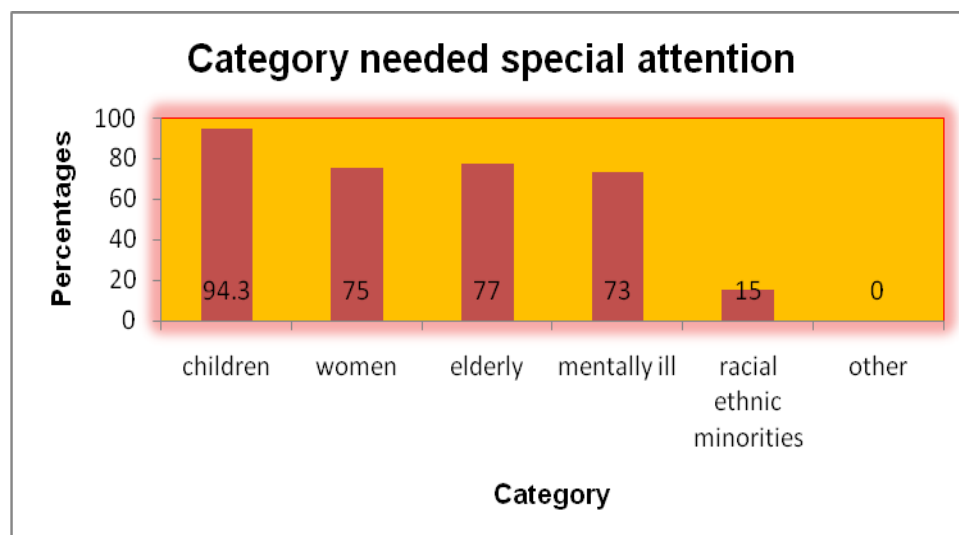


Figure 7.22 indicates that 94.3% of the respondents agree that children need special attention during the disaster, 75% women and 77% elderly respectively.

7.3.4 FINANCIAL IMPLICATIONS

Figure 7.23: Present income and the payment of the services

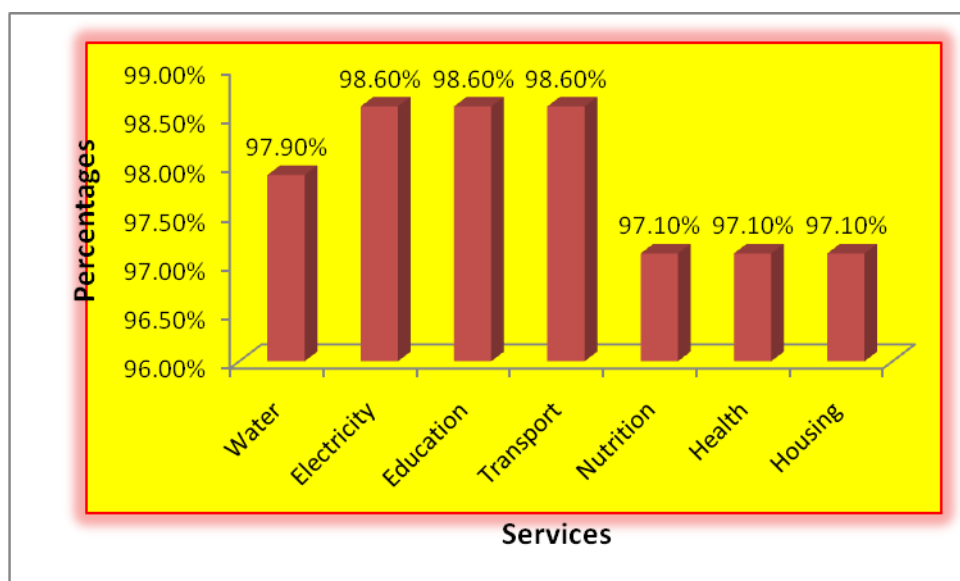


Figure 7.23 shows a disproportionately high percentages (97.9%) of respondents agree that they can afford to pay water, 98.6% for electricity, education and transport and 97.10% for nutrition, health and housing.

Figure 7.24: The financial costs caused by disasters

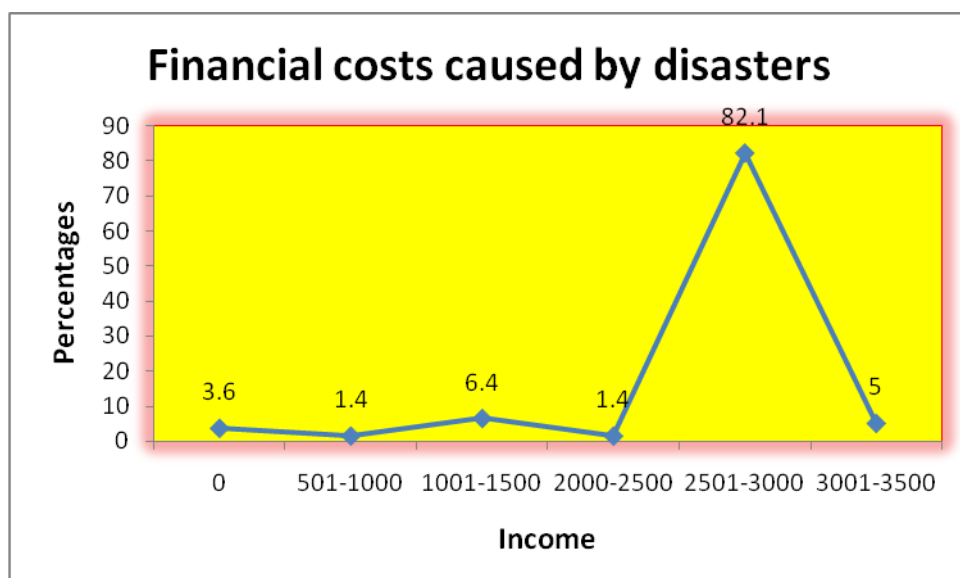


Figure 7.24 indicates that 3.6% of the respondents believe that there are no costs caused by disasters and 1.4% of the respondents agree that costs caused by

disasters are between R501-R1000, 6.4% (R1001-R1500), 1.4% (R2000-R2500), 82.1% (R2501-R3000) and 5% (R3001-R3500) respectively.

Figure 7.25: The repair or replacement cost to respondent's dwelling

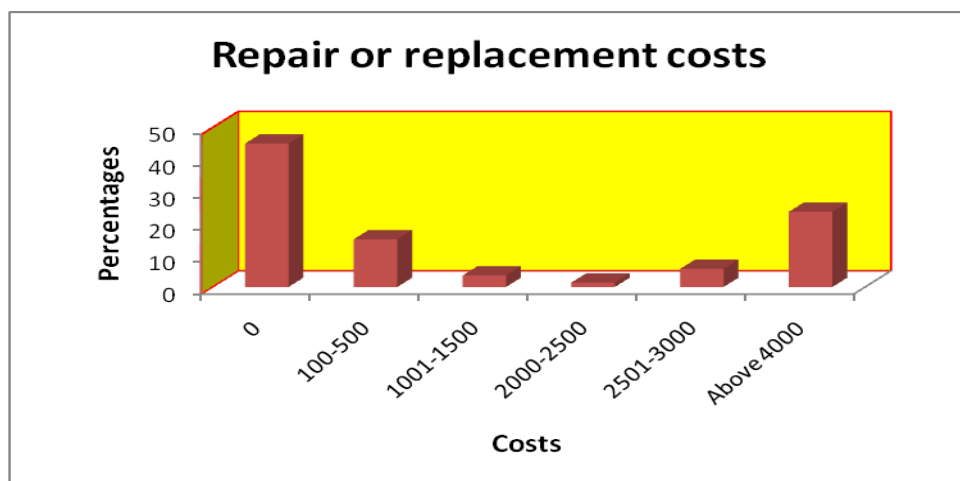


Figure 7.25 indicates that 45% of the respondents never paid any costs for repair or replacement for their dwellings, whereas, 15% spent between R100 - 500, 5.7% between R5001-R1000, 3.6% spent between R1001-R1500, 1.4% spent between R15001- R2000, 5.7% spent between R2001-R2500 and 23.6% spent R3000 and above. The research findings indicate that 99.3% of the respondents do not believe that disaster rehabilitation was created and 0.7% believed that it was created. Furthermore, 98.6% of the respondents believe that financial assistance was not adequate for replacements after a disaster and whereas 1.4% believes that it was adequate.

7.3.5 LOCAL GOVERNMENT SPHERE: eTHEKWINI MUNICIPALITY MANAGEMENT

The Constitution of the Republic of South Africa (1996) section 191 (1) outlines the status of municipalities as the local sphere of government consisting of municipalities, which must be established for the whole of the territory of the Republic. eThekwini Municipality is a Category A municipality enshrined in section 155 (1) of the Constitution as having exclusive municipal executive and legislative authority in its area. Therefore, eThekwini Municipality is the local government body responsible for governing and managing cities like Durban.

Section 23 of the Local Government: Municipal Systems Act, 2000 (Act No 32 of 2000) has prescribed that a municipality must undertake developmentally-oriented planning so as to ensure that it strives to achieve the objectives of local government set out in section 152 of the Constitution. eThekweni Municipality's Integrated Development Plan (IDP) is produced in five year cycles, the 2008/2009 being the third annual reiteration within the second round of the integrated development process (2006/07 to 2010/11). The eThekweni Municipality has an eight point plan of sustaining the natural and built environment, economic development, job creation, quality living environments, safety, healthy and secure environment, empowering citizens, celebrating cultural diversity, good governance and financial viability and sustainability (eThekweni Municipality IDP, 2008/2009:40).

Disaster management is encapsulated under plan four (Safety, Healthy and Secure Environment) and its main goal is to promote and create a safe, healthy and secure environment. Moreover, disaster management and fire departments are under the Safety and Security cluster managed by the Deputy City Manager reporting to the City Manager. These departments are both managed by the head of department reporting to the deputy city manager. Disaster Management personnel consist of a disaster management manager, disaster management co-ordinator and three disaster management officers. The Disaster Management Officer confirmed that between 2008 and 2009, 12 natural disasters such as thunderstorms damaged different wards within eThekweni Municipality. Furthermore, 11 fires (man-made disasters) damaged informal settlements including Foreman and Kennedy Road.

The municipality has developed 15 programmes to address the causes and effects of the threats for a safe environment for its citizens. In addition, Section 43 of the Municipal Systems Act, (Act 32 of 2000) prescribed key performance indicators which are included to the municipality's Performance Scorecards. Programme 3 (safe from fire and emergencies) has two strategies covering two broad areas: community fire safety education including fire prevention, and management and extending of emergency services (eThekweni Municipality IDP review, 2008/2009:42).

According to eThekweni Municipality's IDP review (2008/2009:48), uncontrolled fires have a serious impact on the lives of all communities. Citizens, businesses and public infrastructure are all affected by incidents of fire. The impact of loss of life and the destruction of property and possessions is difficult, if not impossible, to quantify. People living in densely populated informal settlements, without personal insurance, are particularly vulnerable to the effects of uncontrolled fires. Through effective fire and emergency services, the department aims to ensure that all communities have a level of confidence and that the department recognises their duty of care, and able to provide an acceptable level of safety (eThekweni Municipality IDP review, 2008/2009:49).

The main plan of the fire department is to prevent fires by promoting community education and awareness, promoting fire safety in buildings, developing appropriate regulations and ongoing research. The plan of the fire department includes community training and equipping municipal staff to respond quickly and effectively. The department works collaboratively with other agencies whose work helps to prevent fires and improve response times, for example, rapid road access, road naming, house numbering, providing fire-fighting water hydrants, street lighting, and telecommunications (eThekweni Municipality's IDP review, 2008/2009:48).

Based on the legislation on Performance Management from the Department of Provincial and Local Government (Municipal Systems Act, 2000), the Municipality's Scorecard has been re-defined. The project matrix under the rubric of plan four (Safe, Healthy and Secure Environment) within the strategic focus area of "promoting the safety of citizens" programme (safe from fire and emergencies) reveals the following projects to be implemented between 2010 and beyond the financial year (eThekweni Municipality's IDP review, 2008/2009:48-49):

- i. Extend fire and rescue service to under serviced areas,
- ii. Expanded Public Works Programme (EPWP): community based emergency response Services,
- iii. Community Safety Havens Develop a Disaster Risk Reduction Plan for the jurisdictional areas, and
- iv. Maintain acceptable levels of service delivery.

Programme 4 focuses on establishing disaster management within eThekweni Municipality. The municipality is concerned about the human suffering and economic loss that results from disasters. The department's response is guided by a three-phase approach which includes:

- i. Preventing disasters where possible,
- ii. Responding to disasters when they do occur, and
- iii. Assisting communities to recover from the effects of a disaster (eThekweni Municipality's IDP review, 2008/2009:49).

eThekweni Municipality aims to prevent disasters by developing risk and vulnerability profiles. Once they have identified vulnerable areas, they intend developing prevention plans and strategies. Furthermore, training communities to understand risks and how to respond to disasters serves as a prevention and response function. Training municipal officials in effective disaster response is critical for ensuring that they are able to respond quickly and effectively to disasters (eThekweni Municipality's IDP review, 2008/2009:49).

Meanwhile, the project matrix for plan four (safe, healthy and secure environment under the strategic focus of promoting the safety of citizens, programme (safe from disasters) have the following projects that are to be implemented in 2010 and beyond the financial year:

- i. Develop a Disaster Risk Reduction Plan for the jurisdictional areas,
- ii. EPWP: Community Based Emergency Response Services,
- iii. Community Safety Havens. SDB Emergency and Disaster Management Response Centre Planning, and
- iv. Inanda, Ntuzuma and KwaMashu (INK) Disaster management and Prevention Programmes.

7.3.5.1 INFORMATION DERIVED FROM THE COUNCILLOR AND STAFF INTERVIEWS

The information on the disaster management existing conditions and future projects was collected from eThekweni Municipality officials including the Ward 25 Councillor, Councillor (chairman of the housing committee), Deputy City Manager (Safety and Security), Senior manager: housing (planning section), Senior manager,

Electricity (Revenue Protection Division), disaster management manager, disaster management manager, disaster management co-ordinator, disaster management Officer, Fire Department Manager (operational) and the manager (storm water). The report is written around themes determined in literature such as preparedness, mitigation, response, and rehabilitation and future developments.

7.3.5.1.1 DISASTER PREVENTION AND PREPAREDNESS

The councillor for Ward 25 confirmed that the municipality have installed equipments such as fire hosepipes in Foreman and Kennedy Road informal settlements to extinguish fires during a disaster. The councillor stressed that these equipments do not work because marshals are not trained and there are delays in halting fires because of inefficiency and ineffectiveness from the eThekwin Municipality officials.

The councillor mentioned the problem of sprawling and congested nature of informal settlements which is difficult and impractical to get a waterpipe to extinguish fires. The municipality embarked on the plan to provide residents with metal to build shelters in order to prevent fires in places such as Jadhu and Foreman Road and have constructed 150 of such units. The councillor alluded that they have a link with the committee members who phones the fire department directly and react immediately if there are fires in the informal settlements. He said that during windy occasions, fires are uncontrollable and there are no measures in place to control them.

The councillor argued that if they build formal houses in these shack settlements, they are bound by housing regulations and larger space is needed for one house, while some of the land occupied by the shack dwellers are privately owned such as Foreman Road. According to the councillor, the council has built 300 houses at Huwell Road on rental and 400 from Jimmy Carter Foundation in Mayville. These houses were not meant to eradicate the informal settlements in Foreman and Kennedy Road settlements and new people came to occupy them from other areas as a result of corrupt municipal officials. The councillor stated the causes of fires in the shack settlements are as follows:

- i. Alcohol abuse,

- ii. Deliberately caused by domestic violence or conflict between partners forgetting that they are endangering others,
- iii. Wind that comes from the cracks or crevices in the shacks that fans the flames of the candle and it does not happen often now because the officials have spoken to the community about preventing it, and
- iv. Arson (whereby different tribal groups attack each other as in the case of the AmaXhosa and Zulu people).

The councillor stated that in protecting informal settlements from flooding, the council had to relocate people living along the catchment area of the river.

There is little evidence to suggest that a disaster management framework, disaster management centre and a plan exists in the eThekweni Municipality to deal with emergencies such as fires. The eThekweni Municipality has been prone to emergencies and disasters in the past 10 years which is perpetuated by the absence of the disaster management framework, policy and the plan. Hence, the Disaster Management Act 57 of 2002 promulgated in section 42 (1) stipulates that each metropolitan and district municipality must establish and implement a framework for disaster management in the municipality aimed at ensuring an integrated and uniform approach to disaster management in its area.

The Deputy City Manager confirmed that a disaster management department does exist, but it is improperly used as its function was to supply blankets and food parcels after an emergency or a disaster occurring. He indicated that there are plans in place to relocate the disaster management centre from the Central Business District (CBD) of Durban as it is located on the floodplain to highland area of Pinetown. He further stated that it is in the process of designing an organogram of the department and appoint different specialists such a Geographical Information Systems (GIS) specialist in the future.

With reference to disaster management manager statements, it suggests that eThekweni Municipality does have a fragmented disaster management centre, framework and a plan. The department failed to sustain the disaster management centre in the past years and it was dismantled. They lost the key services of that

centre including training and media facilities, boardrooms, offices and training facilities. All that is left are some offices and the operations room which are not the disaster management centre. This does not meet the requirements of the Act.

According to the Manager in the Disaster Management department, the municipality is upgrading and extending the disaster management centre, which is some interest on the subject. He further argued that the eThekweni Municipality's executive council should adopt an already drafted disaster management framework. Furthermore, a consultant should be appointed to undertake risk assessment throughout the eThekweni Municipality to put together a disaster management policy document. Thereafter, a disaster management plan can be crafted.

The manager is of the view that service level agreements between the disaster management department and other municipal units should be signed in order for the units to provide specialist skills during an emergency or a disaster. Whilst the manager indicated the compliance of the municipality to the Disaster Management Act, the high staff turn-over without being replaced is a challenge and aggravated by the fragmented organogram which does not respond to the needs of the department. The manager argued that the disaster management department should take into cognisance the kind and number of projects that need to be planned and implemented. The manager stressed poor consultation or a top down approach on the part of the Deputy City Manager (Safety and Security Cluster) who is designing an organisational strategy and a new organogram without consultation.

The manager (storm water department) stressed that the municipality is installing storm water pipes for low-cost housing developments that are taking place to prevent flooding during disasters. The manager further argued that the municipality cannot install such pipes on some land as they are privately owned.

7.3.5.1.2 DISASTER MITIGATION

The manager (fire department) indicated that the Expanded Public Works Programme (EPWP) and Social Sector Programme developed a plan to ensure the safety of destitute and vulnerable persons and families, especially child headed households who live in unsafe and hazardous homes or shelters. The plan is based

on the “Ilima” concept (each one help one) to be used to repair or rebuild a derelict dwelling. The pilot project has already been launched and there are potential partners who will assist in mobilising financial resources. The outcome of the “Ilima” project is that it revives the ubuntu tradition of caring for one another.

The councillor who chairs the housing committee declared that the municipality is fast-tracking housing delivery as they build 17 000-20 000 low-cost houses a year. He said that the municipality is determined to clear out informal settlements and improve living conditions to help people to get out of the trap of poverty by 2015. The councillor further argued that landlords and businesses such as illegal taverns in the area were a *“hindrance to development initiatives that the council wants to implement”*. Furthermore, the councillor indicated that there are certain businesses and landlords that somehow, benefit from having people living under these conditions and he confirmed that the Mount Moriah housing project would, when complete, benefit the Kennedy Road informal settlements within the 2009/2010 financial year ending.

eThekweni Municipality has approved a plan to provide an interim supply of electricity to 223 500 households in 572 informal settlements across eThekweni Municipality in areas where full upgrades are planned for the future (Metro Ezasegagasini, 2009:3). The senior manager (housing planning section) who presented the plan to the committee said informal settlements across the eThekweni Municipality had been divided into categories, based on their suitability for upgrading and a team had been appointed to roll out the project.

eThekweni Municipality infrastructure chairperson (councillor) said that the plan will curb illegal electricity connections and sabotage of municipal services. He further stated that plans are in place to provide access roads and other basic services to informal settlements that were scheduled for upgrades in the coming financial years. The chairperson said that communal ablution blocks had been installed in most informal settlements, providing clean water and sanitation. According to the infrastructure chairperson, storm-water services for informal settlements would be incorporated into road designs and access roads to settlements which were crucial to aid disaster relief.

The senior manager in eThekweni Municipality's Electricity Revenue Protection Division said that plans were in place to protect legitimate customers from interruptions caused by illegal connections. He further said that some low-voltage copper circuits were now being replaced with aerial bundled conductors to make it harder to tap into the line.

7.3.5.1.3 RESPONSE, RECOVERY AND REHABILITATION

The councillor (Ward 25) stated that the disaster management department plays an active role in the community as it provides blankets and tents after the disaster. He further indicated that in his ward the community get food for 5 days until the shack is rebuilt. As far as assistance is concern, the councillor ensures that they get blankets, school uniforms, pay school fees and ask the schools to be sympathetic. The councillor negotiates with schools for latitude in time for them to get uniform and shoes.

The councillor mentioned a number of NGO's who come to their rescue at short notice during and after the disaster which:

- **SOOFIE Group** (located in Sherwood, Durban) provides food, blankets and clothing.
- **JAMAITUL ULEMA** (based in Durban Central Business District (CBD) they often provide blankets, clothing, and food.
- **AL-IMDAAD FOUNDATION** built corrugated iron houses at Foreman road after the last devastating fires.

The councillor further mentioned that there are other businesses that contribute and provide continuous assistance such as Spar, Ohlanga Cash and Carry, Alamin Bakery in the city and Star Butchery in Sparks Road.

The disaster management concept is explicitly defined in chapter two of this study as a continuous, integrated, multi-sectoral and multi-disciplinary process. The disaster management co-ordinator agreed on the above statement as sectors involved in preventing and reducing post disasters are the South African Police Services (SAPS), South African National Defence Force (SANDF), Non

Governmental Organizations (NGO's), Community Based Organizations (CBO's) and Faith Based Organizations (FBO's).

Despite the absence of the disaster management centre, a framework and a plan the eThekweni Municipality's disaster management team has managed international events successfully such as the Non-Aligned Movement (NAM) Conference, 1995 Rugby World Cup and 1993 Cricket World Cup. The disaster management coordinator explained their future expectations for both urban and peri-urban areas of the city. He mentioned that they are in the process of drafting a disaster management plan including a risk profile which is part of a business plan. He said that there is a draft framework for disaster management attempting to comply with the act. The most crucial point he made is that the disaster management team is organizing existing structures within the community to expand awareness and education.

According to the manager (fire department), the Expanded Public Works Programme (EPWP) and Social Sector Programme will be recruiting community volunteers through Community Based Organisations (CBOs) for the provision of community-based responses to emergency services. The Fire Safety Officer stated that the volunteers will be trained to become Basic Ambulances Assistants or Paramedic level for efficient and effective response to various forms of emergencies.

7.3.5.1.4 FINANCIAL IMPLICATIONS

In the eThekweni Municipality, there are financial and personnel constraints encountered during disaster preparedness and post disaster recovery. Financial and personnel constraints that the disaster management experience is under funding, under resourced, understaffed and incorrectly placed fire services in the municipality. The disaster management manager argued that the disaster management team should report directly either to the executive mayor or to the city manager. This in keeping with section 51(1b) of the Disaster Management Act that states a senior representative of each department or component within the administration of the municipality designated by the executive or mayor, as the case may be should be accountable.

7.3.5.1.5 CHALLENGES

The councillor reported inadequate resources and financial constraints such as fire hydrants are not functioning, lack of funds to build metal houses and the scarcity of land to build formal descent houses as some of the challenges.

7.3.5.1.6 RESPONDENT'S EXPECTATIONS FROM THE MUNICIPALITY

The respondent's future expectations is the satisfaction of basic needs in the form of housing as it is enshrined in the Constitution. There is slow progress on housing delivery in Foreman and Kennedy Road informal settlements, even though the municipality concurs that the area is mainly affected by fires. The councillor confirmed that Kennedy Road informal settlements will be cleared in 2010 and upgraded. Foreman Road will be relocated to Cornubia settlement and Kennedy Road will be part of a relocation project within close proximity. They have identified land nearby to construct some houses. The councillor indicated that the council normally built houses to the value of R40 000 in respect of Lacey Road shack settlements. The council has arranged with the SHIFA Private Hospital to fund the development of these shacks into formal houses in order to give the residents bigger and better homes. In return the private hospital will buy land from council at market value.

7.3.5 OBSERVATIONAL FINDINGS

The researcher discovered that there are other contributing factors to the prevalence of fires in the informal settlements besides the building material types. The poor refuse collection was observed as exacerbating fires in the informal settlements as fires disperse faster due to the fact that informal settlements in between are clustered by waste made up of plastics and papers.

Furthermore, refuse collection contributes to poor health such as increasing rodents in the area which are dangerous, harm and kills children. The researcher further observed that there are many illegal activities in the informal settlements which involve illegal electricity connections, illegal and semi-legal activities such as selling of drugs (dagga), alcohol and sex work. The researcher observed the density of the informal settlements which were nucleated without space in between amounting to half a metre maximum between shacks.

The researcher observed that people in these informal settlements have sources of income through semi-illegal or illegal activities such as sex work, selling of drugs and alcohol. The research findings shows that both male (75%) and female (70.7%) are unemployed. However, it is well known that there are other illegal activities such as illegal electricity connections and sex work which would not be fully reflected in the data as respondents would be reluctant to disclose such information. Female constitute the highest figure composed to them than their male counterparts in respect of part time contract and temporary employment. This difference is caused by the fact that women are employed as domestic workers in the nearby Clare estate formal settlements.

In eThekweni Municipality, a third of the population or around half of the African population live in informal settlements. The researcher observed that Foreman and Kennedy Road informal settlements are constituted of unemployed, semi-literate youth and eThekweni Municipality is failing to implement Adult Basic Education and Training (ABET) and SETA programmes to impart technical skills to the youth.

7.3.6 RESPONDENT'S EXPECTATIONS FROM ETHEKWINI MUNICIPALITY

On the future expectations the research findings indicates that 4.3% of the respondents expect the municipality to build houses, and 83.6% for job opportunities and pensions respectively.

7.4 EMPIRICAL FINDINGS

- eThekweni Municipality is failing to keep pace with housing backlogs and many people continue to settle on land which is exposed to hazards and live in settlements that are unsafe (as is the Foreman and Kennedy Road informal settlements).
- The lack of available land for de-densification, relocation, and the construction of new housing is a major problem encountered by eThekweni Municipality to eradicate informal settlements. The finding was supported by El-Masri and Tipple (2002) who revealed that the high costs of urban land, low levels of affordability,

inappropriate land policies and speculative developments by the private sector are some of the problems to build low cost houses (see page 28).

- Flammable building materials in the informal settlements, high densities and a lack of knowledge about appropriate protection measures contribute to fires at Foreman and Kennedy Road informal settlements. El-Masri and Tipple (2002) suggested that land-use policies for the mitigation of disasters should be complemented by appropriate housing design, construction methods and use of building materials (see page 27). Furthermore, MacMahon and Faen (2007) asserted that poor resources for sturdy construction, inadequate disaster warning systems, communications technology or disaster response (see page 28)
- Research conducted (see page 17) by Dunne and Mhone (2003), revealed that the impact of disasters at the household level, disrupts normal livelihoods, displaces families, destroys infrastructure and disentangles social and community networks. Foreman and Kennedy Road informal settlement resident's ability to recover from fires are minimal because social (social capital, as family and social relations break down) and physical assets are worn away.
- eThekweni Municipality's response after the disaster is through supply of blankets and food which led to disagreements of how the resources should be shared and politics dictate who would and would not receive aid. Dwivedi (1994:4) holds the view that public representatives, political-office-bearers and public officials have an important role to play in reconciling the opposing views based on the concept of a democratic ethos (see page 184).
- According to Van Zyl (2006), best practices in disaster risk reduction such as indigenous knowledge application, disaster management plans and development initiatives should be stated in the IDPs (see page 20). The eThekweni Municipality's Integrated Development Plan (IDP) is silent about informal settlements while the Municipal Systems Act (RSA, 2000) says that this type of spatial and developmental guidance comes from the IDP. There is no strategic, guiding policy, both in terms of the objectives of upgrading and the location of new permanent formal settlements. According to Huchzermeyer (2003), the absence of policy dealing with people living in the informal settlement has misled

provincial and local governments on how to treat those that are driven to make this insecure form of shelter their home through illegal invasion. (see page 184).

- After the disaster women and children seek refuge in community halls which results to their vulnerability from rapes and abuse. Research conducted by Bullock *et al.* (2007) indicated that there are predictors that clearly to their point part of the population are most likely to be vulnerable. These factors include gender, age, education, income, and ethnicity (see page 46).
- Social progress occurs in the informal settlements after the disaster through enlightened technocratic interventions or through civil society or NGOs. According to Annelies and Victoria (2001:1), the Philippine government's inadequacy and the limitations of the prevailing view of disaster management compelled NGO's and people's organisations to promote and develop an alternative approach with the organisation of the Citizens' Disaster Response Centre or Network (CDRC/N) in 1984 (see page 70).
- Haddow *et al.* (2006:194) asserted that local governments often feel that federal and state (USA) mandates overlap restrictively and do not provide enough funding. eThekweni Municipality have failed to establish a disaster management fund to assist the victims of disasters.

7.5 SUMMARY

Upon conducting an analysis of the data, conclusions can be made regarding various dimensions (disaster preparedness, mitigation, response, recovery and rehabilitation as well as financial implications) that influence disaster management respectively. Inferences are drawn concerning the demographic variables and the various dimensions (disaster preparedness, mitigation, response, recovery and rehabilitation as well as financial implications) that impact on disaster management.

Firstly, the study shows no significant relationship between employment opportunities and occupation. Secondly, results show that there is a significant relationship between timber as a building material used and protection from floods. Thirdly, analysis of data reflects a significant association between building dam walls and acceptable standards. Fourthly, results indicate that there is a significant

relationship between the rating of civil society and municipal officials, police and NGOs. Moreover, the study findings reflect a significant association between the rating of civil society and municipal officials, police and NGOs.

The high unemployment rate of 75% indicated by the research findings show that the respondents cannot afford to upgrade these informal settlements. The high percentage of unemployed respondents reflects a lower socio-economic status as a whole. The study further shows that there are few respondents who come to urban areas because of tertiary education and health care (5.7%). One of the contributing factors of people to settle in the informal settlements is the high death rate caused when the bread winner dies predominantly by HIV/AIDS related diseases or loss of employment.

Both Foreman and Kennedy Road informal settlements have been badly affected by fires, causing a number of deaths amongst children. Huchzermeyer (1996:23) argues that children in such settlement have nowhere to play, and the density of the informal settlements prevented mothers from keeping a watch over their children. The Bill of Rights of the South African Constitution enshrines the rights “to privacy” (Republic of South Africa, 1996:8), to an environment that is not harmful to their health and well-being), “to have access to adequate housing”, and for every child, “the right to be protected from maltreatment, neglect, abuse or degradation”.

Stolen electricity claimed at least 11 young lives in the year 2000 in Cato Crest squatter camp (Ka-Manzi, 2001:9). The researcher observed that children are electrocuted by uninsulated live electricity wires serving individual households. Poor refuse collection in the informal settlements lead to unsanitary conditions which exacerbated the rate of children being bitten into death by rats. Informal settlements burn easily as they are built of combustible materials such as wood, plastic and cardboard and are further perpetuated by uncollected refuse that leads to vermin which is also burnt. Huchzermeyer (1996:7) argues that the squatters in Nyanga (Cape Town) were relatively powerless against neglected by local government officials, the irregular collection of refuse and night soil, as well as abuse associated with the collection of over-spilling night soil buckets.

The findings of this study are confirmed by a survey conducted in 2001 which found that “over half of the household heads residing in informal dwellings have lived in their homes between five and ten years and a quarter have lived in them for over eleven years” (Statistics South Africa, 2000). This is an average of 920,000 people, 16.4 per cent or about one in six of all South African household live in informal settlements. The number of South African households living in informal settlements is increasing at more than double the rate of population growth (Statistics South Africa, 2000).

The mushrooming of informal settlements was also caused during 1980s where people were escaping political violence between the Inkatha Freedom Party and the African National Congress in their areas of origin. Some people escaped family violence and some they were not paid enough money to afford a formal house as 60.7% of people in eThekweni Municipality live on less than R427 (eThekweni Municipality, 2005:68) a month and the rent might be minimum of R300 and maximum of R500.

Fires in the informal settlements are perpetuated by the fact that there are no preventative measures in place such as fire extinguishers and water in hydrants.

Within eThekweni Municipality, the estimate stands at 40% to 50% of households rendered homeless through relocations (COHRE, 2008:130). In some instances the vacated settlements are razed to the ground, in other instances re-occupation occurs, to the frustration of housing authorities.

The researcher observed the steepness of the topography where these informal settlements are built without any structural mitigation in place which contributes to the respondents being unsafe. The researcher found that fires mainly in the informal settlements are caused by combustible building materials which is a waste collected from the nearby landfill site as well as the cutting of trees planted mainly for environmental protection. According to the Overseas Development Administration (ODA) (1992) and Hardoy *et al.* (1993), poor and desperate people not only suffer from environmental decline created by rapid uncontrolled urban expansion and inadequate policies, but also themselves become a cause of

ecological deterioration by over-exploiting surrounding natural resources and by neglecting environmental quality under the pressure of survival.

This indicates a danger to environmental conservation and management as these settlers remove trees which are planted to rehabilitate certain areas or trees mainly for balancing the ecosystem. This shows that the respondents collect toxic material as they are located near a landfill site. The researcher observed that in these settlements the kind of zinc used is converted from a drum filled with chemicals and strengthened in order to cover the shack. This can be a contributing factor to the respondent's health as the majority of the people within eThekweni Municipality informal settlements have respiratory problems.

Poor knowledge of disaster management activities shows that eThekweni Municipality's programmes and projects are not implementable regarding awareness on disasters. This is due to the fact that shack dwellers cannot afford to buy televisions and radios since the majority are unemployed and the area does not have electricity to use such appliances.

The respondents indicated that fire fighters started responding to shack fires after the struggle by the Abahlali Basemjondolo which attracted the media and the academics. The Abahlali Basemjondolo (Shack Dwellers) Movement began in Durban, South Africa, in early 2005. Although it is overwhelmingly located in and around Durban it is, in terms of the numbers of people mobilized, it is the largest organization of the militant poor in post-apartheid South Africa. The ambulance and police responds late to shack fires if they know the call is from informal settlements. Another hindrance to the response to fires is caused by the lack of roads and physical addresses in the informal settlements.

The municipality provides blankets, food and accommodate shack dwellers in tents or transit camps and pays for funerals. The municipality focuses on the remedial actions (supplying residents blankets and food parcels after disasters) rather than the future social welfare of the community such as the basic needs. Municipal interpretations of the constitutional obligation 'to active progressive realization' of the right to access to 'sufficient access to water' (COHRE, 2008:132),

particularly in relation to informal settlements is not adhered to by some municipality (such as eThekweni) in South Africa.

The City of Cape Town is leading with a fairly consistent delivery of basic services to its informal settlements which alleviated disaster occurrence (Graham, 2006:130). eThekweni Municipality's disaster management department provides short-term relief, basic blankets and food, whereas there are no strategies for disaster management prevention, preparedness, mitigation and relief. The Department of Housing in 2004 unveiled a housing strategy which indicates a new direction and includes a programme specifically for informal settlement upgrading (Department of Housing, 2004:23). This new approach 'envisages that municipalities will play a significantly increased role in the housing process' (Department of Housing, 2004:10) and will be the primary implementing agents of the programme, following a national trend towards development local government (RSA, 2000; Parnell *et al.* 2002).

Even though the Slums Clearance Programme which was adopted in 2001 by the municipality has prohibited the rebuilding of shacks after fires, the residents cleared the debris and commenced rebuilding before the ground had cooled. The researcher found that as people partially rebuilt houses, the Land Invasions Unit under armed police protection two days later bulldozed their houses.

The interviews conducted with eThekweni Municipality's officials and councillors are briefly discussed and analysed. The findings emanating from the interviews depict that the municipality is at the initial stage of disaster management and its main role is response rather than avoiding, preventing, preparedness and mitigating the impact of disasters.

CHAPTER 8

RECOMMENDATIONS AND CONCLUSION

8.1 INTRODUCTION

The results of the research indicate both Foreman and Kennedy Road informal settlements as well as eThekweni Municipality officials perceptions and the current status of the various dimensions of disaster management, namely, disaster preparedness, mitigation, response, recovery and rehabilitation and the impact of disaster management strategies within eThekweni Municipality. This chapter provide the conclusion and recommendations based on the previous chapters and the future research imperatives on disaster management in local government based on the study.

8.2 OVERVIEW

Disasters occur when hazards impact on a community to the extent that available resources cannot cope with the problem effectively and efficiently. Poor knowledge on disaster management in the informal settlements of eThekweni Municipality leads to deterioration in disasters. Informal settlements encounter life-threatening hazards which are exacerbated by shack fires, electrocutions through illegal electricity connections and exposure to extreme temperatures through the poor insulation qualities of the shack materials. Uncontrolled fire has a serious impact on the lives of all communities, citizens, businesses and public infrastructure. The impact on loss of life and the destruction of property and possessions is difficult, if not impossible, to quantify. People living in densely populated informal settlements, without insurance, are particularly vulnerable to the effects of uncontrolled fires. The municipality should be concerned about the human suffering and economic loss that result from fires. The response to disasters should be guided by a three phase approach such as preventing fires where possible, responding to fires when they do occur, and assisting communities to recover from the effects of the fires.

The eThekweni Municipality does not allow electricity in informal settlements, despite the fact that paraffin is more expensive and unaffordable for many people. Paraffin is also a danger to health, many shack dwellers note that paraffin fumes

cause respiratory problems and children in informal settlements are poisoned after drinking it by accident.

The response against disasters in the informal settlements cannot be seen as the responsibility of eThekweni Municipality alone. Addressing disaster management in South Africa will also require interventions to be undertaken in a coherent manner across all three spheres of government (national, provincial and local). Furthermore, the legal, social and built environment professionals will be required to work together, in response to community-based experiences.

The research findings indicated no significant relationship between fires and protection of the informal settlement dwellers from fires. The study indicated a significant relationship between timber and wood used as building materials and protection from floods and fires. The study further showed no significant relationship between mitigation information and preparedness handouts supplied to the respondents. The study depicted a significant relationship between the role of government officials (municipal officials and SAPS) and civil society (NGOs) after a disaster. It is indicated from the study findings that the municipality provides the victims of disasters with food, tents and transit camps and pays for the funeral of disaster victims.

There is poor attention paid to shack dwellers as they are residing in the same location after a disaster, by providing the appropriate infrastructure to reduce vulnerability in future. The planning policies and practices fail to solve informal settlements that are susceptible to fires without any warning systems in place. The repercussions of fires are holistically addressed in other places such as Brazil. The study indicated that closely nucleated informal settlements with houses built of flammable materials which are burnt in all seasons cannot be predicted and emergency responses are poor. Moreover, eviction of communities by force to other areas without alternatives is regarded as a disaster on its own, as most people are displaced. The informal settler's decision to occupy disaster-prone settlements is influenced by a lack of alternative opportunities, scarce resources, the need to gain access to employment, and short-term horizons.

Both rapid urbanisation and poverty perpetuate the vulnerability of people in these informal settlements, leading to a number of serious negative aspects such as profit-seeking and ignoring environmental quality and inadequate housing conditions. The physical vulnerability of Foreman and Kennedy Road informal settlements is a manifestation of vulnerable socioeconomic conditions and institutional incapacity, which force people to expose themselves to risks in the first place. Disagreements between eThekweni Municipality and the community (political) leaders over the levels of municipal services and location of services, claimed by residents to be the result of a lack of consultation hinders the implementation of development projects. Many disruptions are caused by community marches to the council, disputes over opportunities and payment for casual employment of settlement residents during the installation of services. The universal expectation that any manual labour involved in upgrading must be recruited from the settlement involved has become an accepted feature of state projects across South Africa.

8.3 RECOMMENDATIONS

Results indicated a significant relationship amongst the key variables of the study relating to disaster management in local government. This chapter aims to provide recommendations to eThekweni Municipality with regard to the findings of this study as well as recommendations for future research.

8.3.1 DISASTER PREPAREDNESS

Subsequent to the aforementioned findings of the study in chapter seven it is recommended that:

- eThekweni Municipality should in full comply with the Disaster Management Act 57 of 2002 which requires the establishment of a disaster management centre, disaster management framework and a disaster management plan to be attached to the Integrated Development Plan (IDP).
- eThekweni Municipality should model all components for disaster management such as mitigation and preparedness in order to simplify all risk reduction processes.
- eThekweni Municipality should implement best practices which include indigenous knowledge application, disaster management plans and development initiatives.

Moreover, examples of best practice must encapsulate early warnings messages through community radio stations, television and pamphlets, in order to be disseminated to vulnerable communities.

- It should design a comprehensive preparedness programme which can increase the community's capacity to cope with the larger hazard impacts.
- A disaster management software programme such as Geographical Information System (GIS) should be used for the purpose of disaster management preparedness planning to fulfil the requirements of the Disaster Management Act 2002.
- eThekweni Municipality should disseminate technical knowledge and training, awareness, accessing local knowledge and resources and mobilizing local communities.
- The council should promote integrated and coordinated disaster management through partnerships between different stakeholders and through cooperative relations between all spheres of government.
- eThekweni Municipality should formulate a policy to upgrade and locate new permanent formal settlements.
- An innovative foldaway house should be developed or procured to replace tents as a means of accommodation following a disaster.
- The South African defence force should train municipalities in disaster management and build houses for the Department of Human Settlement as they have quick response mechanisms and have a capacity which no municipality has.
- eThekweni Municipality's Fire and Emergency Services should design a course on Fire Fighting and Prevention specifically to be implemented in the informal settlements. The trainees will be expected to take back the skills and knowledge gained and educate residents in the informal settlements. The trainees will also assist the fire brigade, as they would have a good understanding of the procedures and protocols for fire fighting.
- eThekweni Municipality must establish a strategic response system which should assess informal settlements within the municipality in high risk areas and which are potentially vulnerable to disasters and recurrent hazards.
- eThekweni Municipality should develop an action plan for disaster preparedness.

- The Municipality should follow legalities before evicting shack settlers. The municipality must take into cognizance the South African Constitution, chapter 26 (3) which states that *“no one may be evicted from their home, have their home demolished, without an order of court made after considering all the relevant circumstances.”*
- eThekweni Municipality should mobilise, train or coach staff and volunteers to acquire skills and develop a program for addressing local vulnerability as well as to develop their disaster response skills.
- eThekweni Municipality should establish a good working relationship with other government spheres and other preparedness and response organisations (local and international).
- The council should have a designated media contact person to inculcate and cascade information to the informal settlements.
- eThekweni Municipality, in conjunction with other spheres of government and NGO's, should provide funding to tertiary institutions in order to design and implement curricula for disaster management.
- eThekweni Municipality should conduct more scientific studies in order to improve the effectiveness of disaster preparedness and prevention.

8.3.2 MITIGATION

- Disaster management practices should evolve from largely a top-down relief and response approach to a more inter-sectoral risk management approach.
- eThekweni Municipality should include hazard mitigation objectives in their everyday investment policies to reduce community hazard vulnerability.
- The council should develop a system to classify hazard mitigation strategies in terms of five categories which are hazard source control, community protection works, land-use practices, building construction practices and building contents protection.
- eThekweni Municipality should incorporate disaster risk assessments into urban development planning and management of disaster prone human settlements, rural development, major infrastructure, including considerations based on social, economic and environmental impact assessments.

- It should work collaboratively with other agencies whose work helps to prevent fires and improve response systems or strategies, for example, rapid road access, road naming, and house numbering, providing fire-fighting water in hydrants, street lighting, and telecommunications.
- Geographical Information Systems (GIS) should be used mainly for hazard identification and mapping.
- eThekweni Municipality should design and construct applications as a mitigation strategy to help regulate any infrastructural construction by implementing coding systems that support risk reduction.
- Mitigation strategies with technical tools should be designed to determine where the floodplains are in the communities in order to steer development away from such areas using maps.
- Strategies for land-use planning should be implemented in order to offer many options for effecting mitigation, including acquisition, easement, storm water management, annexation, environmental review and floodplain management plans.
- Insurance for disasters should be implemented as a mitigating strategy to anyone buying a property.
- eThekweni Municipality must use a bottom up approach if a particular area is seen as being a high-risk area, by consulting the community and identify areas for development in order for the residents to relocate.
- Once the area has been identified as the high risk zone, eThekweni Municipality must embark on a “sustainable mitigation” approach which encourages community participation, monitoring and community consulting in decision-making.
- The council should where possible, identify strategies for the integration of traditional leadership structures and communities in line with the promotion of indigenous approaches to disaster management.
- The council should develop an action plan for the assessment of vulnerability as well as risk assessment criteria.
- eThekweni Municipality must institute a three metre wide break programmes to all informal settlements to prevent fires from escalation.

- Foreman and Kennedy Road water tanks must be positioned in various parts in order to provide sufficient water to extinguish any fires that may start.
- The council should provide formal adequate houses to informal settlements as they give rise to diseases, high hazardous conditions and accidents more especially women and children.
- eThekwini Municipality must provide basic services including water, electricity, and sanitation and refuse removal to all informal settlements suitable for further upgrading.
- The council should relocate informal settlements that are located in a flood plain, in an electricity or pipe servitude and on old landfill site because of its potential danger.
- eThekwini Municipality should establish a comprehensive performance management system with a particular focus on disaster management personnel.

8.3.3 RESPONSE, RECOVERY AND REHABILITATION

- eThekwini Municipality should redefine disaster recovery that includes major stakeholders from land-use and building construction agencies, business groups, and neighbourhood associations.
- The council should recognize the recovery period as a unique time to enact policies for hazard mitigation and incorporate this objective into the recovery planning.
- The 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.
- eThekwini Municipality should establish a database that should generate spatial models for informal settlements using remote imagery which is a popular means for monitoring.
- The council should work collaboratively with other agencies whose work helps to prevent fires and improve response times, for example, rapid road access, road naming, and house numbering, providing fire-fighting water in hydrants, street lighting, and telecommunications.

- eThekweni Municipality should allow the shack settlers to modernize or convert their shacks into permanent (formal) housing subject to approval from the Town Planning department.
- The council should adjust the zoning regulations in regards to the land illegally invaded by the shack dwellers and develop appropriate approaches.
- The council should develop an action plan for the rehabilitation of communities in terms of economic, psychological and social well being taking into account high levels of vulnerability exacerbated by HIV/AIDS.
- eThekweni Municipality should establish and implement a comprehensive volunteer mobilisation action plan.
- Disaster management department must be the function of the office of the mayor or the municipal manager as mandated by the Disaster Management Act 57 of 2002.
- NGO's such as the Red Cross and Salvation Army must be mobilised to provide medical attention for smoke inhalation and other minor injuries incurred in the fire.
- Local supermarkets should be mobilised to supply food and blankets to the victims of the disasters.
- eThekweni Municipality should consider and pay attention to the benefits of keeping shack dwellers in the same location after a disaster as they are close to all amenities and enjoy economic viability, by providing infrastructure to reduce vulnerability in future.
- Training communities to understand risks and how to respond to disasters serves as prevention and response function.

8.3.4 FINANCIAL IMPLICATIONS

- eThekweni Municipality should provide disaster financial assistance on the disaster management prevention and preparedness strategies.
- eThekweni Municipality should ensure that during renovating or building of the informal settlements in the form of Reconstruction and Development Programme

(RDP) houses, local labour must be employed in order for the community to own the project and improve their standard of living.

- eThekweni Municipality in conjunction with the NGOs should embark on the fundraising activities and establish a disaster emergency fund.
- Furthermore, eThekweni Municipality's shack settlers in conjunction with NGOs and government should establish a "shack formalisation programme", where shack dwellers will be provided with employment in order to contribute financially.
- The national or provincial government should give financial support to the municipality and ensure that adequate financial arrangements are in place before and after disasters or emergencies.

8.4 FUTURE RESEARCH IMPERATIVES

- This study focused on two study areas (Foreman and Kennedy Road informal settlements) within eThekweni Municipality. Thus, future research might focus on all informal settlements within the eThekweni Municipality.
- Future research needs to focus on informal settlements in different provinces of South Africa with the aim of making comparison.
- Future research can also look at municipalities with informal settlements in South Africa and abroad.
- While the study only focused on disaster risk management components, future research can look at other factors such as public involvement in preparedness planning, Geographical Information Systems (GIS) applications, legal liability and intergovernmental tensions to disaster management.
- Furthermore, future research can look at traditional leadership structures and the role played by their communities in disaster management through the promotion of indigenous knowledge.

BIBLIOGRAPHY

PUBLISHED BOOKS

- Allen, K. 2006. **Building Community Resilience to Disaster in the Philippines', in International Federation of Red Cross and Red Crescent Societies (ed) *World Disaster Report: Focus on Community Resilience***, Geneva: International Federation of Red Cross and Red Crescent Societies.
- Anderson, B. 2000. **"A Guide to the Establishment and Implementation of an Effective Risk Management Programme"**, National Safety Council of Australia.
- Anderson, D.R., Sweeney, D.J., and Williams, T.A. 2005. ***Statistics for business and economics***. Ohio: Thomson-South-Western.
- Arnell, S. J., Yohe, G. W., R. D., Lasco, Q. K., Ahmad, N., Cohen, C., Hope, A. C., Janetos, and R. T. Perez. 2007. **"Perspectives on Climate Change and Sustainability." In *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change***, ed. M. L., Parry, O. F., Canziani, J. P. Palutikof, P. J., van der Linden, and C. E., Hanson. Cambridge, UK: Cambridge University Press.
- Ashford, N. A. 1993. ***Understanding technological responses of industrial firms to environmental problems: Implications for government policy***. In K. Fischer & J. Schot (Eds.), *Environmental strategies for industry*. Washington DC: Island.
- Aucoin, Peter (1990) "Administrative Reform in Public Management: Paradigms, Principles, Paradoxes and Pendulums," ***Governance***, 3(2): 115-137.
- Babie, E., Mouton, J. and Prozesky, B. 2002. ***The Practice of Social Research***. Oxford: Oxford University Press.
- Bankoff, G. 2003. ***Cultures of disaster: Society and natural hazards in the Philippines***. London: Routledge.
- Bell, J. 2005. ***Doing Your Research Project***. 4th edition. Buckingham: Open University Press.
- Berenson, M.L., and Levine, D.M.1992. *Basic Business Statistic*. Upper Saddle River, NJ: Prentice Hall.
- Bereton, D. 1994 .***The efficiency unit . Its purpose, history, operation and***

- results achieved in The Quest for Effective Government**, Sindicatura de Comptes de Catalunya, Barcelona.
- Birly, G. and Moreland, N. 1998. **A practical Guide to Academic Research**. London: Kogan Page Limited.
- Bless, C. and Higson-Smith, D. 1995. **Fundamentals of Social Research Methods- An African Perspective**. 2nd edition. Cape Town: Credo Press.
- Blumberg, B., Cooper, D.R. and Schindler, P.S. 2005. **Business Research Methods**. Maidenhead: McGraw-Hill.
- Botes, P.S., Brynard, P.A., Fourie, D.J. and Roux, N. L. 1997. **Public Administration and Management**. 2nd edition. Pretoria: Kagiso tertiary.
- Bremer, P. L. 2003. Assessing the terrorism risk, in: The terror risk: Can it be managed?
- Bryman, A. 2004. **Social Research Methods**. 2nd edition. Oxford: Oxford University Press.
- Bull, R. 1994. **Disaster economics. Disaster Management Training Programmes**. Geneva: UNDP and DHA.
- Bullock, A. and Perry, P. 2000. "The Historical Context of Emergency Management." **Introduction to Emergency Management**. Third Edition. Burlington, MA: Butterworth-Heinemann.
- Cannon, T. 1994. **Vulnerability analysis and the explanation of 'natural' disasters: In Disasters, Development and Environment**. Chichester: Wiley & Sons.
- Clay, E. 2004) **"Understanding the economic and financial impacts of natural disasters"**. *Disaster Risk Management*. Washington D.C: IBRD/WB
- Cloete, J.J.N. 1967. **Introduction to Public Management**. 1st edition. Pretoria: J.L. van Schaik.
- Coburn, A.W. and Kuran, U. 1993. **Emergency Planning and Earthquake Damage Reduction for Bursa Province. Cambridge: Martin Centre, University of Cambridge**.
- Coetzee, A.J. 1991. **Public Administration**. 2nd edition: J.L. van Schaik. ISBN. 0627024793.
- Coetzee, J.M. 1988. *White Writing: On the Culture of Letters in South Africa*: Yale University Press.
- Cooper, J. and Schindler, P. 2006. **Business Research Methods**. 9th ed. New York:

McGraw Hill.

- Cutter, S. L., Richardson, D. B. and Wilbanks, T. J. 2003. ***The Geographic Dimension of Terrorism***, New York and London: Toutledg,
- Daines, G. E. 1991. ***“Planning, training, and exercising.” Emergency management: Principles and practice for local government***, Washington, D.C, International City/County Management Association.
- DeMarchi, B., Pelanda, C. (Eds), *Sociology of Disasters: Contributions of Sociology to Disaster Research*. Franco Angeli, Italy, 71-102. Humanitarian Aid Workers and the Media in the Midst of Crisis, Baywood Publishing Company, Inc, New York, 2002.
- Devas, H. 2002. *Advanced Research Methodology*, London: Routledge.
- Dunsire, A. 1973. ***Administration: the world and the science***. London: Martin Robertson.
- Dwivedi, K.N. 1999. *Group work with children and adolescents*. London: Jessica Kingsley Publishers.
- Federal Emergency Management Agency (FEMA). 2000. ***Report on Costs and Benefits of Natural Disaster Mitigation***. Washington D.C.: Toronto: Environment Canada.
- Ferlie, E., Hartley, J. and Martin, S. 1999, “Changing public service organisations: current perspectives and future prospects”, ***British Journal of Management***, 14: S1-S14.
- Ferlie, E., Pettigrew, A. Ashburner, L. and Fitzgerald, L. 1996. ***The New Public Management in Action***, Oxford University Press, Oxford.
- Flynn, N. 1993. ***Public Sector Management***, Harvester Wheatsheaf, London.
- Forster, D. 1980. ***Disaster Planning: The Preservation of Life and Property***. New York: Prentice Hall.
- Fox, W. and Meyer, I.H. 1995. ***Public Administration Dictionary***. Stellenbosch: Juta.
- Gall, J. And Johnson, P. 2002. ***Research Methods for Managers***. 3rd edition. London: Paul Chapman
- Gates, R. and McDaniel, C. 1998. ***Marketing Research Essentials***. 2nd edition. Ohio: South Western College Publishing Cincinnati.
- Geis, D.E. 1996. ***Creating Sustainable and Disaster Resistant Communities***. Aspen Global Change Institute, Aspen.

- Gildenhuys, J.S.H. and Knipe, A. 2000. ***The Organisation of Government***. Pretoria: Van Schaik.
- Graziano, A. M. and Raulin, M.L. 2000. ***Research Methods: A Process of Inquiry***, 4th edition, Bosto: Allyn and Bacon.
- Greer, P. 1994. ***Transforming Central Government: The Next Steps Initiative***, Buckingham and Open University Press, Philadelphia.
- Guba, E.G. and Lincoln, Y.S. 1989. ***Forth Generation evaluation***. Newbury Park CA: Sage.
- Haddow, D.G. and Bullock, J.A. 2006. ***Introduction to Emergency Management***. 2nd edition. New York: Elsevire Butterworth.
- Hardoy, J., Mitlin, D. and Satterthwaite, D. 1993. ***Environemmental Problems in Third World Cities***. London: Earthscan.
- Hayndman, D. 2006. ***Natural Hazards and Disasters***. New York: Thomson Brooks/Cole.
- Heller-Paz, D., Nigg, J.M. and Turner, R.H. 1986. ***Waiting for Disaster. Los Angeles***: University of California Press.
- Henry, G.T. 2000. ***Practical Sampling***. Newbury Park: CA, Sage.
- Hindson, D. And McCarthy, J.1994. ***Defining and Gauging the Problem, In: Here to Stay: Informal Settlements in KwaZulu Natal***. Cape Town: University of Cape Town Press.
- Hodgkinson, P.E. and Steward, M. 1991. ***Coping with Catastrophe: A Handbook of Disaster Management***. New York: Prentice Hall.
- Hood, C 1995. Contemporary Public Management: A New Global Paradigm? ***Public Policy and Administration***. 10(2): 104-117. Reprinted in Michael Hill, ed. *The Modern Policy Process: A Reader*. London: Prentice Hall, 1993; 1997 (2nd ed.): 404-417.
- Hood, C. 1991 .A public management for all seasons, ***Public Administration***, 69 (1):3-19.
- Hood, C. 1999. "A Public Management for All Seasons." ***Public Administration***. 69: 3-19.
- Housner, L. 1989. ***International Disaster Management***. Third Edition. Burlington, MA: Butterworth-Heinemann.
- Hughes, O.E. 1998. ***Public Management and Administration: An Introduction***. New York: St. Martin's Press.

- Hy, R.J. and Waugh, W.L. 1990. ***The function of emergency management***. In W. L. Waugh and R.L. Hy (ed), ***Handbook of emergency management Programs in the United States***, Washington, D.C: Joseph Henry Press.
- Ingraham, P.W. 1996. '***The Reform Agenda for National Civil Service Systems: External Stress and Internal Strains***', pp. 247–67 in H.A.G.M. Bekke, J.L. Perry and T.A.J. Toonen, eds, ***Civil Service Systems in Comparative Perspective***. Bloomington: Indiana University Press.
- Jegillos, S. 1991. ***Fundamentals of disaster risk management: How are Southeast Asian countries addressing these? (in Risk, Sustainable development and Disasters Southern perspectives, Cape Town: Periperi publications.***
- Jumbare, M.J. ***Mitigating Floods in Southern Africa***: Guleid, A. Artan, Miguel Restrep. 2002. A Flood Early Warning Systems for Southern Africa. USGS, EROS Data Centre. Sioux Falls, SD.
- Kahn, R. and Cannel, C. 1957. ***The Dynamics of Interviewing***. New York and Chichester: Wiley.
- Kahn, R.L. and Cannell, C.F. 1957. ***The Dynamics of Interviewing: Theory, Technique and Cases***. New York: John Wiley & Sons.
- Larbi, G. 1991. 'Management Decentralization in Practice: A Comparison of Public Health and Water Services in Ghana', pp. 188–206 in M. Minogue, C. Polidano and D. Hulme, eds, ***Beyond the New Public Management: Changing Ideas and Practices in Governance***. Cheltenham: Edward Elgar
- Larbi, G.A. 1991. ***The New Public Management Approach and Crisis States***, United Nations Research Institute for Social Development (UNRISD) Discussion Paper 112, September 1999. Geneva: UNRISD.
- Lewis, P.A. Saunders, M. and Thornhill, A. 2007. ***Research Methods for Business Students***. fourth edition. New York: Prentice Hall.
- Lindell, M.K. and Perry, R.W. 1992. ***Behavioural foundations of community emergency planning***. Hemisphere: Washington D.C.
- Lindell, M.K. Prater, C. and Perry, R.W. 2007. ***Introduction to Emergency management***. New York: Prentice Hall.
- Liongson, L. Tabios, G. and Castro, P (eds). 2000. ***Pressure of Urbanization: Flood Control and Drainage in Metro Manila***. Quezon: University of the Philippines-Center for Integrated Development Studies.

- Lowrance, W.W. 1976. ***Of Acceptable Risk***. California: Los Altos.
- Mallon, R.D. 1994. 'State-Owned Enterprise Reform Through Performance Contracts: The Case of Bolivia'. ***World Development*** 22(6): 925–34.
- Mascarenhas, R. C. 1993 .Building an enterprise culture in the public sector: Reforms in Australia, New Zealand and Great Britain., ***Public Administration Review***, 53(4):319-328.
- McAdam, McCarthy, and Zald, 1999. *Comparative Perspectives on Social Movements*. Cambridge, England: Cambridge University Press. 1999.
- Meyer, C. 1983. ***Clinical social work in the eco-systems perspective***. New York: Columbia University Press.
- Mileti, D. S. 1999. ***Disasters by design: A reassessment of natural hazards of policies dealing with major hazards and disasters***. New York: Greenwood Press.
- Minogue, M. 1998. 'Changing the State: Concepts and Practice in the Reform of the Public Sector', pp. 17–37 in M. Minogue, C. Polidano and D. Hulme, eds, *Beyond the New Public Management: Changing Ideas and Practices in Governance*. Cheltenham: Edward Elgar.
- Mouton, E.B. Payze. P. and Prozesky, P.V.B. 2004. ***The practice of social research***. Cape Town: Oxford University Press Southern Africa.
- Neuman, W.L. 2000. ***Social Research Methods: Qualitative and Quantitative Approaches***. 4th edition: Allyn and Bacon.
- Overseas Development Administration. 1992. ***Action for the Environment***. London: Overseas Development Administration Information Department.
- Parnell, S. 2002. ***Uniting a Divided City: Governance and Social Exclusion in Johannesburg***. London: Earthscan.
- Parnell, S. and Pieteres, E. 2002. ***Developmental Local Government***. In Parnell, S. Pieterse, E. Swilling, M. and Wooldridge, D. (ed). ***Democratising Local Government the South African Experiment***. Cape Town: UCT Press.
- Pollitt, C. 1999. ***Public Management Reform: A Comparative Analysis***, Oxford: Oxford University Press.
- Raga, J.C. 2001. "¿Cambiar todo para que nada cambie? Representación, sistema electoral y sistema de partidos en Colombia: capacidad de adaptación de las élites políticas a cambios en el entorno institucional." In: F. Gutiérrez, editor. *Degradación o cambio: Evolución del sistema político colombiano*. Bogota,

- Colombia: IEPRI-Norma.
- Reid, G. 2003. ***Waiting to happen: HIV/Aids in South Africa***. Boulder, Colo: Lynne Rienne.
- Ritchie, B. W. 2004. ***"Chaos, crises and disasters: A strategic approach to crisis management in the tourism industry."*** Tourism Management .
- Robson, C. 2002. ***Real World Research***. 2nd edition. Oxford: Blackwell.
- Schwab, J., Topping, K.C., Eadie, C.C., Deyle, R.E. & Smith, R.A. 1991. ***Planning for post-disaster recovery and reconstruction***, PAS Report 483/484. Chicago IL: American Planning Association.
- Sekaran, U. 1992. ***Research Methods for Business: A Skill-Building Approach***. 2nd Edition. New York: John Wiley.
- Skinner, C. and Merham, C. 2002. ***Disaster management: A Guide to issues management and crisis communication***. Cape Town: Oxford University Press Southern Africa.
- Smith B., (2002). **The Dangers of Aid Work**. In Danieli Y. (Ed.), **Sharing the Front Line and the Back Hills**, International Protectors and Providers: Peacekeepers.
- Stewart, J. & Walsh, K. 1992: ***Change in the Management of Public Services, in: Public Administration***, 70:499-518.
- Straus, A. and Corbin, J. 1998. ***Basics of Qualitative Research***. 2nd edition. Newsbury Park: CA Sage.
- Sweeney, D.J., Williams, T.A. and Anderson, D.R. 2006. ***Fundamental of business Statistics***. China: Book Masters, Inc.
- United Nations Human Settlements Program (UN-HABITAT). 2003. ***The challenge of slums: Global report on human settlements***. Sterling, VA: Earthscan Publications.
- Van Manen, M. 1990. ***Researching lived experience: Human science for an action sensitive pedagogy***. Albany, NY: State University of New York Press.
- Venter, A. 2001. ***Governement and Politics in the new South Africa***. Pretoria: Van Schaik.
- Victoria, Lorna P. 2003. ***Kahandaan Katatagan at Kaunlaran ng Komunidad Gabay sa Pagsasany sa Disaster Management***. Philippines: Center for Disaster Preparedness Foundation, Inc.
- von Kotze, A. and A. Holloway (1996). ***Reducing Risk: Participatory learning***

- activities for disaster mitigation in Southern Africa.*** Durban: International Federation of Red Cross and Red Crescent Societies.
- Von, Kotze, A. and Holloway, A. 1996. ***Reducing Risk: Participatory Learning Activities disaster mitigation in Southern Africa,*** Durban: IFRC and Oxfam.
- Walsh, K. 1995. ***Public Services and Market Mechanisms: Competition, Contracting and the New Public Management,*** Macmillan, London.
- Wellman, J.C. and Kruger, S.J. 1999. ***Research methodology for the business and administrative sciences.*** Halfway House: Thomson.
- Wisner, B. Blaikie, P. Cannon, T. And Davis, I. 2003. ***At risks: Natural hazards, people's vulnerability and disasters.*** London: Routledge.
- Wisner, B., Blaikie, P., Cannon, T. and Davis, I. 2003. ***At risk (2nd edition): Natural hazards, people's vulnerability and disasters.*** Routledge: Canada.
- Wu, J.Y. and Lindell, M.K. 2003. ***Housing Reconstruction after Two Major Earthquakes: The 1994 Northridge Earthquake in the United States and the 1999 Chi-Chi Earthquake in Taiwan: Hazard Reduction.*** Texas: Texas A&M University.
- Yohe, G.W., Lasco, R.D., Arnell, N.W., Cohen, S.J., Hope, C., Janetos, A.C. and Perez, R.T. 2007. ***Perspectives on climate change and sustainability. Climate Change: Impact, Adaption and Vulnerability.*** Cambridge: Cambridge University.
- Zodhiates, S., Baker, W. and Kemp, T.R. 1996. ***Hebrew Key Word Study Bible: International version.*** Chattanooga: AMG Publishers.

JOURNALS AND PERIODICALS

- Angélil-Carter, S. 1997. *Second language acquisition of spoken and written A global assessment.* ***J. Plan. Lit.*** (9) 370–382.
- Armstrong, E. 2005. *Integrity, Transparency and Accountability in Public Administration: Recent Trends, Regional and International Developments and Emerging Issues,* United Nations.
- Ashford, S. J. and Dutton, J. E. 1993. Selling issues to top management. ***Academy of Management Review,*** 18 (3): 397–428.
- Ballard, Richard. *Globalisation, Marginalisation and New Social Movements in postApartheid South Africa. Proposal for Research,* School of Development

- Studies*. Durban: University of Kwa-Zulu Natal. 2003.
- Berke, P. R. 1995. Natural-hazard reduction and sustainable development: *English: Acquiring the skeptron. TESOL Quarterly*, (3): 263–287.
- Blanco, A. V. R. 2006. Local initiatives and adaptation to climate change. *Disasters*, 30(1): 140-147.
- BMZ. 2001. ***Poverty Reduction: A global responsibility Program of action 2015. Bonn***: German Federal Ministry for Economic Co-operation and Development.
- Bryant, J and Pithouse, R. 2005. Towards Delivery and Dignity: Community Struggle from Kennedy Road, *Center for Civil Society School for International Training South Africa*: Reconciliation and Development.
- Caiden, G.E. 1991. What really is public maladministration? ***Public Administration Review***. 51: 486-493.
- Cloete, F., Schlemmer, L. and van Vuuren, 1991. ***Policy Options for a new South Africa***. Pretoria: Human Sciences Research Council.
- Crowards, 2006. Disasters in the South Africa. people's vulnerability and disasters. ***Disasters***, (3):34-69.
- Delfin, F.G and Gaillard, J.C. 2008. ***Extreme versus Quotidian: Addressing temporal dichotomies in Philippine disaster management***, 28 (3): 190-199.
- Donohue, S., Masilela, T. and Gear, J. 2000. ***Disaster Management***. South African Health Review. hst.org.za.
- Drinkwater, M. 2005. *HIV/AIDS and Agriculture in Southern Africa: What difference does it make?* ***IDS Bulletin***, 36 (4): 2.
- Dwivedi, K.N. 1994. *Mental Cultivation (Meditation) in Buddhism*. ***Psychiatric Bulletin***, 18: 503-504.
- Dynes, R.R. and Quarantelli, E. 1987. 'The Concept of Role in Disaster Research'. 'The Comparative Study of Disaster: A Social Organizational Approach'. ***Mass Emergencies*** 1: 21-31.
- El-Masri, S. and Tipple, G. 2002: *Natural Disaster, Mitigation and Sustainability: The Case of Developing Countries*. ***International Planning***, 7(2): 157-175.
- Gawronski, V.T. 1998. "Night and day: Mitigation policy making in Oakland, California before and after the Loma Prieta earthquake." ***International Journal of Mass Emergencies and Disasters***, 16 (2): 145-179.

- GTZ, 2002. **Disaster risk management. Working concept**. Eschborne, Germany: German Technical Co-operation 9GTZ.
- Haque, H.S. 1999. *Relationship between Citezenship and Public Administration: International Review of Administrative Sciences*, 6 (3): 246-288).
- Henstra, D. and McBean, G. 2004. *The role pf Government in Services for Natural Disaster Mitigation. Institute for Catastrophic Loss Reduction*.
- Herzog, R.J. 2007. *A model of natural disaster administration: Naming and Framing Theory. Administrative Theory and Praxis*, 29 (4): 586-604.
- Holloway, A. 2003. *Disaster Risk Reduction in Southern Africa: Hot rhetoric-cold reality*, 12(1):29-38.
- Huchzermeyer, M. 2001. *Housing for the poor? negotiated housing policy in South Africa. Habitat International*, 25(3): 303-331.
[http://dx.doi.org/10.1016/S0197-3975\(00\)00037-0](http://dx.doi.org/10.1016/S0197-3975(00)00037-0)
- Huchzermeyer, M. 2003. *Housing rights in South Africa: invasions, evictions, the media and the courts in the cases of Grootboom, Alexandra and Bredell. Urban Forum*, 14(1): 80-107.
- Huchzermeyer, M. 2005. *The global governance response to informal settlements-relieving or deeping marginalisation? IGU meeting in Natal*, Brazil: 18-22.
- Huigen, M.G.A and Jens, I.C. 2006. *Socio-Economic Import of Super Typhoon Hururot in San Mariano, Isabela, the Philippines. World Development*, 1(xx): 1-21.
- International Decade for Natural Disaster Reduction. 1996. **Cities at Risk; Making Cities Safer and Before Disaster Strikes** (Geneva: International Decade for Natural Disaster Reduction).
- International Union of Local Authorities (IULA), Africa Section and South African
- International Union of Local Authorities- Africa Section. Pretoria: IULA/SALGA.
- Jick, H., Jick, S., Derby, L.E., Vasilakis, C., Myers, M.W. and Meier, C.R. 1997. *Calcium-channel blockers and risk of cancer. Lancet*, (349): 525–528.
- Jick, T. D. 1997. *Triangulating on mixing qualitative and quantitative methods: triangulation in action, Administrative Science Quarterly*, 24, 602–611.
- Jick, T.D. 1979. *Mixing Qualitative and Quantitative Methods: Triangulation in Action. Administrative Science Quarterly*, (42): 45-67.
- Jovel, J.R. “*Natural Disasters and their Economic and Social Impact*”. **CEPAL**

- Review**, 38(1) 133-145.
- Kent, R. 1992. **Disaster Preparedness**. 1st Edition. UNDRO: UNDMTP.
- Khady, D. 2007. *Governance and natural disasters: addressing flooding in Saint Louis Senegal*. **Environment and Urbanization**, 19 (2): 552—562.
- Kliksberg, B. 2000. *Six unconventional theses about participation*. **International Review of Administrative Sciences**, 66 (1): 34-78.
- Lane, D. C. 1994. With a little help from our friends: how system dynamics and `soft' OR can learn from each other. **System Dynamics Review**, 10:101±134.
- Leandro, C. and Miranda, L. 2000. *Lima preparing communities for disaster*, **Habitat Debate**, 6(2): 25–26.
- Lechat, M.F. 1990. 'The International Decade for Natural Disaster Reduction: Background and Objectives', **Disasters**, 14, (1): 1–6.
- Lenham, R. 1999. *Digital Literacy*. **Scientific American**, 273(3): 253-255.
- Lindell, M.K. 2004. "Perceived charecteristics of environmental hazards." In. **J. Mass Emergencies Disasters**, 12: 303-326
- Linnerooth-Bayer, J. and Kunreuther, H.C. 2003. *The Financial Management of Catastrophic Flood Risks in Emergency Economy Countries*. **Risk Analysis**, 23(3): 627-639.
- Local Government Association (SALGA). 1997. **Local government: the cornerstone of democracy in South Africa**. A report of the 6th Regional Conference of the South African government.
- Mason, C. and Baltsavias, E.P. 1997. 'Airborne laser scanning: basic relations and formulas', **ISPRS Journal of Photogrammetry and Remote Sensing**, 54: 199-214.
- Mason, S. and Baltsavias. E. 1997. "Image-Based Reconstruction of Informal Settlements", in *Automatic Extraction of Man-Made Objects from Aerial and Space Images (II)*, **Birkh"auser Verla**: 97-108.
- McEntire, David A. 1997. "Reflecting on the Weaknesses of the International Community During the IDNDR: Some Implicatinos for Research and its Application." **Disaster Prevention and Management**, 6(4): 221-233.
- McMahon, M.M. and Faen, C. 2007. *Disaster and Poverty*. **Disaster Management Response**, 4(1): 95-97.
- Mellon, 1993. Decentralisation of public services. **Public Administration Review**.

38: 478-520.

- Napier, M. and Rubin, M. 2002, ***Managing environmental and disaster risks affecting informal settlements: lessons in innovative practice from South African local authorities***, Council for Scientific and Industrial Research.
- O'Keefe, P. Westgate, K. and Wisner, B. 1976. *Taking the naturalness out natural disasters*, ***Nature* 260** (5552): 566-567.
- Obrien, G., O'Keefe, P., Rose, J. and Wisner, B. 2006. 'Climate Change and Disaster Management', ***in Disasters***, 30(1) 64-80.
- Osborne, D & Gaebler, T. 1992. ***Reinventing government: How the entrepreneurial spirit is transforming the public sector***, Addison-Wesley, Reading, MA.
- Polidano, C. 1999. '***The Public Management in Developing Countries***', ***Public Policy and Management Working Paper Series No.13, University of Manchester***: Institute for development Policy and Management.
- Rosenberg M, and Daly, S. 1993. An international public health perspective on injury control. ***Violence, Aggression and Terrorism***, 2(4):357–372.
- Roux, N. 2003. *Foreign Policy: A Study in Public Administration*. ***Journal of Public Administration***, 38 (2): 66-84.
- Schipper, L. and Pelling, M. 2006. 'Disaster Risk, Climate Change and International Development: scope for, and challenges to, integration', ***in Disasters***, 30(1):19-38.
- Schwab, J. K.C., Topping, C.C., Eadie, P., Deyle, R.E. and Smith, R.A. 1998. *Planning for post-disaster recovery and construction*. Chicago: American Planning Association.
- Sing, D. 1999. *A governance perspective of public administration*. ***Administration Publica***, 9 (2): 87-105.
- Stoforth, 1999. **Ministry for Provincial affairs and Constitutional Development**.
- Syed, M.H. 2008. *Encyclopaedia of Disaster Management*. Mumbai: Himalaya ***Books PVT.LTD***, 1(1):1-43.
- Thomalla, F., Downing, T., Spanger-Siegfried, E., Guoyi, H. and Rockström, J. 2006. 'Reducing Hazard Vulnerability: Towards a common approach between disaster risk reduction and climate adaptation', ***in Disasters***, 30(1): 39-48.

- UN International Strategy for Disaster Reduction. 2008. **Global Platform**. Retrieved August 9, 2008, from PreventionWeb:<http://www.preventionweb.net/English/hygo/gar>
- UNDRO, 1984. **Disaster Prevention and Mitigation. Preparedness Aspects**. New York: United Nations.
- UN-Habitat. 2003. **Water and Sanitation in the World's Cities: Local Action for Global Goals**, London: Earthscan.
- United Nations Development Programme. 2004. **"Reducing Disaster Risk: A Challenge for Development"**. New York: UNDP.
- United Nations International Strategy for Disaster Reduction. 2008. **Global Assessment Report**. Retrieved August 9, 2008, from Prevention Web: [net/English/hygo/gar/](http://www.preventionweb.net/English/hygo/gar/).
- United Nations International Strategy for Disaster Reduction. 2008. **History of ISDR**. Retrieved August 9, 2008, from Prevention Web: [net/English/hygo/ISDR/history/? pid: 21& pil: 1](http://www.preventionweb.net/English/hygo/ISDR/history/?pid:21&pil:1)
- United Nations International Strategy for Disaster Reduction. 2008. **Linking disaster risk reduction and poverty reduction: Good practices and lessons learned. Geneva: Global Network of NGOs for Disaster Risk Reduction**.
- Van Zyl, 2006. *Reducing Disaster Risk through Vulnerability Assessment: Agricultural Perspectives Dimensions of vulnerability*, (1): 19-24.
- Van Zyl, T.L., Parbhoo, C., Moodly, D., Cwela, B., Umkhonza, D., Shabangu, P., Vahed, A. and ICT 4EO. 2009. **The Meraka Institute, Johannesburg, South Africa. School of Computer Science**, University of KwaZulu-Natal Durban, South Africa.
- Vera, M.I. 1990. *Effects of divorce groups on individual adjustment: A multiple methodology approach*. **Social Work and Abstracts**, 26(3): 11-20.
- Vermaak, J. and van Niekerk, D. 2004, *Disaster risk reduction initiatives in South Africa*. **Development Southern Africa**. 21(3): 555-574.

NEWSPAPERS

Centre for Research on the Epidemiology of Disasters (CRED). 28 January 2006, Understanding risks of death and injury: Evidence from the Tsunami in Tamil Nadu.

Christina Scott, 14-20 2009. Mail and Guardian. A weather eye on Africa. Reports on how South Africa and Egypt are using supercomputers to avert disasters.

KaManzi, V. 2001. Disaster Management, Shack settlements. Metro Ezasegagasini, February.

Mncunu, K. 2009. Electricity, roads for shacks. Metro Ezasegagasini, 4 December: 1-12.

INTERNET

<http://www.undp.org/mdg/>

www.cred.be/cred1/project/tsunamiback.htm.

www.egyakosh.ac.za

www.iol.co.za

www.egyakosh.ac.za

INTERVIEWS

Chairperson of the Sub-committee: Housing. eThekwini Municipality. 1 September 2009.

Deputy City Manager. Safety and Security Cluster. eThekwini Municipality. 2 September 2009.

Infrastructure Committee Chairperson. eThekwini Municipality. 30 September 2009.

Senior Manager. Electricity Revenue Protection Division. eThekwini Municipality. 27 November 2009.

Senior Manager: Housing (planning section). eThekwini Municipality. 15 July 2009.

Manager: Disaster Management. eThekwini Municipality. 5 October 2009.

Manager: Fire services. eThekwini Municipality. 12 October 2009.

Fire Safety Officer. eThekwini Municipality. 9 November 2009.

Councillor. ward 25. eThekweni Municipality. 23 November 2009.

Disaster Management Officer. eThekweni Municipality. 22. October 2009.

DISSERTATIONS AND THESIS

Darkey, D. 2003. ***Implementation of Environmental policies in the Tswane Metropolitan municipality with particular reference to the role of the unemployed women of Mamelodi Township***, University of Durban Westville, Durban.

Mdluli, T.K. 2006. ***Developing A Research Policy Model For The South African Local Government Health Sector: A case study at the eThekweni Municipality***. University of KwaZulu Natal: Durban.

Raga. K. 2001. ***A Model for Procurement Management Relations between the Provincial Government of the Eastern Cape and the building industry***. (Unpublished thesis presented for the degree of Doctor of Administration at the University of Durban Westville. Durban: University of Durban-Westville.

Van Niekerk, D. 2005. ***A Comprehensive Framework for multisphere disaster risk reduction in South Africa***. Doctorate thesis, North-West University, Potchefstroom.

GOVERNMENT POLICY DOCUMENTS

eThekweni Municipality. 2005.2006. ***Annual Report***. Durban.

eThekweni Municipality. 2005-2006.***Integrated Development Plan***. Durban.

eThekweni Municipality. 2008-2009.***Integrated Development Plan***. Durban.

eThekweni Municipality. 2010 and beyond.***Integrated Development Plan***. Durban.

REPORTS

Badiane, O. 2003. ***Sustaining and Accelerating Africa's Agricultural Growth Recovery in the Context of Changing Global Food Prices***. IFPR Policy brief 9.

Environment Forum: ***The Principality of Monaco***, 20-22 February 2008.

Federal Emergency Management Agency (FEMA). 2005. ***FEMA Emergency Operations Vehicle (EOV) Fact Sheet.***

Ferreira, S.L., de Meyer, M., Loots, H. and Keyise, N. 2002, ***“Spot 5 Quantifies rapid urban change”***, GTI.

Inaugural Annual Report, 2006/2007. ***National Disaster Management Centre:***
Department of Provincial and Local Government of South Africa.

International Federation of Red Cross and Red Crescent Societies (IFRC). 2000.
Press, Durban: 1 - 28.

International Federation of Red Cross and Red Crescent Societies. 2000.

International Federation of the Red Cross and Red Crescent Societies. ***Introduction to disaster preparedness***, trainer's notes. Geneva: IFRC, 2000. URL:
www.ifrc.org/Docs/pubs/disasters/resources/corner/dpmanual/Introdp.pdf

International Strategy for Disaster Reduction. 2008. ***Environmental Sustainability and Disaster Reduction.*** 10th Special Session of the Governing Council/ Global Ministerial .

Manitoba Health Disaster Management, 2002. ***Disaster Management Model for the Health Sector: Guideliness for Programme Development***, Canada.

National Disaster Coordinating Council (NDCC). 2004. ***Four Point Action Plan for Disaster Preparedness.*** National Disaster Coordinating Council: Quezon City.

National Disaster Coordinating Council (NDCC). 2005. ***Basic Laws on the implementation of Disaster Management Programs in the Philippines.***
National Disaster Coordinating Council: Quezon City.

Statistics South Africa. 1997. ***The people of South Africa, Population Census, 1996: Census in brief.*** Pretoria: Statistics South Africa.

The International Bank for Reconstruction and Development. 1999. ***Managing Disaster Risk in Mexico: Market Incentives for Mitigation Investment.***
Library of Congress Cataloguing-in- Publication Data, United State of America.

United Nations International Strategy for Disaster Reduction. 2002. ***Living with Risk; A global review of disaster reduction initiatives***, United Nations: New York.

World Bank, 2001. ***World development report 2000/2001: Attacking poverty***. Washington, DC: World Bank.

LEGISLATION

Civil Protection Act. 1977 (Act No. 67 of 1977).

Fund-Raising Act, No. 8 of 1991

Public Finance Act 1 of 1999

Republic of South Africa. 2006. KwaZulu-Natal Elimination and Prevention of Slums Bill.

Republic of South Africa. Prevention of Illegal Evictions Act 19 of 1998 (PIE Act).

South Africa. Department of Provincial Affairs and Constitutional Development, White Paper on Disaster Management Green Paper, 1998.

South Africa. 1996. The Constitution of the Republic of South Africa Number.108 of 1996. Government Gazette Number 23245, South Africa: 4 February.

South Africa. 1996. The Mine Health and Safety Act, Act 29 of 1996. Government Gazette number 29456, 15 December 2006.

South Africa. 2002. Disaster Management Act 57 of 2002. Government Gazette number 24252: 15 January.

South Africa. 2005. A Policy Framework for Disaster Risk Management in South Africa. GN 654.

South Africa. Department of Provincial Affairs and Constitutional Development, White Paper on Disaster Management, January 1999.

South Africa. Minerals Act, 50 of 1991, 1 January 1992.

South Africa. Municipal Systems Act 32 of 2000, Government Gazette number 21,776: 20 November.

South African Weather Service Act 8 of 2001.

Tanzania. 1995. National Urban Development Policy.

United States of America. Congressional Act of 1803. 28 February, 1803.

United States of America. Insurance Act of 1968.

CONFERENCE PAPERS

- Cronin, M.S. 2008. *Social Work in the International Context of Poverty and Social Inequality*. 18 World Conference of Social Work, Salvador: 1-14.
- Croward, T. 2000a. ***An Index of Inherent Economic Vulnerability of Developing Countries***, Staff Working Paper (6/00): 1-24.
- Dunne, P. and Mhone, G. 2003. ***Africa's Crisis: Recent analysis of armed conflicts and natural disasters in Africa***, InFocus Programme on Crisis Response and Reconstruction on Working Paper, (5):1-69.
- Housner, G. W., 1989, ***"Limit Design of Structures to Resist Earthquakes,"*** *Proceedings*, World Conference on Earthquake Engineering, University of California, Berkley, pp.5-1 to 5-13, 1956.
- McBean, G. 2000. ***Forecasting in the 21st Century***. 9th IMO Lecture, WMO-No. 916. Geneva: World Meteorological Organization.
- Mitchell, T. 2003. ***An Operatinal Framework for Mainstreaming Disaster Risk Reduction***, Disaster Studies Working Paper, (8): 1-29.
- Napier, M. and Rubin, M. 2002. ***Managing environmental and disaster risks affecting informal settlements: Lessons in innovative practice from Southern African local authorities***. Council for Scientific and Industrial Research (CSIR). Pretoria. Submitted to the international conference and meeting of CIB Task Group 40 on informal settlements: Sustainable livelihoods in the integration of informal settlements in Asia, Latin America and Africa, 10-13 October 2002, Surabaya, Indonesia.
- Rasmussen, T.N. 2004. ***Macro Economic Implications of Natural Disasters in the Caribbean***, IMF Working Paper (wp/04): 224.
- Thornhill, C. 2006. ***Effective Municipal Government and Administration As Preconditions For Efficient Service Delivery***. Journal of Public of Administration, Conference Proceeding: 317-333.
- UNISDR. 2003. ***Disaster Risk Reduction Framework: Synthesis of the United Nations-ISDR/UNDP online conference***. 25 August- 30 September.
- Vermeiren, J.C. 1993. ***Disaster Risk Reduction as a Development Strategy***. *Paper presented at the Caribbean Session of the 1993 National Hurricane*

Conference, Held in Orlando, Florida, and 13 April 1993. (Online) [http: www.undp.org/bcpr/](http://www.undp.org/bcpr/). Accessed 01 March 2008.

Yodmani, S. 2001. ***Disaster Risk Management and Vulnerability Reduction: Protecting the Poor***. Paper presented at the Asia and Pacific Forum on Poverty Organised by the Asian Development Bank.

ANNEXURE A
QUESTIONNAIRE FOR FOREMAN AND KENNEDY ROAD INFORMAL
SETTLEMENTS

I would greatly appreciate your assistance in completing the following questionnaire as part of a survey on disaster management in Foreman and Kennedy Road informal settlements within eThekweni Municipality. The questionnaire is ANONYMOUS and all responses will remain STRICTLY CONFIDENTIAL and will be used for academic purposes only. Should you require additional information concerning the research project or further clarity, you may call Sibongiseni Ngcamu at the eThekweni Municipality: 031-3113095 during office hours or email: ngcamubs@durban.gov.za.

SECTION A: BIOGRAPHICAL DATA

1. Age (in years):

18-24	01
25-34	02
35-44	03
45-54	04
55-64	05
65+	06

2. Gender:

Male	01
Female	02

3. Marital status:

Single	01
Married	02
Divorced	03
Widowed	04

4. Education:

Below matric	01
Matriculation	02
Trade Certificate	03
Diploma	04
Degree	05

5. Occupation:

	Males	Females
Employment Full Time	01a	01b
Self-employed	02a	02b
Part-time/Contract/Temporary	03a	03b
Casual	04a	04b
Unemployed	05a	05b
Housewife	06a	06b
Pensioner	07a	07b
Student/Scholar/Child	08a	08b

6. Income category per month:

R500 – 1000	01
R1001 – 1500	02
R1501 – 2000	03
R2001 – 2500	04
Over R3000	05

7. Number of children:

1	2	3	4	Above 5
01	02	03	04	05

8. Number of other dependents:

1	2	3	4	+5
01	02	03	04	05

9. Race:

Black	01
White	02
Indian	03
Coloured	04
Other	05

10. Tenure (how long have you stayed here?):

0-5	01
6-10	02
11-15	03
20 and above	04

SECTION B: DISASTER PREPAREDNESS

1. How many other people are living with you in this dwelling?

1-4	01
5-8	02
9-12	03
More than 12	04

2. Why did you choose to stay here?

Land is vacant	01
Close to enough resources of income	02
Close to transportation	03
Enough public schools for the children	04
Relatives in the area	05
Other (Please specify)	06

3. Which of the following types of occupation features best suits you?

Owner	01
Renting	02
Sharing	03
Other (Please specify)	04

4. Why did you come to Durban? (You may cross (x) more than one category)

Job opportunities	01
Safer environment	02
Better quality education	03
Provision of housing	04
Provision of water and sanitation	05
Provision of electricity	06
Provision of health services	07
Other (Please specify)	08

5. What kinds of disasters (emergencies) were you prone to in the past five years?

Fires	01
Floods	02
Soil erosion	03
Storm surges	04
Thunderstorms	05
Tornados	06
Other (specify)	07

6. How do you rate your condition of living?

Poor	01
Good	02
Very good	03
Excellent	04
Don't know	05

7. Do you feel adequately protected from fires?

Very safe	01
Safe	02
Neither safe nor unsafe	03
Unsafe	04
Very unsafe	05

8. Do you have fire preventative measures in place?

Yes	01
No	02

9. Does your community have a 24 hour a day warning devices?

Yes	01
No	02

10. Are there warning procedures?

Yes	01
No	02

11. Do you feel adequately protected from floods?

Very safe	01
Safe	02
Neither safe nor unsafe	03
Unsafe	04
Very unsafe	05

12. How satisfied are you with the dwelling you are currently living in?

Very satisfied	Satisfied	Neither satisfied or dissatisfied	Dissatisfied	Very dissatisfied	Don't know
01	02	03	04	05	06

13. Do you think your role in disaster or emergency management before and after the disaster is important?

Very important	Somewhat important	Not at all important	Don't know
01	02	03	04

14. What is your assessment of the community's overall disaster preparedness?

Very good	Good	Neither good	Poor	Very Poor
01	02	03	04	04

15. Do you think eThekweni Municipality is prepared for disaster or emergency management at any time a disaster strikes?

Very well	Well	Neither good nor poor	Poor	Very poor	Don't know
01	02	03	04	04	04

16. Have you participated in the disaster or emergency planning process?

Never	Once or twice	13 to 26 times	More than 26 times
01	02	03	04

17. Have you received volunteer training in the past year?

Yes	01
No	02

18. Do you think community meetings are held regularly based on disaster preparedness with all stakeholders including eThekweni Municipality officials?

Yes	01
No	02

19. Do you think disaster or emergency management challenges are addressed adequately in your community?

Very well	Well	Neither good nor bad	Poorly	Very poorly	Don't know
01	02	03	04	05	06

20. Are there emergency preparedness handouts and other information distributed to your community on disaster or emergency management?

Yes	01
No	02

21. Do you think emergency preparedness is taught in schools?

Yes	01
No	02

SECTION C: MITIGATION

1. Rate the following needs in terms of its level of importance to you. Use the following scale:

- 1- Extremely important
- 2- Very important
- 3- Not all important
- 4- Least important
- 5- Don't know

Nutrition	
Housing	
Health	
Water and Sanitation	
Electricity	
Education	
Transport	
Employment	
Clothing	
Other (Please specify)	

2. Do you have resources of acceptable standards to build house?

Yes	01
No	02

3. What types of materials are used for building your shack/house?

Cardboard	01
Timber	02
Zink	03
Wood	04
Concrete blocks	05
Other (specify)	06

4. What community protection works are available in your community?

Stream channelization	01
Dams	02
Levees	03
Floodwalls	04
Embankments	05
Other (Please specify)	06

5. Do you have major evacuation routes identified in your community?

Yes	01
No	02

6. Are pre-designed shelters or destinations identified?

Yes	01
No	02

7. Has mitigation information been provided in writing to you?

Yes	01
No	02

8. Following disasters, local stakeholders typically initiate numerous forms of traditional disaster mitigation?

Yes	01
No	02

SECTION D: RESPONSE, RECOVERY AND REHABILITATION

1. Are there warnings about imminent disasters?

Yes	01
No	02

2. If 'yes' what kind of warnings? Tick where appropriate.

Pamphlet	Newspapers	Television	Radio	Municipal official/s	Other (specify)
01	02	03	04	05	06

3. What government agencies are available during and after a disaster?

Municipal officials	Police	Health workers	Home affairs workers	Fire fighters	NGOs (such as Red Cross)	Other (specify)
01	02	03	04	05	06	07

4. What is the role of civil society during and after the disaster?

Very important	Somewhat important	Not at all important	Don't know
01	02	03	04

5. Do disaster victims receive adequate help from relief agencies?

Yes	01
No	02

6. What assistance did you receive after the disaster?

Tents	Permanent houses	Food	Clothes	Counselling	Medication	Other (specify)
01	02	03	04	04	05	06

7. How would you rate the overall contribution of eThekweni Municipality's disaster management response during a disaster?

Very high	High	Neither high nor low	Low	Very low	Other (specify)
01	02	03	04	04	05

8. What activities are performed by eThekweni Municipality after a disaster or emergency?

Debris removal	01
Restoring services	02
Repair public facilities	03
Rebuilding stricken areas	04
Immunization	05
Other (please specify)	06

9. Do disaster victims receive counselling?

Yes	01
No	02

10. Which category needed special attention after the disaster?

Children	01
Women	02
Elderly	03
Mentally ill	04
Racial ethnic minorities	05
Other (specify)	06

11. After your house was destroyed or damaged, what type of accommodation have you received?

Emergency shelter	01
Temporary shelter	02
Temporary housing	03
Permanent housing	04
Other (please specify)	05

12. What type of transport mode was used for injured victims?

Ambulances	01
Own cars	02
Hired cars	03
Police cars	04
Other (please specify)	05

13. What emergency personnel were involved after the disaster (rescue)?

Fire-brigades	01
Police officers	02
Emergency medical technicians	03
Local municipal officials	04
Disaster Management Officers	05
Other (please specify)	06

14. What type of temporary care facility was provided?

Halls	01
Schools	02
Tents	03
Library	04
Other (please specify)	05

15. What support or assistance have you received after a disaster?

Food parcels	01
Blankets	02
Sleeping bags	03
Tents	04
Building materials	05
Accommodation	06
Medical care	07
Counselling	08
Water supply	09
Sanitation	10
Other (please specify)	11

16. Where were injured disaster victims moved to?

Hospitals	01
Clinics	02
Other (please specify)	03

17. What has been done to reduce risks after the disaster?

Building resistant houses	01
Building embankments	02
Building dam walls	03
Installing drainage system	04
Installing fire-hydrants	05
Installing sandbags	06
Installing levees	07
Other (please specify)	08

18. Was technical knowledge disseminated in your community for disaster risk reduction?

Yes	01
No	02

19. What type of education programmes were you part of?

Awareness	01
Exercises	02
Training	03
Other (specify)	04

20. Were you supplied with maps showing risk areas?

Yes	01
No	02

21. Were local people provided with jobs after the disaster cleanup and reconstruction?

Yes	01
No	02

SECTION E: FINANCIAL IMPLICATIONS

1. Does your present income allow you to pay for the following services?

8.1 Water	Yes	01	No	02
8.2 Electricity	Yes	01	No	02
8.3 Education	Yes	01	No	02
8.4 Transport	Yes	01	No	02
8.5 Nutrition	Yes	01	No	02
8.6 Health	Yes	01	No	02
8.7 Housing	Yes	01	No	02
8.8 Other (Please specify)	Yes	01	No	02

Comments:

2. How do you rate the financial implications caused by disasters?

Very well	Well	Neither good nor poor	bad	Very poor	Don't know
01	02	03	04	05	06

3. What was the repair or replacement cost of your dwelling after the disaster?

100-500	01
501-1000	02
1001-1500	03
2000-2500	04
2501-3000	05
3001-3500	06
Above 4000	07

ANNEXURE B
SEMI-STRUCTURED INTERVIEWS/THEMES FOR ETHEKWINI
MUNICIPALITY OFFICIALS

SECTION A: Disaster preparedness strategies

SECTION B: Disaster mitigation strategies

SECTION C: Disaster response, recovery and reconstruction

SECTION D: Future Expectations