AN EVALUATION OF DISASTER AND RISK MANAGEMENT IN THE DURBAN SOUTH BASIN, WITH PARTICULAR REFERENCE TO COMMUNITY AWARENESS

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DEDICATED

TO

ALL THOSE PEOPLE WHO UNSELFISHLY SACRIFICE THEMSELVES FOR THE GOOD OF OUR ENVIRONMENT

YOU CONTINUE TO ASTONISH ME WITH YOUR RESILIENCE, YOUR PATIENCE AND YOUR LOVE

DECLARATION

I hereby declare that, except where acknowledged, this research is entirely my own work and that all resources used or quoted have been acknowledged.

I further declare that this research has not previously been submitted for a degree or diploma to any other tertiary institution.

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CONTENTS

LIST OF ABBREVIATIONS

APELL	Awareness and Preparedness at Local Levels
ASME	American Society of Mechanical Engineers
BLEVE	Boiling Liquid Expanding Vapor Explosions
CBO's	Community Based Organization
DSB	Durban South Basin
ERPG	Emergency Response Planning Guideline
LA21	Local Agenda 21
MHI	Major Hazard Installation
NEMA	National Environmental Management Act
NGO's	Non Governmental Organization
NDMC	National Disaster Management Centre
OHSACT	Occupational Health and Safety Act
PIS	Pipeline Integrity Study
PHL	Public Health Law
PPM	Parts Per Million
SAPREF	South African Petroleum Refineries
SEA	Strategic Environmental Assessment
VCE	Vapour Cloud Explosion

CHAPTER 1

INTRODUCTION AND OVERVIEW OF THE STUDY

1.1 INTRODUCTION

This chapter introduces the research topic and provides an overview of the chapters that follow. The focus of the study is on awareness around the issue of Disaster Management, viewed in the context of Public Health. What follows is a brief discussion on the topic around which the theme of awareness is centered.

Disaster Management is a general term used to describe neither the faculty nor a discipline relative to the elements that construct calamities. Rather, it is centered in an instinctive philosophy of society for survival. In theory, the basis for a disaster or risk strategy is set in the principles enshrined in the South African Constitution[1] and liberally defended in legislation. It is submitted that the study of risk in the context of Disaster Management is a fairly new discipline.

The ability of a community [or communities] to mitigate and prepare itself in the wake of a disaster can be attributed to many factors. Vulnerability, leadership and socio-economic standing are the key elements, however, a plan would be useless if it failed to consider community intervention and genuine community participation. The approach that is proposed in the research is a practical and common sense attitude towards awareness, and the need to involve the community at ***all*** levels. The environment in which the research is undertaken is an important factor in determining the necessity for the study and is discussed hereunder.

[1] The Constitution of the Republic of South Africa, 1996

1.2 BACKGROUND TO THE STUDY

The impact of a Major Hazard Installation [MHI] in the center of a community must pose a real danger to that specific community. It does not matter whether the community grew around the installation, or *vis-à-vis*, the community is faced with a clear and present danger and some intervention in respect of awareness and mitigation is required. A point in case is the community in the Durban South Basin.

The impact of the Constitution and prevailing legislation in respect of the Public Health confers rights on individuals and communities alike. Notwithstanding this, the message is not filtering quickly enough to the ground. The rationale for community awareness and participation provides an important medium to channel information to lobby groups and more integrally the affected communities.

The reasons for the study can be validated by the vulnerability of the community and is discussed below.

1.3 JUSTIFICATION OF THE STUDY

The incident that occurred on 19 January 2005 at the Engen Refinery and the lessons that were learnt are indicators that, not only is the targeted community unprepared for such incidents, but it was also strained by the efforts of local government.[2]

From the above incident, it is evident that there is very little value in considering awareness for a Major Hazard Installation that is situated far from a communal setting. The true test of awareness is a community that is alerted of something

[2] The Mercury, 20 January 2005. On the 19th of January 2005, storage tank holding approximately 16000 liters of fuel exploded at the Engen Refinery quickly turned into a fire hazard, skipping over the fence and threatened the community.

that benefits them. Such substantive intervention is a result of taking the first step, which is often the most challenging one.

Legal prescripts and the need to fuse society with a basic understanding of their rights is an important aspect of community participation. A further justification for the study is the issue of location and re-location of the targeted community and the implications thereof.

1.4 OBJECTIVES OF THE STUDY

The principle objective of the study is, *inter alia*, a plan for awareness involving the most affected areas in the Durban South Basin in relation to the Engen Refinery. The petroleum industry in general has a history of accidents and ***near misses***[3] that impact on the rights of residents in enjoying the right to a safe and healthy environment. This would not only entail conditions for a safe living environment, but also includes the right to all amenities that support such an environment.

Several core objectives have been identified in relation to this study. The objectives of the study are to:

- Provide a legal perspective in relation to Disaster Management;
- Present a holistic approach to the management of disasters in the specific context of the Durban South Basin, and in general, from a National and an International perspective;

[3] Section 1 of the MHI Regulations set out in the Occupational Health and Safety Act [Act 85 of 1993] the defines a near miss as any unforeseen event involving one or more hazardous substances, but for mitigating effects, actions or systems could have escalated to a major incident.

- Interrogate the theme of awareness in the region, highlighting the present situation, and providing an insight on the aspirations of the community;
- Examine the status of response to disasters, and the management of risks in the basin; and
- Provide recommendations for disaster and risk awareness.

The manner of achieving the above objectives is discussed in the subsequent subsections.

1.5 RESEARCH METHODS

The researcher has utilized a variety of methods to obtain information in relation to community awareness. The following methods were used: -

1.5.1 QUESTIONNAIRES

The research methodology included questionnaires aimed at collating information from the community, the lobby groups involved in the Durban South Basin, industry and Local Government.

The significant categories of respondents were identified and formed part of the research. These are highlighted as follows: -

- **The Community**

  The questionnaires were distributed to the community on the peripherals of the refinery in Tara Road and Badulla Drive. The total number of questionnaires distributed to the community was 100, of which 74 responses were received and considered for purposive sampling.
  [A copy of the questionnaire is attached and is marked Annexure **B**].

- **Industry**

  To obtain feedback from industry, a questionnaire was also designed and circulated to industry. The questionnaire was sent to the major manufacturing sector, as well as smaller industries within the Durban South Basin.

  [A copy of the questionnaire is attached and is marked Annexure **C**].

- **Local Government**

  Since Local Government plays a pivotal role for service delivery at a municipal level, its primary function, *inter alia*, is to promote a healthy and safe environment for all citizens. Therefore, the Local Government Perspective is an important consideration in the understudy.

  [A copy of the questionnaire is attached and is marked Annexure **D**].

1.6 LIMITATIONS OF THE STUDY

The study involved a tripod analysis that took into account the community, the industry and Local Government. There appeared to be a triangle of blame that existed amongst the various stakeholders in the Durban South Basin. There is little or no evidence of a polarization of groups as the issues are relatively clear. On this score, contradictions were difficult to clarify and certain issues could not be taken any further.

Another limiting aspect of the study was indicated by the response of the community, and the importance that was placed on the awareness in the context of disaster management.

1.7 STRUCTURE OF THE STUDY

The structure of the study is organized as follows:

1.7.1 CHAPTER ONE: INTRODUCTION AND OVERVIEW OF THE STUDY

This chapter presents the *locus* and *focus* of disaster and risk management and the background of the study. It sets out the introduction of the study, and gives both a succinct account and an important insight into the conceptualization of the study. A brief summary of the important aspects of each chapter is also depicted.

1.7.2 CHAPTER TWO: CONCEPTUAL FRAMEWORK

Chapter two emphasizes the conceptual link between Disaster Management and Public Health Law. Although Disaster Management is a faculty separate from law, this chapter leans on the discipline of law with emphasis on the Constitution of the Republic of South Africa, the Disaster Management Act, the National Environmental Management Act and the Promotion of Access to Information Act. There is also a commentary on the provision in the Acts relating to Awareness and Community Participation.

1.7.3 CHAPTER THREE: DISASTER MANAGEMENT AND COMMUNITY AWARENESS IN SOUTH AFRICA

International, National and Provincial perspectives on awareness in disaster management are themes that flow throughout the entire study. This chapter examines the manner in which disasters are generally handled and the significance of disaster awareness. The research also examines risk, vulnerability, theories of mitigation strategies and its impact on the target community. Apart from these, the Chapter offers specific information on the situation, population data and movement, and the hazards that occur. A discussion focusing on community awareness and participation, community involvement and the mobilization of people in disaster mitigation sets the basis for the research in the subsequent chapter.

1.7.4 CHAPTER FOUR: RESEARCH METHODOLOGY

This chapter expounds the methodological approaches in obtaining and interpreting information from specific target groups. The medium used to collect information was through the distribution of questionnaires to the various categories of respondents. Analysis of the information resulted in graphs, diagrams and finally informing the research. The researcher uses various techniques to capture the perspectives of the community, the industry and Local Government. The results were codified, analyzed, interpreted and discussed.

1.7.4 CHAPTER FIVE: RECOMMENDATIONS AND CONCLUSIONS

The final chapter makes recommendations arising out of the study. Recommendations were mainly drawn from the surveys through the empirical study which formed the basis for intervention. It must be noted,

however, that the recommendations must be viewed objectively given the dynamic nature of societies, their real needs, the impact of national and international best practices and the ability of legislation to supplement this change.

1.8 CONCLUSION

Community awareness and participation plays an important role in the manner in which disasters are managed in South Africa. Legislation makes provisions for this to happen at Local and National spheres of Government. This chapter presents an overview of the various discussions that follow in the subsequent chapters. It also outlines the study of community awareness in disaster management and highlights the issues to be considered in ensuring that the rights with regards to individuals' health and safety are not compromised. The most important variables in considering the management of disasters and the related forms of legislation are discussed in the subsequent chapter.

CHAPTER 2

CONCEPTUAL FRAMEWORK OF DISASTER MANAGEMENT WITHIN THE CONTEXT OF PUBLIC HEALTH LAW

2.1 INTRODUCTION

In this chapter the *locus* and *focus* of Disaster Management in relation to Public Health is expounded. The chapter highlights the conceptual link between Disaster Management, Public Health Law and applicable legislation.

Public Health Law is the responsibility of Government to ensure the health and safety of all citizens. The neglect of basic health and safety issues lends itself to potential disasters. Moreover, this chapter aims to examine the relationship between relevant legislation and its impact on Public Health.

2.2 THEORETICAL FRAMEWORK OF AWARENESS IN PUBLIC HEALTH

The discussion below is a theoretical framework of the three important pillars for awareness in Public Safety: Public Health, Disaster Management and Legislation. This forms the basis for of intervention in disaster management.

The mission of public health is a set of broad encompassing systematic efforts to promote physical and mental health and to prevent disease, injury and disability. The core functions of public health agencies are to prevent epidemics, protect against environmental hazards, promote healthy behaviors, respond to disasters and assist communities in recovery, and assure the quality of health services.

2.2.1 PUBLIC HEALTH LAW

According to Gostin,[4] [2000:4]

> ***"Public Health Law is the study of legal powers and duties of the state to assure the conditions of the people to be healthy, and the limitations on the power of the state to constrain the autonomy, privacy, liberty, proprietary, or other legally protected interests of individuals for the protection or promotion of community health".***

Gostin [2000:3] proposes five essential characteristics of Public Health Law as follows: -

- Government: Public Health activities are the special responsibility of government.
- Populations : Public health focuses on the health of the populations.
- Relationships: Public health addresses the relationship between the state and the population [or between the state and individuals who place themselves or the community at risk].
- Services: Public health deals with the provision of population-based services grounded on the scientific methodologies of public health.
- Coercion: Public health authorities possess the power to coerce individuals and businesses for the protection of the community, rather than relying on a near universal ethic of voluntarism.

[4] Gostin, L O, Public Law: Power, Duty, Restraint, 2000 ISBN: California.

Gostin [2000:5] explains that the study of the field requires a detailed understanding of the various legal tools available to prevent injury and disease and promote the health of the populace.

The five essential characteristics of the field help separate public health law from other disciplines at the intersection of law and health. Although regulation in the name of public health is theoretically intended to safeguard the health and safety of whole populations, it often benefits those most at risk of injury and disease. Everyone gains value from public health regulations, such as food and water standards, but some regulations protect the most vulnerable. For instance, the elimination of toxic waste, environmental degradation and issues of disaster management for a community neighboring a Major Hazard Installation. Public health law is therefore, a broad discipline for health and safety issues. The focus of disaster management as a subject of public health law is discussed hereunder.

2.2.2 DISASTER MANAGEMENT

Disaster Management and awareness concepts are the building blocks of public safety. According to Hari Srinivas of the Global Alliance for Disaster Reduction [GADR],[5] the following concepts are important in the management of disasters: -

2.2.2.1 MITIGATION

Mitigation activities actually eliminate or reduce the probability of a disaster occurrence, or reduce the effects of unavoidable disasters. Mitigation measures include building codes, vulnerability analyses updates, zoning and land use regulations and safety codes, preventative health care and public education.

[5] www.gdrc.org : Hari Srinivas, Disaster Management and Mitigation

The effectiveness of a mitigation strategy will depend on the potential hazards, emergency risks and the countermeasures to be taken.

2.2.2.2 PREPAREDNESS

The goal of emergency preparedness programs is to achieve a satisfactory level of readiness to respond to any emergency situation through programs that strengthen the technical and managerial capacity of governments, organizations and communities. These measures are enhanced by having response mechanisms and procedures, rehearsals, developing long term and short term strategies, public education and building early-earning systems.

2.2.2.3 RESPONSE

The aim of emergency response is to provide the immediate assistance to maintain life, improve health and support the morale of the affected population. The focus in the response stage is on meeting the basic needs of the affected people until more permanent and sustainable solutions can be found.

2.2.2.4 RECOVERY

As the emergency is brought under control, the affected population is capable of undertaking a growing number of activities aimed at restoring their lives and the infrastructure that supports them. There is no distinct point at which the immediate relief changes into recovery and then into long-term sustainable development.

The concept of Mitigation and Preparedness embraces the themes of community awareness, education and participation. It is submitted that such communication is important for the realistic realization of its objectives.

Compliance and obligations are important for successful outcomes of objectives. To realize such outcomes in public health and specifically in disaster management, legislation is important. This is discussed in the following section.

2.2.3 LEGISLATION

Law occupies a central role in the realization of public health issues. According to Nadasen [2000: 1][6], law is an important determinant in realizing public health goals and it serves not only to regulate public health, but to also promote themes of the discipline. An important focus of legislation is awareness. It follows that the basis for intervention of law in public health, is no accident. It is a necessary and essential determinant for successful outcomes of health.

Law may take various forms depending on the application. It can assume an international perspective through the use of *inter alia* covenants, conventions, treaties and other international instruments that may be couched in specific or general terms, or it may be in relation to a national context. The Constitution of the country, the common law, certain national enactments and local and municipal pronouncements all form part of the *corpus* for a local and domestic legislative strategy.

There is a plethora of legislation that informs, in general, Public Health Law, and specifically the right to well-being. The following pertinent pieces of legislation are discussed.

2.2.3.1 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA

The starting point for any discussion in relation to any right would be the Bill of Rights in the Constitution[7]. This paradigm of rights is reflected by the legislation

[6] Nadasen S, Public Health Law in South Africa 2000
[7] The Constitution of the Republic of South Africa, 1996.

promulgated in the interests of Public Health and the promise of a cleaner environment[8]. Unlike the right to health[9], there is no explicit provision for the progressive realization of the right to an environment that is not harmful to one's health or well-being. This can be interpreted as though the state, business and all South Africans have a duty to ensure that the environment should not be contaminated and that all reasonable means should be taken to ensure that it is protected. In so far as the meaning of the words 'health and well-being' are concerned, it is submitted that it qualifies as protection from the effects of pollution *ad nauseam* and environmental degradation to the less obvious dangers such as noise, invasions of privacy and dignity.

Section 41(1) (b) of the Constitution provides that all spheres of government are required to '***secure the well-being of the people of the Republic***'. What is clear from the right is that its scope, purpose and intention are wide. The right to a clean environment and the right of access to healthcare complements the obligation of the state to secure the well-being of its people. Further, section 152(1) (d) of the Constitution urges local government to promote a safe and healthy environment requiring that programmes be facilitated and targets be realized. The right to health therefore employs an inter- and multi-sectoral, and multi-disciplined approach. It follows that a single and unitary method must fail, given the pointed and isolated emphasis of the solution when dealing with a dynamic problem.

The Constitution also imposes an obligation on the state in arriving at certain conclusions which must be based on procedural fairness. The right to Just Administrative Action[10] provides that environmental conflicts do not arise as a result of incorrect or unjust practices in the decision-making powers of state representatives. This creates a safeguard for the application of established procedures for making decisions and can be readily challenged in circumstances. What is also important when looking at rights in the Constitution is that certain

[8] The Constitution of the Republic of South Africa, 1996. Section 24.
[9] The Constitution of the Republic of South Africa, 1996. Section 27
[10] The Constitution of the Republic of South Africa, 1996. Section 33

rights may be restricted by the Limitations Clause[11]. There are instances where *certain* rights may be limited under *certain* conditions. The various considerations for the limitation are weighted given the reasonability test in an open and democratic society based on human dignity, equality and freedom. The possible [and positive] spin-off from such a clause is that whilst it limits the right of an individual or community, it also causes constraints on the state when a right has to be denied, making the state conform *[albeit in reverse]* to the limitation.

The purpose of legislation from an environmental perspective is twofold. ***Firstly***, it expands the general and broad objectives as set out in the Constitution adding detail and specificity to the nature and purpose of the right. ***Secondly***, legislation defines the scope and the necessary framework by providing for mechanisms, duties and obligations for the realization of the identity right. Part A of Schedule 4 of the Constitution identifies disaster management as the functional areas of concurrent national and provincial legislative competence. This means that the national, as well as the provincial spheres of government, have powers in legislating in respect of disaster management. There is also some authority vested in local government.

Apart from direct pronouncements to protect the environment, the Constitution makes provision for the right of access to information. This is dealt with below.

2.2.3.2 THE PROMOTION OF ACCESS TO INFORMATION ACT

Rights would be meaningless and cannot be invoked if one does not possess the necessary [and often relevant] information required to enjoy the right in question. The Constitution provides a substantially fair starting point that offers other remedies that must be subject to interpretation. The right to information is important for environmental rights activists.

[11] The Constitution of the Republic of South Africa, 1996. Section 36

Without proper access to information, one may not know if rights are being infringed. As a consequence, genuine participation is not possible. On this score, the Promotion of Access to Information Act[12] gives cognizance to the legislative realization of the right. The Act advances the duties and obligations of all interested parties, clarifying the ambient factors and the conditions under which the sharing of information may take place.

The preamble to the Act specifically encourages all persons to: -

- ***Foster a culture of transparency and accountability in public and private bodies by giving effect to the right of access to information;***

- ***Actively promote a society in which the people of South Africa have effective access to information to enable them to more fully exercise and protect all of their rights.***

The implications that this has for Public Health Law is that affected persons not only have rights that can be maintained against the state, but may also be asserted against private bodies. These rights against private bodies are referred to as horizontal rights. For lobby groups and environmental advocates, this piece of legislation has created obligations for industry to be transparent in their activities.

2.2.3.3 THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT

The National Environmental Management Act [13](NEMA) is based on the concept of sustainable development and is regarded as the most important piece of general environmental legislation, integrating development, conservation and management of the environment. The NEMA principles serves both as a general framework for environmental planning, guidelines by which the state must

[12] Promotion of Access to Information Act, [Act 2 of 2000]
[13] National Environmental Management Act [Act 107 of 1998]

exercise its environmental functions, and as a pilot in the interpretation of any other law relating to the environment. The Act does not have retrospective application before it was assented to on 19th of November 1998; however the basis for a claim does exist if the problem persists or that the harm appears imminent. The Act presents a holistic solution to environmental problems subscribing to a multi-faceted approach that provides for, *inter alia,* procedures for co-operative governance, fair decision-making and conflict management, and an integrated environmental management strategy.

The Act also recommends for the ratification of international environmental instruments[14] and for co-operation agreements to be concluded between the state and municipality and '...any person or community for the purpose of promoting compliance...'[15]. Apart from this well-defined strategy for environmental sustenance, the Act further qualifies these provisions by initiating the compliance, enforcement and protection machinery[16]. This involves some degree of obligation on the offending party to either act or refrain from creating a condition that causes or has the potential to cause harm or, within reason, to take steps to minimize or rectify the problem.

Section 31 of Part 2 of the Act provides for the access of information held by the State or by private institutions for the purposes of protecting the state of the environment. This section also serves to protect the integrity of whistleblowers or informants that disclose information to the relevant authorities or interested parties cited in sub-section 5.

The strength of the Act can also be determined from the actions contemplated in Section 30[17], where a considerable overlap in respect of the nature of incidents, resonates in the Disaster Management Act, which is discussed below.

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[14] The National Environmental Management Act,[Act 107 of 1998], Chapter 6, Section 25
[15] The National Environmental Management Act [Act 107 of 1998], Chapter 8, Section 35
[16] The National Environmental Management Act [Act 107 of 1998], Chapter 7
[17] The National Environmental Management Act [Act 107 of 1998], Section 30, The Control of Emergency Incidents

2.2.3.4 THE DISASTER MANAGEMENT ACT

The Disaster Management Act[18] replaces provisions in relation to the management of disasters in both the Fund Raising Act[19] as well as the Civil Protection Act[20]. Both these Acts dealt with limited aspects of the subject in a fragmented format and there was an urgent need to integrate the existing into a streamlined and unified legislative strategy that emphasizes mitigation, preparedness and recovery. The Disaster Management Act not only seeks to address all of these practical issues in a ***strictu sensu***, but seeks to eliminate confusion around disaster declarations and address the ***lacunae*** in legislation. Given the nature of disasters and the frequency at which it occurs, and a relatively new Act that still has to withstand the pressures that only time can test. The Disaster Management Act presents challenges to the three spheres of government, intergovernmental structures and responds to policy framework, funding and the issue of volunteers.

The approach adopted by the Act is twofold. ***Firstly***, it provides for a significantly strengthened capacity to track, collate, monitor, and disseminate information on phenomena and activities known to trigger disastrous events, supported by institutional emergency preparedness and response capacity by the government and private sector, communities and other non-governmental organizations. This plan for a coordinated effort reverberates throughout the Act in an attempt to oblige all spheres of government.

Secondly, the shift from mere disaster relief to an increased commitment to prevention and mitigation actions will reduce the probability and severity of disastrous events by incorporating these actions into policies, plans and projects from both the government and the private sector. The promotion of an awareness framework that is aimed at vulnerable communities enables them to be self-reliant and capable of supporting and co-operating with government in

[18] The Disaster Management Act, [Act 57 of 2002]
[19] The Fund Raising Act, [Act 107 of 1978]
[20] The Civil Protection Act, [Act 67 of 1977]

support of prevention and mitigation strategies. This type of intervention is invaluable as it sheds a practical perspective on the management of disasters involving the community that is affected or one that has an interest in the well--being of its society.

The Disaster Management Act urges industries to adopt national policies and integrate the planning to suit local conditions. However, industries need to admit that poor facilitation within the workplace can lead to incidents. Occupational hazards in the workplace are just as important issues within the paradigm of disasters. Legislation guiding standards and compliance within the workplace are discussed below.

2.2.3.5 THE OCCUPATIONAL HEALTH AND SAFETY ACT

The Occupational Health and Safety Act[21] [OHSACT] includes specific sets of regulations that apply to different occupations. Of particular importance in the context of risk and disaster management would be the Major Hazard Installations Regulations, hereinafter (MHI)[22] and the Vessels Under Pressure Regulations or (VUP)[23]. These important pieces of legislation create operating boundaries for this type of industry, mainly in light of the high incidence of ***near misses*** that have occurred.

According to Darlow and Louw[24], this type of legislation becomes increasingly important as the pressure for public awareness continues; "...the more people become aware of the Constitution, the more this type of legislation will be demanded ".

Further, the regulation not only creates an obligation for Local Government, but also lays out the scope of its authority in respect of the allocation of a site for a

[21] The Occupational Health and Safety Act [Act 85 of 1993]
[22] Government Notice R692, 30 July 2001
[23] Government Notice R1591, 8 January 1999
[24] Darlow and Louw. 2001 *Explaining the Health and Safety Act*, Lex Patria 2001

MHI.[25] The local authority shall not permit property development that poses a threat to the general public. The Act does not create a retrospective application. It does, however, provide that where installations, completed before 4 October 1996, the local authority must ensure that all possible steps are taken to reduce and handle the risk to the public.

The intention of this section is in anticipation of the capacity of Local Government to control the risk as the authoritative organ of the state. The standard of measuring the extent of the threat is indicated by a risk assessment contemplated in Section 5. A major criticism of the Vessels under Pressure Regulations is that it legislates on vessels that are on the processing site and neglects fixed vessels that carry substances to or from the plant.

2.2.3.6 THE ENVIRONMENTAL CONSERVATION ACT

The broad objective of the Environmental Conservation Act[26] is to provide for an effective protection and controlled utilization of the environment and matters incidental thereto[27]. The Act is important for the control of [industrial] activities which may have a detrimental effect on the environment.[28] The Act, however, does not have retrospective application, but it is important that future industrial endeavors are undertaken with due regard to conservation.

Apart from the control of activities, the Act also provides for the Identification[29] and Prohibition on the undertaking of activities that will probably have a detrimental effect on the environment.

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[25] Major Hazard Installations Regulations, Section 9: General Duties of Local Government
[26] The Environment Conservation Act. [Act 73 of 1989]
[27] Preamble to the Environment Conservation Act [Act 73 of 1989]
[28] The Environment Conservation Act [Act 73 of 1989], Part V
[29] The Environment Conservation Act [Act73 of 1989], Section 21

Section 21[1] of the Act gives the Minister of Environmental Affairs and Tourism a discretion to identify those activities that may have a detrimental effect on the environment whether in general or in respect of certain areas.

A comprehensive list of prohibited activities is referred to in Section 21[2]. The applicable category relevant to the understudy is the industrial processes mentioned under (*g*). Further the Act also provides for Environmental Impact Reports[30] and environmental assessments to be made available to the relevant authority for activities and alternate activities mentioned in Section 21[2].

The impact that this has for Disaster Management in the Durban South Basin is twofold. ***Firstly***, industrial activities mentioned in terms of Part V of the Act are conditionally prohibited. The Act provides for persons to undertake such activity [or alternate activity] except by virtue of a written authorization issued by the Minister or by a competent authority.[31] The authorization may be withdrawn if in the opinion of the Minister or any local authority if compliance is not adhered to.

It follows then that should a community be faced by an issue of environmental degradation as a result of industrial activities, there are mechanisms in place to legally lobby and advocate the Minister to withdraw such authorization. ***Secondly***, and apart from the obvious present prohibitions, present expansion and future activities may not be undertaken without first assessing the potential harm that this activity may cause to the environment or to the community.

In the context of study in the Durban South Basin, much of the area around the Engen Refinery has been declared Conservancy areas and the potential for expansion projects and future development has been limited to the plant. It is submitted that real expansion for the industry must take place at a different location.

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[30] The Environment Conservation Act [Act73 of 1989], Section 26

2.2.3.7 THE OCCUPATIONAL HEALTH AND SCHEDULED TRADE PERMITS

Bylaws for occupational health and scheduled trades are promulgated under the Health Act[32], and apply to all listed industrial and trade processes in the City of Durban only. The City Medical Officer of Health issues Scheduled Trade permits. These are used to stipulate and enforce conditions of operational controls as may be deemed appropriate.

Section 259 of the Local Authorities Ordinance[33] provides the City Medical Officer of Health with necessary powers to prosecute where a nuisance is being created. However since the level of "nuisance" will often be regarded as a subjective judgment, especially in terms of identifying unknown air pollution sources, this legislation is rarely used.

The Scheduled Trades and Occupations Bylaws for the City of Durban regulate the permit procedures for all of Durban's industries including Engen. At present, the status quo remains with Durban implementing a revision of these permit procedures in line with the Pipeline Integrity Study (PIS).

The relationship that public health and safety has with the law is a matter that can only be described as being perpetual and integral. Law completes the intent of policy and sets out the limits for legal enforcement. It also creates rights and obligations for all parties.

One major impediment, however, for not achieving projected and desired outcomes is a problem manifest in enforcement. A variance in human limitations coupled with capacity and capability deficiencies make a somewhat foolproof solution fraught with uncertainty. A changing environment dictates that the legal system needs to be dynamic in its approach to problem-solving. Clearly, there exists a reality in subjecting the legal system to constantly confront the issues

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[31] The Environment Conservation Act [Act 73 of 1989], Section 22[1]
[32] The Health Act [Act 63 of 1977]

raised in society. The challenge, however, always exists for legislators and law enforcement agencies alike, to collectively to address the ***lacuna*** that exists in the law.

A major impact of Public Health Law on disaster management is that in the event of a disaster, public safety is threatened. Public safety falls well within the ambits of the public health system. When the safety of people is affected, it becomes a public health issue.

It follows then that disaster management is a subject of public health law and is interdependent before, during and after a disaster. As far as legislation goes, it is a tool that is used in the dominion of public health law to achieve its broad objectives.

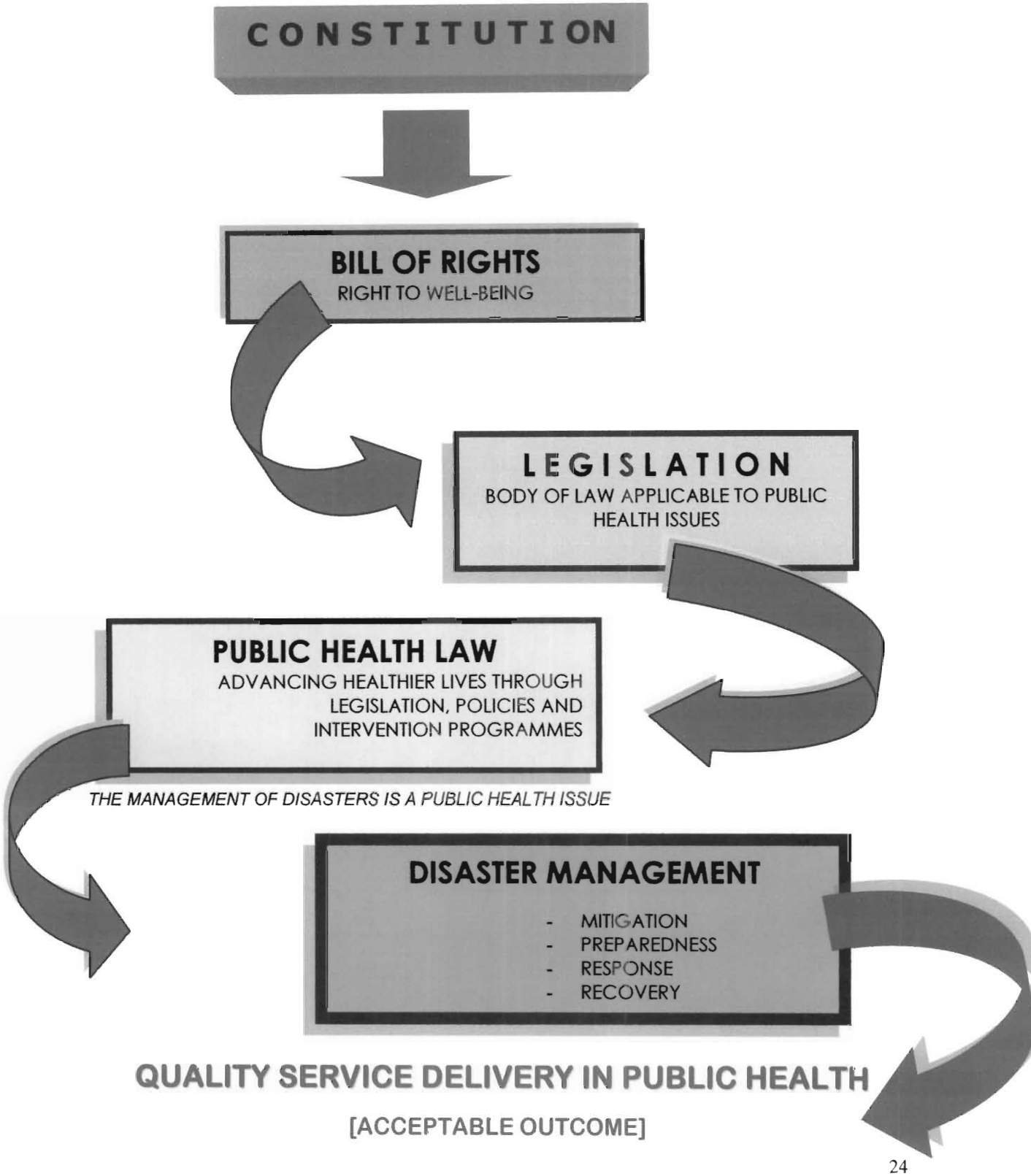
Figure 2.1 illustrates the relationship between broad-based rights [the Constitution and the Bill of Rights] to specific rights found in legislation. The relationship that Public Health Law has with disaster management is that it defines and monitors the application and effectiveness of the law prior to service delivery.

On this score, Gostin [34][2000: 4] explores the theory of the discipline of public health law and comes to the following conclusion:

> ***"Public health law shares conceptual terrain with the field of law and medicine, or health care, but is a distinct discipline. It can not be contained within a tidy doctrinal package; its boundaries are blurred and overlap the other paths of study in law and health. Rather it is susceptible to theoretical and practical differentiation from other disciplines at the nexus of law."***

[33] Local Authorities Ordinance, City of Durban
[34] Gostin, L O, Public Law: Power, Duty, Restraint, 2000 ISBN: California.

FIGURE 2.1 THE IMPACT OF PUBLIC HEALTH LAW ON DISASTER MANAGEMENT



2.3 CONCLUSION

This chapter examined the conceptual framework in relation to awareness around issues of Disaster Management. The different concepts that support and expound the theme of awareness in disaster management is expanded. This chapter further examines the relationship that exists between legislation and Public Health Law in general. The impact of public health law and the management of disasters was discussed. Legislation for Public Health Law is set against the backdrop of the Constitution and concludes with an assessment of the different pieces of legislation and its impact on Public Health. The management of disasters cannot be categorized as a single discipline. It has legal, political and socio-economic dynamics and the approach to its management should be multi-sectoral. The hazards, risks and vulnerability would define the type and extent of the intervention that is to be made. This is discussed in the next chapter.

CHAPTER 3

DISASTER MANAGEMENT AND COMMUNITY AWARENESS IN SOUTH AFRICA

3.1 INTRODUCTION

South Africa is a developing country and in many respects fits the profile of any developing nation. There are however, First World attributes and influences on the economy in the development of its infrastructure. The influence of the developed countries in managing disasters and the move towards a co-ordinated approach by district and metropolitan municipalities and the various spheres of Government are evident in South African systems. The system has by far many advantages as it involves not only the sharing of resources, but more importantly the sharing of information, ideas and skills that help build and strengthen the maturing ***forte*** of disaster control.

Helping poorer communities brave the effects of a disaster was a mercy mission that involved, at most, some form of military assistance. Rehabilitation was almost unheard of, and more often than not, it was the poorer communities that had to help themselves. There is a growing paradigm shift towards an integrated framework for disaster management. In his foreword to the White Paper on Disaster Management, the then Minister for Constitutional Affairs and Development, Minister Valli Moosa warns that:

> '...***in order to meet the unprecedented challenges that we face in all fields to achieve sustainable development, it is essential for us to revise our patterns of thinking.' Not only has there been a change in mindset, but the Disaster Management Act serves to affirm the intentions of government and progressive sectors of society.***[35]

[35] The White Paper on Disaster Management, Government Gazette 15 January 1999

The interaction between different role-players cannot be over-emphasized and the Minister further points out that:

> '...***disaster management is not the exclusive preserve of government. The private sector and civil societies have crucial roles to play [and] fostering of partnerships between government and the private sector is a prerequisite for sustainable and effective disaster management to take place.***'[36]

The South African experience of disaster management as a field of study is a relatively new discipline. It is a rough art that can, for all intents and purposes, only be guided by a theoretical framework that cannot be all encompassing. This is because the discipline is changing and experiences in managing disasters are diverse and cannot be compacted in a ***'what to do if it happens'*** box. The activity, however, is centered on Local Government and it is discussed in the next paragraph.

3.2 ROLE OF LOCAL GOVERNMENT

The reference point for disaster management would be the Disaster Management Act. The Act obliges local authorities to take specific steps to mitigate the effects of a disaster, loss of life, damage to property detriment of the economy, devastation to the environment and a reduction in the number of casualties. Section 42(1)[37] provides that:

> '... ***each metropolitan and each district municipality to 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...***'

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[36] The White Paper on Disaster Management- Government Gazette, 15 January 1999

The language used in section 42(1)[38] is specific enough to oblige metropolitan and district councils to take action. The effect of this is to strengthen each and every segment of the South African society in preparedness of a disaster without creating an unnecessary dependency on national or central government.

An integrated approach will ensure that the different local authorities are connected and complement each other, given the wide gap created by the distribution of resources in the past. A uniform approach suggests that although the challenges of metropols may vary, there exist similar and corresponding themes that can reflect a common response in tandem to the disaster. A further advantage of this approach is that it also guides Local Government in addressing important issues such as the development of a contingency plan and emergency procedures, community participation, degrees of vulnerability and post recovery and rehabilitation. It follows then, that amongst many disaster management practitioners, disaster management is not seen as a field of study, but rather as a ***philosophy.***

In anticipation of managing disasters, the City of Durban's Disaster Management Team has initiated a generic emergency plan that outlines the responsibility of City Management. The plan is hazard-based in a three tiered form that steps up the intervention in relation to the demand. What this means is that as one level fails to normalize the situation, the next level responds. In this respect there are three levels to disaster management in the context of the greater Durban area at a Local Government level,[39] viz.

- Operational level;
- Tactical level; and
- Strategic level.

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[37] The Disaster Management Act, [Act 57 of 2002]
[38] The Disaster Management Act, [Act 57 of 2002]
[39] Source: Disaster Management Center, eThekwini Municipality Standing orders

Before any of the above levels of response from Local Government can be initiated, the affected sector of business will implement its own on-site emergency plan[40] in the first instance. Whilst Local Government may have a generic response to disasters, the enterprise concerned has specific knowledge of the cause, effect [and possibly a remedy] of the incident. This basic response to the disaster means that all related policies and procedures, and the summoning of emergency assistance from the appropriate emergency services are engaged. Compared with the broad definition of a disaster, the enterprise may in itself declare the incident to be an event that it cannot contain, making it a disaster at an industrial level. Early on-scene co-ordination of remedial action will be via the forward control post comprising of different role-players who will undertake dissemination of information in respect of health and safety, and warnings to the affected community. The response has to be a coordinated effort to ensure the effectiveness of the intervention.

3.2.1 PROTOCOL 1: OPERATIONAL LEVEL

Protocol 1 is perhaps the most common response to an emergency. It occurs at an operational level where the level of interaction is in line with standard operating procedures of the respective agency. Ground teams respond to events as functionaries executing their duties in line with agency protocol. It is important to note that at this stage, although not all information is fed mainstream to the disaster management center, the potential for a disaster is always present. Depending on the vulnerability levels or mitigation strategies in place, the symptoms of disasters should never be underestimated or downplayed.

For day-to-day emergencies, the performance standard is called the '***Golden Hour***'. The Emergency Medical Services must be able to rescue, triage, stabilize and transport a victim to hospital where they receive appropriate care all within one hour. The golden hour standard is an important indicator in response to disasters. In the context of industrial risks, the plan deals with the incident

[40] Contemplated in terms of section 6 of the MHI Regulations of the Occupational Health and Safety Act, [Act85 of 1993]

confined to the site of origin. Local Government emergency services are on standby to complement the Industrial team that uses its experience as the domain. The movement of the incident to the next level will vary based on a permutation of factors that can impact on the immediate environment depending on aspects of vulnerability.

3.2.2 PROTOCOL 2: TACTICAL LEVEL

This plan addresses the situation where the effects of the incident may reach beyond the perimeter of the site, with the potential to place its neighbors in danger. The coordination is usually done from the Emergency Control Post of the plant. Depending on the type of incident, the time, the nature of the emergency, meteorological conditions and wind speed, and direction is an important indicator on the type of action that the emergency teams must consider.

At this level, the momentum increases as the severity and the number of casualties increases. The factors that are a norm at an operational level becomes unpredictable but teams are in control. Backup and auxiliary units may become necessary should a critical stage be reached.

3.2.3 PROTOCOL 3: STRATEGIC LEVEL

At the strategic level, the situation [either progressively or through a rapid onset occurrence] reaches catastrophic proportions. The ability and capacity of local authorities to manage the phenomenon has been compromised and, as a consequence, it must be classified as a disaster. The intervention, depending on the nature, the form and the geographical area affected, attracts either Provincial or National assistance. At a local level, the disaster is activated from the City's Disaster Management Operations Center by the City Manager or a delegated Senior Official.

According to Dr. Mike Sutcliffe, The Mercury,[2005:2]:

> '...***the level of planning is appropriate for incidents that could reach disaster proportions, extend for long periods of time or could cause widespread damage.***[41]

Some scenarios would involve solutions that would require a set of solutions that don't exist locally and would have to be mobilized from National Government. An example of this would be helicopters. Although plans are in place to deal with '***incidents that could reach disaster proportions'***, Dr Sutcliffe excludes the possibility of such incidents occurring at ***'our'*** refineries. With respect to the local team, the proximity [and obvious vulnerability] was overlooked.

It is respectfully submitted that for a strategy to be sustained and progressive the correct and relevant information, policies and procedures need to be in place. To this end three initiatives are discussed in the paragraphs that follow.

3.3 LOCAL AGENDA 21

Local Agenda 21 is a global action for socially, economically and environmentally sustainable development. It was adopted at the United Nations Conference on the Environment and Development held in Rio de Janeiro in June 1992. The purpose of Agenda 21 is to set out principles and programmes to achieve a changed relationship between development and the Earth's natural resource base, on which all development depends.[42] The South Central Local Council and the Durban Metropolitan Council accepted their responsibility to resolve the conflict between industrial and local community needs. They undertook this as an integral part of the Phase 2 of the Local Agenda 21 [LA21] programme. Phase 1 of the LA21 programme had identified the Durban South Basin as an environmental "***hotspot***" in the Durban Metropolitan Area [DMA] that required immediate attention.

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[41] Mercury, 20 January 2005. Dr Mike Sutcliffe comments on the vulnerability levels following the incident at the Engen Refinery on the 19th of January 2005.

[42] EThekwini Municipality LA21 Homepage, www.ceroi.net /reports /Durban /response /envman/locala21 .html

Durban's LA21 programme was initiated by the creation of the City's first Environmental branch in 1995. After extensive lobbying within Local Government and civil society, the Durban City Council accepted the implementation of the LA21 mandate as a corporate responsibility in August 1994.

The goal of Durban's LA21 programme was aimed at the development of an Environmental Management System [EMS] that guided the City towards an environmentally sustainable path. This required the development of new policies, institutions and procedures. It also requires ongoing, monitoring, review and improvement of environmental performance in line with pre-determined sustainable development goals. The implementation of LA21 is the responsibility of local government to urge all stakeholders to **think globally while acting locally**.

An initiative of the LA21 Programme was the Durban South Strategic Environmental Assessment which is discussed next.

3.4 DURBAN SOUTH STRATEGIC ENVIRONMENTAL ASSESSMENT

The Center for Scientific and Industrial Research [Environmentek] was commissioned in December 1996 to undertake the Durban South Environmental Assessment [SEA] by the South Central Local Council. In March the following year, the Executive Committee concluded that undertaking SEA was a Metropolitan responsibility in terms of Provincial Proclamation 38 of 1996.[43] A general overview of the research undertaken suggests that there are urgent needs in the Durban South Basin. Industrial tolerance by the community is an issue that has received international exposure and the obvious danger surrounding the community has often been downplayed. Industry and Local Government are wary of a community that has a single and unitary goal for its future sustainability and an environment that is safe and healthy.

[43] Background Durban South Strategic Environmental Assessment, August 1999

The placement of a Major Hazard Installation, an actively charged community, a transforming Local Government, industrial incidents and seepages and the high levels of emissions experienced in the Basin creates problems that require an intercession that is innovative and sustainable in the light of the dynamic needs of all parties.

There have also been international interventions at a local level. Of most significant is the United Nations initiative for creating awareness in the Durban South Basin, being the site of a major hazard installation [MHI]. The project is discussed below.

3.5 AWARENESS AND PREPAREDNESS FOR EMERGENCIES AT A LOCAL LEVEL (APELL)

APELL is a programme developed by the United Nations Environmental Branch in conjunction with governments and industry with the purpose of minimizing the harmful effects of technological accidents and environmental emergencies. The strategy of the APELL approach is to identify and create awareness of risks in an industrialized community, to initiate measures for risk reduction and mitigation, and to develop coordinated preparedness between the industry, the local authorities and the local population.[44]

The APELL handbook has provided the elements for local communities to prepare emergency response plans.

3.5.1 APELL IN THE DURBAN SOUTH

One of the recommendations of the Durban South Basin Strategic Environmental Assessment [SEA] was that APELL be initiated in the basin in order to ready the City for possible technological and industrial accidents. The initiation phase ran

[44] Source: APELL homepage www.unep /apell.org

from September 1998 to May 2001. The Disaster Management branch of the eThekwini Municipality took over primary responsibility from the Environmental Branch and a workshop comprising of the different stakeholders was held.[45] There was very little effort to sustain the programme and it was subsequently lost.

3.6 SPECIFIC INITIATIIVE OUTCOMES

Local Agenda 21 is still a feature of Environmental Management in the DSB. The international perspective that the programme brings to a local environment is a healthy indication of Local Government's attitude to outside intervention.

The Durban South Basin Strategic Environmental Assessment contains important recommendations for the target area. Some of these recommendations have never been implemented and it has been identified as recommendations in Chapter 5.

The Durban APELL project has not been implemented. There were two reasons for this. ***Firstly***, the project was met with some opposition from a leading community organization in the region because of APELL"s association with the Durban South Basin SEA project's recommendations for the declaration of the basin as a favored industrial center rather than a residential area. ***The second*** difficulty was the inability to transfer the lead agent responsibility from the Environmental Branch to the Disaster Management Branch due to the lack of importance placed on it by City management.[46]

Although APELL could not be launched in the DSB for the various reasons mentioned above, it is submitted that the principles are tailor-made for communities around the world neighboring MHI's. The situation, population, demographics and hazards inherent in the Durban South Basin are discussed in the subsequent paragraph.

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[45] Source: Strategic Environment Assessment Document- Durban South Basin, 1999
[46] http://www.durban.gov.za/eThekwini/ Municipality/environment

3.7 THE DURBAN SOUTH BASIN AS A CASE STUDY

There are several implications for the people living in the Durban South Basin. Issues of health and safety are always at the forefront of the agenda and in the South Durban basin the struggle is no different. The placement of the refinery and the orchestrated effects of Apartheid City planning for poor communities left a strong presence in the region. Contamination of and discharges into the atmosphere and its obvious exposure to humans is a disquieting experience for thousands of the residents in the residential areas of Merebank and Wentworth.

Issues of pollution are readily challenged, but dangers sourced from the Engen installation and progresses beyond the plant, receive little or no attention. It is submitted that this scenario has cataclysmic implications for the general populace of Merebank and Wentworth who are citizens of South Africa and have a Constitutional right to a health and well-being.

3.7.1 SITUATION

The Engen refinery is located south of Durban and is a crude oil processing plant, tank farm and a dispatch facility. Originally constructed in 1954, the refinery site covered an area of undeveloped farm land. ***See Figure 3.1.***

Located some 10 kilometers to the South of the city, the refinery occupies about 75 percent of the 150 hectares site which is situated in a valley approximately 2 kilometers wide. The refinery is roughly rectangular in shape with a north-south dimension of 2.2 kilometers and a maximum east-west dimension of 900 meters.

FIGURE 3.1 AERIAL VIEW OF THE DURBAN SOUTH BASIN

Residential areas surround the refinery site, on the east by Marina Drive and on the South by Badulla Road. The Western boundary is bordered by Tara Road and it is through here that all road contact is made. The railway access, parallel to the refinery, is from the South Western corner.

The Southern freeway between Durban and KwaZulu-Natal South-Coast is approximately 1 kilometer to the West running parallel to Tara road. The Durban International Airport is situated about 2 kilometers to the east of the plant.

Although the flight-path in relation to the refinery is not on course, it is however at very close proximity to Engen. The Island view terminals are located 10 kilometers North-East on the Bluff transfer pipelines carrying crude oil and products between the two installations[47].

3.7.2 POPULATION DATA

To allow for the calculation of societal risks, it is necessary to gather information concerning the general population in the surrounding area. There is a considerable statistical discrepancy in respect of the populace from the Department of Statistical Services and the Engen survey.

Four main districts have been identified and considered:-

1. Merebank – This is a concentrated residential area situated South of the Engen Refinery and is bordered by Badulla Drive.

2. Merewent – This is the area located to the South-Western border of the refinery and stretches from the freeway to the beach. Some areas are extremely close to the operating plant. Of importance is the residential

[47] Gary McFadden, Principal Consultant - CORE RISK , Quantitative Risk Assessment of Engen Refinery

area of Treasure Beach and Austerville which is home to four schools, one directly adjacent to the refinery.

3. Bluff District – This area lies to the north east of the refinery and comprises the suburbs of Brighton Beach, Wentworth, Grosvenor, Ocean View and Fynnland. It is also made up of the Van Riebeeck Park Nature Reserve.

4. Jacobs Industrial Area – This area consists mainly of small industry and is located 2.5 kilometers North West of the refinery.

3.7.3 POPULATION MOVEMENT

The migration pattern of the population from the affected sections of the Durban South basin is evident in the 1996 and 2001 population census and is so reflected in the Movement diagrams.

The two areas, Merewent and Jacobs, have seen a substantive decrease in its population by at least 10 percent and 31 percent respectively. In the Jacobs' industrial area, the shift to acceptable housing for many of the African residents in the so-called '***squalor barracks'*** is a move up.

Other factors responsible for the decline in population figures include the increasing industrialization of land and the demolition of certain buildings in the area that had a contributory effect.

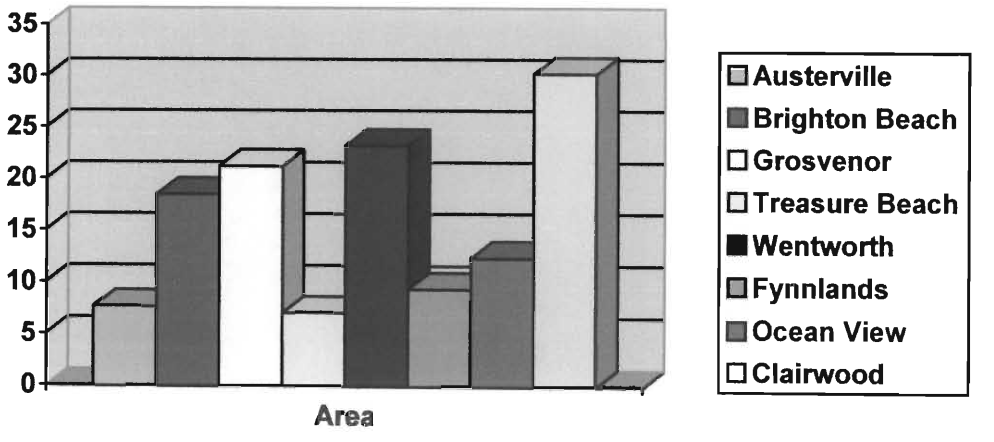
FIGURE 3.2 COMPARATIVE GRID IN RESPECT OF POPULATION IN THE ABOVE AREAS IN THE 1996 AND 2001 SURVEYS RESPECTIVELY

Area	African	Colored	Indian	White	Unspecified	
Austerville	973	20241	314	35	1517	23080
	1286	23482	212	51	-	25031
Brighton	365	245	210	3767	62	4649
Beach	680	581	555	3691	-	5507
Grosvenor	476	128	123	3239	128	4094
Beach	641	343	333	3643	-	4960
Treasure	146	1221	122	18	124	1631
Beach	196	1390	152	10	-	1747
Wentworth	461	260	211	1287	161	2380
	971	587	591	3248	-	5397
Merewent	532	669	21643	32	164	23040
	507	846	19181	25	-	20559
Fynnlands	748	246	236	4435	50	5715
	865	556	469	4361	-	6250
Ocean	781	121	199	5563	41	6705
View	869	429	467	5767	-	7532
Jacobs	2251	21	5	113	5	2395
	1574	32	13	31	-	1650
Clairwood	1158	1025	1865	1	21	4070
	3136	166	1974	26	-	5302
TOTAL	7891	24177	24928	18490	2273	77760
	10725	28412	23947	20853	-	83937

Figure 3.2 gives a comparative analysis of data between the two Census Exercises.

The comparison of population figures is an important indicator of the societal risk, vulnerable areas and the total number of people that are affected. The comparator also suggests declining numbers of persons in certain areas and the influx of people in others. This type of information, ready available, assists the planning process when gauging vulnerability, mitigation and preparedness strategies for the effective management of disasters. An increase in population in the target areas is represented by figure 3.3. [48]

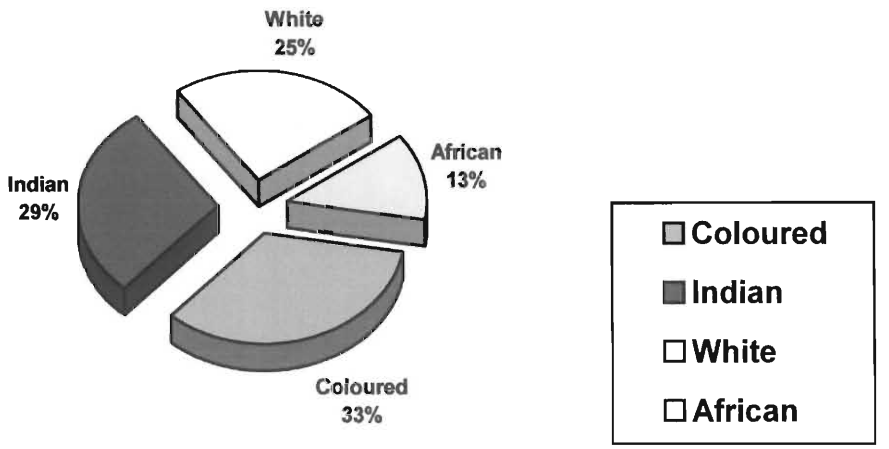
FIGURE 3.3 INCREASE IN POPULATION REPRESENTED BY PERCENTAGE IN THE TARGET AREAS OVER A PERIOD OF 5 YEARS



It can be noted from figure 3.4[49] that the planning and placement of the different races in the region by the City has given rise to health and safety consequences. The communities that are directly affected are those that live closest to the plant, that is, on Tara Road and Badulla Drive consisting mainly of Colored and Indian communities.

[48] Source: Department of Statistics and Statistical Information: Census 1999/2001
[49] Source: Department of Statistics and Statistical Information: Census 2001

FIGURE 3.4 THE DEMOGRAPHIC VULNERABILITY OF THE DIFFERENT RACES IN THE REGION



It can be noted from the above that the demographics relating to races are fairly evenly distributed. However, the situation of the refinery has on its direct borders the roads Badulla and Tara as its buffer zone along which mainly Indian and Colored communities reside.

It follows then that the communities of Wentworth and Merebank are in the direct vicinity of the refinery and are most vulnerable to incidents that could manifest out of the Engen Refinery. A description of the hazards faced by these communities is discussed below.

3.7.4 THE HAZARDS

There are various types of hazards that pose a risk to the community in the Durban South Basin.

3.7.4.1. VAPOR CLOUD EXPLOSION (VCE's)

This type of explosion occurs when there is a sudden and often violent release of energy leading to a rapid increase in the exploding medium. The 'violence' depends on the energy release rate. This is the main cause of major accidents in petrochemical industry as the processing and storing of huge amounts of flammable materials is a literal recipe for disaster. In the context of risk assessment, the discharge can be divided into two categories, namely: -

- **A CHEMICAL EXPLOSION**

  An exothermal chemical reaction where the energy released takes place in the combustion process of the flammable material. This is the most common type of explosion and is a common in the vicinity of the Durban South Basin. An incident which occurred on the 19th of January 2005 is an example of this type of hazard.

- **A PHYSICAL EXPLOSION**

  The cause of the explosion is generally mechanical energy released due to a mechanical malfunction. This type of hazard is occasioned by poor maintenance of equipment or the pipeline. Although this type of hazard is not a common occurrence, the effects can be catastrophic.

3.7.4.2 EFFECTS OF VAPOUR CLOUD EXPLOSION

The primary effects of Vapour cloud Explosion can be felt immediately. This includes damage to structures and installations. There is also a significant thermal effect on the immediate environment. There are several hazardous conditions created as a secondary feature and is known as the ***domino effect***. Fires and secondary explosions or BLEVE (Boiling liquid expanding vapor explosions) are not uncommon. This may as a consequence, trigger additional blast waves which create additional cause for concern.

Studies have shown that at least 5% of a 4.00 KW/m^2 radiation from a BLEVE could well extend beyond the Engen boundary. The interference outside the plant is calculated as a raw risk[50] value assuming that all preparedness for such an incident fails and the inability to inhibit the detonation.

3.7.4.3 TOXIC GASSES

The release of toxic gasses into the atmosphere is an unavoidable and almost inherent feature of an industry that processes flammable materials under extreme process conditions. As a consequence, the immediate community must pay the price for the emissions with their health. The exposure is normally as a result of flaring[51] or sourced from a rupture in a vessel.

One cannot discount that the cause of these discharges can at times also be attributed to human error, power outages, equipment failure, maintenance repair work, poor management or negligence. In any event, gases are generated when the process is not operating properly. There are two main types of gases that have the potential for consequences: -

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[50] Raw risk is the presentation of a hazard with complete vulnerability where no preparedness or planning strategies was considered. In other words what the worst case scenario would be if an incident of such magnitude did occur.
[51] Flaring is used to describe a naked flame or open flame that is burning off excess gas. This usually occurs at oil refineries, as well as at certain chemical plants, land fills and mines.

- **HYDROGEN SULPHIDE**

  This is an extremely dangerous chemical and has the capability to cause sudden death due to accidental exposure in high concentrations.[52]

- **SULPHUR DIOXIDE**

  This is a colourless gas and has a strong smell. It irritates the respiratory system and can cause and aggravate asthma and bronchitis. Continued exposure in pregnant women can result in babies being born with a pre-condition to asthma.[53]

3.7.4.4 EFFECTS OF TOXIC GASSES

According to the Emergency Response Planning Guideline (ERPG) the effects of contamination will vary with the intensity exposure and will include irritation, narcosis, asphyxiation, sensitization, blindness, organ damage or even death. To human health, a 5-PPM[54] exposure to hydrogen fluoride has a mild odor perception and may cause a mild face irritation. At 20 PPM, the experience causes no impairment of an individual's ability to take protective action or the ability to concentrate. The guideline indicates that a 50ppm exposure for one hour would cause mild irritation without developing life threatening symptoms. However, with a degree of dizziness it may impede the ability to escape from the area of contamination.

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[52] Shell Safety Committee handbook *Hydrogen Sulphide*, 1986
[53] Settlers Primary School Health Study, November 2002
[54] Parts per million

3.7.5 PIPELINES

The pipelines that are responsible for sustaining the existence of the refinery are the source of major criticism from the community. There is no specific enactment regulating the precise groundwork of the pipelines. There are, however several guidelines that are internationally recognized as the ***'best practice'*** for the petroleum industry in relation to the transfer of hydrocarbons, liquid petroleum gas, anhydrous ammonia and alcohols.

The American Society of Mechanical Engineers [ASME] guidelines are an important international norm that has been adopted by many processing plants in South Africa. Engen claims that for strategic reasons, the marking of routed lines was not allowed in terms of the National Key Point Act. Newer and more recent installations, however, subscribes to the Part B31 of the guidelines.

3.7.5.1 THE IMPACT OF SAPREF

Joining the transfer pipelines in the same vain along Tara Road is similar pipelines from the Sapref[55] installation and in 2001; the largest petrol spill in South African history took place in Tara Road. The investigation revealed a hole in the underground pipeline and Sapref estimates that between 500 and 750 kiloliters of petrol might have escaped.

The figure is later adjusted to 'between a million and a million and a half liters'. Since the incident, more than a million liters of petrol has been recovered from the ground.[56]

[55] South African Petroleum Refineries

3.7.5.2 CRUDE OIL TRANSFER PIPELINES

The crude oil transfer pipelines is utilized to transport crude oil from the single buoy mooring (SBM) facility to the tanks used to store the imported oil, and then transported on toward the Engen refinery.

3.7.5.3 EFFECTS OF THE PIPELINE

The effects of the duct and the location have some distinct consequences.

Firstly, it has created an obvious and associated health risk to the residents and the general public. A variety of symptoms including nausea and dizziness was caused, in the first instance, by the petrol vapors by the initial spill. The latter recovery exercise, resulted in high concentrations of benzene, toluene, ethylbenzine and xylene released back into the atmosphere bringing with it adverse health effects[57].

The vulnerability of which is apparent in the lack of awareness and the acceptable and subjective levels of risk in the community. Community awareness is a central theme throughout the Disaster Management Act and a strong presence of some misrepresentation or non-disclosure is manifest.

Another effect of the pipeline is that it contributed to the decline in property values[58]. It can be noted from the discussions with local residents that, the marking of property along Tara Road would make the area untouchable and would not attract a suited market value. In fact, the area would be regarded as a medium to high risk as there are factors that are not suited for [human] habitation.

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[56] Source: Groundwork, 2003 Volume 3
[57] Source: Ground work 2003 Volume 3

The concealed possibility of danger makes it a hazard that is hard to ignore. What motivates residents to continue living in Tara Road is the degree of vulnerability, as the incidents recorded in the past are confined to leaks in the pipeline that the community did not view as 'catastrophic', and the apparent lack of awareness of the conceivable danger of the pipelines. An informed community is a prepared community, and the next chapter deals with issues of community awareness and the techniques used to achieve intervention targets.

3.8 COMMUNITY AWARENESS AND PARTICIPATION

There is a strong connection between disasters and the way societies structure themselves. From a disaster management perspective, there is considerable benefit in contributing to public education as far as possible, in support of training programs as well as national policy objectives.

The danger posed by disasters and the reduction of vulnerability due to development are no longer issues for debate and disagreement. In the same vain, (fragmented) development without awareness programs is ***like pouring water into a perforated bucket***. It becomes totally ineffective and can become a very costly exercise.

The aim of public awareness programs is to promote an informed, alert and self-reliant community capable of playing its full part in support of, and in co-operation with the government in all relevant disaster management matters. The public's response to any emergency is based on an understanding of the nature of the emergency, the potential hazards, the likely response of the emergency services and knowledge of what individuals and groups should do prior to the emergency. Being prepared for a disaster is often the key for surviving one. [59]

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[58] Source Association of Estate Agencies of South Africa

[59] Green paper on Disaster Management

Preparedness indicates the state of readiness of a community in preparing for a disaster. Section 20(2) and Section 15 of the Disaster Management Act[60] encourages a broad-based culture of risk avoidance, the promotion of education and training throughout the Republic, and the research into all aspects of disaster management. This also addresses the need for the development of an integrated public awareness strategy, including the effective use of the media, the development of education and training initiatives for disaster management and associated professions, and the incorporation of aspects of disaster management in school curricula.

Communication is divided into two parts: the sender and the receiver. It is also important that the receiver acknowledge the message that is being sent. This form of communication is known as community participation. Community participation and involvement of people are important communication skills in an intervention strategy. These are discussed below.

3.8.1 COMMUNITY PARTICIPATION

Community involvement must always be part of the disaster management approach. There is a link between an informed and educated community and the impact that a disaster has on it. This being relative to the specific outcomes of an incident based on projected mortality rates. An example of this would be the unprepared community of Laingsburg who had not experienced flooding before 1981.

As a result, 104 lives were lost when a flood struck the town.[61] By contrast, the communities in the low-lying areas around Ladysmith frequently experience flooding and were better prepared to mitigate and limit the effects of severe flooding.

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[60] The Disaster Management Act 57 of 2002

[61] http://www.heritage.org.za /karoo/laing/htm

According to K R Sastry, [2000][62] :

> "...***the crux of community participation in the final analysis would be exercising 'voices and choices' of the community thereby developing the human, organizational and management capacity to solve problems as they arise in order to sustain the improvements made over time." People [are] sources of useful ideas and can assist in adopting technical inputs emanating from the outside for assimilation pertinent to local conditions".***

Sastry advocates that communities and people can participate in decision-making processes for the implementation of development schemes important to disaster [mitigation and] reduction measures.

3.8.2 COMMUNITY INVOLVEMENT IN DISASTER MANAGEMENT

According to Sastry, a community comprises of several families belonging to various socio-economic strata. Every family has its own role in disaster reaction measures. A family's behavior, however, differs from the community's needs and aspirations. Thus, it connotes that the process of establishing relationships between families and the community is very important in devising disaster reduction plans.

It follows then that neither entity can exist in isolation and the strong theme of mutual support, acceptance and of one complementing the other is absolutely necessary.

An example of obligations for the family and for the community is set out in ***Figure 3.5*** below.[63]

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[62] Sastry KR, Dr. Vice Principal-Disaster Management Unit, Hyderabad, India: The Role of Local Organizations in Disaster Management (2000)

[63] Source: Jacob Dharamraj: The Taxonomy of Disaster Mitigation: 1996

FIGURE 3.5 MOBILIZATION OF PEOPLE IN DISASTER MITIGATION

LEVEL	TASKS TO BE ACHIEVED
FAMILY	Awareness creation Disaster mitigation Motivation of people Corrective measures Opening up Opportunities Need assessment capacity of dangers
COMMUNITY	Creation of motivation Preparing community for coordinated action Coordination among different local organizations Attending to emergency needs like Health care Saving property and providing for its safety

3.8.3 PEOPLE'S AWARENESS

According to Sastry, Governmental Organizations, Non-governmental organizations, lobby groups and religious and community-based organizations are collectively responsible for awareness. Each one of these institutions will leave its own imprint on concentrating the people towards preparedness of a disaster or an impending one. People's awareness is strengthened by providing advance warning signals to the communities to organize themselves in the shortest possible time.

The theme of community awareness as a primary and initial intervention strategy in the Durban South Basin is perhaps underestimated and undervalued. The study indicates that the pretext under which such limited intercession is carried out provides no real value to the community. It does not provide realistic mitigation solutions to risk and disaster management. The reason for this,

perhaps, is that the community is involved and focused on imminent issues of health and air quality. There appears to be a want of pre-warning and evacuation policies and procedures.

An immediate effect of such deficiencies is the role played by local government and industry in relation to incidents. The critical component of communication cannot be over-emphasized and spurs on the need for coordinating efforts relating to awareness. This is discussed in the next chapter.

3.8.4 THE DEVELOPMENT OF AN INTEGRATED PUBLIC AWARENESS SYSTEM

Section 20(2) of the Disaster Management Act provides for the promotion of risk avoidance among stakeholders. These include all departments in the three spheres of government. Such a strategy is necessary for the promotion of an informed, alert and self-reliant society capable of supporting and cooperating with government in all aspects of risk and vulnerability.

To achieve this objective, a disaster management public awareness and information service must be established [preferably] by the National Disaster Management Committee [NDMC]. This service will be a critical interface between the disaster management information systems, the emergency communication system, all organs of state involved in the disaster management and the general public.[64]

Another broad-based coverage is the use of television, newspapers and newsletters, and where applicable, the use of information technology to achieve mass communication. This is known as the media and is discussed below.

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[64] Source: Green Paper for the Proposed National Disaster Management Framework

3.9 THE MEDIA

The role of that the media is crucial to the success of a disaster management strategy. As an example, in the mid eighties, the media highly publicized the relationship between the HIV/Aids pandemic and homosexuality. The heightened focus by the media on homosexual behavior neglecting heterosexual patterns may have been the detonator for the exploding rates of the worst pandemic since the Black Death of the thirteenth century which is regarded as one of the worst natural disasters in history [Cartwright 1991: 42][65].

So, whilst the media is a catalyst for change it can also impair the reality of the message. It follows then, that the media has to be managed and it becomes an important partner for the realistic dissemination of information. At a local level, the quickest possible ways to communicate would be by use of local radio stations or by way of an Emergency Broadcast System to the community.

3.10 CONCLUSION

This Chapter focused on the contextualization Disaster Management and community awareness as a field of study. The different aspects that support the framework are extensive and much of the lessons are international. Community awareness is a theme that resonates throughout this chapter as it does throughout the study. It is common knowledge that one major setback to the realization of legislative goals is problems with implementation.

Issues of awareness around disaster management are key themes in this chapter outlining the demographics and the extent of risks faced by the community. It sets the basis for the research and the aspirations of the target community. An exposition of the methodology, the research techniques and an analysis of the results of the data collected are presented in Chapter 4.

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[65] Cartwright Lawrence: Disease and History, New York:1991

CHAPTER 4

RESEARCH METHODOLOGY

4.1 INTRODUCTION

This chapter focused mainly on the research methodology that was employed in this research. It is the amplification about construction of research instruments, selection of types of perception measurements scale, different perspectives, and respondents. The data processing and statistical analysis will be discussed in this chapter.

The American Statistical Foundation describes research and survey as a means to promote the improvement of survey practice and the understanding of survey methods by encouraging both theoretical and applied research on survey related topics and by disseminating information on survey methods.

4.2 RESEARCH METHODOLOGY

Three different types of questionnaires were used to obtain responses including semi and unstructured interviews. Three different categories of respondents participated in the survey. The following categories of people were directly linked to the research study and were in a position to inform the research. An analysis of how each of the categories contributes to the research is explained hereunder:-

- **THE COMMUNITY**

This category of persons lives in the direct vicinity of a Major Hazard Installations. They are most affected by the potential occurrence of a disaster due to their geographical situation.

- **INDUSTRY**

Industries in the DSB have been the main source of hazards that places communities at risk.

- **LOCAL GOVERNMENT**

As an important sphere of government, Local Government is closest in location to the target community. It follows that they are regularly interfacing with the community. Their primary responsibility is to provide bulk services, one of which is enforcement and public safety is significant.

The research was conducted on the basis of the following core objectives: -

- Provide a legal perspective in relation to the Disaster Management;
- Present a holistic approach to the management of disasters in the specific context of the Durban South Basin, and in general, from a national and an international experience;
- Interrogate the theme of awareness in the region, highlighting the present situation and providing an insight on the aspirations of the community;
- Examine the status of response to disasters and the management of risks in the basin; and
- Provide recommendations for disaster and risk awareness.

4.2.1 RESEARCH DESIGN

Research design refers to the overall structuring of the plan of the research. The researcher systematically collected and analyzed empirical data. This was used to explain the levels of vulnerability and awareness in the community.

These specific objectives cannot be adequately addressed by a single methodology. Therefore both quantitative and qualitative methods were combined in the study and are described in the subsequent section.

4.2.2 QUANTITATIVE RESEARCH

In quantitative research, the researcher's interest is hard data. The focus is on variables and hypothesis. Quantitative researchers emphasize precision in measuring the variables and testing the hypothesis, hence the research is formulated by using close-ended questions.

The analysis was preceded by using tables and charts in relation to the hypothesis.

4.2.3 QUALITATIVE RESEARCH

Qualitative research is defined as social research which is carried out in the field and is analyzed in non-statistical ways. The emphasis here is on capturing and discovering meaning in the data collected.

Three different sample groups were selected from different categories for participating in this research project, and the questionnaires were administered accordingly. After collecting the questionnaires, they were analyzed statistically and captured for the study. The research results have been interpreted, presented and discussed.

The following research techniques were used in the study: -

4.2.4 SAMPLING DESIGN

Sample is the selected group of respondents for participating in research investigation. Sampling is the process of selecting part of the elements in a population and using the information obtained to draw conclusions about the entire population [Cooper & Emory, 1995:174]. In this research, samples were drawn from persons residing in the direct proximity of Engen, which is the main area of focus in the context of the understudy.

4.2.5 POPULATION AND SAMPLE

Population indicates the suitable number of people available for the study. The selected people are called the sample group. A population refers to "the entire group of people, events or things of interest that the researcher wishes to investigate" [Cooper & Emory, 1995:200][66]. Sekaran [2000:119][67] defines population as the entire group of people or things of interest that the researcher wishes to investigate.

For the purpose of this study, a sample can be defined as "the subset of the whole population which is actually investigated by a researcher and whose characteristics will be generalized to the entire population (Bless & Higson-Smith, 1995:84).[68] According to Locke, Silverman & Spirduso [1998:47][69], a sample refers to "a small number of the set (whether people, objects, events or situation)".

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[66] Cooper R and Emory, C W, 1995:200 Business Methods, 5th Edition, USA, McGraw Hill
[67] Sekaran,U. 2000 Reseach Methods for Business: A Skill Building Approach. 3rd Edition. New York: John
[68] Bless & Higson- Smith : Fundamentals of social research : African Perspective : Capetown : Juta & company
[69] Silverman & Spirduso 1998. Business Statistics. Berkshire : McGraw- Hill

The population in this study highlighted that there was an urgent need for intervention in respect of awareness.

4.2.6 SAMPLING IN RELATION TO THE RESEARCH

The basic idea of sampling is that by selecting part of the elements in a population, conclusions may be obtained about the entire population [Cooper & Emory, 1995][70]. Cooper and Emory [1995] maintain further that an element is referred to the subject on which the measurement is being taken and is also the unit of study.

In this study, the simple random sampling technique was used to select the sample. The only selection criterion that was used in the understudy was that respondents had to be ordinarily residing in the direct vicinity of Engen. Simple random sampling is a sampling procedure which provides equal opportunity of selection for each element in the population, and the sample is a fair representation of the larger population [Bless & Higson-Smith, 1995][71].

In this study, three different categories have been selected to investigate perceptions on disaster management in the Durban South Basin.

The three different categories are: -

- Community perspective
- Industries perspective
- Local Government perspective.

[70] Cooper,D R and Emory, C W, 1995 Business Methods, 5th Edition, USA, McGraw Hill
[71] Bless and Higson-Smith, Fundamentals of Social Research, 2nd Edition, 1995

4.2.6.1 COMMUNITY PERSPECTIVE

In the community perspective purpose, a group of 90 persons were selected from the community. They were informed telephonically or personally about this project. 74 people indicated interest in the research and this translated to approximately 82 % return response rate. Questionnaires were sent out to 74 community respondents, collected after a week, and subsequently processed for data analysis.

4.2.6.2 INDUSTRY PERSPECTIVE

In the industry perspective, 46 people were selected for the survey. They were informally informed telephonically or personally regarding the survey. Of the 46 people from different industries situated in the Durban South Basin, 37 people expressed an interest, and there was approximately an 80 % return response rate. The 37 questionnaires were sent out to the respondents. The questionnaires were collected after a week and processed for data analysis.

4.2.6.3 LOCAL GOVERNMENT PERSPECTIVE

A group of 38 persons from local government were selected. Again, they were informed telephonically or personally regarding participation in the survey. A total of 31 people have indicated their interest and an 82 % return response rate was noted. The 31 questionnaires were sent out to the respondents. The questionnaires were collected after a week and processed for data analysis.

4.3 CONSTRUCTION OF QUESTIONNAIRES

The construction of questionnaires was vital to ensure high-quality research results. In this project three different questionnaires were constructed dependant on three different perspectives. In each questionnaire different types of measurements were used to analyze each responses.

The biographical variables questions were those of gender, ethnic group, age groups, education level, number of years they have been living in the area. It is obvious respondents perceptions do vary depending on the elements configured in their biographical details.

For the study, statements of the continuous measurement type Lickert scale and categorical measurement types have been used. Those scaling options for the Lickert type started from lowest negative perception to highest positive perception. They include strongly disagree, disagree, neutral, agree, strongly agree. In the categorical measurement, yes and no options were given to collect the perceptions of respondents.

4.4 DATA ANALYSIS

The returned questionnaires have been put together and separated according to the three different respondents. In each category of the questionnaires, the questions are coded to meet requirements for statistical data analysis. The Statistical Package for Social Sciences (SPSS 12 V) was used for data analysis and presentation of results. Three different template sheets were designed for three different questionnaires and the data decoded and captured in template sheets. The descriptive statistics tools were used for the data analysis and interpretation of the results of the survey

4.5 DESCRIPTIVE STATISTICS

Descriptive statistics refer to the collection of methods for classifying and summarizing numerical data. The objective of descriptive statistics "is to provide a summary measurement of the data contained in all the elements of a sample" (Kinnear & Taylor, [1991:546]. Descriptive analysis incorporates frequencies, measures of central tendency and measures of dispersion.

4.5.1 FREQUENCY DESCRIPTIVE STATISTICS

According to Sekaran [2000:136], frequencies refer to the number of times various sub categories of a certain phenomenon occur, from which the percentage and cumulative frequency of their occurrence can be easily calculated. Frequencies were used in the current study to obtain a profile of the sample. The frequencies were converted to percentages and revealed in each statement of the respondents' perceptions towards each question.

4.5.1.1 THE MEAN

The mean is the average value of the variable, computed across all cases (Judd, Smith and Kidder, 1991). The mean is referred to as the arithmetic average (Cooper & Emory, 1995). It is defined by Cooper & Emory [1995:395] as "the sum of the observed values in the distribution divided by the number of observations. It is the local measure most frequently used for interval-ratio data but can be misleading when the distribution contains extreme values, large or small [Cooper & Emory, 1995]. The mean value reveals an average perception towards the study questions.

The value of a mean indicator in the understudy indicates the average perception of the community was on any given issue. This was converted to a percentage and could then be used as a comparator against other values in the table.

4.5.1.2 RANGE

In collected data, the difference between the highest and the lowest value is called Range. This indicates is there any difference in highest perception of respondents and lowest perception of respondents. The range indicated the breadth or the scope that was used in the survey.

Notwithstanding the varying degrees of responses that can be illicited, the range creates certain limitations as to the answers that respondents can offer. For the purposes of the understudy, this ensured that responses received were clear and unambiguous.

4.5.1.3 MINIMUM

In collected data, the lowest scored value in particular variable is called the Minimum. This indicates minimum value for any given respondent's perception for a particular question. This helped the research in ascertaining what the community cared or worried least about, or what they thought was of least importance.

4.5.1.4 MAXIMUM

In collected data, the highest scored value in particular variable is called the Maximum. This indicates maximum value for any given respondent's perception for a particular question. This helped the research in ascertaining what the community cared or worried most about, or what they thought was of most importance.

4.6 ETHICAL CONSIDERATIONS

Babbie and Mouton [2001:519][72] advocate that ethical and political consideration must be taken into account in the design and execution of the research, together with any scientific consideration.

The researcher conducted the research on the basis on anonymity and respected the rights of the individuals' privacy. As a result of the anonymity, there was a willingness to be part of the research study.

The researcher assured the participants that all ethical considerations have been adhered to and respected by the researcher in the study.

4.7 PRESENTATION OF RESULTS

The statistical results of the research survey are presented and interpreted. The collected questionnaires were coded and decoded numerically according to a designed statistical template sheet.

The statistical computer programme Statistical Package for Social Sciences V12 (SPSS V 12) was used for this research statistical analysis. In this research study, three different research instruments have been used, based on the type of statistics needed from Community, Industry and the Local Government perspectives.

At the end of each frame, a comment is made in respect of the response.

[72] Babbie,E and Mouton, J , 2001: The Practice of Social Research, Cape Town, Oxford University Press

4.7.1 PERCEPTIONS - COMMUNITY PERSPECTIVE

SECTION A: BIOGRAPHICAL DETAILS OF RESPONDENTS

Q1: RESPONDENTS GENDER GROUP

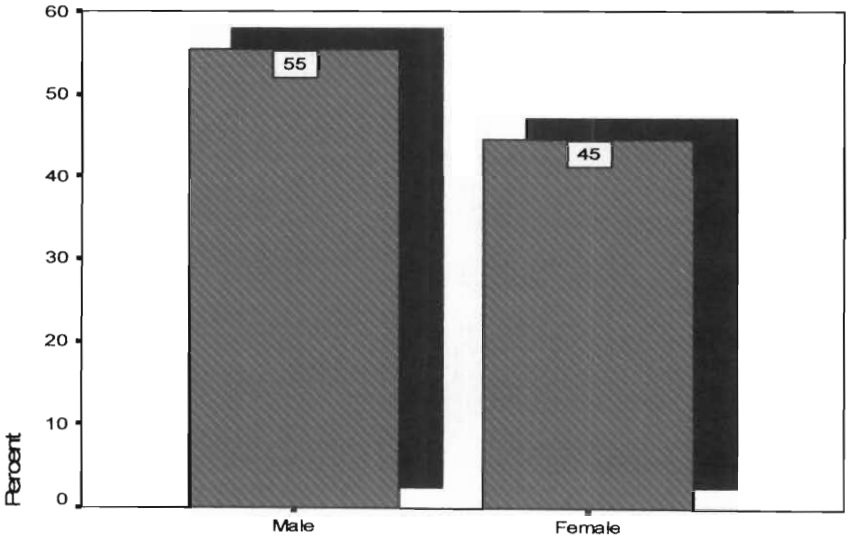
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	41	55.4	55.4	55.4
	Female	33	44.6	44.6	100.0
	Total	74	100.0	100.0	

The above table reveal gender dispersion of participated respondents in this project, the participated respondents in this research are:

- 55.4 % Male.
- 44.6 % are female.

From the above it can be noted that the difference between male and female respondents is not vast. Figure 4.1 gives a graphical representation of the respondents' gender groups

FIGURE 4.1 GRAPHICAL REPRESENTATION OF GENDER GROUPS



Q2: RESPONDENTS AGE GROUP

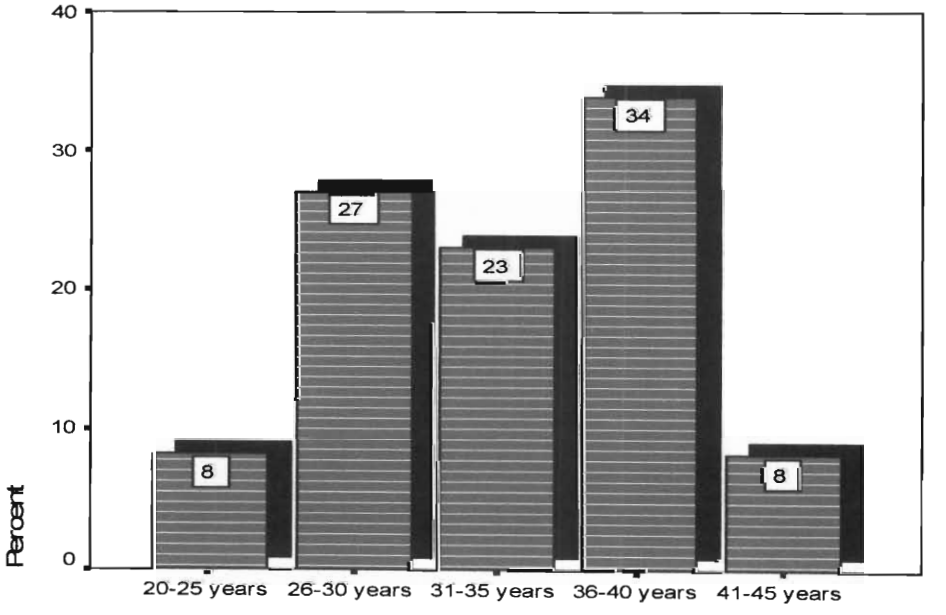
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20-25 years	6	8.1	8.1	8.1
	26-30 years	20	27.0	27.0	35.1
	31-35 years	17	23.0	23.0	58.1
	36-40 years	25	33.8	33.8	91.9
	41-45 years	6	8.1	8.1	100.0
	Total	74	100.0	100.0	

The above table reveals the age dispersion of participated respondents in this research. The results are:

- 8.1 % are between 20-25 years.
- 27.0 % are between 26-30 % years.
- 23.0 % are between 31-35 years.
- 33.8 % are between 36-40 years.
- 8.1 % are between 41-45 years.

The data reveals that the respondents were from a wide spectrum of ages and is graphically represented by Figure 4.2 below.

FIGURE 4.2 GRAPHICAL REPRESENTATION OF AGE



Q3: RESPONDENTS ETHNIC GROUP

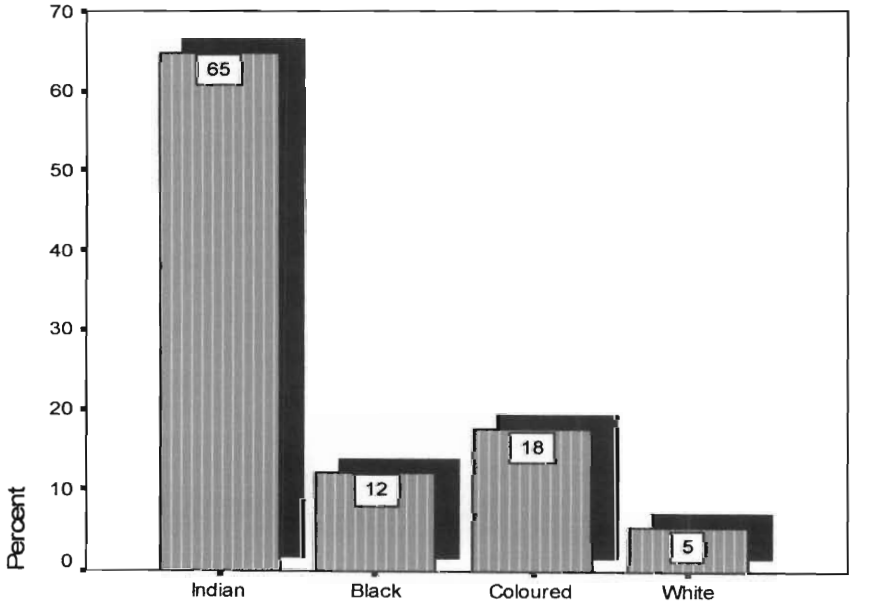
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Indian	48	64.9	64.9	64.9
	African	9	12.2	12.2	77.0
	Colored	13	17.6	17.6	94.6
	White	4	5.4	5.4	100.0
	Total	74	100.0	100.0	

The above table reveals the ethnic group dispersion of participated respondents in this project, these are:

- 64.9 % belong to the Indian race,
- 12.2 % belong to an African group,
- 17.6 % belong to the Colored group,
- 5.4 % belong to the White group.
-

The respondent's ethnic grouping reflects the demographics of the area and is represented by Figure 4.3

FIGURE 4.3 GRAPHICAL REPRESENTATION OF ETHNIC GROUPS



Q4: RESPONDENTS EDUCATION

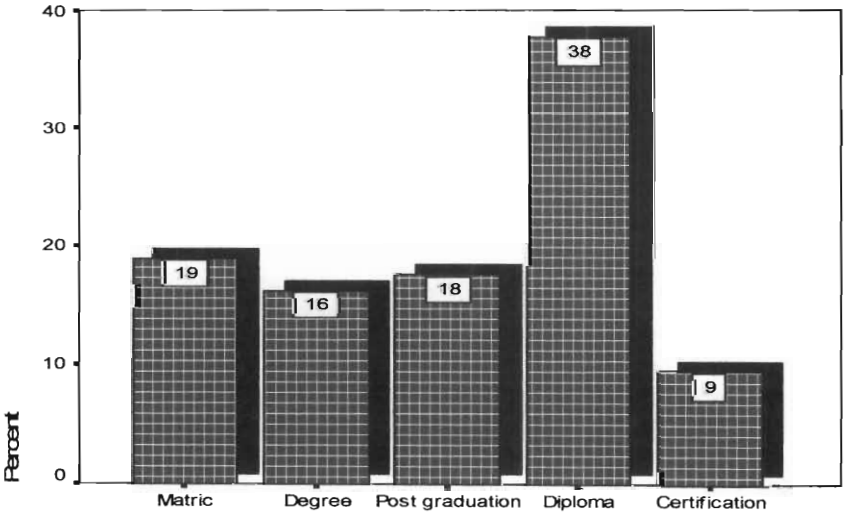
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Matric	14	18.9	18.9	18.9
	Degree	12	16.2	16.2	35.1
	Post graduation	13	17.6	17.6	52.7
	Diploma	28	37.8	37.8	90.5
	Certification	7	9.5	9.5	100.0
	Total	74	100.0	100.0	

The above table reveals the education level dispersion of participated respondents in this project, they are:

- 18.9 % have Matric.
- 16.2 % have degrees.
- 17.6% are post graduates.
- 37.8 % have diplomas.
- 9.5% are in possession certificate courses.

The data reveals that many of the respondents have matriculated and is represented by Figure 4.4. This has no real implications for the integrity of the study.

FIGURE 4.4 GRAPHICAL REPRESENTATION OF EDUCATIONAL LEVELS



Q5: YEARS THAT RESPONDENTS HAVE BEEN LIVING IN THIS AREA

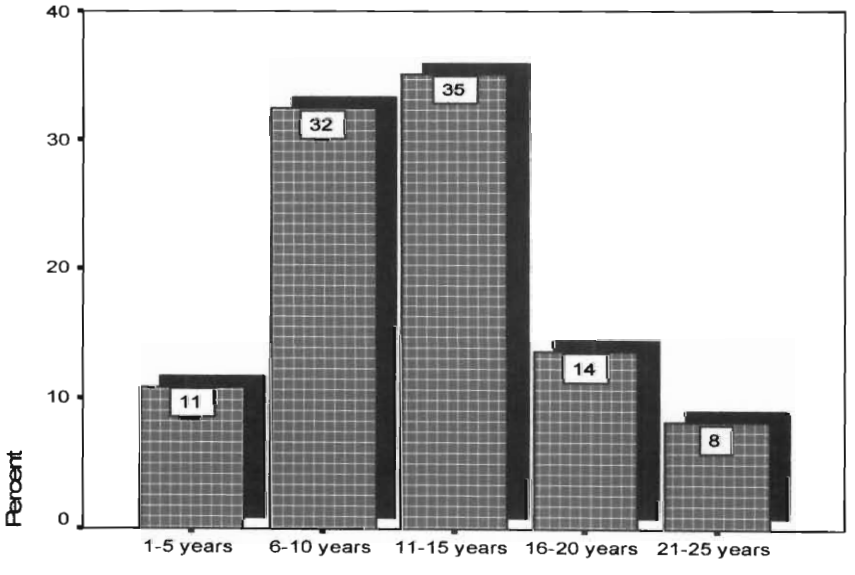
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-5 years	8	10.8	10.8	10.8
	6-10 years	24	32.4	32.4	43.2
	11-15 years	26	35.1	35.1	78.4
	16-20 years	10	13.5	13.5	91.9
	21-25 years	6	8.1	8.1	100.0
	Total	74	100.0	100.0	

The above table reveals the number of years of persons living in the Durban South area. The results are:

- 10.8 % are 1-5 years.
- 32.4 % are 6-10 years.
- 35.1 % are 11-15 years.
- 13.5 % are 16-20 years.
- 8.1 % are 21-25 years.

The data reveals that the average period of residence in the target area is about 15 years and is represented by Figure 4.5.

FIGURE 4.5 GRAPHICAL REPRESENTATION OF YEARS OF RESIDENCE IN THE AREA



SECTION B: STUDY VARIABLES

Q1.1A: WHICH OF THE FOLLOWING ISSUES ARE IMPORTANT TO YOU?

MAINLY HEALTH ISSUES

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	5	6.8	6.8	6.8
	Neutral	13	17.6	17.6	24.3
	Agree	25	33.8	33.8	58.1
	Strongly Agree	31	41.9	41.9	100.0
	Total	74	100.0	100.0	

The above table reveals perceptions of participated respondents in this project. The results are:

- 6.8 % disagree.
- 17.6 % neutral, 33.8 % agree.
- 41.9 % strongly agree towards mainly health issues.

From the research it can be noted that the majority of respondents consider issues of health to be important. Being a hub for pollution, the response to this question confirms that these issues are topical and current. More than 75% of the respondents agreed or strongly agreed.

Q1.1B: MAINLY SAFETY ISSUES

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	1.4	1.4	1.4
	Disagree	1	1.4	1.4	2.7
	Neutral	13	17.6	17.6	20.3
	Agree	32	43.2	43.2	63.5
	Strongly Agree	27	36.5	36.5	100.0
	Total	74	100.0	100.0	

The above table reveals perceptions of respondents who participated in this research. The results are:

- 1.4% strongly disagree.
- 1.4% disagree.
- 17.6% neutral.
- 43.2 % agree.
- 36.5 % strongly agree.

Almost 80% of the respondents felt that safety issues were important when compared to the previous issue. From this research it can be noted that residents are not unaware of the dangers of the MHI's in the proximity of the neighborhood.

Q1.1C: MAINLY ENVIRONMENTAL ISSUES

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	11	14.9	14.9	14.9
	Agree	36	48.6	48.6	63.5
	Strongly Agree	27	36.5	36.5	100.0
	Total	74	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 14.9 % neutral.
- 48.6 % agree.
- 36.5 % strongly agree.

On this score 85.1% of the respondents thought that environmental issues were important. This again reflects that the current situation in the DSB, in particular environmental issues are important to the residents.

Q1.1D: ALL ARE EQUALLY IMPORTANT

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	6	8.1	8.1	8.1
	Agree	30	40.5	40.5	48.6
	Strongly Agree	38	51.4	51.4	100.0
	Total	74	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 8.1 % neutral.
- 40.5 % agree.
- 51.4 % strongly agree.

Understandably, the growing concerns around health, safety and environment in the DSB took precedence over all other matters. More than 92% of all respondents felt that each of these issues is equally important.

Q1.2: DO YOU CONSIDER THE AREA THAT YOU LIVE IN TO BE DISASTER PRONE?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	2	2.7	2.7	2.7
	Disagree	3	4.1	4.1	6.8
	Neutral	12	16.2	16.2	23.0
	Agree	30	40.5	40.5	63.5
	Strongly Agree	27	36.5	36.5	100.0
	Total	74	100.0	100.0	

The above table reveals perceptions of participated respondents in this project. The results are:

- 2.7 % strongly disagree.
- 4.1 % disagree.
- 16.2 % neutral.
- 40.5 % agree.
- 36.5 % strongly agree.

77% of the respondents felt that the area that they live in is prone to disasters.

Q1.3: THERE IS SUFFICIENT INFORMATION AVAILABLE ON DISASTER AWARENESS.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	30	40.5	40.5	40.5
	Disagree	29	39.2	39.2	79.7
	Neutral	8	10.8	10.8	90.5
	Agree	5	6.8	6.8	97.3
	Strongly Agree	2	2.7	2.7	100.0
	Total	74	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 40.5 % strongly disagree.
- 39.2 % disagree.
- 10.8 % neutral.
- 6.8 % agree.
- 2.7 % strongly agree.

79.7% of the respondents believe that there is insufficient information available on disaster awareness. The absence of [or inadequate] awareness and education programmes in area such as the DSB can only cause prejudice and harm to the well-being of the community. This information will inform the research in drawing informed conclusions.

Q1.4A. WHO DO YOU THINK SHOULD BE RESPONSIBLE FOR SUCH AWARENESS?

INDUSTRY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	6	8.1	8.1	8.1
	Disagree	20	27.0	27.0	35.1
	Neutral	9	12.2	12.2	47.3
	Agree	20	27.0	27.0	74.3
	Strongly Agree	19	25.7	25.7	100.0
	Total	74	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 8.1 % strongly disagree.
- 27.0 % disagree.
- 12.2 % neutral.
- 27.0 % agree.
- 25.7 % strongly agree

52.7% of the respondents agree that industry should be responsible for awareness.

Q1.4B: LOCAL GOVERNMENT

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	4.1	4.1	4.1
	Disagree	7	9.5	9.5	13.5
	Neutral	3	4.1	4.1	17.6
	Agree	29	39.2	39.2	56.8
	Strongly Agree	32	43.2	43.2	100.0
	Total	74	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 4.1 % strongly disagree.
- 9.5 % disagree.
- 4.1 % neutral.
- 39.2 % agree.
- 43.2 % strongly agree.

82.4% agree that this responsibility rests with local government as the custodian of public safety and related initiatives

Q1.4C: NGO'S / CBO'S

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	7	9.5	9.5	9.5
	Disagree	13	17.6	17.6	27.0
	Neutral	3	4.1	4.1	31.1
	Agree	36	48.6	48.6	79.7
	Strongly Agree	15	20.3	20.3	100.0
	Total	74	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:-

- 9.5 % strongly disagree.
- 17.6 % disagree.
- 4.1 % neutral.
- 48.6 % agree.
- 20.3 % strongly agree.

68.9% of respondents agree or strongly agree that NGO's or CBO's should take the lead. It is submitted that the issues of funding and other issues are constraints that impacts on NGO's.

Q2: WHAT ARE SOME OF THE HAZARDS OR POTENTIAL HAZARDS THAT THE COMMUNITY COULD BE FACED WITH?

Q2.1A: EXPLOSIONS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	13	17.6	17.6	17.6
	Disagree	10	13.5	13.5	31.1
	Neutral	20	27.0	27.0	58.1
	Agree	17	23.0	23.0	81.1
	Strongly Agree	14	18.9	18.9	100.0
	Total	74	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 17.6 % strongly disagree.
- 13.5 % disagree.
- 27.0 % neutral.
- 23.0 % agree.
- 18.9 % strongly agree

41.9% of respondents thought that explosions pose a real danger to the community.

Q2.1B: FIRE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	13	17.6	17.6	17.6
	Disagree	11	14.9	14.9	32.4
	Neutral	10	13.5	13.5	45.9
	Agree	24	32.4	32.4	78.4
	Strongly Agree	16	21.6	21.6	100.0
	Total	74	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 17.6 % strongly disagree.
- 14.9 % disagree.
- 13.5 % neutral.
- 32.4 % agree.
- 21.6 % strongly agree.

54% of the respondents believe that fire could pose a real threat in the DSB.

Q2.1C: CONSEQUENCES OF A PIPELINE RUPTURING

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	6	8.1	8.1	8.1
	Disagree	8	10.8	10.8	18.9
	Neutral	6	8.1	8.1	27.0
	Agree	35	47.3	47.3	74.3
	Strongly Agree	19	25.7	25.7	100.0
	Total	74	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 8.1 % strongly disagree.
- 10.8 % disagree.
- 8.1 % neutral.
- 47.3 % agree.
- 25.7 % strongly agree

73% of the respondents believe that major threat in the DSB in the consequences of a pipeline rupturing. This suggests that the community is aware of the pipelines that pass through their community and pose a real danger of it rupturing.

Q2.2: IN YOUR OPINION, WHICH OF THESE INDUSTRIES POSE A REAL DANGER TO THE COMMUNITY?

Q2.2A: ENGEN

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	4	5.4	5.4	5.4
	Neutral	6	8.1	8.1	13.5
	Agree	46	62.2	62.2	75.7
	Strongly Agree	18	24.3	24.3	100.0
	Total	74	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 5.4 % disagree.
- 8.1 % neutral.
- 62.2 % agree.
- 24.3 % strongly agree.

From the results of this section, 86.5% of the respondents agree that Engen poses a real danger to the lives of the community in the DSB.

Q2.2B: SAPREF

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	8	10.8	10.8	10.8
	Disagree	6	8.1	8.1	18.9
	Neutral	8	10.8	10.8	29.7
	Agree	29	39.2	39.2	68.9
	Strongly Agree	23	31.1	31.1	100.0
	Total	74	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 10.8 % strongly disagree.
- 8.1 % disagree.
- 10.8 % neutral.
- 39.2 % agree.
- 31.1 % strongly agree

From the above, 70.3% believe that SAPREF poses a risk to the community

Q2.2C: MONDI

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	6	8.1	8.1	8.1
	Disagree	4	5.4	5.4	13.5
	Neutral	9	12.2	12.2	25.7
	Agree	36	48.6	48.6	74.3
	Strongly Agree	19	25.7	25.7	100.0
	Total	74	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 8.1 % strongly disagree.
- 5.4 % disagree.
- 12.2 % neutral.
- 48.6 % agree.
- 25.7 % strongly agree.
-

74.3% of the community believe that the source of risk is Mondi.

Q2.2D: SMALLER INDUSTRIES

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5	6.8	6.8	6.8
	Disagree	10	13.5	13.5	20.3
	Neutral	7	9.5	9.5	29.7
	Agree	18	24.3	24.3	54.1
	Strongly Agree	34	45.9	45.9	100.0
	Total	74	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 6.8 % strongly disagree.
- 13.5 % disagree.
- 9.5 % neutral.
- 24.3 % agree.
- 45.9 % strongly agree.

70.2% of the respondents felt that smaller industries pose real danger to the community.

Q2.3: WHAT CAN BE DONE TO PREVENT OR LESSEN THE DANGERS?

Q2.3A: IMPLEMENTING NEW TECHNOLOGY.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5	6.8	6.8	6.8
	Disagree	9	12.2	12.2	18.9
	Neutral	14	18.9	18.9	37.8
	Agree	30	40.5	40.5	78.4
	Strongly Agree	16	21.6	21.6	100.0
	Total	74	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 6.8 % strongly disagree.
- 12.2 % disagree.
- 18.9 % neutral.
- 40.5 % agree.
- 21.6 % strongly agree.

On the issue of mitigation, 62.1% of the communities believed that implementing new technology would prevent or lessen the danger faced by the community.

Q2.3B: REACHING INTERNATIONAL STANDARDS DISPOSAL METHODS.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	4.1	4.1	4.1
	Disagree	5	6.8	6.8	10.8
	Neutral	8	10.8	10.8	21.6
	Agree	37	50.0	50.0	71.6
	Strongly Agree	21	28.4	28.4	100.0
	Total	74	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 4.1 % strongly disagree.
- 6.8 % disagree.
- 10.8 % neutral.
- 50.0 % agree.
- 28.4 % strongly agree.

78.4 % of the respondents believe that by reaching international standards in methods of disposal may help mitigate the effects of a disaster. Disposal methods imply the safe storage and transportation of volatile and hazardous substances.

Q2.3C: NOT PERMITTING THE BUILDING OF RESIDENTIAL HOUSES.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	29	39.2	39.2	39.2
	Disagree	23	31.1	31.1	70.3
	Neutral	8	10.8	10.8	81.1
	Agree	9	12.2	12.2	93.2
	Strongly Agree	5	6.8	6.8	100.0
	Total	74	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 39.2 % strongly disagree.
- 31.1 % disagree.

- 10.8 % neutral.
- 12.2 % agree.
- 6.8 % strongly agree.

On this score only 21% agree that by not permitting further residential houses in the DSB, the danger can be prevented or lessened. It is important to note that the vulnerability would be the same except that more residents would be vulnerable to the risk.

Q2.3D: RELOCATING INDUSTRIES FROM RESIDENTIAL AREAS.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	6	8.1	8.1	8.1
	Disagree	13	17.6	17.6	25.7
	Neutral	7	9.5	9.5	35.1
	Agree	31	41.9	41.9	77.0
	Strongly Agree	17	23.0	23.0	100.0
	Total	74	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 8.1 % strongly disagree.
- 17.6 % disagree.
- 9.5 % neutral.
- 41.9 % agree.
- 23.0 % strongly agree.

The issue of relocating the plant has been raised several times. For economic reasons this was not practical. However 64.9% of the respondents believe that moving or relocating industries away from residential areas would lessen the danger.

Q2.3E: RELOCATING OF RESIDENTS FROM INDUSTRIAL ZONES.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	29	39.2	39.2	39.2
	Disagree	24	32.4	32.4	71.6
	Neutral	10	13.5	13.5	85.1
	Agree	6	8.1	8.1	93.2
	Strongly Agree	5	6.8	6.8	100.0
	Total	74	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 39.2 % strongly disagree.
- 32.4 % disagree.
- 13.5 % neutral.
- 8.1 % agree.
- 6.8 % strongly agree

This was not a very popular option and only 14.9% felt that relocating residents from industrial zones would lessen or prevent dangers to communities.

Q3: COMMUNITY PARTICIPATION AND INTERVENTION

Q3.1 IN YOUR OPINION, IS THE COMMUNITY ADEQUATELY REPRESENTED ON MATTERS AFFECTING IT?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	9	12.2	12.2	12.2
	Disagree	5	6.8	6.8	18.9
	Neutral	9	12.2	12.2	31.1
	Agree	24	32.4	32.4	63.5
	Strongly Agree	27	36.5	36.5	100.0
	Total	74	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 12.2 % strongly disagree.
- 6.8 % disagree.

- 12.2 % neutral.
- 32.4 % agree.
- 36.5 % strongly agree.

68.9% of the community believe that they are adequately represented on matters affecting it. This must not be confused with the question of adequate or information that is available to the community on matters affecting it.

4.7.2 PERCEPTIONS - INDUSTRY PERSPECTIVE

Q1.1: IS THERE A COMMUNITY AWARENESS PROGRAMME FOR THE COMMUNITY?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	20	54.1	54.1	54.1
	No	17	45.9	45.9	100.0
	Total	37	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 54.1 % yes.
- 45.9 % no

This response indicates that there is either some confusion or that there is no coordinated effort in respect of awareness from industry. It is important that a coordinated approach be taken by industries in the DSB so that the intervention is uniform.

Q1.2: WHO, IN YOUR OPINION SHOULD BE THE LEAD AGENT IN THIS REGARD?

A: INDUSTRY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	21	56.8	56.8	56.8
	No	16	43.2	43.2	100.0
	Total	37	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 56.8 % yes.
- 43.2 % no

A major part of industry believes that it should be the lead agent on issues of awareness.

Q1.2B: LOCAL GOVERNMENT

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	22	59.5	59.5	59.5
	No	15	40.5	40.5	100.0
	Total	37	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 59.5 % yes.
- 40.5 % no

Almost 60% of industries believe that local government should be the lead agent when it comes to Community awareness and education.

Q1.2C: COMMUNITY GROUPS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	21	56.8	56.8	56.8
	No	16	43.2	43.2	100.0
	Total	37	100.0	100.0	

The above table represents perceptions of participated respondents in this research. The results are:

- 56.8 % yes.
- 43.2 % no.

56.8% of Industry believes that Community groups should be responsible for awareness

Q1.2D: OTHER PLEASE SPECIFY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	8	21.6	21.6	21.6
	No	29	78.4	78.4	100.0
	Total	37	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 21.6 % yes.
- 78.4 % no

78.4% of the respondents felt that of the abovementioned categories of persons were in the best position to be the lead agent in awareness and education initiatives.

Q1.3: DO YOUR CONSIDER THE SHARING OF ENVIRONMENTAL INFORMATION IMPORTANT TO YOUR ORGANIZATION?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	30	81.1	81.1	81.1
	No	7	18.9	18.9	100.0
	Total	37	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 81.1 % yes.
- 18.9 % no.
-

81.1% of industry felt that it is important to their organization to share information. This is a majority and a positive implication for disaster public health.

Q1.4: DOES THIS ADD VALUE OR BENEFIT THE INDUSTRY?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	27	73.0	73.0	73.0
	No	10	27.0	27.0	100.0
	Total	37	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 73.0 % yes.
- 27.0 % no.

73% of industry believes that the sharing of information does add value to the organization. This indicates that about 8% believe that the sharing of information is important; it does not add value to the organization.

Q1.5: CAN MORE BE DONE TO EDUCATE THE COMMUNITY ON HEALTH AND SAFETY ISSUES?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	32	86.5	86.5	86.5
	No	5	13.5	13.5	100.0
	Total	37	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 86.5 % yes.
- 13.5 % no

86.5% of industry believes that more can be done to educate the community on issue of health and safety. There were several suggestions made and will be discussed in the next chapter.

Q1.6: ARE THERE INTERNATIONAL LESSONS ON DISASTER MANAGEMENT FOR LOCALIZED ISSUES?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	19	51.4	51.4	51.4
	No	18	48.6	48.6	100.0
	Total	37	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 51.4 % yes.
- 48.6 % no.

51.4 % of the respondents believed that the international experience of managing disasters would be important lessons for the management of disasters for localized issues. International best practices and standards form important models for local conditions

Q1.7: IS THERE CURRENTLY ANY INVOLVEMENT WITH ANY OF THESE BODIES?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	33	89.2	89.2	89.2
	No	4	10.8	10.8	100.0
	Total	37	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 89.2 % yes.
- 10.8 % no.

It is apparent that industry needs to adhere to international best practices where much of the focus is on compliance. 89.2 % of the respondents admit that they do involve themselves with international organizations.

4.7.3 PERCEPTIONS – LOCAL GOVERNMENT PERSPECTIVE

Q1.1: TO WHAT EXTENT ARE APPLICABLE LEGISLATIVE PROVISIONS SUCCESSFUL?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	22	71.0	71.0	71.0
	No	9	29.0	29.0	100.0
	Total	31	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 71.0 % yes.
- 29.0 % no.

71% of the respondents believe that legislation applicable to Public Health are successful in application and enforcement.

Q1.2: ARE THERE DISPARITIES OR FLAWS IN THE LEGISLATION?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	10	32.3	32.3	32.3
	No	21	67.7	67.7	100.0
	Total	31	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 32.3 % yes.
- 67.7 % no.

32.3% believe cited major flaw in legislation is the problem with interpretation. 67.7% believed that there was nothing wrong with legislation.

Q1.3: DOES THIS CREATE A PROBLEM WITH ENFORCEMENT?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	19	61.3	61.3	61.3
	No	12	38.7	38.7	100.0
	Total	31	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 61.3% yes.
- 38.7 % no.

61.3% of the respondents believe that there is a problem with enforcement. Many of the respondents cite human capacity as the main problem with enforcement.

Q2.1: IN THE CONTEXT OF DISASTER MANAGEMENT, IS AWARENESS IMPORTANT?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	29	93.5	93.5	93.5
	No	2	6.5	6.5	100.0
	Total	31	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 93.5 % yes
- 6.5 % no

Many of the respondents thought that awareness was an important concept on disaster management.

Q2.2: WHO SHOULD BE RESPONSIBLE FOR AWARENESS?

A: LOCAL GOVERNMENT

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	28	90.3	90.3	90.3
	No	3	9.7	9.7	100.0
	Total	31	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 90.3% yes.
- 9.7 % no.

Local government felt that they should take the lead in this regard. 90.3% believed that it was the responsibility of local government.

B: INDUSTRY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	26	83.9	83.9	83.9
	No	5	16.1	16.1	100.0
	Total	31	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 83.9% yes.
- 16.1 % no.

83.9% of the respondents felt that industry should also be responsible for awareness.

C: NGOS / CBOS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	28	90.3	90.3	90.3
	No	3	9.7	9.7	100.0
	Total	31	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 90.3% yes.
- 9.7 % no.

The respondents from local government believe that NGO's and CBO's should also be responsible for awareness. The 90.3% of the respondents believed that there could not be too much awareness and that the type and focus of awareness should be from different perspectives.

D: OTHER

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	20	64.5	64.5	64.5
	No	11	35.5	35.5	100.0
	Total	31	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 64.5% yes.
- 35.5 % no.

Local government felt that it could rely on national and international organs for some of its initiatives.

Q3.1: DOES LA21 COLLABORATE WITH THE MANDATE OF LOCAL GOVERNMENT IN TERMS OF SUSTAINABLE DEVELOPMENT?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	24	77.4	77.4	77.4
	No	7	22.6	22.6	100.0
	Total	31	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 77.4 % yes.
- 22.6 % no.
-

77.4 % expressed that LA21 does play a part in the activities of local government. Examples of the collaboration are evident in the Strategic Environmental Assessment for the Durban South Basin.

Q3.2: DO YOU THINK THAT LOCAL GOVERNMENT CAN BENEFIT FROM THE GLOBAL INITIATIVES OF LA21?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	26	83.9	83.9	83.9
	No	5	16.1	16.1	100.0
	Total	31	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 83.9 % yes.
- 16.1 % no

83.9% of the respondents believe that it can benefit from global initiative of LA21.

Q4.1: FROM THE PERSPECTIVE OF LOCAL GOVERNMENT, DO YOU THINK APELL FAILED?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	29	93.5	93.5	93.5
	No	2	6.5	6.5	100.0
	Total	31	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 93.5 % yes.
- 6.5 % no.

93.5% of the respondents think that APELL did fail. Interestingly the 6.5% that thought it did not fail explained that it was an opportunity that came before its time and the various role-players were not ready for it. On the contrary the believed that Durban failed in its initiative and that APELL is alive in other countries.

Q4.2: CAN ANYTHING BE DONE TO DECREASE THE GAP BETWEEN THE COMMUNITY AND LOCAL GOVERNMENT?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	30	96.8	96.8	96.8
	No	1	3.2	3.2	100.0
	Total	31	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 96.8 % yes.
- 3.2 % no.
-

96.8% of the respondents believe that a lot can be done to decrease that gap between the community and local government.

Q4.3: CAN DURBAN ATTRACT ANOTHER APELL?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	27	87.1	87.1	87.1
	No	4	12.9	12.9	100.0
	Total	31	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 87.1 % yes.
- 12.9 % no.

87% of the respondents are confident that Durban can attract another APELL.

Q4.4: IS THERE ANY LESSONS CAN BE LEARNED TO MAKE THE NEXT PROJECT SUCCESSFUL?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	28	90.3	90.3	90.3
	No	3	9.7	9.7	100.0
	Total	31	100.0	100.0	

The above table reveals perceptions of participated respondents in this research. The results are:

- 90.3 % yes.
- 9.7 % no

90.3% of the respondents believe that there are lessons that could improve the chances of success with another project. Better relationships and the objective of putting the interests of the community first, were the key reasons offered.

4.8 DISCUSSION OF RESULTS

The results of the research are discussed below

4.8.1 COMMUNITY

It can be noted from the study that the community felt that issues of health, safety and the environment were current and topical issues in the community. The community is aware of the risks associated with industry. More than 90% of the respondents felt that all were equally important. .

The issue of a ***disaster prone area*** emphasizes that this area is more vulnerable than purely residential area. A large percentage of respondents believe that the area has the potential to become disaster active.

The issue of awareness was also interrogated in the study and the results revealed that almost 80% believe there was insufficient information on disaster awareness. Awareness being the core theme in this study, the issue has received little attention in the target area.

82.4% of the respondents believed that the responsibility for awareness rested with government. As the custodian of public safety and environmental issues, Local Government has the ethical and legal responsibility to ensure that communities are informed and educated on matters affecting it.

The community expressed the danger of a pipeline rupturing supersedes the any other risk. The risks that were less hazardous, in the opinion of the community were fire and explosions. It follows then that the awareness and education should be more focused on the dangers of the pipeline that passes through their community.

Apart from the pipelines, 86.5% of the respondents believed that because of its situation, Engen posed a greater risk to the community than any other single industry.

The community was asked to provide opinions on the issue of prevention and mitigation. From the study it was noted that the community is developing in create ways to resolve issues and the majority of the respondents [78.4%] thought that reaching international standards in methods of disposal would be a more practical solution over relocating industries from residential areas. It is submitted that South Africa as an emerging nation must be open to alternatives when faced with long standing environmental problems.

Many respondents believed there was the issue of inadequate means of communication and the message does not filter down to the community

4.8.2 INDUSTRY

The questionnaire designed and presented to industry as a role-player in the Durban South Basin. There was some indication that some industries did not participate or that they were not aware of any awareness programmes in the region. The results revealed that only 54.1% of industry admitted that an awareness programme for the region existed. The issue of coordination and general industrial participation is discussed in the next chapter.

Industry believed that there awareness programmes should be initiated by all stakeholders at should not be confined to a specific group. Information sharing received a positive response from industry and 81.1% of respondents in industry believed that the sharing of environmental information is important to their organization. 73% of these respondents went further stating that this would add value to the industry. From the aforegoing, it is evident that there is an almost ***quid pro quo*** mentality in the DSB that community groups and industry have an understanding of the needs of the one another. 86.5 % of the respondents from industry believed that more could be done to educate and inform the community on health and safety issues.

4.8.3 LOCAL GOVERNMENT

Public Health legislation is important in ensuring compliance. 71% of respondents in local government believed that legislation applicable to health, safety and the environment were successful in ensuring the intended objectives. 32.3% believed that there were disparities or flaws in the legislation and that there was room for change. The common problems were with enforcement, human capacity and the issue of funding. Local Government believes that awareness was amongst the most important concepts in the management of disasters. 93.5% believed that awareness and education will help build better communities and 90.3% of the Local Government respondents believed that they should be responsible for such initiatives.

Local Government as the local authority has from time to time implemented and adopted initiatives that would benefit the community. One such endeavor was the Local Agenda 21 [LA21]. 77.4% of the respondents felt that the principles set out in LA21 do collaborate in the activities of local government in respect of the environment. 83.9% of the respondents from local government believe that, not only does LA21 play a part, but also benefits from such enterprises.

The other initiative that did prove to be beneficial was the project APELL. 93.5% of the respondents believed that APELL did fail. This failure was due to a permutation of factors that emerged after it was flouted. One major impediment to this was the lack of coordination and commitment from the local authority. 87.1% was optimistic that Durban can and will be the subject of another project such as APELL.

It is evident from the three questionnaires and the responses received, that the role-players in the Durban South Basin are more focused on their environment as it relates to issues of Public Health.

4.9 CONCLUSION

The research methodology and statistical analysis employed in this research highlights the different responses gauged from the various respondents. The results have been codified, interpreted and presented. Disaster perception is suggestive of a range of ideas and thoughts that aim to educate, sensitize and alert the community so that the response rate and conscious levels are elevated. It also creates an appreciation of the environment toning and re-defining their insightfulness and acuity. The medium through which information was obtained was the distribution of questionnaires to various target groups. Specific information that needed to be collected was put to the respondents from various perspectives. Analysis of the information was depicted in graphs, diagrams and finally informing the survey.

The feedback obtained from this research methodology was used as a basis to inform the recommendation, and ultimately the conclusion for this research.

CHAPTER 5

RECOMMENDATIONS AND CONCLUSION

5.1 INTRODUCTION

The high density of cities and human settlements make them particularly vulnerable to hazards and disasters. Disasters are becoming more complex, where a range of factors in the social, cultural, and natural spheres are increasing the risks associated with disasters.

In this chapter the researcher focused on a series of recommendations that arose out of the research study. Whilst the recommendations are linked to the respondents' feedback, the research also presented issues for future consideration. This is depicted in the ***lacuna*** for further research.

5.2 RECOMMENDATIONS

The following recommendations have arisen out of the findings of the research.

5.2.1 INADEQUATE INFORMATION ON ISSUES OF DISASTER MANAGEMENT

The research indicated that there was little or no information on issues of Disaster Management. Furthermore, issues relating to Public Safety and community awareness of the risks and hazards associated with industries in the Durban South Basin were limited.

It is recommended that the accountability for Public Safety is the domain of Local Government. It has both the ethical and legal responsibility to ensure that communities are informed and educated on matters affecting them. It is recommended that Local Government takes the lead in ensuring that communities are informed through the media or a monthly newsletter, regular workshops and interfacing between local councilors and the communities that they represent on relevant issues of risk, hazards, mitigation and preparedness strategies that are employed in the region.

5.2.2 INFORMATION ON PIPELINES

The community also felt that the major threat in the area resulted from the pipelines that carry fuel and other flammable materials through their communities. These pipelines are underground and have been one of the main reasons for contention between the community and industry. Insufficient information is available on the nature, purpose and risks associated with the pipelines

It is recommended that a comprehensive study should be undertaken to investigate the exact nature, purpose, and risks related to the pipeline that is closest to the community. It is a further recommendation that in terms of International Best Practices for the petroleum industry, a pipeline integrity study should be undertaken by an independent Engineering Risk Consultant.

The Risk Assessment for the Durban South Basin should take into account the cumulative effects of industry and the growing nature of risks associated [mainly] with the Engen Plant. The assessment should also consider [and possibly expand on] the current Island View Risk Assessment exercise.

It is submitted that the information and the results obtained from the study be widely disseminated to the affected community.

5.2.3 INTERNATIONAL BEST PRACTICES

A further concern of the community in the Durban South Basin is that industry fails to comply with basic standards of methods disposal. This causes long term environmental degradation and directly affects the community.

It is recommended that Local Government take this opportunity in its early stages, and create awareness within the industrial sector in ensuring that International Best Practices for wastewater and pollutants are disposed of in compliance with industry norms.

It is further recommended that the e-Thekwini Municipality employs the City's by-laws as a means of enforcement in realizing goals of conserving the environment.

5.2.4 COORDINATION OF INDUSTRY

Industry expressed that there were no co-ordination of activities associated with industrial manufacturing. Industry presently operates in isolation from each other, without any real connection. Majority of the respondents from industry responded in a positive manner and expressed a willingness to participate in community awareness programmes.

It is recommended that Local Government coordinate the activities associated with industry in the Durban South Basin with the objective of creating Industrial Awareness in the region. The researcher further recommends that such an intervention should be in the form of a forum where the relevant stakeholders *inter alia*, community and lobby groups, can also participate.

5.2.5 DISPARITIES IN LEGISLATION

One main disparity in the Major Hazard Installation Regulations found in Section 6 of the Occupational Health and Safety Act is the fact that this piece of legislation fails to consider the impact of communities situated presently near Major Hazard Installation. It creates very little obligations for industry in relation to communities.

It is a recommended that the Major Hazard Regulations found within the Occupational Health and Safety Act be revised. This revision should include an obligation on industry to ensure public responsibility in the region that it conducts its business activities. It is submitted that those issues affecting the health and safety as a result of the activities of the industry be made public knowledge.

5.2.6 ENFORCEMENT

The second phase of governance is enforcement. The concern from Local Government was that a major problem with enforcement was issues of capacity and human resources.

It is recommended that a more rigid and concerted effort from local government be initiated to counter the perpetrators who pose a risk to the Health and safety of communities. The delegation of some responsibility to the Metropolitan Police Department will give Local Government an advantage in enforcement.

5.2.7 IMPLEMENTATION OF PROJECTS

The concern from both the community and industry was the benefit of projects was lost due to misunderstanding and capacity problems. These specifically included the Awareness and Preparedness at Local Levels [APELL]

It is recommended that an independent task team be tasked to deal with the implementation and other variables associated with the project. The funding and mandate for the task team should be engaged with the sponsor at the start of the negotiations for the project. Whilst the success of the project will depend on the cooperation of all participants, it is envisaged that the impartial nature of the task team will be considered.

5.2.8 EDUCATION

The issue of education in Public health and safety is an urgent need for communities such as the Durban South Basin especially at schools.

It is recommended that a more localized programme be integrated into the school curricula to educate learners about the dangers prevalent to that community. Education in mitigation and risk reduction strategies has an invaluable role in affected communities. It is submitted that this type of investment in youth at an early age creates a community that is conscientised to issues of the environment.

5.3 AREAS FOR FUTURE RESEARCH

There are admittedly gaps that could not have been covered by this research. Health and safety are issues that are much wider in scope and form.

In the context of this research technology and the rapid growth of the economy are key indicators for future research and development. The expression of needs, lobbied by the different stakeholders and the perspectives of industry are significant to chart a way forward for future studies. The evolution of Disaster Management to its present form, although significant, remains relatively un-appreciated. It follows that future studies on the subject should focus on issues relating to technology and education.

5.4 CONCLUSION

The conclusion tendered in this chapter is as a result of the needs of the community, the industries, Local Government and the different lobby groups. The theme that prevails throughout this study is one of community awareness. Without the need to be too technical, the study presented a realistic picture of the way disasters are handled in a local context, comparison to the norm by identifying pitfalls in procedure, implementation and approaches. Disaster management is a dynamic field, involving the safety and security of people at their most vulnerable. It is respectfully submitted that the community awareness and intervention programmes should, in all respects, be dynamic too.

CHAPTER 6

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ANNEXURE A

GLOSSARY OF DISASTER MANAGEMENT TERMINOLOGY

Acceptable risk	Degree of human or material loss that is perceived by the community or authorities as acceptable
All hazards approach	Dealing with all types of emergencies/disasters, both natural and man-made, that may impact on the communities and the environment using the same set of management arrangements.
Chemical hazards	Hazards involving chemicals or processes which may realize their potential through agents such as fire, explosive, toxic or corrosive effects.
Communications	Specifically the means of communication, for example roads, railways, telephone lines, radio, television, fax, internet. Broadly the dissemination of disaster management messages using a variety of means to people and organizations at various stages of the disaster management cycle.
Command	The direction of members and resources of an organization in the performance of the organizations roles and responsibilities. Authority to command is established in legislation or by agreement and operates vertically within an organization.

Comprehensive Approach	The development of disaster arrangements to embrace the aspects of prevention, preparedness, response and recovery
Control	Control is the overall direction of the activities in any given operation
Coordination	The bridging together of organizations and resources in accordance the requirements imposed by the threat or the impact of the emergency.
Coping	Coping is the manner in which people and organizations act, using existing resources within a range of expectations of a situation to achieve various ends. Coping capabilities are a combination of all the strengths and resources that are useful in reducing the effect of disasters.
Disaster	An event, man-made or natural, sudden or progressive, the impact of which is such that the affected community must respond through exceptional measures.
Disaster plans	An agreed set of arrangements for preventing, mitigating, preparing for, responding to, and recovering from a disaster. A formal record of agreed disaster management roles, responsibilities, strategies, systems and arrangements.

Disaster risk Management	A development approach to disaster management that focuses on underlying conditions in the risks which lead to the disaster occurrence. The objective is to increase capacities to effectively manage and reduce risks, thereby reducing the occurrence and magnitude of disasters.
Disaster support plans	Refers to those plans which are designed to address specific hazards and are in support of national disaster planning arrangements.
Emergency Coordination center	Facilities established to control and coordinate the response and support to an emergency.
Emergency Management team	A group or team of disaster management personnel headed by an incident manager who is responsible for the overall control of the emergency.
Fire protection	All pre-fire activities designed to reduce fuel quantities, remove known hazards and prepare for the possibility of fire so that the damage is mitigated.
Hazard	A potential or existing condition that may cause harm to people or damage to property or the environment. The magnitude of the phenomenon, the probability of its occurrence and the extent of the severity of its impact can vary. In many cases, these effects can be anticipated and estimated.

Hazard Analysis	That part of the overall planning process which identifies and describes hazards and their effects on the community.
Hazard Mapping	The process of establishing where and to what extent particular hazards are likely to pose a threat to people, property and the environment.
Integrated or 'All Agencies Approach'	Involves the inclusion of all relevant agencies and or departments that can assist in the effective implementation of disaster management arrangements.
Lead Agency	The agencies identified as primarily responsible for responding to a particular disaster.
Lifelines	Public facilities and systems that provide basic life support systems such as water, energy, sanitation, communications and transportation.
Logistics	A range of operational activities concerned with supply, handling, transportation, and distribution of materials.
Mitigation	Measures, structural and non-structural, taken to reduce the impact of disasters.
Preparedness	Arrangement to ensure that, should a disaster occur, all those resources and services which are needed to cope with the effects can be efficiently deployed.

Prevention	Regulatory or physical measures to ensure that disasters are prevented or their effects mitigated.
Public Awareness	The process of informing the public as to the nature of the hazard and the actions needed to save lives and property prior to and in the event of a disaster.
Recovery	The coordinated process of supporting disaster affected communities in re-construction of the physical infrastructure and restoration of emotional, social, economic and physical well being.
Relief	The provision of immediate shelter, life support and human needs of persons affected by a disaster.
Resources	Any asset, physical, human, economic or environment which can be used to assist in achieving the objectives of the plan.
Response	Actions taken in anticipation of, during and immediately after a disaster to ensure that its effects are minimized and that people affected are given immediate relief and support.
Risk reduction	Selective application of appropriate techniques and management principles to reduce either the likelihood of an occurrence or its consequences, or both.
Search and rescue	The process of locating and recovering victims and the application of first aid and basic medical assistance as may be required.

Situation report	A brief report that outlines the details of the report as they become known.
Stakeholder	Any one who has a vested interest or impacts on disaster risk management, either negatively or positively and may include community members, governmental and/or non-governmental organizations, land owners, the media etc.
Standard Operating Procedures	A set of directions detailing what actions could be taken, as well as how, by whom and why, for specific events or tasks.
Support agency	Agencies that provide essential services, personnel, or material to support a control agency or affected persons.
Technological Disasters	A hazard of a technological origin as opposed to a hazard of a natural origin.
Vulnerability	A set of prevailing or consequential conditions composed of physical, socioeconomic and/ or political factors that adversely affect the ability to respond to disaster.
Warning Systems	The purpose of warning is to persuade and enable people and organizations to take actions to increase safety and reduce the impact of the hazard.

UNIVERSITY OF
KWAZULU-NATAL

15 August 2004

TO WHOM IT MAY CONCERN

EMPIRICAL STUDY: An Evaluation of Risk and Disaster Management in the Durban South Basin with particular reference to Community Awareness

I am a registered student in the Faculty of Law at the University of KwaZulu-Natal. I am presently pursuing a Masters degree in Law.

A requirement for the degree is a research component. This involves a questionnaire in relation to the above topic.

You participation in completing the attached questionnaire is much appreciated. Your input will be treated as confidential and will be used solely for purposes of this research.

Should you have any queries or require further clarity with regard to the questionnaire, do not hesitate to contact me.

You time and effort in completing the questionnaire is appreciated.

Yours sincerely,

HARDEO P.
[Student No.: 9509627]
Tel 031 260 7967

MS M. SUBBAN
[Supervisor]

ANNEXURE B

UNIVERSITY OF KWAZULU- NATAL

DISASTER MANAGEMENT

COMMUNITY PERSPECTIVE

PLEASE TICK THE MOST APPROPRIATE ANSWER PROVIDING A COMMENT WHERE NECESSARY

SECTION A: BIO GRAPHICAL DETAILS OF RESPONDENTS

1. GENDER

Male	Female

2. AGE GROUP

20-25 years	26-30 years	31-35 years	36-40 years	41-45 years

3. ETHNIC GROUP

Indian	Black	Colored	white

4. EDUCATION LEVEL

Matric	Degree	Post Graduate	Diploma	Certification

5. HOW LONG HAVE YOU BEEN LIVING IN THIS AREA?

1-5 years	6-10 years	11-15 years	16-20 years	21-25 years

SECTION –B: STUDY VARIABLES

Please tick the correct opinion that indicates the level of importance of each statement to you.

The measuring scale as follows

Strongly Disagree = SD
Disagree = D
Neutral = N
Agree = A
Strongly Agree = SA

1. COMMUNITY FOCUS

1.1 WHICH OF THE FOLLOWING ASPECTS ARE IMPORTANT TO YOU?

a) Mainly Health Issues	SD	D	N	A	SA
b) Mainly Safety Issues	SD	D	N	A	SA
c) Mainly Environmental Issues	SD	D	N	A	SA
d) All are equally important	SD	D	N	A	SA

1.2 DO YOU CONSIDER THE AREA THAT YOU LIVE IN TO BE DISASTER PRONE?

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

1.3. IS THERE SUFFICIENT INFORMATION AVAILABLE ON DISASTER AWARENESS?

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

1.4 : WHICH ORGANIZATIONS DO YOU THINK SHOULD RESPONSIBLE FOR SUCH AWARENESS?

a) Industry	SD	D	N	A	SA
b) Local government	SD	D	N	A	SA
c) NGO's / CBO's	SD	D	N	A	SA

2. VULNERABILITY OF THE COMMUNITY

2.1 WHAT ARE SOME OF THE HAZARDS OR POTENTIAL HAZARDS THAT THE COMMUNITY COULD BE FACED WITH?

a) Explosions	SD	D	N	A	SA
b) Fire	SD	D	N	A	SA
c) Consequences of a pipeline rupturing	SD	D	N	A	SA

2.2 IN YOUR OPINION, WHICH OF THESE INDUSTRIES POSES A REAL DANGER TO THE COMMUNITY?

a) Engen	SD	D	N	A	SA
b) SAPREF	SD	D	N	A	SA
c) Mondi	SD	D	N	A	SA
d) Smaller industries	SD	D	N	A	SA

2.3 WHAT CAN BE DONE TO PREVENT OR LESSEN THE DANGERS?

a) Implement new technology	SD	D	N	A	SA
b) Reaching international standards disposal methods	SD	D	N	A	SA
c) Not permitting the building of residential houses	SD	D	N	A	SA
d) Relocating industries from residential houses	SD	D	N	A	SA
e) Relocating residents from industries	SD	D	N	A	SA

3. COMMUNITY PARTICIPATION AND INTERVENTION

3.1 IN YOUR OPINION, IS THE COMMUNITY ADEQUATELY REPRESENTED ON MATTERS AFFECTING IT?

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

3.2 : IF NO, WHAT OTHER INTERVENTION STRATEGIES WOULD YOU SUGGEST?

_____

_____

_____

_____

3.3 : WHAT WOULD THE IMPACT OF SUCH INTERVENTIONS BE?

_____

_____

_____

_____

3.4 : IS THERE ANY OTHER INFORMATION YOU WISH TO SHARE THAT CAN ASSIST IN THIS RESEARCH?

_____

_____

_____

_____

_____

_____

YOUR TIME AND PARTICIPATION IN THIS RESEARCH IS APPRECIATED

ANNEXURE C

UNIVERSITY OF KWAZULU- NATAL

DISASTER MANAGEMENT

INDUSTRIAL PERSPECTIVE

PLEASE TICK WHICHEVER IS MOST APPROPRIATE OR APPLICABLE TO YOU

Q1.1: IS THERE A COMMUNITY AWARENESS PROGRAMME FOR THE COMMUNITY?

YES		NO	

Q1.2: WHO, IN YOUR OPINION SHOULD BE THE LEAD AGENT IN THIS REGARD?

A: INDUSTRY

YES		NO	

B: LOCAL GOVERNMENT

YES		NO	

C: COMMUNITY GROUPS

YES		NO	

D: OTHER: PLEASE SPECIFY

YES		NO	

Q1.3: DO YOUR CONSIDER THE SHARING OF ENVIRONMENTAL INFORMATION IMPORTANT TO YOUR ORGANIZATION?

YES		NO	

Q1.4: DOES THIS ADD VALUE OR BENEFIT THE INDUSTRY?

YES		NO	

Q1.5: CAN MORE BE DONE TO EDUCATE THE COMMUNITY ON HEALTH AND SAFETY ISSUES?

YES		NO	

IF YES, WHAT CAN BE DONE

Q1.6: ARE THERE INTERNATIONAL LESSONS ON DISASTER MANAGEMENT FOR LOCALIZED ISSUES?

YES		NO	

Q1.7: IS THERE CURRENTLY ANY INVOLVEMENT WITH ANY OF THESE BODIES?

YES		NO	

THANK YOU FOR PARTICIPATING IN THIS RESEARCH PROJECT.
YOUR TIME IS APPRECIATED

ANNEXURE D

UNIVERSITY OF KWAZULU- NATAL

DISASTER MANAGEMENT

LOCAL GOVERNMENT

PLEASE TICK APPROPRIATE PERCEPTION, WHICHEVER IS APPLICABLE TO YOU.

1. "The Major Hazard Regulations within the Occupational Health and Safety Act 85 of 1993 creates obligations for local government."

Q1.1: ARE THESE PROVISIONS SUCCESSFUL?

YES		NO	

Q1.2: ARE THERE DISPARITIES OR FLAWS IN THE LEGISLATION?

YES		NO	

IF YES, PLEASE EXPLAIN

_____

_____

_____

Q1.3: DOES THIS CREATE A PROBLEM WITH ENFORCEMENT?

YES		NO	

2: COMMUNITY RESPONSIBILITY

Q2.1: IN THE CONTEXT OF DISASTER MANAGEMENT, IS AWARENESS IMPORTANT?

YES		NO	

Q2.2: WHO SHOULD BE RESPONSIBLE FOR AWARENESS?

A: LOCAL GOVERNMENT

YES		NO	

B: INDUSTRY

YES		NO	

C: NGOS / CBOS

YES		NO	

D: OTHER

YES		NO	

IF YES, KINDLY EXPLAIN

_____

_____

_____

3: LOCAL AGENDA 21 [LA21]

Q3.1: DOES LA21 COLLABORATE WITH THE MANDATE OF LOCAL GOVERNMENT IN TERMS OF SUSTAINABLE DEVELOPMENT?

YES		NO	

Q3.2: DO YOU THINK THAT LOCAL GOVERNMENT CAN BENEFIT FROM THE GLOBAL INITIATIVES OF LA21?

YES		NO	

IF YES, HOW

_____

_____

_____

4. AWARENESS AND PREPAREDNESS FOR EMERGENCIES AT THE LOCAL LEVEL [APELL]

Q4.1: FROM THE PERSPECTIVE OF LOCAL GOVERNMENT, DO YOU THINK APELL FAILED?

YES		NO	

Q4.2: CAN ANYTHING BE DONE TO DECREASE THE GAP BETWEEN THE COMMUNITY AND LOCAL GOVERNMENT?

YES		NO	

IF YES PLEASE EXPLAIN

_____

_____

_____

Q4.3: CAN DURBAN ATTRACT ANOTHER APELL?

YES		NO	

4.4: ARE THERE ANY LESSONS THAT CAN BE LEARNED TO MAKE THE NEXT PROJECT SUCCESSFUL?

YES		NO	

IF YES, PLEASE EXPLAIN

_____

_____

_____

THANK YOU FOR PARTICIPATING IN THIS RESEARCH PROJECT.
YOUR TIME IS APPRECIATED.