

**An Evaluation of Compliance with Environmental
Regulations: The Case of South Durban Basin
Industries, eThekweni Municipality**

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DECLARATION

I would like to declare that this dissertation is of my own work and that any additional work done by other persons has been acknowledged properly. I also declare that this dissertation is my original work and has not been submitted for any other degree or examination in any university or tertiary institution.

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Abstract

South Durban Basin is one of the places that have experienced environmental pollution. This challenge started back in 1950s and exacerbated during the 1960s as development of heavy industries increased. Environmental pollution and air pollution in particular, has resulted in a huge struggle for the local and surrounding communities of South Durban Basin. The struggle was strengthened mostly by health impact of industrial pollution which included asthma, tuberculosis, cancer and chest problems. This situation has lasted in a conflict and dispute between local communities and industries.

This study evaluates the extent to which the industries in South Durban Basin comply with environmental regulations. As a hypothesis, it is argued within this study that most industries in South Durban Basin and South Africa as a whole are production and profit driven. There is very little attention paid to protect and manage the environment.

As part of the findings, it has been found that pollution in South Durban Basin has worsened and required full involvement of all relevant stakeholders including Non-Government Organizations, local communities, government and industries. The local government and eThekweni municipality in particular has tried to mitigate and come out with environmental management programmes. However, the worsening of the situation shows that there is no or little compliance by industries and this is as a result of the lack of enforcement of environmental regulations.

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LIST OF ACRONYMS

CBD	Central Business District
CBO	Community Based Organization
CEMS	Continuous Emissions Monitoring Systems
CPCB	Central Pollution Control Board
DEAT	Department of Environmental Affairs & Tourism
DOT	Department of Transport
DTI	Department of Trade and Industry
EIAs	Environmental Impact Assessments
IDP	Integrated Development Plan
MPP	Multi-Point Plan
MRA	Merebank Ratepayers Association
NGOs	Non-Government Organizations
NEPA	National Environmental Protection Authority
NRDC	National Research Development Corporation
OECD	Organization for Economic Co-operation and Development
PPT	Pipeline Performance Technologies
SARAH	South African Railways and Harbours
SAPREF	South African Petroleum Refineries
SDB	South Durban Basin
SDCEA	South Durban Community Environmental Alliance
SDI	Spatial Development Initiative
SEA	Strategic Environmental Assessment
SME	Small and Medium Enterprises

CHAPTER ONE

1.1 Introduction

The South Durban Basin is an area that has five major industrial nodes, namely: The Valley Industries (Engen, Mondi, and SAPREF), the Jacobs Industry, the Navy/Mobeni Industry, the Island View Industry and the Umbogintwini Industry. All these industries have a long history and are considered as perpetrators of air, water, noise and land pollution in South Durban (Butler *et al*, 2002). There are many affected residential areas in South Durban Basin including Bluff, Umlazi, Clairwood, Merebank, Wentworth and Isipingo. These communities continue to suffer (as they have for decades) the environmental, health, and socio-economic costs of pollution, resulting from either the deliberate or accidental release of harmful substances from adjacent industries (Paterson *et al*, 2009). The situation also includes dangerous smokes from intense traffic on nearby major roads (Doyle, 2003).

Many authors argue that the South Durban Basin industries show no compliance to environmental regulations, this is because they do not face the risk of severe penalties for their polluting activities (Scott & Wayman, 2002). In the absence of concrete action to address the environmental issues facing communities living there, these profit driven industries are concerned with serving the consumers and buyers and have scant regard for the environment. Ironically, the outcome that these industries may face is that the very same pollution that they discharge may one day bring an end to their profit (Doyle, 2003). In South Africa, environmental compliance and enforcement are implemented to make sure that there is commitment from industries to comply with approved environmental principles. The aim is to ensure a liveable environment for the communities close to industrial sectors like in South Durban Basin.

This research will examine the compliance of industries, particularly eThekweni based industries, with environmental regulations. It is argued that the increasing environmental effects in South Durban Basin are as a result of non-compliance with

environmental regulations. Therefore, the goal of this research is to propose strategies for creating a sustainable liveable environment in places around industries, for present and future generations. This study also acknowledges ISO 14001 which was initiated in 1996 as an international standard to assess and improve an organisation's environmental management systems (Sheldon, 1997). Its first and foremost aim was to help companies to reduce their environmental impact, but in addition to an improvement in environmental standards and performance, organisations can obtain a number of economic benefits, including higher conformance with legislative and regulatory requirements (Sheldon, 1997), through the use of ISO standards.

The study also takes cognisance of the National Environmental Management Act (NEMA) which came into effect in 1996. The main object of NEMA was to provide control and cooperative environmental governance by establishing principles for decision making on matters affecting the environment and also to establish institutions that will promote cooperative governance and procedures for coordinating environmental functions exercised by organs of state (World Bank, 2000).

Map 1. The location of South Durban Basin



Figure 1. Source <http://www.durban.gov.za/visitors/about/maps/index.htm>

1.2. Problem statement

Environmental pollution is a serious issue not only in South Durban Basin but in the world as a whole (Chetty, 2004). Pollution can be defined as the introduction of contaminants into an environment that causes instability, disorder, harm or discomfort and degradation on the ecosystem i.e. living and non-living organisms (Web 3). The three well known types of pollution include water, air and land pollution, and they all affect human life. In South Durban Basin, the most recognized type of pollution is air pollution (Scott *et al*, 1999). This is caused mostly by industries, and it occurs when the air contains a number of different gases especially carbon dioxide, dust, fumes particles or odour in harmful amounts. All these emissions are dangerous to the ecosystem as a whole (Scott *et al*, 1999).

The compliance of industries with environmental regulations is still a critical issue in South Africa. This has been demonstrated by the environmental impacts that are being experienced by the communities residing in South Durban Basin in KwaZulu-Natal (Chetty, 2004). The key apprehensions about the South Durban Basin are the effects of air pollution on human health and ecology that are caused by the emissions of offensive levels of toxins, land degradation, chemical waste and a large content of sulphur dioxide from industries (Ekins, 2003). Furthermore, the eThekweni Council has also acknowledged that the South Durban Basin (SDB) is environmentally degraded; experiences very high levels of air pollution and waste disposal problems, and that the problems are also compounded by the loss of vital natural resources (KMT Enterprises, 2004). The environmental problems that are being experienced by the local communities are not new, but started back in 1960s (Chetty, 2004).

The most affected communities of South Durban Basin are Low-income communities which continue to breathe in a dangerous cocktail of gasses from the industries. This has resulted in severe health problems like asthma, severe chest complaints, and cancer for the residents (Carnie, 2004). A study based on health has also been done by Carnie in 2004 in Settlers Primary School located between two refineries (Engen and SAPREF), and it has put it clearly that the learners around South Durban Basin are severely affected by air pollution from SDB industries resulting in Asthma,

cancer, allergies and other skin diseases. Carnie (2004) also reported that in Merebank a number of people including school children, teachers and residents were treated by paramedics after being poisoned by airborne gas fumes next to the Engen fuel refinery in south Durban, and that six of them were taken to hospital after clouds of black smoke and petroleum fumes belched from two refinery industries. The researcher argues that most industries are production and profit driven, and very little attention is paid to the protection and management of the environment.

1.3. Objectives

The broad objective of this research is to find out the extent to which industries in South Durban Basin are complying with environmental regulations.

1.3.1. Specific Objectives

1. To examine the mechanisms used by government environmental departments in the enforcement of environmental regulations in South Durban Basin. The aim of this objective is to assess the effectiveness of the mechanisms enforcement.
2. To assess the role that the communities in Durban play in ensuring that the industries comply with environmental regulations. The aim of this objective is to ascertain the views and experiences of the communities with the industries.
3. To analyse the key strengths and weaknesses of South Africa's current environmental compliance and enforcement efforts. The aim is to examine the effectiveness of South African environmental compliance regulation, and to make suggestions as to how environmental compliance regulations can be strengthened where it is lacking.

1.3.2. Research question

What are the factors which explain the failure of South Durban Industries to comply with environmental regulations?

1.3.3. Sub-questions

1. What is the role of the Non-Government Organizations and local communities in ensuring the compliance of industries with environmental regulations?
2. What are the institutional challenges which have affected the enforcement of environmental regulations in South Durban Basin?

1.4. International and local precedents in Environmental Regulations

Much research has been conducted in South Durban Basin on different aspects (Scott, Wayman & Oelofse, 1999). However, the most important issue that has drawn the most attention is environmental pollution, air pollution in particular, emitted by industries in this area. Since the 1990's, different efforts and strategies, including environmental awareness programs have been put forward by South African government and non-government institutions, in particular eThekweni Municipality, to promote green industries. However these actions have had little positive impact if any, with regard to environmental compliance and management. The National Environmental Management Act (NEMA) has also been applied and implemented to assist in reducing environmental impacts from South Durban Basin industries. NEMA has many provisions that require industries to comply with environmental notices and regulations.

Environmental regulations are promulgated to ensure that corporate bodies comply with environmental management principles which are the new tools of environmental enforcement in South Africa (Kotze *et Al*, 2007). Kotze also argues that the main purpose of environmental regulation is to ensure that there is a legal compliance by defaulting industries. Generally, the environmental compliance regulations are enforced by Environmental Management Inspectorates. Kotze describes these as a “network” of environmental enforcement officials from different government departments at the national, provincial and municipal levels. They were formed when the National Environmental Management Act, 107 of 1998 (NEMA) was amended by Act 46 of 2003 which came into effect on the 1st of May 2005 (See NEMA sections 31A to 31Q)

Environmental compliance and enforcement in South Africa has been improved by the introduction of environmental compliance agencies. Important environmental statutes, regulations, policies have been put into place to combat environmental pollution. The most important of these in addition to NEMA are:

- National Water Act 36 of 1998;
- National Health Act 61 of 2003;
- National Environmental Management: Air Quality Act 39 of 2004 (“the Air Quality Act”);
- National Environmental Management: Waste Act 59 of 2006 (“the Waste Act”).

In addition to these national statutes, important regulations have been promulgated under the Air Quality Act (relating to the listing of activities that may result in significant pollution of the air) and the Waste Act (relating to waste management activities). Some of the regulations have been adopted internationally. However, these have had a very little influence if any is to be identified. As will be observed, much legislation is in place and South Africa is a party to many international treaties to combat pollution, yet the failure of all these efforts shown clearly that there is a great need to apply new effective approaches that will assist in improving the existing environmental enforcement and compliance legislation. The issuing of

compliance notices only without effective follow up and implementation will not solve the problem.

1.4.1. Inadequacy of environmental regulations controlling South Durban Industrial pollution

Much research has been undertaken in South Durban Basin regarding compliance of industries with environmental regulation (Scott, 2002). In particular, Scott (2002) found that it is not true that air quality in South Durban is likely to be difficult to reduce or that the implementation of environmental regulations is weak or difficult to apply. She concludes that an assessment which truly reflects air quality in South Durban has not been done adequately, hence an assessment of effective compliance is based on inadequate data.

Scott (2002) and other writers¹ are critical of previous studies on South Durban Basin. She states that every report that fails to address the true extent of South Durban environmental degradation should be rejected as a decision making tool. Scott strongly believes that there are many more steps that must be undertaken to reduce environmental degradation. She mentions community intervention, municipal intervention, intervention of intellectual theories and the involvement of all spheres of government in this intervention. Moreover, Scott recommends proper implementation of applicable environmental regulations and enforcement as a first step to resolve South Durban environmental issues.

1.4.2. Comparative International literature on industrial pollution and environmental compliance notices

After a long struggle, government agencies of India came out with different strategies which brought a little if not a real improvement in environmental protection and

management (Lane *et al*, 1999). The strategies included increasing environmental awareness, providing a mechanism for individual citizens to bring polluters to court, and promoting greater judicial activism. All these initiatives have pushed Pollution Control Boards (PCB) into more energetic enforcement. A sanction based strategy is used to enforce environmental standards, and the tendency has been for any individual or a PCB itself to bring a case against an industry for disregarding the environmental compliance notices. The judicial response has been to set a very limited period of time for installing pollution abatement equipment or to change technology used, or face closure (Dasgupta, 1998).

According to Dasgupta (1998), for feasibility, the approaches to enforcement of environmental policy are often divided into sanction-based and compliance-based approaches. Sanction-based approaches aim to enforce environmental regulation by obligation and force, with a penal approach dealing with non-standard activity, given that regulations are in place (Dasgupta, 1998). Compliance-based approaches on the other hand commence by recognizing that the discovery of non-standard activity is the first step towards prevention, rather than prosecuting deviance (Lane *et al*, 1999).

Nigeria is also a country faced by industrial pollution. The case of Nigeria is similar to South Durban industries since both experience petroleum industrial pollution. The petroleum industry is the dominant industry and largest land-based source of pollutants to the marine environment in the Niger Delta (Barrett, 2008).

1.5. The study area

Durban is an area found in the South East of Kwazulu-Natal and it covers about 14% of KZN area and it is 2297 km in size (Department of Statistics Report quoted in Chetty 2004). It is as the second biggest city after Johannesburg in South Africa. It is a very ethnically diverse area, and its demographics show that 71% of the population are of working age, and 29% is under the age of 19 years (Wayman, 2010). Economically, Durban has very powerful manufacturing sectors, light and heavy industries, tourism, finance and government departments. It is the second economic

driver after Johannesburg in the country and the first economic driver in KZN province (Wayman, 2010).

South Durban Basin is an industrial focal point with petrochemical refineries, several waste storage sites fibre plants, the Mondi paper mill, hazardous chemical storage facilities and more than 150 industries (Peek, 2002). However, the major industries are Engen, AECI, SAPREF, SASOL factory and Mondi Paper Industry. South Durban Basin makes significant contribution in the local, regional and national GDP (Wayman, 2010).

South Durban Basin is also home to a number of people of different racial groups mostly poor Africans and Indians (Chetty, 2004). Chetty argues that the location of the working class people on the entrance routes to South Durban Basin industries and surrounding areas was because of inappropriate urban spatial planning during the apartheid government. According to Chetty, during that time locating poor people near the workplace was considered as an advantage to individuals owning industries as it provided easy access to labour force. Moreover, in more recent times (post-apartheid) people have been drawn to industrial areas in search of work, and as a result, poor control over this migration, the inadequate provision of housing and poor spatial planning have together aggravated the situation.

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1.6. Conceptual and Theoretical Framework

1.6.1. Definition of concepts

1.6.1. (i). Environment

Basically, environment is the surrounding or the space where both living and non-living organisms reside in. The living organisms in the environment are plants, animals and humans, and non-living organisms are water, land and air. All these components form the environment and make it function well. The collapse of one of these components will cause an imbalance in the environment. To have a healthy and liveable environment, all its components should be protected from pollution and

degradation so that this balance is maintained. There are therefore many reasons to take good care of our land, water resources, forests and atmosphere (Ekins, 2003).

1.6.1. (ii). Environmental regulation

Environmental regulation is the body of legislation passed by Parliament or promulgated by the relevant ministers to ensure that the activities of all people are controlled so as not to cause significant environmental degradation. It is the primary tool of environmental management in South Africa. Environmental regulation according to Botha *et al* (1991) is very important in enforcing and ensuring that all the activities, particularly industrial activities comply with environmental laws. In the context of environmental management, the main intention of compliance regulation is -to compel people to act in a responsible way in relation to the environment and to punish wrongdoers. Usually, the environmental compliance regulations are implemented by Environmental Management Inspectors (appointed under NEMA) and other officials with delegated authority to enforce the relevant legislation. Follow up action is important and provides the teeth to environmental compliance and enforcement (Botha, 1991).

NEMA makes non-compliance with environmental compliance notices an offence in terms of section 34N (1) (Lazarus, 1999). As stated by Lazarus, in cases where there is non-compliance, it is the Environmental Management Inspector's duty to report the matter to the Minister or MEC as the case may be and the Minister or MEC may, acting in terms of subsection (2):

- (a) revoke or vary the relevant permit, authorisation or other instrument which is the subject of the compliance notice;
- (b) take any necessary steps and recover the costs of doing so from the person who failed to comply; and
- (c) report the matter to a Director of Public Prosecutions.

This action is consistent with the "polluter pays" principle which is internationally promoted and is expressed in section 24 of NEMA

1.7. Methodology

This section explains the how the research on which this paper is based was carried out. Based on the nature and subject of the research, the undertaking of structured interviews was chosen as the primary tool for data collection.

1.7.1. (i). Format of research methodology

The research was conducted in a logical sequence commencing with environmental authorities (the KwaZulu-Natal Department of Agriculture, Environmental Affairs and Rural Development, national Department of Water and Environmental Affairs and EThekweni Municipality. Interviewees from the relevant government departments were chosen first so as to first confirm the level of awareness and enforcement imposed by the government bodies to industries, and also to confirm if there has been any positive or negative reaction from the industries. Thereafter interviews were conducted with private individuals who are experts in the field, representatives of NGOs that have and interest in South Durban Basin and community members.

1.7.2. (ii). Sampling techniques and methods

The selection of sampling methods and techniques used was based on the type of data to be collected. This research adopted qualitative approach, as this gives the researcher the advantage of understanding the research problem from the perspectives of the affected local communities. A qualitative research method will provide an ability to have a broad description of how South Durban Basin local communities experience problem investigated by this research. With regard to sampling, the best -known methods are random samplings and stratified sampling. These sampling methods will be used during this research in order to gather data from various sources and areas.

1.7.3. (iii). Targeted sources of data collection

The sources of data for this research were local communities of South Durban Basin, South Durban Industries, government environmental authorities and bodies, non-government organizations and eThekweni Municipality. The targeted communities of South Durban were those which are near the industries including local residents of Merebank, Wentworth, Mlazi and Isipingo. The target group included schools and clinics operated by the municipal health department. With regard to industries, not all industries operating in the target area were used as a source of data. The targeted industries included SAPREF, Engen and Mondi. All of these companies have a long history and are considered as perpetrators of air, water, noise and land pollution in South Durban (Lazarus, 2007). The targeted non-government organizations include South Durban Community Based Organization (SDCBO) and South Durban Community Environmental Alliance (SDCEA). The reason for targeting these NGOs is because they have a long history with the study area and have done many projects to reduce environmental impacted from surrounding industries.

1.8. Dissertation Structure

- **Chapter one** Introduction

Chapter one of this research introduces the topic by giving the context in which the South Durban Industrial Basin area is operating in relation to environmental compliance notices. The Chapter provides a general background of the South Durban Basin as a study area by looking at the physical location of the area and local communities around the area. The chapter further provides the framework of research as a whole and indicates its purpose. This chapter concludes by posing the research question, and introduces the methods and techniques of data collection employed in conducting the research.

- **Chapter two** Literature Review and Conceptual Framework

The main aim of this chapter is to provide a reflection and a picture of the existing literature on South Durban Basin and the applicable environmental regulations. This

chapter also provides definitions of key concepts and theories and also gives a background on the evolution of environmental compliance in the local and international landscapes.

- **Chapter three** Research Methodology

This chapter describes the research methodology used in the study. The chapter first highlights the advantages and disadvantages or strengths and weaknesses of research methodology. Different sources of data including primary, secondary and tertiary sources are also outlined in this chapter.

- **Chapter four** Case Study

The main purpose of this chapter is to provide an overview of the study area. The South Durban Basin is a selected case study which will be analysed within the context of its location and the surrounding environment.

- **Chapter five** Findings and Discussion

This chapter provides all the results and findings of the research. Within this chapter, the results are described, interpreted and analysed. The findings are also presented in different formats including tables, graphs, pictures, maps and diagrams.

- **Chapter six** Conclusions and Recommendations

Chapter five provides conclusion of the dissertation research. It emphasises the results and findings of the research. Recommendations based on the findings of the research are provided.

CHAPTER TWO

2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1. Introduction

In order for one to have a broad and clear understanding of the role and significance of environmental regulation, enforcement and compliance, it is necessary to draw on literature relevant to urban development control, environmental regulation and management and theories of industrial location and development. This literature on urban development control draws one's attention to how development, industrial development in particular, has been controlled, is being controlled and should be controlled for future purposes. On the other hand, environmental regulation related literature portrays a wide understanding of environmental management, protection and rehabilitation especially in areas where most industries are located, in this case, the study area of the South Durban Industrial Basin. The literature also provides a critical and broad understanding of the efforts and attempts that have been made in South Durban Basin to improve the situation, including the approaches to implementing and improving environmental compliance, and the involvement of local communities and non-government organization (NGOs) in finding solutions to the serious pollution problems that exist.

South Durban is a narrow belt of mixed industrial and residential areas running southwards of Durban harbour. It is where two refineries (Engen and SAPREF) are situated, in addition to a range of other chemical industries, chemical storage facilities, and the former Durban International Airport. These comprise close to seventy percent of Durban's heavy industry. The area was established as a neighbourhood of heavy industry by the Durban Town Council in 1938, surrounded by racially zoned labour reservoirs (Scott, forthcoming 2003). This racially based environmental planning resulted in Indian, Coloured and African communities being located directly adjacent to the industry. Most acutely affected are the former Indian community of Merebank, and the former coloured community of Wentworth. Hallows & Butler (2002) note that black communities were located downwind and

downstream in the apartheid era. These communities also suffer from degraded living environments (the product of apartheid urban design), high levels of unemployment and low average per capita incomes and associated social problems (Scott & Ridsdale, 1997).

Since the 1960s the industrial revolution has led to a fast growth of industries. These growing industries have exploited natural resources, emitted and discharged toxic effluents and emissions, and thus have polluted the surrounding environment. The release of carbon emissions from industries into the air causes chemical imbalance of natural cycles which may result² in global warming, the consequence of which is melted ice-caps and flooded cities (Sengar, 2007).

In recent years, two important trends in the international arena were highlighted (Jenkins 2007). As observed by Jenkins, the first is the globalization of economic activity which he defines as a process in which structures of economic markets, technologies and communication patterns become progressively more international over time. The second is the increased public concern over the environmental impacts of economic activity and awareness of the global dimensions of many environmental problems.

According to Jenkins (2000), the idea of greening production sites and creating a green environment between industries and residential communities was well developed during the period of the 1960s and 1970s. Under state ownership, firms were not likely to respond to community pressures relating to environmental protection, but this has however, changed substantially since the end of authoritarianism. There is now public disclosure of the activities of big corporations and they have to pay attention to their environmental profile for reasons of public relations (Jenkins, 2000).

2.2. Approaches to Improving Environmental Enforcement and Compliance in South Africa

Government environmental bodies and other environmental agencies have put increased effort into improving environmental compliance and enforcement in South Africa. Many environmental regulations, policies and laws have been put into place, , some of which are influenced by international trends, however, this has had a very little influence if any on the state of the environment in South Africa, and none of any significance in South Durban Basin. The failure of all these efforts has shown clearly that there is a great need to apply new effective approaches in combating pollution that will also lead to improving existing environmental enforcement measures and efficacy of compliance notices.

Developing countries like South Africa have all established environmental management approaches, and their environmental protection regimes are generally modelled on other countries' legal frameworks. They are based on or are influenced by international norms and principles (Kidd, 2002). However, the most common instruments used are regulatory command and control measures, including standards and sanctions, permits, zoning guidelines, environmental impact assessment (EIA) requirements and liability. There are however, many applications of economic instruments and some legal frameworks specifically provide for fiscal incentives and disincentives to environmental pollution (Kidd, 2002).

2.3. Formal institutional and regulatory context in improving Environmental Enforcement and Compliance in South African industries

The period of 1994 in South Africa was seen as a time of transition. People became free, and democracy became a reality in South Africa in 1994. Most importantly, in this period it was recognised that everyone had to have access to clean water, food, adequate shelter and other basic rights, including the right of access to information and the right to administrative justice. The most important change in this context

was a right granted to all citizens to live in a safe and healthy environment. South Africa's 1996 Constitution while having an emphasis on achieving sustainable development, to provide section 24 of the Bill of Rights for the "environmental right". The section states ...

"Everyone has the right -

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

This section then posed a duty to all humans to take responsibility of the environment. As human life becomes more modernised and there is an increasing demand for consumer goods and advanced technology, there is a parallel increase in impacts on the environment. More economically driven society has become, the less concerned it has become about compliance with the laws that protect the environment. By 1998, Durban had become one of the most industrialised cities in the world. At the same time, scientists began to raise the alarm, meteorologists warned of massive climate change, and the high concentrations of carbon dioxide and sulphur dioxide in the atmosphere of the Durban area were identified. This created a big challenge for the state and a demand that a new and more effective approach to managing the environment should be adopted.

Another most important period was 1998. During this period the Parliament passed into law the National Environmental Management Act 107 of 1998, or "NEMA" as it is commonly referred to., Its aim was to provide for cooperative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote cooperative governance and procedures for coordinating environmental functions exercised by organs of state and to provide for matters connected therewith (Preamble to NEMA). The most important part of this legislation in the context of pollution was the adoption of the internationally accepted

principle which was directed at all environmental polluters including industries, namely the “polluter pays” principle. This principle imposes an obligation to all industries to pay the cost of their pollution or damage to the environment. This is intended to discourage industries from producing polluting emissions and effluents by making them pay for them. The principle states that everyone, including industries shall take account of the recovery of the environmental and resource costs (Sengar, 2007).

NEMA also gives effect to other important internationally recognised concepts in the control of pollution, namely the need to minimise pollution, reduce, reuse and recycle waste and that “cradle to grave” responsibility for all substances used in industry³ and the “precautionary principle” in all environmental decision-making.

2.4. Compliance promotion and enforcement tools

As mentioned before, environmental enforcement is a fundamental element of any effective environmental protection method. “Compliance” is accordance of behaviour with the law and “enforcement” is government action to compel compliance by violators and to prevent others from failing to comply with environmental regulations (Bowonder, 2003). Compliance and enforcement are relevant to industrial environmental management mechanisms. They play a larger role with respect to command and control mechanisms, but they are also central in ensuring that economic instruments and other mechanisms function properly. For example, in a tradable emissions system enforcement is needed to ensure compliance with emissions monitoring and reporting, and ultimately, it is necessary to ensure that emissions do not exceed the overall maximum amount (Bowonder, 2003).

2.5. Community participation in regulating industrial environmental impacts

Public participation in environmental regulation processes is very important. In this case, community participation refers to a varied formal process by which community or public concerns, needs, and values are integrated in decision making. In environmental decision making and in the context of environmental regulation community participation includes public meetings, advisory committees, interactive workshops, interviews, focus groups, and other means of public involvement.

In the USA, Most recent federal laws authorizing or establishing federal programs, including the latest environmental laws according to (Sengar, 2007), contain requirements that agencies must consult with communities in all environmental related decision making processes. In South Africa, public participation is mandatory in town planning processes and in integrated environmental management through the mechanism of environmental impact assessments.

Public or community participation is an important part of the regulatory regime for the control of point sources of pollution. Such involvement is necessary to ensure that all industries recognize the need for, and accept the obligations placed upon it by, the regulatory government or organization, and that the public is satisfied that adequate control is being exercised (Kidd, 2002).

The involvement of the public and industrialists is essential to enable regulators to understand the impact of any proposed measures prior to setting standards for water and effluent discharges, and to ensure that any programmes for improvement are achievable within the financial and technical capabilities of the country (Bowonder,2003).

2.6. Increasing public participation for the purpose of reducing industrial pollution in Elbasan (Commune of Bradashesh) – A Comparative Study

Industries in Elbasan have caused severe environmental impacts on surrounding communities. As part of a reaction towards this problem, the Municipality of Elbasan has collaborated with the community to combat pollution which is not only in a form of air, but also land and water pollution.

Residents of the Elbasan Municipality complain mostly of respiratory problems, particularly among children and youth but the pollution in the long term also leads to a diversity of cardiac and lung diseases (Sengar, 2007). The so called “Ecological Club of Elbasan” subscribed to develop an action plan to improve environmental quality using community participation methods and involving the Municipal and Commune authorities, the public, industrial operators, relevant NGOs, and elected federal representatives. The draft and comments including further plans of action was sent to the local government.

As a result of the contribution of local communities, the Municipal Council took a positive step and prepared concrete proposals for the reinforcement of the control and conformity of emissions of the industrial operators and better cooperation with the Regional Environmental Agency. It also established green surfaces to tame the impact of industrial pollution.

2.7. South Durban Community Environmental Alliance (SDCEA)

South Durban Community Environmental Alliance is a grouping of various environmental organizations, residents associations and other environmental champions (including those mentioned above) that pressure local business and government to reduce pollution, especially air pollution in the Southern Durban Basin. Made up of 14 affiliate organizations, and active since its formation in 1996, it is considered successful for many reasons, one of which is that it is a vocal and vigilant grouping in terms of lobbying, reporting and researching industrial incidents

and accidents in this area. It contributes to the struggle against environmental racism, for environmental justice and environmental health (Scott & Oelofse, 1999).

Advocacy and public engagement are some of the tools used in south Durban Basin by the South Durban Community Environmental Alliance (SDCEA). It has used these comprehensively to fight for better air quality in the surroundings and a healthier environment. The use of these tools has led to some positive changes in the South Durban Basin. However, there are also times when it has backfired, hence the double-edged sword referred to by Tony (2004).

The formation of SDCEA was the product of the creative thinking individuals and organizations that realised that there would be strength in diversity, and that its integrity would be founded on the quality of the information it gathered on the various industries and on the many accidents and incidents that occur in south Durban (Scott & Oelofse, 1999).

2.8. The perception of environmental racism in South Durban Basin

Democracy in 1994 created a platform for South Durban residents to stand up for their environmental rights. All residents including black, coloured, Indian and white communities gave clamoured for their rights which are guaranteed in section 24 of South African Constitution. It was during this period is that the perception of environmental racism arose. Democratization in 1994 allowed all communities to stand up and speak out for environmental justice. Black communities, particularly women, were in the frontline of the fight for justice. This was due to the heavy burden that they had to carry as they endured exposure to air pollution and the responsibility of dealing with health impacts on their families. The relationship between women and the environment and their role in environmental justice is important in this context.

Environmental justice focuses on the relationship between marginalized groups and environmental issues. The injustice of environmental pollution usually has a spatial dimension, where hazardous activities are located in poorer areas inhabited politically and socially marginalized communities (Scott and Oelofse, 1999). This is also referred to as environmental racism.

Women form part of a group that is disadvantaged and marginalized in South Africa, as they in particular carry significant costs of environmental degradation but often lack access to resources to change or manage their living environments (Oelofse and Patel, 2000).

2.9. Contested urban politics of air pollution in south Durban (local precedents)

Cox (1998) is one of the many scholars to use South Durban Basin as a case study. He argues that the existence of local politics cannot be taken for granted in the context of development planning and environmental management. The contentious politics of environmental justice in the South Durban Industrial Basin developed over decades before 1990's and it is an on-going effect. In the southern industrial basin of Durban, the proximity of residential communities with long histories of activism to sites of key national economic importance has enabled social movement organizations to generate highly visible expressions of the tensions between dirty industrial growth and social justice.

The main argument raised by Cox (1998) is that the air pollution of South Durban Basin has resulted into politics while Scotts (2002) on the other hand argues that the politics of South Durban basin has resulted into air pollution and land degradation. However, both these authors are correct. Political involvement in development and environmental management has caused on-going disputes between local communities, local government and industries. Communities have lost hope in their government since the situation is continuing and since the industries are permanently located in the area. Some communities including Bluff community have even proposed to take matter into their hands and burn the Engen industry as one of the pollution sources Cox (1998). Scotts (1999) argues that the government and the civil society have paid more attention on the disputes of South Durban Basin. This has resulted in the situation of environmental pollution and degradation getting worse.

2.10. Overview of industrial air pollution studies in South Africa

The industrial sector is the prime contributor to air pollution in South Africa. More than 90% of South Africa's electricity is generated from the combustion of coal in industries that produce atmospheric emissions that contain approximately 1.2% sulphur and up to 45% ash (CSIR, 2004).

The approach to air quality studies has been fragmented and haphazard in South Africa and although a number of studies have been completed, results are not integrated or easily accessible (Kidd, 2002). However, regardless of this lack of information, South Africa's air quality is regarded as having a number of air pollution "hotspots" around the country where severe air quality problems are experienced. The Air Quality Act recognises this problem and provides specific means by which these hot spots may be managed by the declaration of "Priority Areas" (Kidd, 2002). "Hotspot" in this paper refers to a place of unrest, politics, conflicts and violence. Indoor air pollution is the biggest problem that occur in the hotspot areas. According to Tony (2004), number of studies have pointed out that the domestic sector, especially domestic coal burning, is responsible for high levels of air pollution. Although this is true, the specific contribution of industrial air pollution and specifically the contribution of the petro-chemical industry has not been adequately addressed nor fully understood. The impact of air pollution, especially on human health is also well-documented for the domestic and transport sections but few studies have taken full industrial air pollution impacts into account.

In South Africa, environmental assessment was practiced on a voluntary basis from the early 1980s. Environment Conservation Act 73 of 1989 (ECA) provided generally for the conservation and protection the environment. This Act established rules for the management and protection of the environment, including water, air and land. It was not particularly effective in the control of environmental degradation but it was given impetus by the incorporation of an environmental right in the Bill of Rights which came out after 1994. As observed above this affords every person *"the right to have the environment protected for the benefit of present and future generations "through reasonable legislative and other measures that prevent pollution and ecological degradation..."*

This set the Minister the formidable task of determining the causes of environmental impacts and devising the procedures that are to be carried out in conducting environmental assessments, an important tool in the protection of the environment. After the period of 1994 where every South African citizen was given the right of access to clean water, NEMA came to group all the laws of the past and created new and future laws. It then served as an umbrella of that existed before.

The Constitution's imperative to enact environmental legislative measures prompted government to pass new framework legislation, namely the National Environmental Management Act 107 of 1998 (NEMA). NEMA also includes environmental assessment provisions in a chapter entitled Integrated Environmental Management (sections 23 and 24). Regulations were promulgated under NEMA in 2006 and were amended in 2010⁴, the latter regulations and the lists of activities for which Environmental Authorisation is required, are currently in force.

2.11. The struggle of South Durban Basin with environmental degradation

The struggle for a clean environment in South Durban Basin originated in the struggle against apartheid and in spatial planning discourse and practice. Duming (1990), states that apartheid was not only an example of political injustice but it was also the most glaring example of environmental injustice. Apartheid left deep scars on the South Durban Basin environment, and its legacy continues to pose numerous hazards to public health and people's daily lives (Kaplan, 2000). The zoning strategy of apartheid planning and its racially based separate development philosophy resulted in black South Africans being forced to live in overcrowded "Bantustans" and townships located downwind or downstream from industrial complexes (Kaplan: 2000). Consequently many black South African communities are overburdened by both disparate exposure to industrial pollution and socioeconomic deprivation. These communities live in extreme poverty in hazardous conditions.

The South Durban Basin is an example of this apartheid policy that allowed politicians and senior public officials to locate polluting industries close to low-income black South African townships. These low-income communities in south Durban continue to inhale the deadly fumes from the environment as a result of these past policies. They bear the health costs of a poor environment, mainly due to the petrochemical industry in the South Durban Basin (Scott and Oelofse, 1999). These health costs include high levels of asthma, severe chest complaints and cancer. The apartheid legacy, particularly its spatial planning and its impact on black communities has left us with people who reside close to toxic industries and inhale fumes which are harmful to both humans and the environment. The most affected low-income communities are located in the residential townships of Wentworth, Merebank, and Bluff (Sengar, 2007).

Apartheid era urban planning ensured that different racial groups lived apart from each other (segregated), while separate residential areas for white communities were maintained (Kaplan, 2000). Desmond D'Sa, the environmental justice activist with South Durban Community Environmental Alliance (SDCEA) maintains that, apartheid spatial planning deliberately sited black residential areas near dirty industries in order to facilitate easy access to cheap labour, and generally these black townships were located within close proximity of toxic dumps, sewerage treatment plants, and polluting industries. Apartheid was the cause of environmental inequalities that were coupled with human rights abuses, socioeconomic deprivation, and public health violations. Post-apartheid South Africa has a huge task to redress these inequalities. Kaplan (2000) states that apartheid has left an indelible scar on the environment, which in turn has resulted in many hazards to public health and people's daily lives.

In an attempt to redress these inequalities, the government has implemented a plan to monitor and assess the impacts of air pollution in South Durban Basin. Bolowana (*Mercury*, 2 February 2004: 4) reported at the time that the fight for fresh air in the South Durban Basin has been taken to new levels, with eleven new air quality monitoring stations being established in the area. They are part of a multi-point plan for the South Durban Basin, an air pollution monitoring network established by the eThekweni municipality and national Minister of Environmental and Tourism, ValliMoosa. Speaking at the launch of the twenty one million rand project at Settler's

Primary School in Merewent, where two stations have been placed, the national Deputy Minister of Environment and Tourism, Rejoice Mabudafhasi, highlighted that these stations would provide concrete evidence of pollution which would also help to establish new legislation. The Minister maintained that this, "...system will inform the government and the public about how much pollution is generated from industry and traffic, where the significant sources of pollution are and to what extent our air quality is affected by pollution. An air quality monitoring station will play an important role in measuring how many pollutants occur in our living space. In the past, air pollution management was a contested terrain as there was mistrust over data sets, mistrust over governance and our legislation was ineffective." The Minister further explained that air quality levels exceeded limits; legislation would ensure that action was taken to identify sources and set stricter emission limits.

2.12. International precedents

2.12.1. Multinational corporations and environment in developing countries

There has been much recent interest in new spaces of governance within which the relationships between business, society and the environment are contested and constructed. Within the era of globalization and liberalization of markets, the apparent limited capacities of the state to regulate industry has opened up new roles for non-state regulators such as market regulation, civic regulation, and industry self-regulation (World Bank, 2000). Through liberalization and globalization multi-national corporations ("MNCs") are arguably the most important actors in the global economy. The case can therefore be made for increased recognition of their responsibilities towards the countries in which they operate (UNCTAD, 2003).

Much has been written on the evolution of corporate environmentalism in developed countries (see e.g. Hoffman; Prakash 2000) but comparatively little in the developing world (see e.g. Garcia-Johnson 2000; Utting 2002). However, this comparative study is unique in that it seeks to explain how and why corporate environmentalism is evolving in a developing country context. The purpose of this dissertation is to

develop a theoretical framework, methodological strategy and research design for the analysis of changing corporate environmental behaviour within new spaces of governance in a developing country context.

2.12.2. Overview of Industrial air pollution studies in India

India is one of the ten most industrialized nations of the world (*Bell et al, 2003*). This has brought with it unwanted and unanticipated consequences such as unplanned urbanization, pollution and the risk of accidents. The CPCB (Central Pollution Control Board) has identified seventeen categories of industries (large and medium scale) as significantly polluting, and the list includes highly air polluting industries such as integrated iron and steel, thermal power plants, copper/zinc/ aluminium smelters, cement, oil refineries, petrochemicals, pesticides and fertilizer units. The distribution of these units reveals that the sugar sector has the maximum number of industries, followed by pharmaceuticals, distillery, cement and fertiliser. It also indicates that agro-based and chemical industries have major shares of 47% and 37% of the total number of industries respectively (*Bell et al, 2003*)

Small scale industries of India are a special feature of the Indian economy. India has over three million small scale units accounting for over 40 percent of the total industrial output in the country while the larger industries are better organised to adopt pollution control measures, the small scale sector is poorly equipped to handle this problem (*Bell et al, 2003*). They (small scale industries) have a very high aggregate pollution potential.

It has been stated that millions of people breathe air with high concentrations of dreaded pollutants. The air is highly polluted mostly by small scale industries within cities. This has led to a greater incidence of associated health effects on the population manifested in the form of sub-clinical effects, impaired pulmonary functions, and use of medication, reduced physical performance, frequent medical consultations and hospital admissions with complicated morbidity and even death in the exposed population (*Bell et al, 2003*). According to World Bank (2008) study,

respiratory infections contribute to 10.9% of the total burden of diseases, which may be both due to presence of communicable diseases as well as high air pollution levels, while cerebra vascular disease (2.1%) ischemic heart disease (2.8%) and pulmonary obstructions (0.6%) are much lower. The prevalence of cancer is about 4.1% amongst all the diseases demonstrating that the effects of air pollution take their toll on the urban communities of India.

The environmental problems in India are growing rapidly. The increasing economic development and a rapidly growing population that has taken the country from 300 million people in 1947 to more than one billion people today is putting a strain not only on the environment but also on human basic needs and natural resources. Industrial pollution, soil erosion, deforestation, rapid industrialization and land degradation are all worsening current problems in India. Overexploitation of resources due to industrialization process has resulted environmental degradation of resources.

According to Environmental Pollution News Research (July 5, 2011) India's per capita carbon dioxide emissions were roughly 1,360 kilograms in 2007, according to the study, and that is small compared to other countries like China and the U.S., with 4,763 kilograms each. According to *Environmental Pollution News Research* (July 5, 2011), long term exposure to air pollution could damage the brain and lead to learning and memory problems and even depression in India. India has been ranked as seventh most environmentally hazardous country in the world by a new ranking released recently.

According to Nielsen of *Environment and Sustainability Survey* (August 29, 2011), India and the U.S. on November 8, 2010 signed an agreement to establish a joint energy cooperation programme to support clean and energy-efficient businesses, and this signed joint venture transaction is worth \$175 million in the renewable energy sector. According to Nielsen, the Indian consumers are now increasingly

aware of the benefits of environmentally friendly and sustainable practices that their industries are supposed to take.

Industrial survey statistics state it clearly that more than 36.3% of the total value added by to the raw materials through manufacture in the industrial sector of India comes from Maharashtra (23.66 %) and Gujarat (12.64%) (Down to Earth Report, 2000). These are the two most industrialized states of India, and their governments of both the states claim they have created vast prosperity in the region. Mohanty is one of them. He has been working in the DaruKhana ship breaking yard of Chembur for the past 15 years according to Down to Earth Report (2000). He always breathes in toxic smokes from the reckless ships that he breaks in the industry every time.

According to the World Bank (2006), as one drives down the Mumbai-Pune highway, one can witness the horrible truth of industrialization. It is also stated by the World Bank that hundreds of industrial units dealing with chemicals and fertilizers dump their sludge along the roadside. Chimney is one of the big industries that emit gases that also make breathing difficult.

On the local community side, there was hope of battling out the pollution through the courts and action by non-governmental organizations (NGOs). Finding out that knocking at the doors of government agencies was unsuccessful, there is a clear bias in favour of the industry throughout the government machinery, and those affected by pollution rallied behind NGOs. Their efforts paid off and the Gujarat High Court of India in 1995 ordered the closure of 756 industrial units in the areas of Vatva, Narol, Naroda, and Odhav (Down to Earth Report, 2000). The courts ordered the offenders to compensate the villages affected by pollution through discharge of untreated effluents and carbon emissions (World Bank 2006).

The former environmental Minister stated that there is an urgency to improve environmental enforcement. Pressure to do so has come from local communities and other stakeholders who facilitate the compliance of environmental regulations by forwarding numerous messages about devastating environmental impacts and proposed projects that shortcut environmental review. The minister explains that the

governing principles for the new agency are: strengthening the current monitoring system to catch violations early; decentralizing regulation so that the states and central government work together; and creating an independent agency based on scientific environmental integrity.

In the broader context of improving environmental governance, the Ministry explained that the proposed National Environmental Protection Authority (NEPA) would be related to the new Green Tribunal, established earlier in 2010, and it will ramp up administrative compliance and enforcement (Down to Earth report, 2000).

The National Research Development Corporation (NRDC) Indian scheme hosted a dialogue with Indian civil society and NGO's early in 2010 to share perspectives on environmental compliance and governance in India, China, and the US (Down to Earth report, 2000). The NRDC's team had extensive discussions with Indian civil society stakeholders about their experiences in working to strengthen environmental governance. However, one can argue that this was a good step by the National Research Development Corporation, but the concern seems to be the same as the one in South Africa. In the context of South Durban Basin, the most active parties are civil societies, non-government organizations, government and local communities and very little if any from the industries as the polluters. In both India and South Africa (South Durban Basin) there seem to be a lack of co-operation between affected and concerned parties and industries.

One of the main areas of discussion on the dialog was how the process of environmental review by all government agencies occurs in India and US (Down to Earth report, 2000). Indian professionals and other local community members including agencies explained their opinion that one of the biggest problems for environmental compliance in India is the government's assessment of environmental authorisations and Environmental Impact Assessments (EIAs) on industrial activities.

According to McKinsey (2008), the compliance of environmental regulations in India and other parts of the world is dependent on the cost of alleviation, the comprehensiveness of the law in relation to the level of development of the society, and the ability of the industry in question to bear the costs of mitigation, the

disciplinary measures, and the probability of discovery of violation. This means that the industries that are resource-intensive like chemicals, iron and steel, non-ferrous metals, non-metallic minerals, and pulp and paper can potentially involve relatively large negative externalities and face high compliance costs requiring high initial investment in both cleaner production processes and end-of-pipe equipment to restrict pollution according to McKinsey. However, this seems to be fair enough and requires adoption to the situation of South Durban Basin. Industries like Mondi, SAPREF and Engen are the ones that are resource-intensive, and they can also involve high negative externalities and therefore are likely to face extreme compliance costs.

McKinsey (2008), further states that an industrial' level of compliance is influenced by many factors. Positive inducements in the process of pollution reduction, like lowered per unit costs, tax breaks and investment subsidy according to McKinsey could bring about greater compliance. If the finding of polluting firms is low and penalties are alleged to be insignificant, the level of non-compliance may be very high.

Strengthening enforcement and compliance with pollution standards in India has engaged environmentalists and law makers equally in the context of designing policies that can promote sustainable development and yet not hold back industrial economic growth. This section ascertains the use of mandatory public discovery of pollution compliance data within the existing environment legislation in India as the 'stepping stone' of a three stage model to foster conformity to pollution standards by a larger percentage of Small and Medium Enterprises (SMEs) (Environmental Pollution News Research , 2011).

Owing to an increase of industrial environmental impacts in India, it has been observed that effective environmental enforcement needs informed agreements on environmental management objectives and policies that are based on a good understanding of the shared roles and responsibilities of all role players, including the regulator, the regulated community (developers and polluters) and the affected community (general public) (World Bank 2006). This fundamental view of shared responsibility is currently challenged in India by the general perception among the public, project proponents, and development authorities equally that environmental

problems are the only responsibility of environmental agencies failing to effectively implement and enforce the laws (World Bank 2006). This then puts it clearly that as India's economy is said to continue and speed up, the performance of the environmental regulator will come under increased inspection and force.

To deal with these impacts, India has developed a complete set of environmental laws and institutions, including a very active judiciary (Environmental Pollution News Research, 2011). Regardless of a strong policy and institutional framework and some successes, environmental degradation has not been arrested on a large scale in India. The country-wide average compliance ratio for monitored industries is only fifty percent according to Anderson & Lohof (2008) which is almost the same as in South Africa. However, the different is that the trends in environmental quality indicators in India are mixed, for example, urban air quality has been improving in the largest cities, such as Delhi and Mumbai, where significant efforts have been made to control multiple pollution sources, while it is deteriorating in many other cities (Anderson, 2008).

To discourse these environmental challenges in synchronisation with the governments, the central government has acknowledged and targeted almost all highly polluting industries and all environmental affected areas. On the list, the chemical and engineering industries were on top since they are the key contributors to air, water, and waste pollution in India. These industries include integrated iron and steel plants, non-ferrous metallurgical units, pharmaceutical and petrochemical complexes, fertilizers and pesticide plants, thermal power plants, textiles, pulp and paper, tanneries and chloralkali units (OECD report ,2006).

2.12.3. Environmental Regulations in India and their relations in South Durban Basin

Legislative steps to pollution control in India started in the mid-nineteenth century. A number of Acts that were formulated dealt mostly with environmental regulation in a gradual approach and proved unsuccessful at reducing the levels of pollution and industrial pollution in particular. Actions against polluters had essentially to be

initiated in courts by those affected, and pollution and environmental degradation on the other hand were addressed very generally in terms of nuisance, negligence, liability, and a few principles of delict (Maharashtra and Gujarat, 2000).

According to Anderson (2008), judging from the distinctiveness of the pollution control mechanism put in place in India, it can be clearly observed that this set of laws were designed to perform a preventive position rather than a proactive position. However, this is worthy and requires a wide spread all over the most affected countries and South Africa (South Durban Basin) in particular. He further states that even the constitutional provisions, while affirming the right of the state and the duties of the citizens do so without upholding the corresponding rights of the individuals and the duties of the state. This means that the citizens cannot claim environmental protection as a right and the state is not bound by any duties to protect the environment. Therefore, judging from the statement by Anderson, it appears obvious that environmental regulations in India have not evolved in reaction towards specific problems, but rather have been an anticipation step to problems.

The primary functional tool employed by the Pollution Control Boards for controlling industrial pollution is inspection of polluting units and enforcement. Given the penalties in force for non-compliance in India and keeping in mind the extent of the State Pollution Control Boards' powers, the impact of inspections on compliance was only as strong as the threat of enforcement and punishment faced by the industrial units (Ahuja, 1985). Furthermore, a study conducted by the Planning Commission found that they do not have a complete inventory of polluting and potentially polluting industries. Small industries (capable of high levels of pollution) have been left out of the purview, further undermining determinations at pollution control. Small industries are known to contribute as much as 40 per cent of air and water pollution (Walter, 1999).

2.12.4. Environmental pollution leads to impoverishment and violence in Nigeria

Nigeria is a country with vast natural resources, conservation, reserved and protected areas. The Niger Delta is one of the world's most important wetland and coastal marine ecosystems and has a population of 31 million (Cohen, 1998). The Niger Delta is also coincidentally a place of immense oil and gas deposits from the National industries.

According to Curmally (2002), oil pollution caused by oil spills and gas burning by the oil industry has devastated the Niger Delta for more than half a century. The oil industry in the Niger Delta according to Curmally comprises both the government of Nigeria and subsidiaries of multinational companies such as Shell, Chevron, Total and ExxonMobil, as well as some Nigerian local industries. The failure of the oil companies and regulators to quickly deal with oil spills and the lack of effective clean-up activities greatly exacerbated the environmental impacts of such spills, and these industrial spills have serious human rights impacts for the people living in the Niger Delta (Walter & Ugelow, 1999). Comparing to South Africa, the situation is virtually the same in a manner that both countries are affected by pollution from the so called "multinational corporations" (Shell and Total which are found both in Nigeria and South Africa and SAFPREF, Engen and Mondi which are in South Africa-SDB) which makes the frustration worse for humble local communities.

Oil pollution in Nigeria kills fish, their food sources and fish larvae, and damages the ability of fish to reproduce, causing both immediate damage and long-term harm to fish stocks (Cohen, 1998). Oil spills and waste dumping have also seriously damaged agricultural land which results in long-term effects such as loss of soil fertility and agricultural productivity, which in some areas is likely to last for decades. In numerous cases, these long-term effects have undermined a family's only source of livelihood. This is when Cohen (1998), states that the exploitation of oil and gas in the Niger Delta of Nigeria has brought impoverishment, conflict, human rights abuses and hopelessness to the majority of the people in the oil-producing areas, rather than development and wealth as expected. This has even led to local communities lacking the trust in their government.

The scale of pollution and environmental damage has never been properly assessed, and this indicates clearly that there is very little attention paid to the protection of the environment in Nigeria. The figures that do exist vary considerably depending on sources. Nevertheless, it is widely recognized that hundreds of spills occur each year (Curmally, 2002). He further states that Nigeria has laws and regulations that require companies to comply with internationally recognized standards of “good oil field practice”, and laws and regulations to protect the environment, but these laws and regulations are poorly enforced. The government agencies responsible for enforcement are ineffective and the local communities have been scientifically denied access to information about how oil exploration and production will affect them, and they are repeatedly denied access to justice.

In Niger Delta, like in South Africa (South Durban Basin) the conflict is between the communities and the oil companies, and the oil companies and the government, in particular Nigerian security forces. Difficulties in accessing parts of the Niger Delta is regularly used as an excuse for failure to take action in line with international good practices and standards to prevent and address pollution and environmental damage in order to protect the human rights of communities affected by oil operations according to Cohen (1998).

2.13. Summary

The two case studies (India and Nigeria) discussed above are of relevance to South African environmental situation particularly South Durban Basin. The well recognized relevance is the allocation of poor groups close to industries and poor spatial planning. In South Africa particularly South Durban Basin, the issue of industrial social health problem is as a result of poor apartheid spatial planning whereas in India the cause is not apartheid planning but poor and lack of spatial planning skills and knowledge in the past (Hallowes & Butler, 2002). However, the main lesson to be learnt from India is that their sets of laws are designed to perform a preventive

position rather than a proactive position. With regards to Nigeria, the most comparable relevance is environmental conflict and injustice which resulted from the exploitation of oil and gas. This has led to the same situation as in South African South Durban Basin which is destitution, conflict, human rights abuses, hopelessness to the majority of the people and has even led to local communities lacking the faith in their government.

CHAPTER THREE

3. Research Methodology

3.1. Introduction

The main purpose of this chapter is to present a viewpoint underpinning this research study and also to provide the research strategy and other techniques that have been applied in this research study. This chapter consists of four sections. The first part provides the types of research contained within the study and the second part provides the sources of data and an indication of these are primary or secondary data sources that have been used in the research study. The next part of this chapter consists of data collection methods, interview processes in data collection, sampling procedure and also covers the key informants for this research. The last part focuses more on the methods of data analysis.

3.2. What is methodology?

A methodology in a research project can be defined as a systematic way to progressively undertake a research project by logically adopting specific methods. Therefore, methodology helps a researcher not only to achieve the findings, but to find logical steps towards the findings. A research methodology generally consists of four parts including: identifying all sources of data, the key informants, mechanisms and tools, sampling procedures, and methods of analysing the findings.

3.3. Research type

This research is qualitative in nature. In general, qualitative research entails gaining insight into people's attitudes, behaviours, value systems, concerns, motivations, aspirations and culture or lifestyles (Coolican, 1994). Therefore, this is a great advantage to the researcher to provide complex textual descriptions of how people experience a given research issue.

With regards to this study, the qualitative research helped the researcher to understand how people feel about the pollution of the environment by South Durban Basin Industries, and why they feel the way they do. Patton (1980) argues that qualitative research differs from quantitative research in a way that the information acquired from community members is not expressed in a mathematical or statistical format. Rather, the prominence is on the stated experiences of the participants and on the stated meanings they attach to themselves, to other people, and to their environment (Patton, 1980).

There are different ways in which qualitative researchers attempt to demonstrate that their results are consistent. Possibly the most reasonable approach is to see whether the results obtained from a qualitative analysis can be replicated (Coolican, 1994). Coolican (1994) argues that this can be done by comparing the findings from an interview study with those from an observational study.

Instead of approaching research participants with a structured research tool, in-depth interviews had been undertaken which included semi-structured conversations in which the researcher set out general questions around the topic of industrial environmental impacts and regulation.

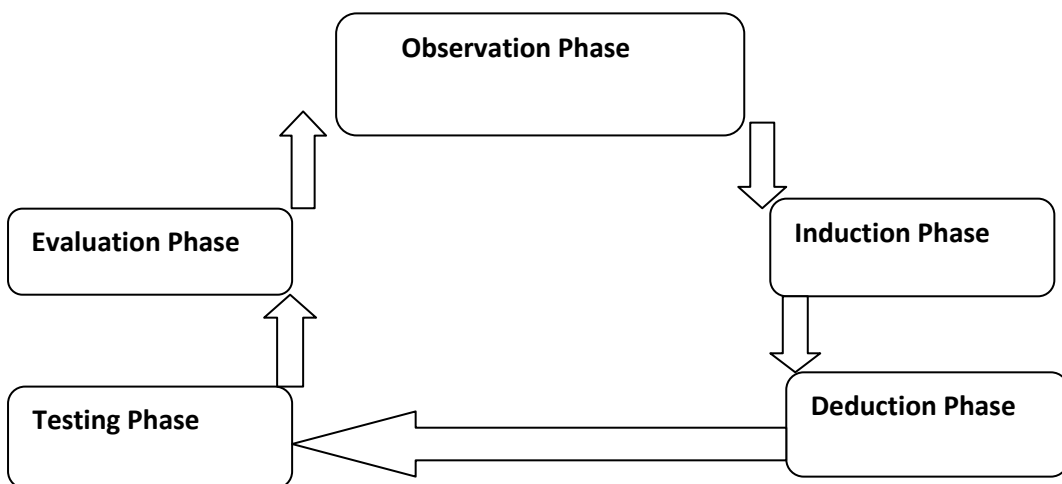
According to Denzin (2000) research is a structured enquiry that utilizes acceptable scientific methodology to solve problems and create new knowledge that is generally applicable. Scientific methods consist of systematic observation, classification and interpretation of data. Therefore, for this paper to qualify as research, the process of data collection, storage, interpretation, and manipulation and out-put must have certain characteristics. The characteristics include the research being controlled and empirical (Denzin, 2000).

3.3.1 Control research

In this regard, the research will be controlled to minimise the factors or any variables that may affect the outcomes. For example, racial and phobic based questions will be modified in a manner that accommodates the respondents.

3.3.2 Empirical research

Empirical research means that the conclusions drawn in this research will be based upon hard evidence gathered from information collected from real life experiences or observations. Empirical research method is good in a manner that it involves traditional and superstition knowledge which has been trusted for a long time, and it also allows a researcher to distinguish between traditional and superstition knowledge.



Empirical research model (Coolican, 1994)

The above diagram shows the circle of empirical research. The first step in empirical research is observation where the researcher collects and organizes empirical facts to land to the so called induction. The induction stage involves the formulation of hypothesis about the research problem. Deduction is the third stage whereby a researcher reasons and judges the results of hypothesis as testable predictions (Coolican, 1994). The second last stage in the empirical research is the testing

phase where there is inclusion and application of new empirical material in examining the hypothesis. The whole process then results in the evaluation of the outcomes after testing.

Distinguishing inductive from deductive processes is a significant attempt in identifying what counts as qualitative research. Diab (2007) argues that generally, inductive reasoning uses the data to generate ideas (hypothesis generating), whereas deductive reasoning begins with the idea and uses the data to negate the idea (hypothesis testing). In actual practice, however, many quantitative studies involve much inductive reasoning, whereas good qualitative analysis often requires access to a full range of strategies in an empirical research (Coolican, 1994).

3.4 Sources of data

This research consists of two types of sources of data which include primary and secondary data. In this regard, primary sources include both face to face and electronic interviews and personal observation. The interviews were conducted with South Durban Basin local communities (both NGOs and households), industries, local government departments and senior expertise and researchers. The great advantage of primary source of data is that it enabled the researcher to have a higher control over how the information is collected, and also decide on such requirements as size of project, timeframe and goal (Patton, 1980). Secondary sources include literature, previous research reports, organizational records, newspaper articles, magazine, censuses, text books and journals on environmental law and international precedents. Therefore, both primary and secondary sources of data are measured input in this study. Secondary data was then required in the beginning of the research to determine what was known already and what new data was required (Leedy, 1981).

3.5 Sampling procedure

Sampling basically refers to the process of selecting units (e.g. people or organizations) from a population of interest so that by studying the sample we may fairly generalize our results back to the population from which they were chosen (Denzin *et al* , 2000). The reasons for using a sample rather than collecting data from the whole population are self-evident according to Denzin (2000). Involving several or all elements in data collection is practically impossible and may be prohibitive in terms of time, cost and other human resources. It is also argued by Denzin that the study of samples rather than the entire population/area is sometimes likely to produce more reliable results.

As primary source of data the researcher interviewed twenty individuals. Three of these were from government departments including the eThekweni Municipality (energy office), eThekweni Department of Environmental Affairs, and Environment and Development Planning Department. The reason for selecting these local government departments is that they are the ones who formulate, implement and monitor the environmental regulations in local industries. They are also responsible for providing services to people and take a good care of them. Three individuals included industries from South Durban Basin namely Mondi, SAPREF and Engen. The reasons for selecting these industries were based on their duration (existed more than twenty years), size (they are considered as the biggest industries) and level of impacts they produce. Eight of the individuals were local communities (households) from uMlazi, Wentworth, Bluff and Isipingo as selected areas for this research. These areas were chosen because they are located close to industries and some of them even share a fence with the industries. In this regard the researcher was mostly interested in interviewing two categories of households, which were the senior citizens and youth of South Durban Basin. The senior citizens of South Durban Basin are the people who have been in the area for more than twenty years, and the reason for being selected is that they were likely to have a wealth of information from their experience and comments with regards to the situation in the area as it is. Youth was targeted to elicit a response about the

situation as future leaders. The other two interviewed individuals were from the non-government organizations which included South Durban Community Environmental Alliance and Ground Work organizations. These were selected because they are well known non-government organizations with long history in South Durban Basin. The remaining six individuals will be experts or previous senior researchers.

3.6 Interview Process

An interview can be defined as a verbal exchange of ideas between two people namely the interviewer and the interviewee whereby an interviewer asks questions to acquire information from the interviewee. Interviews are particularly useful for getting the story behind a participant's experiences (Coolican, 1994). Coolican (1994), states that interviews vary considerably in terms of their degree of structure where there is an unstructured / informal interview which lends itself to qualitative analyses, whereas structured interview lends itself to quantitative analysis. Coolican also argues that there are a variety of skills that interviewers need in order to gain valuable data, and these skills involve establishing a good understanding with the person being interviewed, adopting a non-judgemental approach, and developing effective listening skills.

3.6.1 Interview or data collection techniques

In this research, the researcher used checklists, questioners and observation or visual records as data collection techniques. These techniques were applied during personal interview which is defined as the process where an interviewer meets and discusses the concerned questions with the interviewee. Personal interview is therefore preferable in this study because the interviewer (researcher) gets control over the situation and make sure that the interviewee answers all the question in an appropriate sequence (Musvoto,2007).

3.6.2 The role of the researcher during the interview process

In a research interview process a researcher plays an important role. Robinson (2002), also argues that an important element of any research whether qualitative or quantitative is to reflect on the role that the researcher plays in generating, storing, analysing, interpreting and outputting data. The first step for a researcher is to find the respondents and stimulate them to participate on the research study. During the process of generating data, a researcher creates a good atmosphere for all the respondents to make sure that they are comfy. More than all, the researcher also makes sure that there is no bias and that there is clarification of questions whenever a respondent gets confused.

3.7. Data analysis

Generally, most researchers and qualitative researchers in particular present their findings and make use of raw data (e.g. direct quotations from participants) as well as analyses of the data based on categories, and in addition, they often indicate how their hypotheses changed during the course of the investigation (Diab *et al*, 2007).

Therefore, likewise, the researcher in this study used different methods to present the findings and show that the findings are consistent. Usually researchers, especially the qualitative researchers, are interested in seeing whether the findings that they obtained can be replicated after analysis (Leedy, 1981). This is then done by comparing the findings from an interview study with those from an observational study (Diab *et al*, 2007).

In this research, the findings are presented in different formats including textual write-up, charts, graphs, and tables. All these are forms of data analysis. These methods are designed to process and purify qualitative data so that reviewers can obtain attention-grabbing findings easily.

Method of data analysis	Importance and advantage of selected method
Textual write-up	<ul style="list-style-type: none"> • It allows a researcher to tell a story in details • It allows a researcher to state detailed reasons for the methods applied • It allows a researcher to bring his hypotheses in a discussion • It allows a researcher to link the findings with previous literature / studies
Graphs	<ul style="list-style-type: none"> • It is very simple and easy to determine the results and trends as it is more visual
Figures	<ul style="list-style-type: none"> • It shows up the differences rather than trends/changes • It is designed to insert understanding of information that it difficult to convey with words
Tables	<ul style="list-style-type: none"> • Makes it easier to compare the findings and find the rate of change

CHAPTER FOUR

Case Study: South Durban Basin Industries

4.1 Introduction

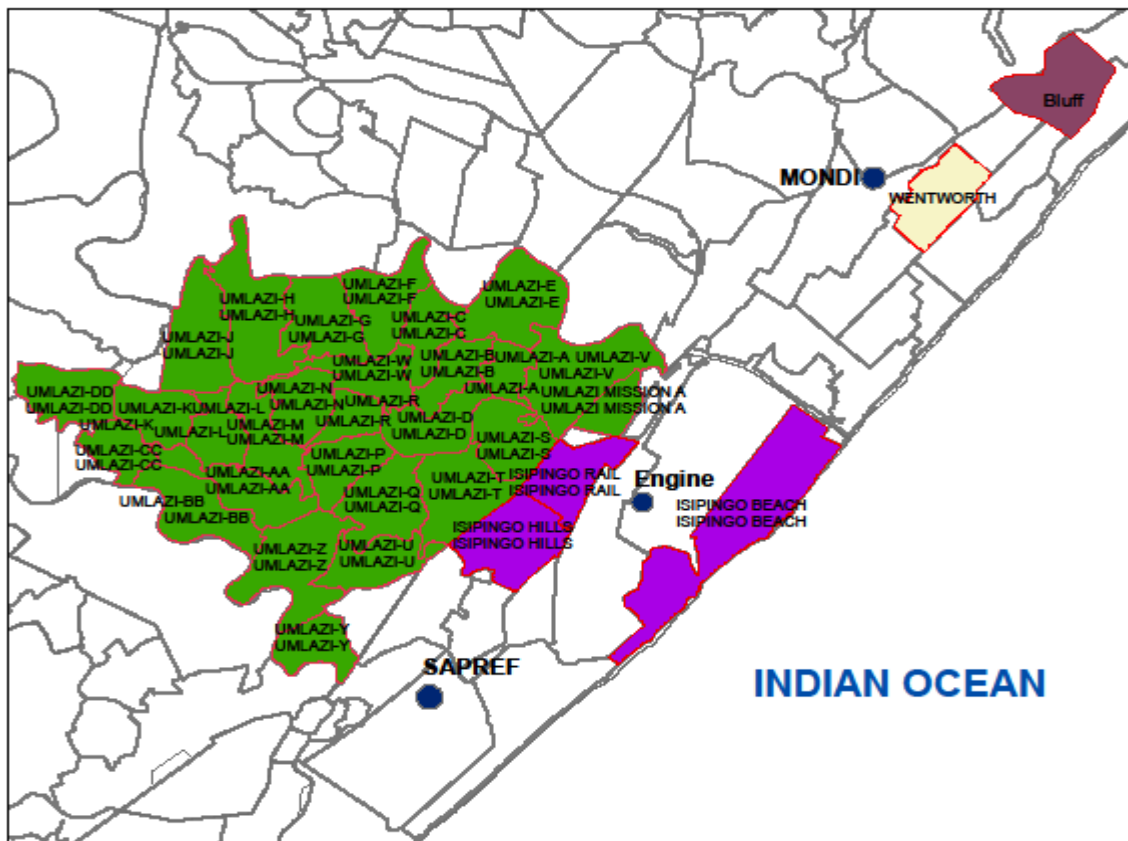
The South Durban Basin (SDB) is an area that has faced many challenges in political, economic, social and in particular, environmental contexts. The area has been characterised by its apartheid-based spatial planning. This chapter presents an overview of South Durban Basin area as a case study. The geographical location of South Durban Basin Industries and the historical background will be described. This chapter will also include situational analysis where the social, economic, political and environmental strength and weakness of the South Durban Basin will be considered.

4.2 Geographical location

South Durban Basin is an area in KwaZulu-Natal within eThekweni Municipality. It is located in on the coast of Durban and approximately 4 km wide extending south from the Durban Central Business District (CBD) for 24 km to Umbogintwini on the eastern coastline of South Africa (Chetty, 2004).

South Durban Basin is a combination of industrial and residential areas in close proximity to each other. Industries include heavy industry and smaller industries. Besides being a centre for industries, this area is also a focal point of major transport routes, including highways, and a harbour (Chetty, 2005).

SOUTH DURBAN BASIN STUDY AREA



Legend

- INDUSTRIES
- BLUFF
- ISIPINGO
- WENTWORTH
- UMLAZI

0 1 2 4 Kilometers

Bhekani David Nzimande > mtrp.

Figure 1

4.3 Historical background

The South Durban Basin had been a booming and successful market garden area until 1938, after which the Durban City Council decided that the area be developed into an industrial zone with the black residential area providing the workforce (Peek *et al*, 2002).

The South Durban industrial zone emerged in the early 20th century as an urban landscape planned by the local authority in concert with powerful industrial interests (Scott *et al*, 1997). The growth of the industrial area on the port of Durban in the first half of the twentieth century was the product of the joint interests of industry: the Natal Manufacturer's Association (NMA), the Durban Town Council and the National State Department of South Railways Association (SARAH) (Scott *et al*, 2002).

Peek (2002), also argues that in the post-war planning of the city and in the later demarcation of the so called 'group areas' in line with the Group Areas Act which was spread in 1950s by the newly elected apartheid government, a sequence of residential areas was planned around this productive zone to supply labour for the emerging industrial zone. He further argues that within the South Durban area, Merebank was zoned for Indian occupation while the Wentworth/ Austerville area was demarcated to be occupied by people of mixed race.



Figure 2 : <http://www.google.co.za/imgres?q=engen+refinery+durban>

South Durban Basin has also been identified as pollution “hot-spot” caused by nearby poor operation by industries which put the surrounding communities at risk as a result of industrial accidents (Scott *et al*, 1997). Communities began to raise their fear about increasing levels of pollution and their associated environmental and health effects. In addition, this led to local communities standing up and putting pressure on local government to come out with solutions. The pressure from community based organization leaders eventually led to the declaration of the so called South Durban Basin Multi-point Plan (SDBMPP) in November 2000 by the former Minister of Environmental Affairs, Mr ValliMoosa (Chetty, 2005).

4.4 Situational analysis

According to Durban Metro Report (1999), the situation in South Durban Basin has undermined the quality of life of residential communities in the area, and has also negatively impacted on the competitiveness of the business environment. The report further argues that the close interface between residential and industrial activities in the area has also created tensions between residential communities, local government and industry regarding future development in the area.

The area of SDB is considered to be the economic hub of KwaZulu-Natal(KZN), contributing some 8% of the GDP (Chetty, 2005), with key industries including two oil refineries, a paper and pulp plant, sugar refinery, chemical industries, the busiest port in Africa, and various medium to smaller industry, all within an area of some 100 km². According to (Scott *et al*, 2002), South Durban Basin is a very ethnically diverse area, and its demographics show that 71% of the populations are of working age, and 29% is under the age of 19 years (Wayman, 2010). It consists of 200 000 people living in the suburbs of Bluff, Clairwood, Jacobs, Mobeni, Wentworth, Merebank, Merewent, Isipingo, and Lamontville, extending to Athlone Park and Amanzimtoti in the south. The most current population groups are Africans, Indians and fewer coloureds. The white population group existed before industrial development most moved to better suburbs around Durban.

Poverty in South Durban Basin is high with 52% of the adult population not economically active and 79% of those who are economically active earning less than R15 000 per annum (Scott *et al*, 1997). Even though there is now a slight improvement, the area has the low cost housing and informal settlements that tend to develop around industrial areas such as those surrounding the old airport site (Scott *et al*, 1997).

The poor water quality which is due to oil spilt from surrounding industries discourages the use of water by local communities for washing, cleaning and watering gardens. This poor quality of water results in health risks. Musvoto (2007) also argues that in the Durban Port itself, there is the Island View bulk chemical storage complex which contains an extensive infrastructure of tanks and pipes. These pipes run inland to the National Petroleum Refiners of South Africa (NATREF) while others lead directly underneath residential streets to the South Durban refineries which are South African Petroleum Refineries (SAPREF) and Engen.

As pointed out by Maharaj (2009), South Durban Basin is an area with many strengths and opportunities as it has excellent tourist attractions including perfect beaches, bird sanctuaries, a fascinating mix of cultures, and a unique history. The area also offers accommodation, restaurants, shopping centres and an abundance of tourist services. Economically, Durban has very powerful manufacturing sectors, light and heavy industries, tourism, finance and other government divisions. It is the second economic driver after Johannesburg in the country and the first economic driver in KZN province (Wayman, 2010).

Dodson (2002) argues that the progressive development of the South Durban Basin area has been accompanied by increasing environmental problems that impact on the quality of life of nearby communities. He further states that the political democratization of the period of 1994 created the space for local communities to

demand environmental justice and claim their rights to a safe and healthy environment, a right guaranteed in South Africa's Constitution. This focus provides some preliminary insights into women's experiences of, and responses to environmental issues, particularly air pollution in South Durban (Dodson, 2002).

4.4.1. Challenges faced by communities in South Durban Basin.

In South Industrial Durban pollution has been a major worry for local communities in south Durban for decades, and the worst part of it according to Diab (2004) is that local residents, who are predominantly poor black people, live in very close proximity to a host of dirty industries. Diab (2004) further argues that the residential areas of South Durban Basin suffer very high levels of air, ground, and water pollution. She states that amongst the worst polluters in the area are the two oil refineries. One of these, the SAPREF refinery, is jointly owned by two multi-national oil companies, Shell and BP.

Other toxic incidents in South Durban Basin include leaks, fire sand explosions. These toxic incidents according to Musvoto (2007) have become “normal” for industrial operation conditions in the South Durban Basin Industries. This “normal” condition has had very negative impacts on the lives of South Durban residents. It mostly results in high levels of respiratory illness and cancer which is clearly increasing compared to other areas outside South Durban Basin (Musvoto, 2007).

4.4.2. Development of Environmental Community Based Organizations in South Durban Basin

South Durban Community Environmental Alliance (SDCEA) is a local community based environmental justice organization in South Durban Basin. This organization was initiated in late 1995 and has been active ever since then. It is made up of sixteen associate active organizations and has been considered successful for many reasons, one of which is that it is a vocal and vigilant grouping in terms of lobbying, reporting and researching industrial incidents and accidents in this area (Scott *et al*,

1997). It contributes to the struggle against environmental racism, for environmental justice and environmental health (Scott *et al*, 1997).

The South Durban Community Environmental Alliance had its first protest in the 1990s before it was a recognized body. The protest was on the on the environmental pollution caused by the South Durban Basin Industries and its incidents and accidents affecting the surrounding communities. Scott (1997) argues that advocacy amongst local communities was one of the many tools used in South Durban Basin, and the SDCEA has used this extensively to fight for better air quality in the locale, and this has led to many successes.

“SDCEA has created a network with environmental organizations, both nationally and internationally. A good example of this is that SDCEA, along with groundwork and Friends of the Earth International, confronted Shell International about the incidents, accidents and high level of pollution from their refinery in Durban along with other fence line communities from other parts of the world. This strategy has gained the south Durban community international NGO collaboration, as well as international media attention”
(Reid &D’sa, 2000; 37)

The above statement puts more emphasis on the role and strength of SDCEA in collaboration with private sectors and other organization at all levels in combating environmental injustice.

Furthermore, as stated by Musvoto (2007), the main goals and objectives of the SDCEA were to protect and ensure a liveable and healthy environment of the South Durban communities, to promote clean and environmentally friendly development and particularly industrial development that also supports safe local jobs. SDCEA according to Musvoto also wanted to promote South Durban Basin development that is considerate of the impact on resources for present and future generations.

4.5. Summary

The South Durban Basin area is located on the coast of Durban. It is very diverse with regard to the age of its inhabitants, and is mostly occupied by Black, Indian and Coloured people. The area has great development potential because of its location. The main challenge and obstacle to the prosperity of the area is the environmental pollution caused by industrial development.

CHAPTER FIVE

5. Results and Discussion

5.1. Introduction

This chapter presents the results of the research. The process of data analysis as stated by Creswell (2003) involves preparing the data for interpretation, conducting different analyses, moving deeper and deeper into the understanding of the data, representing the data and then making an interpretation of the larger meaning of the data. The researcher within this chapter breaks down the objectives and sub-questions of the research upon which the analysis is conducted. The chapter presents and discusses views from different parties including local communities of South Durban Basin, South Durban industries, government environmental bodies and senior researchers of South Durban Basin. Within this chapter, the role of local communities in ensuring the compliance of industries with environmental regulations is discussed.

The local communities of South Durban Basin started to raise concerns about worsening air quality as far back as the 1960's (Scott, 2002). In the late 1970s communities started raising complains with the government. However, the communities realized later that the airborne diseases could be as a result of carbon emissions from industries. At that time the most dominant diseases were asthma, diarrhoea and tuberculosis. It is also stated by Scott (2002) that the efforts to intermediate in this South Durban situation intensified in the 1980's and 1990's as environmental pollution severely worsened, and the complaints led to a national response to the problem (Scott, 2002).

5.2. Discussion and analysis

During data collection, as shown in the chart below (figure 1), forty percent of the respondents for this research were local communities including both community

based organizations and households, thirty percent were senior academic researchers from University of KwaZulu-Natal (UKZN) and University of South Africa (UNISA), twenty percent were local government bodies including eThekweni municipality and ten percent were South Durban Industries.

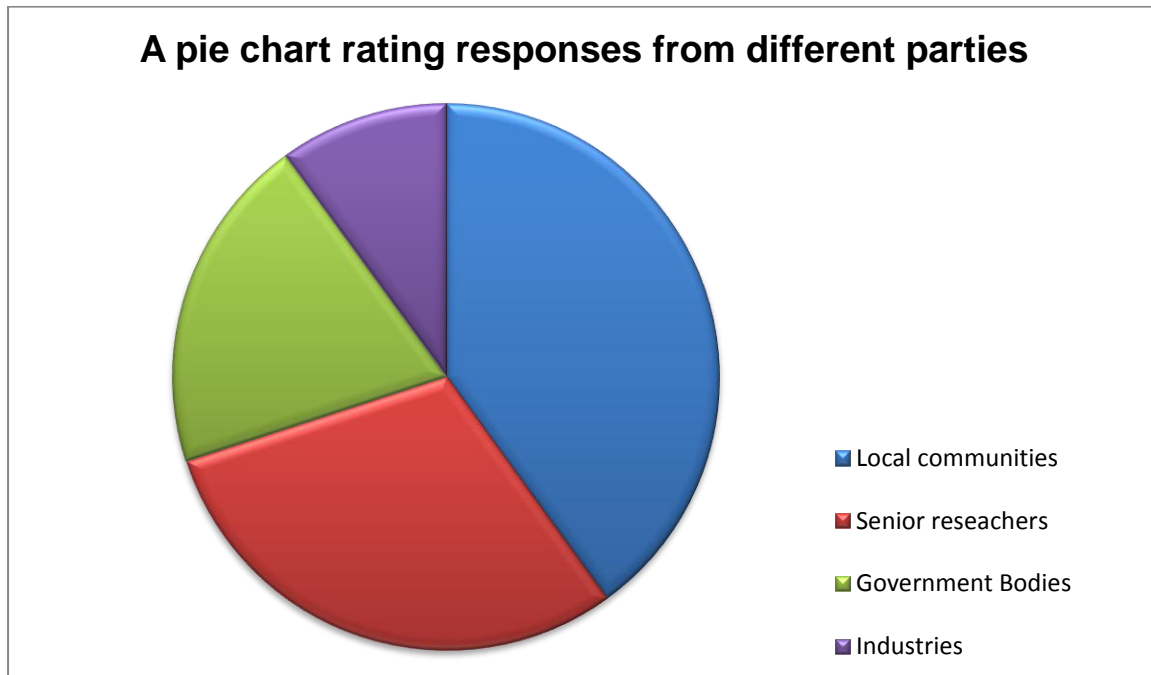


Figure 2

All community interviewees were from uMlazi, Wentworth, Bluff and Isipingo as selected areas for this research. In this regard the researcher was mostly interested in interviewing two categories of households, which were the senior citizens and youth of South Durban Basin. The senior citizens of South Durban Basin are the people who have lived in the area for more than twenty years, and the reason for being selected is that they were likely to have a wealth of information from their experience and comments with regards to the situation in the area as it is. The youth were targeted to elicit a response on the situation from future leaders.

On the side of public sector agencies an interview was conducted with eThekweni municipality energy office and the Department of Water and Environmental Affairs in Durban. Professor Jeremy Ridl who is an Attorney and a senior environmental law

specialist was interviewed as representing the non-government body. With regards to industries, it was difficult for the researcher to get access to this group, the reason being that the research topic is politically sensitive. The targeted industries were SAPREF, Mondi and Engen. The reason for selecting these industries includes the fact that they are old industries with a long history. They have also received many challenges and complaints from affected communities and government bodies.

With regards to demographic composition as shown in the graph below (figure 2), fifty percent of the local communities interviewed were Indians, thirty percent were Africans and mostly Zulu speaking people and twenty percent were Coloured people. Scott (2002) states that this racial mix is due to the fact that apartheid planning had separated individuals among racial lines and the areas under study were historically designated for Indians, Africans and Coloureds who were considered as poor groups by the apartheid government. She further states that the results indicate that the racial composition of the area has not changed significantly after the apartheid era. Most groups of interviewees live close to industries, with seventy percent estimated to be located less than two kilometres away from the industries.

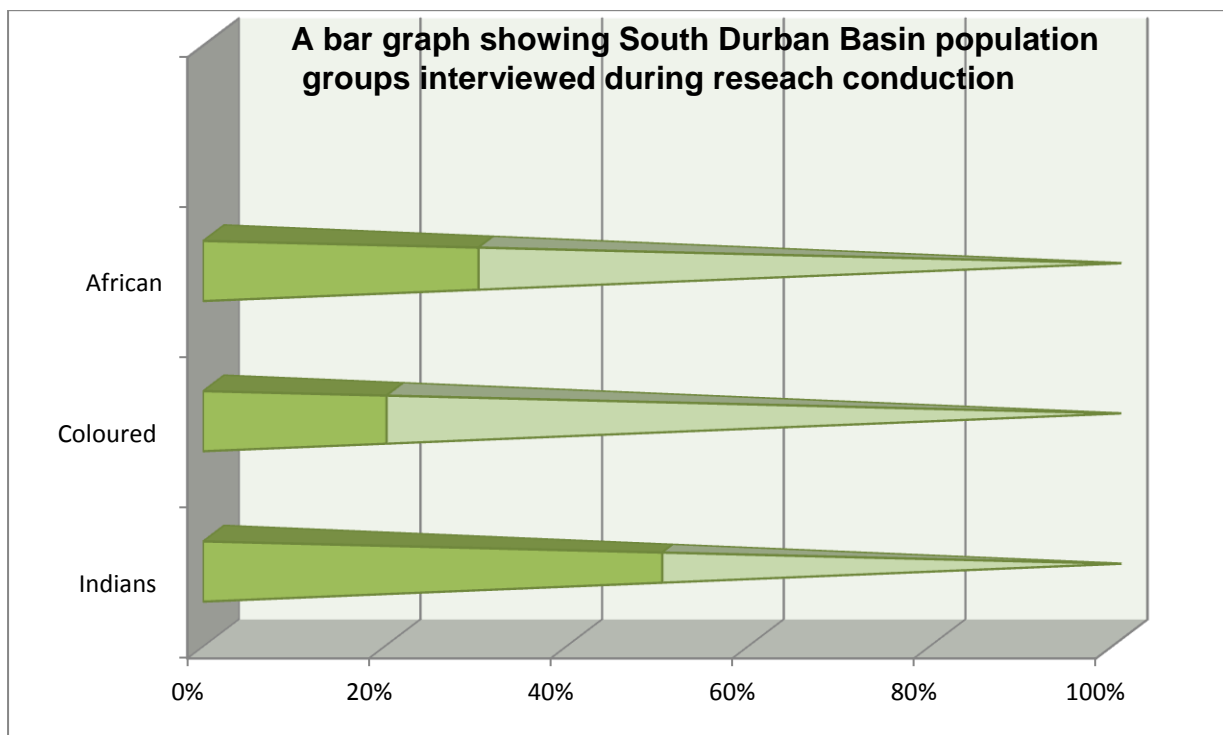


Figure 3

5.3. Mechanisms for enforcement of environmental regulations

One of the primary goals of an environmental enforcement programme as stated by Kidd (2002) is to change human behaviour and to make sure that environmental requirements are recognized and respected. Reaching this goal requires one or government to motivate the regulated groups (which are the industries in this case) to comply, removing barriers that inhibit compliance, and overcoming existing factors that encourage non-compliance (Kidd, 2002).

Ahuja, (2005) raises a number of factors that affect compliance of industries with environmental regulations. These factors are divided into five categories: economic, moral, personal, management and technological. Economically, Ahuja (2005), states that an industry will comply to avoid penalties or fines and also to save funds by using more cost-efficient and environmentally sound practices. Morally, the compliance with environmental regulations will depend on the morals and values for environmental quality and societal respect for the law. Personal, compliance will depend on the desire of industries to avoid the stigma of enforcement and adverse publicity. Managerially, industries will comply with certificates and credits based on a good record of environmental compliance. Technologically, the industries will comply based on the availability of affordable technologies.

Ahuja (2005) also presents the reasons behind non-compliance or factors affecting environmental compliance by industries. Amongst these reasons is the lack of government inclination to enforce, lack of public support for environmental concerns, lack of internal accountability for compliance, lack of management systems for compliance, incapability to meet requirements due to lack of appropriate technology and other equipment, lack of social admiration for the regulations and competing demands for resources.

5.3.1. Institutional framework

The government has established the institutional framework for environmental laws in South Africa including the Department of Environmental Affairs, Development and Planning department, Department of land Affairs and Department of Water Affairs. Within these departments there are special divisions including those dealing with monitoring of environmental regulations, those dealing with conducting and analyzing research, those dealing with implementation and enforcement of environmental regulations. Within the institutional framework the government of South Africa and local government in particular (eThekweni Municipality) has ensured that the technical staff is adequate and that it consists of university and technical graduates.

Within the institutional framework a prominent environmental compliance and enforcement aspect is environmental inspection. The government has appointed environmental practitioners at all levels to provide technical information on the different alternative approaches including new technologies that can be used for environmental compliance. The eThekweni municipality environmental specialist stated (who asked not to be disclosed) "...our officials may also deliver information to demonstrate the economic practicability of using new technologies". She continued stating that this helps in encouraging the industries to realise that the compliance requirements are practical, useful and beneficial.

Therefore, according to eThekweni municipality, in this regard the government has tried to make sure that related requirements to prevent bribery, to prevent forgery of environmental data, and to ensure fair application of the law is taken into consideration and strictly monitored.

5.4. Views from South Durban Basin local communities (households and community based organizations)

One of the local residents of South Durban Basin (Merebank) who is also a teacher in Settler School stated that "*...I have stayed in this area for more than thirty five*

years and I have been involved in a number of protests against pollution from industries...and I don't want to lie, up until today I have seen no changes, people are getting sicker than ever before!" The senior resident of Merebank continued stating that she started feeling sick (coughing) in 2002 and she took it lightly because she thought it was just a normal flu, and when she went to clinic later in four months she discovered that she had tuberculosis. The anonymous resident blames government as she believes that government could be the only mediator in this situation of environmental pollution. She continued stating that "...it seems like the government is only concerned with what type of pollution is in this area and how it occurs than coming with solutions", and she continued "...and I say this because I have read so many newspapers with headline stories about the South Durban Basin pollution, some of them even come from the government departments themselves but there is no solution". The anonymous resident also stated that if it was not for her job (teaching) and if she had enough funds she would have left the area twenty years back. The resident has three children who are staying in Cape Town, but that does not stop her worry "... I was very happy when they moved to Cape Town in 1994. However, I still worry every time they come home for holidays because I do not know how fast the industrial infections are". Moreover, the first thing that the angry anonymous resident of South Durban Basin (Merebank) would do if she was in power would be to request for compensation from industries for all the families who are sick and those who have lost their members because of pollution and also shut down all the industries which are off no use, "... some of these industries really have no use to us as local communities", and she continued saying "there are many people and youth who are unemployed...". The angry resident states that the industries mostly employ people from outside the country e.g. Rwanda, Zimbabwe and Nigeria and leave them as local communities. The resident absolutely does not believe that this happens because the local communities lack skills, but "... it is because we always fight and protest against them (industries)..."

Furthermore, on the same school where the anonymous resident works as a teacher, it is stated by SDCEA findings (2003) that an independent medical study shows that learners at Settlers Primary School face asthma levels five times higher than normal because of polluting industry, and that this school has begun converting

a classroom into a sickbay to treat learners and staff suffering from asthma, wheezing and tight chests.

The reaction of most of these industries does not assist, rather, it makes the situation worse. Mondi is one of the big and old industries of South Durban Basin which tried to build an incinerator in response to complaints from communities and government. The communities and SDCEA in particular were the first to protest against the building of incinerator as they believed it was going to worsen the situation and cause more pollution in the form of dioxin which causes cancer (Van der Merwe 2004). This was discovered after the SDCEA has hired an independent scientist who clearly stated that the proposed incinerator would lead to an increase in carbon dioxide and sulphur dioxide as well as dioxins in the surrounding environment. However, even after the harmful effects of the proposed incinerator had been discovered, Mondi was given permission by the government to continue building the incinerator. This was when most local communities in South Durban Basin finally lost faith in the government.

An old man (approximately 70 years) was also interviewed. He stated that as a senior citizen of South Africa and South Durban Basin (Isipingo) he knows his rights under the Constitution and he also knows that he cannot exercise them. The resident states: *“I know the constitution as much as I know myself, and I know that I have a right to a purified place”*. What this senior resident has realized is that neither the government nor industries recognize environmental rights but favor consuming rights. This seems to be true as *“Sarah Allan from the Provincial Department of Agriculture and Environment signed a record of Decision which allows Mondi to go ahead with the incinerator”*. The city Manager Mike Sutcliffe gave Mondi the thumbs up in 2002 rather than taking SDCEA’s objections into account. The refusal of the authorities to refuse the incinerator, too many communities and SDCEA as an organization, led to the realization that it was not enough to government that Mondi was found to be the third biggest polluter in South Durban Basin, to be a factor in the decision to allow the incinerator (Scott, 2002).

Mrs. Kelly Nadiio (40) from Isipingo claims that even though she only worked for six months in Wentworth Hospital, she has a lot of information regarding the sicknesses caused by air pollution from South Durban Basin industries. She said that Asthma, cancer, breathing and chest problems and tuberculosis are the main infections that cause Wentworth hospital to be amongst the busiest health facilities in Durban. She lays blame on the government and says that the government should hand the matter over to the people to sort out the environmental pollution in South Durban Basin area. Mrs Kelly Nadiio believes that the situation can only change if the communities of South Durban Basin (as affected parties) play a role in decision making and the government only listen and regulate.

The last view on this research was from the SDCEA Chairman. He has been leading this organization for a number of years. Desmond D'Sa argues that industries in other countries are many times cleaner than industries in Durban, e.g. Shell in Denmark is much cleaner than the plant in South Durban. Desmond is argues that industries must not wait for the South African government to develop new programmes when they already know how to clean up. He further stated that they want to work with industries. *"We want them to put the necessary controls on their stacks, put the necessary controls on their valves, so they will quit emitting so much unnecessary pollution into the community"*.

5.5. Actions by local communities of South Durban Basin

Communities in the SDB started to express concern about deteriorating air quality as far back as the 1960's, and efforts intensified in the 1980's and 1990's as air quality deteriorated even further. Persistent complaints to government about high pollution levels, chemical leaks, flares, visible emissions and health complaints ultimately led to a national response to the problem. As a result, the Minister of Environmental Affairs & Tourism, Mr. Mohammed "Valli" Moosa, decided that *"...the peculiarities and worrying levels of pollution in the South Durban area warranted a singular and coordinated approach from government..."*(SDCEA report, 1999). A variety of issues

of concern were debated between representatives of government, industry and community and a way forward to addressing the pollution “hot spot” problem was formulated, and consequently the South Durban “Multi-point Plan” was officially announced by Minister Moosa on 27 November 2000 (Van der Merwe 2004). The aim of the Multi-point Plan was to provide an improved decision making structure for air pollution management at local government level, to reduce air pollution to meet health based air quality standards and to improve the quality of life for the local community (SDCEA report, 1999).

As stated, South Durban Basin communities have had several protests against the issue of environmental pollution which resulted in proposal of evictions and relocation of industries, Engen, SAPREF and Mondi in particular. The Engen refinery apart from being the largest oil refinery in Durban as well as one of the two largest sources of sulphur dioxide pollution in south Durban, it is closely located adjacent to two residential low-income black communities, Merebank and Wentworth. Its proximity to these two communities increases the industry’s impact on public health and the impact of air pollution on these communities (Freund, 2001).

During the year 2002 the roof of an Engen storage tank in South Durban Basin collapsed and released dangerous benzene and phenol in a toxic cloud of smoke which according to Freund(2001)reached all the way from the Bluff area to Isipingo. It is also stated by Freund (2001) that during the year of 2002 SAPREF had a pipeline leak and this had a huge impact on people living near Tara Road, and the leak spread to Merebank. As a result many communities including children at Settlers School became sick and the Barracks community also suffered. The communities felt like they were sleeping next to petrol pumps because of the leaking smell and fumes (SDCEA report, 1999).

5.6. The role of South Durban Community Environmental Alliance

The protest against environmental pollution in South Durban Basin started as far back in 1995 under President Nelson Mandela when communities protested outside Engen industry (Freund (2001). The most groups who were involved in this protest were the South Durban community based organizations.

The south Durban community based organizations are made up of poor communities that have been historically exposed to petrochemical industries and air polluting substances like sulphur dioxide, and benzene. These organizations are protecting people who are on the point of “losing” their rights (Jenkins, 2000).

A positive aspect is that the South Durban community is aware of the loopholes within South Africa’s environmental legislation, and has therefore taken initiative to step in to enforce environmental responsibility on the part of petrochemical industries (Van der Merwe 2004).

The role that local communities of South Durban Basin can play to ensure that industries comply with environmental regulations is crucial. Since the culmination of apartheid in the South Africa, community representatives and community groups in South Durban Basin have become increasingly vocal in their opposition to industrial management practices and to the levels of pollution that impact on the environment.

According to a SDCEA report, (1999), local communities nearby the South Durban Industrial Basin have a great deal of local knowledge and expertise which is valuable and instrumental in the evaluation of environmental pollution and improving quality of life.

A number of community demonstrations against South Durban industries which resulted in the closure of a hazardous waste site in south Durban and the establishment of a multi-stakeholder forum that resulted from demonstrations against the expansion of an oil refinery which President Mandela had come to open, show clearly that communities of South Durban Basin have a big potential and a role to play in reducing environmental pollution and enforcing compliance of environmental regulations through pressure.

For several years, the communities of South Durban Basin have tried to find solutions to the environmental pollution issue. A report by SDCEA (2005) states that the SDCEA as community based organization has obtained technical and legal help and engaged with industries in the area in an attempt to get them to reduce their pollution voluntarily. They have engaged in local forums in order to set standards and monitor pollution levels in partnerships with industry and local government. However, it was then realized that this approach can never fully address these issues fully. The problem is that the environmental issues in South Durban involve many actors, and communities do not have the resources to secure the co-operation of each of these, while also monitoring compliance with agreements (SDCEA report, 1999).

The argument raised by SDCEA in its report (1999) is that the Department of Environmental Affairs & Tourism does not monitor emissions of “all poisonous or noxious gases” which it should be doing in order to comply with its obligations in terms of the Atmospheric Pollution Prevention Act. The report continues by stating that the government played virtually no role in forcing industries to improve their emission standards, and that the Engen Oil Refinery improvement plan is a result of many years of protest action by the South Durban communities., This demonstrates clearly that local communities have a big role to play in environmental management and environmental compliance in industrially polluted areas.

In one of the meetings held between South Durban residents, local authority officials and the Department of Environmental Affairs & Tourism a SO₂ (sulphur dioxide) emission reduction strategy was discussed, and in this meeting the Department of Environmental Affairs & Tourism (as it then was) indicated that it did not have the capacity to guarantee the reduction of SO₂ and CO₂ (carbon dioxide) emissions of all industries in the area. However, it is submitted that it is on occasions like this that the government must involve the public as people who know what they want who are passionate about achieving a clean and sustainable environment.

Despite the introduction of the legal right to an environment which is not harmful to health or well-being and the constitutional obligation of the state to take reasonable measures to combat environmental pollution and ensure compliance with this obligation, the communities of South Durban Basin have experienced little transformation in their environmental conditions since 1994 (Andrews, 2005). Andrews (2005) further argues that there have been no significant controlling intermediations that have been taken to date that address the problem in a fitting, satisfactory and convincing manner. This argument demonstrates that the government has failed to take reasonable measures to evaluate and reduce air pollution in South Durban Basin.

Local communities of South Durban Basin have tried their best to find ways and approaches to solve the problem of pollution. The steps that they have taken include getting technical and legal help to work with industries in the area to get them to reduce their pollution voluntarily. As disclosed by Andrews (1999) “...communities of South Durban Basin have engaged in local forums in order to set standards and monitor pollution levels in partnerships with industries...” However, this approach has not been completely effective for reason that this approach relies on voluntarism. Andrew argues that this community based approach can never fully address industrial pollution problems as it is without force. Rather, the industries will only accept and develop solutions that suit them and their production. Further argument is also raised that local communities on their own cannot solve the pollution problem or ensure that the industries comply with environmental regulations. Rather, they need support from government in terms of resources to secure the co-operation and monitoring of compliance with environmental regulations.

The role that the South Durban local communities can play requires a co-operative and collective approach with government. As stated by SDCEA report (2004), their demand as local communities include “...relocate industry, not people, no polluters but clean industries which create quality jobs!” This is a challenging objective to be achieved by local communities, and requires government bodies like the Department of Water and Environmental Affairs to fully intervene in order to take the obligatory

steps to ensure compliance with environmental regulations which will result in the removal of unhealthy levels of environmental pollution.

As stated by Humphrey (2000: 01)

“A key issue for Africa’s economic future is whether and how local enterprises benefit from the liberalisation and globalisation of product markets. Most enterprises are of small or medium size and the problems they face fall into two categories: First, access: can they participate in production for regional and global markets or do they remain excluded? Second, upgrading: does inclusion lead to upgrading or does it lead into a race to the bottom?”

Humphrey poses an important question. In the case of South Durban Basin, the industries deny access to information to local communities or to allow them have a say regarding the production process. With regards to upgrading, the industries have negatively changed the lives of South Durban Basin. People are suffering permanently from worry as a result of diseases like asthma, cancer, tuberculosis and chest problems. One can respond to Humphrey’s question strongly in the affirmative by arguing that industrial development and operation lead into a race to the bottom in South Durban Basin.

5.7. The involvement by local government in combating environmental degradation

A number of interventions have occurred in South Durban Basin, the first being in 1995, following a visit by President Mandela to the SDIB which was marked by community protests outside one of the oil refineries (Engen), and resulted in government convening a South Durban Multi-Stakeholder Environmental Management Meeting (Indaba) under the leadership of the Deputy Minister of Environmental Affairs (Peek, 2000). Another noted significant intervention by national government came in 2000, when the Minister of Environmental Affairs and Tourism (ValliMoosa) visited Durban to discuss plans to improve air quality in the SDIB and to make it possible for people to continue to live there and to have the benefit of their right to a healthy environment (Carnie, 2000). However, these forums and discussions resulted in the local authorities establishing a "Multi-Point Plan" for the area which they said is a controlling and influential model for tackling pollution and point to a 40% reduction in sulphur dioxide emissions in recent years (Web 5).

5.8. The extent of compliance with environmental regulations

The extent of industrial compliance with environmental regulations depends on external and internal obstacles. According to Sanpath (2011), the external obstacles include government policies, high cost of equipment and lack of technology. Even though environmental regulations are fundamental incentives to improve environmental performance, they are also considered as obstacles. Sanpath also mentions the lack of co-operation by the authorities in regulating the pressure, behavior and approach by surrounding communities to industries. The internal obstacles that determine the extent of industrial environmental compliance include industrial priorities, inadequate knowledge for solving problems and financial problems.

One of the main concerns which lead to non-compliance with environmental regulation is voiced by the industries which are competing at a local, provincial and national scale. They complain that compliance with all programmed environmental

regulations will lower their standards, or results in economic set-back (Jenkins, 2000). While on the other hand the government environmental bodies' fear of industrial pollution and industrial competition that it will lower local and national environmental standards.

Another major cause for poor compliance raised by Dagupta (2003) is the "race to the bottom" approach adopted by states to attract investments. Dagupta states that since states do not enjoy the freedom to lower environmental standards, they compensate for the same through lax enforcement in their bid to attract investments, and the enforcement of environmental standards remains merely on paper with industries taking advantage of the lax enforcement which results in wide variations in enforcement across states.

With regards to the extent of compliance, it said by eThekweni municipality that it is obvious that not all industries comply with environmental regulations, but it all depends on the risk of being caught and the degree of punishment, both of which are currently minor. However, specific guidelines and criteria are often available and put into place to determine compliance from noncompliance.

5.9. Implementation, enforcement and compliance with environmental regulations

When it comes to implementation of environmental management regulations, it is crucial to know that resources, styles of monitoring, enforcement and other environmental performance strategies differ across boundaries owing to the fact that protection sites with similar environmental impacts are treated differently (Jenkins, 2000).

According to Sanpath (2011) almost all South Durban Industries have a written environmental policy, and the most important aspect which is included in the environmental policy is the commitment to reduce air pollution, waste and

consumption of natural resources through compliance with environmental regulations.

According to the traditional viewpoint on the relationship between environmental protection and industrial, environmental regulation can only be met with additional investments and higher operating costs, and as a consequence, a lower economic growth rate can be expected (Jenkins, 2000).

The industrial sector's capability to comply with environmental regulations depends on the internal production capabilities in promoting green innovation which are: dynamic technological, managerial and financial (Jenkins, 2000). Therefore, Jenkins (2000) argues that in order to encourage the so-called green innovation within industries, there has to be a greater design and analysis, managerial, technological and financial regulations within the industry itself.

According to Sanpath (2011), it has now been confirmed that key senior staff have resigned from the department, leaving pollution levels unchecked for at least a year, and this means that the stations used for monitoring air pollution were no longer functional since the resignation of senior staff, therefore, the absence of sufficient resources to actively monitor and detect non-compliance in all industries is challenging the drive to protect the environment.

According to Jenkins (2000) while standards with strict implementation may limit emissions of pollutants, they typically exact relatively high costs in the process by forcing industries to resort to unduly expensive means of controlling pollution and it does not end there. On the governments' side, standards with strict implementation impose high monitoring costs. On the other hand Coase (1960) in his landmark essay points out that pollution control situations have certain symmetry. He states that inefficient pollution control imposes costs on victims, which exceed the costs of controlling that pollution, and in other words, this means that the marginal benefits of pollution control exceed the marginal costs, and also that the existence of inefficient pollution damage therefore provides a motivation for the victims to take corrective action, even in the absence of any such incentives by the polluters. He further stipulates that such remedial action in the form of informal regulation will be

prospective wherever formal regulation leaves an opening between actual and locally preferred environmental quality.

Coase (1960) further supports his statement by arguing that the mentioned informal regulation can take many forms, including demands for compensation by community groups, social ostracism of the firm's employees, the threat of physical violence, boycotting the firm's products, and monitoring and publicizing the firm's emissions. As a result, indirectly, such actions force recognition of the community's property rights in the local environment. This works on the premise that when formal regulatory mechanisms are absent or ineffective, communities will seek other means of translating their preferences into reality (Coase, 1960). However, one can therefore argue that even though the Coase theory was developed in the USA, but it is still applicable in the present situation. What Coase said more than 50 years ago still holds well in South Africa and South Durban Basin in particular. In effect, nothing has changed.

The compliance of industries with environmental regulations is weak, and this is as a result of the enforcement of environmental regulations by the government which is also weak. Dagupta (1999) proves that the enforcement and government's role is weak by arguing that the impact of merely formal inspection on enforcement draws a very weak response from industries towards compliance. He further argues that when government environmental inspectors find violations of environmental regulations, they typically threaten fines, which are small, or closure, and that this closure would be such a large burden that the unit has strong incentives to ensure that closure does not take place.

It has become increasingly obvious that it is practically impossible for the government to monitor all the activities of individual industries across the country including South Durban Basin, and according to Freund (2001) if the government is considered as a singular monitoring agency, then corruption and inefficiency are likely to creep into the system. Therefore, watchful stakeholders, including local and surrounding communities with strong and technically equipped institutional support, can play a very important role in managing the environment (Botha & Huntley, 2008).

Self-reporting is a substitute for government monitoring efforts that may reduce enforcement costs without compromising deterrence and polluters are told to report any violation of pollution standards (Jenkins, 2000). As result, the magnitude of penalty they receive will depend on whether the defilement is reported voluntarily or if government enforcement authorities discover it when no self-report has been made. This also applies if the report is late, then the penalty may be considerably strong.

Another weakness of the South African government is that the penalties for non-compliance with standards are unrelated to the compliance costs, and the prosecution and court decisions are based on compliance or non-compliance and not on the extent of compliance (Botha & Huntley, 2008). The extent of compliance has to be noted since some industries claim they comply but not to the fullest.

5.10. Actions by industries in mitigating environmental pollution in South Durban Basin

Jenkins (2000) states that in so far as industrial activities are one of the leading sources of pollution in both developed and developing countries, it is not surprising that the role played by industries or firms in environmental management and control of pollution or any sustainable development strategy is a critical issue.

The main argument raised by Mondi is that they know that they emit pollution from their industry, but it is not acceptable that all the blame comes to them. One of the representatives for Mondi who asked not to be identified stated “...*the hospitals and other government sectors also pollute the environment ...*” He continued stating that there is no evidence that proves that the sicknesses in this area are as a result of Mondi or any other South Durban industrial pollution. In this regard, the representative argues that the blame should go to all operating sectors whether public or private.

Engen refinery managing director also stated that even though they use a lot of fuel and have SO₂ emissions, over the past 10 years the plant has reduced its emissions from an average of 46 tons a day in 1998 to a daily 25 tons this year (Freund, 2001).

5.11. Views on environmental pollution from South Durban Basin industries

Almost all the respondents representing South Durban Basin industries felt that their industries are complying with government environmental regulations. These industries and SAPREF in particular feels that the focus thus far has been on larger industry and disregarding the smaller industries to carry on business as usual. They therefore feel that this has been the reason why environmental pollution has kept on increasing over years. According to Chetty (2005), one of the reasons why it sometime seems as if there is no or little compliance it's because most of the big industries like SAPREF, Mondi and Engen are driven more by international pressure than local authority pressure. Another very important point raised by Mr Obwuka who works as a chemical engineering specialist in SAPREF is that however, the increasing impacts of a large number of smaller industries can overshadow the impacts of larger industry.

Environmental Manager for SAPREF also stated that the public thinks and believes that they (industries) not taking any steps towards environmentally friendly productions system. However, she does not blame them because she understands that they do not know how much it costs to find new technologies. She said the communities of South Durban Basin also do not understand how long it takes for a big industry to deal with complaints since the decisions also require extensive resources. The manager stated that that as SAPREF they have done a lot to accommodate local communities in such a way that they have even supplied with a toll free line for the public to report. She finally suggested that the government and the public should not rely on media with regards to industrial performance since the media is only interested in the bad side and no the positive measures practised.

However, the views from the Environmental Manager for SAPREF when she complains that sometimes people baselessly accuse SAPREF without any tangible evidence, and that smoke from other areas come and settle in the South Durban Basin since the area is a bowl, leading people to conclude that the pollution and air pollution in particular is from South Durban Basin Industries, give an idea that it is not easy for industries to admit or take the blame for the pollution problem.

5.12. The strength and weaknesses of the South African government in the enforcement of environmental regulations

Seemingly, even though South Africa has many environmental related laws, the government has tended to provide too little industrial environmental regulations, while more hope is with industries to provide much on self-regulation which is to control their collective behaviour through voluntary compliance and through the adoption of operational and technical standards, working practices (Lennox & Nash 2003).

According to Desmond D'Sa (Chairperson for South Durban Community Environmental Alliance) South Africa is a state with weak environmental laws and regulations, and as a result, industries take an advantage and pollute knowing that even though civil and criminal section under NEMA provides a go ahead to hold them accountable, but they cannot due to strong politics. In this regard, one can agree with Desmond DSa because politically, the environment is low on the agenda so inadequate resources are provided and incompetent appointments are made. He further stated that the key thing is to get government and the industry to realise that communities must have a good law to hold the industries accountable, and also to have good enforcement.

5.13. The impact of environmental regulations on the industrial sector (national economy)

Kairuz (2010) raises the argument that environmental regulations are of significance in the industrial sector, and adds that they force the industrial sector to find innovative ways to economise and deal with operational constraints. Environmental regulations of industries force the industrial sector to find innovative ways to economise and deal with environmental pollution at the same time. The regulatory focus centres on health, safety and environmental issues, particularly the remediation of environmental damage.

In this regard, the Environmental Health Scientists during the interview did not agree with the statement that compliance of industries with environmental regulations is a solution to environmental pollution and degradation but a setback in the national economy. He stated that the costs that the government bears on the health sector for asthma, cancer, tuberculosis, chest and breathing sicknesses are more than what the industries may lose for a short period when investing on new environmentally friendly technologies and other production methods. He further argues that the industrial pollution is really letting the government and the national economy down since all these people who are sick as a result of industrial pollution have their position waiting for them at work place and they are suppose to be contributing with reasonable tax in the national economy.

5.14. The relationship between industries, local communities and government departments in South Durban Basin.

Many serious disputes have risen in South Durban Basin area between local communities and industries. The main causes of the disputes were increasing demand and expansion of industries and their increasing environmental pollution. The concern was on people's health and degradation of the natural environment (Van der Merwe 2004). Ozawa (1996) argues that another underlying cause of

dispute in South Durban Basin was the absence of sound political control, and that strong political leadership is needed to prevent further bad environmental management decisions in the future. Ozawa (1996) postulates that environmental disputes and conflicts arise not only from residents' perceptions and concerns about potential undesirable consequences of proposed developments and upgrades of industry, but also from a perceived disregard of the legal rights of individuals and groups, which are institutionalised in national environmental legislation.

According to Shriver (2007), the resident's perceptions of government and corporate culpability vary widely depending on the harshness of the environmental hazard. He further states that residents' perceptions of environmental hazards involve a combination of psychological, physical, scientific, and attitudinal factors that have been shaped by previous apartheid environmental and planning policies, and this has resulted in government being criticised for failing to successfully regulate and control the activities of environmentally hazardous industries in racially segregated areas (Van der Merwe, 2004).

CHAPTER SIX

6. Summary of Findings, Conclusions and Recommendations

6.1. The way forward on environmental regulations in industries

The best way to achieve the intended aims of environmental regulation is to focus more on promoting compliance with environmental laws before enforcement (Murombo, 2011). Murombo argues that overemphasizing enforcement is costly and ineffective in protecting the environment because, even if environmental offenders are prosecuted and penalized, often the environment will have been irreparably damaged. He states that ensuring compliance prevents the potentially irreversible environmental damage from occurring in the first place. However, Murombo's statement is highly debatable, one would say that in the case of industries, there should be first an introduction of all environmental regulations notices through forums, meetings and public advertisement before enforcement, the reason being that drawing from the present environmental pollution situation the environmental regulations and compliance will be ineffective and useless if implemented alone. The situation will not change but rather worsen. Enforcing the compliance with environmental regulations which goes with huge fines, penalties and sanction will be a lesson to others to strictly comply.

Morombo (2011) believes possible solutions to encourage more compliance include benefits for compliant companies, such as incentives like tax reductions or rebates, as well as making noncompliance more costly than is currently the case. He further uses an example of a mining firm Coal of Africa Limited which is reportedly facing an administrative fine of R9,25-million, and he argues that the fine is not going to restore the damage done to the environment where the company is preparing to mine in Limpopo. On the other hand Rogger (2008) disagrees with Morombo by stating that even though the damage on the environment cannot be easily fixed, the state can use the fine for other environmentally related purposes. Besides that, Rogger argues that fining one industry or any other polluter serves as a lesson to thousands of polluters who might cause the same damage on the environment.

Rogger further asserts that enforcement of environmental compliance including strict punishments such as criminal prosecution leading to imprisonment of industrial chiefs, managers and directors or shutting down operations until compliance is achieved, can certainly ensure a reduction in environmental pollution.

According to Dasgupta *et al* (1999) one of the ways to ensure and improve environmental compliance in industries is to treat pollution control as an economic issue. He argues that in cases where emissions exceed the given limit, a fee is charged on the amount exceeded in the form of a pollution levy, and that this could operate in a such a manner that no levy is paid by industries whose effluent concentrations are equal to, or below the relevant standards.

To ensure the compliance of industries with environmental regulations the government must use its authority over non-complying industries by cutting off the electricity and water supplies of polluting industries, promote prosecutions, and initiate proceedings against top management so as to hold them personally liable (Dagupta, 1999). On the other hand Curmally (2002) agrees with Dagupta, but also raises some possible challenges to his opinion. Curmally argues that the government is at times unable to exercise its powers to force compliance because of intervention and meddling from powerful interests and political pressure groups. He states that such interference is sometimes based on the argument that strict compliance with standards will lead to closure of industrial units, which in turn may result in unemployment and protests. As a result, the industries as polluters, are let off the hook because of the pressure exerted by powerful political groups (Curmally, 2002), and this has resulted in gross violations of the law, with a large number of industries operating with a lack of proper anti-pollution measures.

An approval or permission from the surrounding communities and the government should be required before any industry is set up. After an approval, the industry is must be obliged to maintain the standards prescribed by the prescribed norms (Botha & Huntley, 2008). This approach according to Botha *et al* (2008) plays an important role as it permits little flexibility in the means of achieving goals as it forces all firms to make similar efforts to control pollution. As the standards are source-

specific, being neither technology based or performance based, this policy gives little incentive to polluters to search for cleaner technologies or improved abatement technologies (Jenkins, 2007).

Finally, Jenkins (2000) intermediates in this argument and concludes that both Morombo and Rogger are correct. He states that enforcement is important in ensuring compliance of industries with environmental regulations, but should come as a result of the failure of what Morombo refers to as spontaneous compliance, which is voluntary compliance. Farina (1995) raises the argument that compliance assurance strategies are most efficient when general and facility-specific requirements induce a maximum level of spontaneous compliance which usually occurs in the absence of enforcement and is driven by intrinsic (internal) motivation. According to DEAT (2000), compliance stems from social norms and also from social and economic benefits of compliance. If intrinsic motivation is insufficient, as it is often the case, then regulatory monitoring and sanctions (external pressure) are necessary in order to ensure compliance (DEAT, 2000).

Moreover, it has been found that even though in areas like Bluff and Merebank environmental pollution was identified as the most obvious apprehension, in areas like Wentworth and Umlazi the pollution problem alone was not the problem, but was experienced together with poor living conditions, lack of infrastructure, local facilities, and crime and safety (DEAT, 2000). According to DEAT (2000), this has implications for the priorities within the Durban Metropolitan Authority, and practical programmes for addressing these concerns have to be considered alongside measures to improve the impact of local heavy industry.

It has also been discovered by Farina (1995) that the success of environmental regulations and enforcement requires more co-operations from all sectors but mostly local communities. In his opinion he considers local community participation as the process through which stakeholders influence and share control over environmental management decisions and resources that affect them.

Jenkins (2007) argues that the idea of 'greening' production sites and creating a green corridor between industries and residential communities was well developed during the 1960s and 1970s, and that under government control the industries were unlikely to bow to community pressure related to environmental management and protection. However, Jenkins argues that this has changed extensively since the end of authoritarianism, and there is now recognition that communities are part of environmental management decision making processes, and that industries have to pay heed to for reasons of public relations.

A full enforcement of environmental regulations in industries is applicable and only becomes successful when there is community, non-government organization and government's full involvement (Jenkins, 2000). There is no doubt that pollution is a major impediment to the well-being of people at large, particularly for those who are compelled to work in hellholes and reside in crowded colonies which are poor in terms of civic amenities (Coase, 1996). Experience in industrialized countries has also shown that firms react to popular pressure. To generate such pressure, citizens may be empowered through a 'right to information'. Making publicly available emission measurements and audit of firms can help citizens to be vigilant. In the Indian context, publishing details of consent applications, reasons for rejection and so forth would be the starting point.

As stated within this document, one of the implications for environmental regulatory policy is that the regulators no longer need to think of themselves as the sole enforcers, and when participation by the community is introduced into the framework, supplemented by selective Market Based Instrument, then monitoring and enforcing rules and standards are no longer solely confined to the regulator (Coase, 1996).

The state agencies must function as watchdogs to keep an eye on the existing industries, and all new industries, before they start to function, would in this approach require prior permission to do so (Farina, 1995). Therefore, in this case the agency responsible then permits them to carry out industrial activity, subject to certain terms and conditions.

Environmental planning as a tool of environmental management is intended to ensure that development activities and exploitation of natural resources for different purposes are harmonized with the need to conserve the environment (Eisner, 2004).

Bringing industries to comply with environmental standards has been very slow and laborious and takes numerous visits of environmental inspectors, several compliance schedules and agreed benchmarks intended to achieve gradual compliance, and the issues that usually come up relate to the cost of clean-up operations and adoption of appropriate technology (Eisner, 2004).

According to Ahuja (2005) it could be argued, however, that the use of social and economic incentives should go hand in hand with valuing natural resources, considering the cost that development activities have on the environment and calculating the contribution of the environment sector to the gross domestic product.

Other enforcement challenges include insufficient capacity of law enforcers, both in terms of environmental law and management expertise and equipment and facilitation, thereby underscoring the importance of continuous training and capacity building together with inconsistent political positions and statements on the environment, especially during election undermine the integrity of the environment.

However, from the information provided by eThekweni municipality regarding the institutional framework and capacity for environmental compliance and enforcement mechanisms, this researcher recognized that the government does not consider the size of industries which he regulates. This is of significance since the size of the industries regulated can greatly influence a programme's aptitude to effectively implement and enforce compliance regulations. In this case, the bigger the industries, the higher the pressure and attempt needed for the enforcement to be effective.

Another recommendation in promoting the effectiveness on environmental regulations and its compliance, enforcement and implementation is to allocate

funding provision to the environment division in order to enable environment management activities including regulations enforcement and compliance and public awareness, information and local community training programmes(Eisner, 2004). Eisner also argues that there is a need to create and strengthen partnerships at community, local, national, regional and international levels, a need to step up efforts in ensuring compliance with environmental law, a need to continue effective restoration of degraded ecosystems and a need to provide effective checks and balances to harmonize development objectives.

As a recommendation, one of the interviewees stated that government should take steps to evaluate the present implementation, compliance, enforcement, monitoring and to come up with an innovative system and methods to ensure that not even a single industry cheats including the numerous small industries in South Durban Basin. Consequently, it will be easier for government to establish continuous emissions monitoring systems (CEMS) which will provide an everlasting and continual confirmation of all appropriate emissions from industries. Furthermore, it should not be the industries that submit a certification to the authorities that they are in compliance with the environmental regulations, but the government should send environmental inspectors and monitors to do a follow-up.

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8. APPENDIX: INTERVIEW QUESTIONS

A. INTERVIEW QUESTIONS FOR GOVERNMENT ENVIRONMENTAL BODIES/ DEPARTMENTS.

1. In general, what do you know about the South Durban Industrial Basin area (your perception)?
2. What according to your opinion are the main problems facing South Durban Basin?
3. South Durban Basin has been identified as an area with many environmental pollution issues, what do you think are the main causes of such issues?
4. What are the mechanisms used by the government environmental departments in the enforcement of environmental regulations.
5. Do you think the industries are complying with environmental regulations? If yes, to what extent. If no, what are the reasons behind non-compliance?
6. Do you think what the government has done to intermediate in the issue of environmental pollution has been effective?
7. In your own opinion what do you think is the role that communities in South Durban can play in ensuring that the industries comply with environmental regulations?
8. What do you think are the key strengths and weaknesses of South Africa's current environmental compliance and enforcement efforts?

9. In your opinion who deserves the blame for the situation (environmental issues) in South Durban Basin?

10. Who do you think can be the key role players in combating environmental pollution in South Durban Basin?

11. "Most industries are production and profit driven, and very little attention is paid to protect and manage the environment" what is your opinion on this statement? (Do you agree?)

12. Compliance of industries with environmental regulations is a solution to environmental pollution but a setback in industrial production (national economy). Do you agree with this statement?

B. INTERVIEW QUESTIONS FOR SOUTH DURBAN BASIN (MANAGEMENT TEAM/ STAFF)

1. In general, what do you know about the South Durban Industrial Basin area (your perception)?
2. What according to your opinion are the main problems facing South Durban Basin?
3. South Durban Basin has been identified as an area with many environmental pollution issues, what do you think are the main causes of such issues?
4. What are the mechanisms used by the government environmental departments in the enforcement of environmental regulations.
5. Are your industries complying with environmental regulations? If yes, to what extent. If no, what are the reasons behind non-compliance?
6. What recent actions have the South Durban Basin industries taken to combat environmental pollution?
7. In your own opinion what do you think is the role that communities in South Durban can play in ensuring that the industries comply with environmental regulations?
8. Who do you think can be the key role players in combating environmental pollution in South Durban Basin?
13. In your opinion who deserves the blame for the situation (environmental issues) in South Durban Basin?
9. “Most industries are production and profit driven, and very little attention is paid to protect and manage the environment” what is your opinion on this statement? (Do you agree?)

10. Compliance of industries with environmental regulations is a solution to environmental pollution but a setback in industrial production (national economy). Do you agree with this statement?
11. What do you think are the strengths and weaknesses of South African government in the field of environmental management?

C. INTERVIEW QUESTIONS FOR LOCAL COMMUNITIES OF SOUTH DURBAN BASIN

1. In general, what do you know about the South Durban Industrial Basin area (your perception)
2. What according to your opinion are the main problems facing South Durban Basin?
3. South Durban Basin has been identified as an area with many environmental pollution issues, what do you think are the main causes of such issues?
4. In your opinion whose deserves the blame for the situation (environmental issues) in South Durban Basin?
5. Who do you think can be the key role players in combating environmental pollution in South Durban Basin?
6. Do you think what the government has done to intermediate in the in the issue of environmental pollution has been effective
7. Do you think there is any role that the local communities can play to solve the problem of environmental pollution?
8. If you were in power, what first attempt would you take as a solution of environmental pollution in South Durban Basin?
9. What in your opinion are the environmental regulations?
10. Compliance of industries with environmental regulations is a solution to environmental pollution but a setback in industrial production (national economy). Do you agree with this statement?