

**AN ASSESSMENT OF ENVIRONMENTAL MANAGEMENT IN
THE EXPORT PROCESSING ZONES, KENYA, A CASE STUDY
OF SOME SELECTED ENTERPRISES**

BY

MIDEVA JOY

Registration No: C50/P/7743/05

TEL. 0712883883/0733941000

**A PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF
ARTS IN
ENVIRONMENTAL PLANNING AND MANAGEMENT**

**DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES
UNIVERSITY OF NAIROBI**

NOVEMBER 2012

DECLARATION

This is to certify that this project is my original work and has not been submitted for examination in any other university.

MIDEVA JOY

C50/P/7743/05

Candidate signatureDate

This research project has been submitted for examination with our approval as the University Supervisors

1. DR. J.K. MUSINGI

Signature.....Date.....

2. DR. J. M. MORONGE

Signature.....Date.....

DEDICATION

To

Ivy Hellen Moraa

The apple of my eye and the main motivation behind most of my endeavors, I wish you love, peace, great success and God's abundant provisions and blessings in your life. I pray that you accomplish all that you are wishing for and much more.

I love you,

Mama

ACKNOWLEDGEMENTS

I wish to acknowledge everyone whose assistance and contribution, made both my studies and this research work possible;

I thank the Almighty God for providence and good health while I carried out this work and beyond. I appreciate my supervisors ,Dr J. K. Musingi and Dr. J.M. Moronge for taking time to read the thesis at various stages, and provide much needed scholarly guidance and direction . I also thank the academic staff of the Department of Geography and Environmental Studies UON for specific assistance in various areas of environmental studies. I'm grateful to Prof. Brillian Muhonja, PhD for very valuable insights.

My gratitude is also extended to the Chief Executive Officer, Management and staff of the EPZA for allowing me to leave work early so as to make it to my lectures. Special thanks to M. Were, M. Kimeu, F. Rotich, J. Mararo, R. Ngetich and other personnel in charge of environmental compliance and enforcement in the Operations department at E. P. Z. A for making it possible for me to access the information under their custody, thereby enabling me to obtain research data and for assisting me to administer questionnaires and availing themselves for interviews as well as K. Okello, B. Kabira and N. Kapsoot for logistical support.

Much appreciation to the management, staff and employees of various enterprises under the E.P.Z program for the cooperation accorded to me during interviews and data collection process and for allowing me access to their various production premises, even when it interfered with their busy schedules.

I sincerely thank my family, who I love dearly, particularly my loving Mama for urging me on to complete this work and so much more besides, and my sister Cynthia for your input and finally , my lovely daughter Ivy, who endured many evenings alone and often times told me “Mummy I don't see you any more”, as I took my evening classes.

I recognize and deeply appreciate your input and that of others not specifically mentioned above.

ABSTRACT

This research sought to carry out an assessment of environmental management within the Export Processing Zones (EPZs) in Kenya, using some enterprises as a case study. The specific objectives were to investigate whether the enterprises are aware of the requirements of good environmental management, if Environmental Impact Assessment (EIA) and initial Environmental Audit (EA) were carried out, whether the enterprises implement the recommendations of the EIA/EA reports and the factors influencing the levels of compliance to these recommendations. Other objectives were to investigate whether the enterprises continue to carry out annual self audits, whether the companies have an environmental management plan (EMP) and whether the enterprises adequately address requirements of occupational safety and Health (OSH).

The enterprises under study were categorized by type or sector within the various branches of industry to enable meaningful evaluation of observations made. Data was collected from primary sources using a structured questionnaire. Respondents constituted operations managers from 55 enterprises working in the garment and textiles, agricultural produce and chemical sectors within the EPZ. Corroborative information was collected during visits to the enterprises where various staff were interviewed. Secondary data was collected from records on statistical returns and Environmental audit reports. The data collected was then analyzed and findings tabulated and also presented in graphs, pie and bar charts.

Data was tested using the chi – square statistical technique. Upon testing of data, the calculated X^2 was 9.11 for EIA, 7.11 for self audits and 15.19 for EMP and OSH combined, all against a critical X^2 of 5.99147. The findings indicate that out of a total number of 55 enterprises, only 38.46 % had carried out an EIA at the commencement of their project, 24.35 % continued to carry out annual self audits, while 21.79 % had a proper Environmental Management plan in place and a mere 15.38 % had adequately taken care of the requirements of occupational safety and health for their workers and customers. These four aspects were considered to be quite representative of the status of environmental management within the enterprises in the EPZs. From the data analysis, there was sufficient evidence to lead to a rejection of the null hypothesis and acceptance of the alternative hypothesis that EPZ enterprises were not sufficiently aware of the requirements of good

environmental management and neither were they complying with the recommendations of the EIA and EA to adequate levels.

The findings on the overall performance of the enterprises in environmental management with reference to the four aspects which were used as a basis for this study show that although there was a relatively high level of awareness, there was no commensurate high level of compliance and enforcement. Low percentage scores in each aspect was an indication of a poor or undesirable position in most of the enterprises. This could be attributed to various challenges observed to be hindrances to achieving compliance. Among these were, the incidence of companies carrying out EIA merely to meet the legal requirement but not enforcing the recommendations, issue of priorities where proprietors focused on profits and not good environmental management, lack of finance for implementation, and lack of action on the part of enforcers. Enterprises which negatively impacted the environment continued to do so as there were no immediate consequences to non compliance

From the findings, it is recommended that investors should be made to make adequate budgetary provision for environmental management and build capacity by way of environmental education and training so as to achieve change of attitude and input by all. It is also recommended that the polluter pays principle be applied strictly to make poor environmental management a cost to the enterprises. Regulators like EPZA should be legally empowered to have a level of enforcement authority over entities operating under them to enable them carry out more regular and stringent enforcement. Supervisors should ensure strict and timely response to issues raised in instances of non-compliance. Government should recognize and reward good environmental management. Policy formulators should make processes easier and faster as bureaucracy gets in the way of better environmental management. Finally scholars should incorporate environmental education at primary level of education to make good environmental management part of the population's norms and practices.

ACRONYMS

AECEN	-	Asian Environmental Compliance and Enforcement Network
BEPZA	-	Bangladesh Export Processing Zones Authority
BOI	-	Board of Investment (Sri – Lanka)
EA	-	Environmental Audit
EIA	-	Environmental Impact Assessment
EMCA	-	Environmental Management and Coordination Act
EMP	-	Environmental Management Plan
EPA	-	Environment Protection Agency
EPL	-	Environment Protection License
EPZ	-	Export Processing Zones
EPZA	-	Export Processing Zones Authority
EU	-	European Union
IEA	-	Initial Environmental Audit
NEMA	-	National Environment Management Authority
NEP	-	National Environmental Policy
OSH	-	Occupational Safety and Health
SEZ	-	Special Economic Zone
UNEP	-	United Nations Environment Programme

TABLE OF CONTENTS

DECLARATION.....	ii
DEDICATION.....	iii
ACKNOWLEDGEMENTS	iv
ABSTRACT	v
ACRONYMS.....	vii
LIST OF FIGURES	xii
LIST OF TABLES.....	xiii
LIST OF PLATES	xiii
CHAPTER ONE: BACKGROUND OF THE STUDY.....	1
1.1:Introduction	1
1.2: Statement of the Research Problem.....	4
1.3:Study Questions.....	6
1.4: Objectives of the study	7
1.4.1: Specific Objectives.....	7
1.5: Hypotheses	7
1.6 Justification of the Research.....	8
1.7: Scope and Limits of the Study	10
1.8: Operational Definition of Key Terms	11
CHAPTER TWO: LITERATURE REVIEW	12
2.1: Introduction and Background.....	12

2.2 Exploring Environmental Management and Management systems	14
2.2.1: Environmental Management	14
2.2.2: Managing Environmental Problems.....	16
2.2.3: Making Implementation of environmental rules effective.....	18
2.2.4 Environmental management and compliance requirements.....	18
2.2.5 Problems arising from development.....	24
2.2.6 Cost benefit analysis.....	25
2.2.7 Waste Management	26
2.3 Legal framework.....	27
2.3.1 Environmental Law	27
2.3.2 Environmental Governance in Kenya	28
2.3.3 Environmental Management and Coordination Act 1999.....	31
2.3.4 EMCA quality regulations.....	33
2.4 Environmental Management tools.....	34
2.4.1 Environmental Impact Assessment (EIA).....	34
2.4.2 Initial environmental audit	39
2.4.3 Environmental Management Plan (EMP)	39
2.4.4 Environmental audit	40
2.4.5 Occupational Safety and Health	40
2.5 An Overview of Environmental Management in a few select EPZs outside Kenya.....	41
2.6 Environmental Management in the Export Processing Zones in Kenya.....	45
2.7 Conclusions from literature review	48
2.8 Conceptual Framework	48
CHAPTER THREE: STUDY AREA	53
3.1 Background.....	53
3.1.1 Mandate and Principle objectives.....	53
3.1.3 EPZ Incentives.....	54
3.2 Public EPZs	54

3.3 Status of gazetted zones.....	56
3.4 Performance of the EPZ program.....	59
3.5 Sector performance.....	60
3.6 Significance of EPZ to the national economy	60
3.7 Destination of Exports.....	62
3.8 Constraints reported by EPZ enterprises	62
3.9 Challenges facing the program.....	64
CHAPTER FOUR: RESEARCH METHODOLOGY	66
4.1 Introduction	66
4.2 Research design	66
4.3 Target population.....	67
4.4 Sampling design	68
4.5 Preparation for the Field Work.....	69
4.6 Data collection methods	69
4.6.1 Primary data.....	69
4.6.2 Secondary data.....	69
4.6.3 Questionnaires	70
4.6.4 Visits, on site observations, interviews and Photographs	71
4.7 Data analysis techniques.....	71
4.7.1 Statistical techniques.	71
4.7.2 Chi-square.....	71
4.7.3 Bar graphs, pie charts, graphs	73
4.8 Limitations of study.....	73

CHAPTER FIVE: RESULTS AND DISCUSSION	75
5.1 Introduction	75
5.2 Results	75
5.2.1 Environmental Impact Assessment	75
5.2.2 Annual self audit.....	77
5.2.3 Environmental management Plan (EMP).....	78
5.2.4 Occupational safety and Health.....	80
5.2.5 Rule of 5 – EMP and OSH	81
5.2.6 Relationship.....	82
5.2.7 Aggregate findings	82
5.3 Discussion of findings on Environmental Management and its role in EPZs.....	84
5.3.1 Awareness and environmental education	84
5.3.2 Environmental Impact assessment and Environmental management	87
5.3.3 Annual self Audits.....	92
5.3.4 Environmental Management Plan (EMP)	95
5.3.5 Compliance and Enforcement of EIA recommendations.....	99
5.3.6 Occupational Health and safety(OHS) -Work environment	103
5.4 Reasons for non compliance.....	104
CHAPTER SIX:SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	107
6.1 Introduction	107
6.2 Summary.....	107
6.3 Conclusion	109
6.4 Recommendations	110
6.4.1 Recommendations for manufacturers.....	110

6.4.2 Recommendations for regulators like EPZA.....	111
6.4.3 Recommendations for administrators and policy formulators	111
6.4.4 Recommendations for Scholars.....	112
6.5 Best practice	112
6.6 Areas for further research.....	112
6.7 Contributions made by this study	113
References	115
Annexes	120
Letter to enterprises	120
Questionnaire.....	121

LIST OF FIGURES

Figure 1: Some problems arising from the development process	24
Figure 2: The process of cost benefit analysis.....	25
Figure 3: Schematic presentation of Conceptual framework	52
Figure 4: Geographical location of zones.....	58
Figure 5 : Market destination for all exports, 2010.....	62
Figure 6 : Distribution of EIA	76
Figure 7 : Annual self Audit distribution	78
Figure 8 : EMP distribution.....	79
Figure 9 : OSH distribution	81
Figure 10 : Aggregate distribution	83
Figure 11 : Aggregate findings.....	84

LIST OF TABLES

Table 1: Waste treatment and disposal technologies.....	26
Table 2: Components of EIA.....	35
Table 3: Location and status of zones, 2010	57
Table 4: Performance of EPZ Key Indicators: 2005 – 2010	59
Table 5: Performance by sector - Year 2010 (Kshs).....	60
Table 6 : EPZ contribution to the national economy 2005 - 2010	61
Table 7 : Constraints /impediments reported by EPZ enterprises in 2010.....	63
Table 8 : EIA responses.....	75
Table 9 : Distribution of EIA.....	76
Table 10 : Annual self audit responses.....	77
Table 11 : Distribution of annual self audit.....	77
Table 12 : EMP responses	78
Table 13 : Distribution of EMP	79
Table 14 : OSH responses	80
Table 15 : OSH distribution	80
Table 16 : EMP and OSH responses	81
Table 17 : Aggregate responses.....	82

LIST OF PLATES

Plate 1: Administration building – Athi River EPZ	56
Plate 2 : Cleaning of boiler in progress	87
Plate 3 : Offcuts from a garment factory strewn all over	89
Plate 4 : A well kept compound at an enterprise juxtaposed with a badly maintained one .	91
Plate 5 : An enterprise which is technology intensive and clean	91
Plate 6 : A boiler at one of the enterprises.....	94

Plate 7 : waste incinerated but not burnt at adequate temperatures.....	95
Plate 8 : Production floor with packed products	97
Plate 9 : Waste that had been sorted but then mixed at the dumping site	98
Plate 10 : The effects of delayed repairs- a drain with algae	99
Plate 11 : Oil spillage outside an enterprise	102
Plate 12 : Poorly stored oil	102
Plate 13 : Workers properly attired for work.....	104
Plate 14 : Broken pieces of glass dumped inappropriately	106

CHAPTER ONE: BACKGROUND OF THE STUDY

1.1:Introduction

The Export processing zones (EPZs) are largely industrial developments. An observation of various industrial areas in Kenya viewed against the background of best practices with respect to development implementation indicates that not enough attention has been paid to issues of managing the environment and therefore there is a need to incorporate environmental concerns in conceptualizing, designing and delivering industrial development plans. The poor state of affairs is a clear indication of the need for the central government, and its various arms, including local authorities and the general public which consumes its services, to partner in the promotion of environmentally friendly practices and pay attention to the need for sustainability in the preparation and subsequent implementation of industrial developments.

That there is a connection between environmental conservation, industrial and neighboring developments is not in doubt. Industrial developments are put up mostly to generate income for investors. Their ultimate customers are consumers of the industrial produce who aim to improve their social economic well being. All developments whether residential, commercial or industrial impact the environment either negatively or positively, but mostly negatively unless they are well planned and appropriate and adequate measures put in place to mitigate against possible and certain negative impacts. It is only in the recent past that mankind has begun to appreciate environmental issues and their importance to the general well being of the human race and other species. Environment has been defined as a set of interlocking systems, natural or biophysical and man-made or social, within which all living things interact (Muthoka et al, 1998).

The connection between the location of land, its planning and use is also not in doubt. Land is the main resource for production, yet it is limited in supply (finite). Other resources, especially naturally occurring, whether renewable or non renewable are to a large extent limited in supply. Sufficient care must therefore be taken to ensure the available land is put to optimal use. In Kenya, cities and urban centers are run by local authorities who oversee the distribution, development and use of land besides the Ministry of Lands and Housing which is the main custodian of Land. Optimal use is the best, most favorable, best possible, and most advantageous or most select use. Land sharing among competing users in EPZ should ideally seek to achieve overall optimum use

for all including the neighboring publics. Managers of industrial developers should pay attention to neighboring users so that complimentary users can be juxtaposed thus the importance of environmental considerations as they affect everyone. The United Nations conference on Environmental and Development (UNCED) held in Rio de Janeiro in 1992 reaffirmed the need to integrate environmental concerns in development activities. The concept of sustainable development as development that “meets the needs of the present generation without compromising the ability of future generations to meet their own needs “ was adopted by the conference , whose main outcome-Agenda 21 continues to guide sustainable development activities. Exploitation of resources must be done sustainably to ensure availability for not only the present but the future generations as well. This is the reason why adherence to development guidelines, which include environmental regulations, is critical. These laws, guidelines and regulations have been developed over time and are recommended as they have been tried, tested and proven and even where a considerable degree of success has been achieved, there are efforts to achieve even more by continually improving. According to the state of environment report, Kenya (2004), various initiatives have been undertaken to ease pressure associated with industrial production such as emissions, effluent discharge, and solid waste management. These include cleaner production technologies, strategies for acquisition and transfer of such technology, as well as enforcing environmental standards, regulations and laws. Environmental Impact assessment (EIA), Environmental Audit (EA) specifically self audits, Environmental Management Plans (EMP) and requirements of Occupational safety and health (OSH) have been employed in various enterprises as a management tool. The cumulative effect of micro and small scale enterprises is a challenge as insufficient modalities for EIA, EA and EMPs have been instituted.

The Export Processing Zones Authority (EPZA) is a State Corporation established by the Government of Kenya through an Act of Parliament – the Export Processing Zones (EPZ) Act (Cap 517) of the Laws of Kenya for the promotion and facilitation of export-oriented investments and the development of an enabling environment for such investments. EPZA is responsible for the development and management of Public EPZs on behalf of Government and the facilitation and regulation of EPZ activities in both public and private zones. Though the program was officially adopted in 1990, production activities did not take off effectively until 1993. The introduction of the program followed several studies which indicated their viability, thus making Kenya one of the early African countries to adopt EPZ’s in the 1990s. The factors which favored

establishment of EPZ's in Kenya included a relatively large and dynamic private sector, a low cost but well trained labor force and relatively good infrastructure among others.

The EPZA has a vision to be a world-class economic development agency responsible for Kenya's Transformation into the hub of choice for global investment and trade. The EPZA's mission is Catalyzing Industrial and Economic Development through Investment in Economic Zones. The Authority carries out the twin roles of facilitation and regulation. The main mandate of the EPZA is to promote the EPZs in Kenya as an excellent investment destination. EPZA by its nature deals with various customers which include the investors. It is critical that all these customers be provided for but in an organized and user friendly manner to ensure that all co-exist and carry on their business without any impacting the others negatively. Customers of the EPZA also include water consumers, various service providers, local authorities, neighboring residences among others. Diverse social, economic and environmental considerations influence developments and land use in the EPZs.

Since the commencement of the implementation of EPZ program in Kenya (1990), the numbers of enterprises under the program have continued to grow. According to the annual performance report, by 2005 there were 68 enterprises operating and these rose to 83 by 2009 (EPZA,2010) Investments rose from Kshs 18,682 million in 2005 to Kshs 21,507 million as at 2009. According to the EPZA strategic plan 2009 to 2013, it is anticipated that investment, and consequently number of companies and number of jobs will increase in the EPZs. Some of the projections are based on the anticipated implementation of the Special Economic Zones program. This means that all commensurate services and facilities must also grow and environmental management is one such aspect of development. It behooves the administration, which includes the regulatory and implementing authorities and the developers to reexamine practices and identify instances where there may have been lapses so as to be able to develop the new upcoming enterprises better because correcting errors especially environmental ones can prove to be a very costly exercise in terms of time, money and human resource. The implementing public must fully play its role.

Investors share land among other resources. The authorities must therefore issue very well laid out guidelines on how facilities in which all have a common interest will be utilized either by individuals or as corporate bodies so as not to impact other users present and future negatively. The overall proper management of the environment is part of these guidelines. EPZA as part of its

regulatory role must oversee the industrial and other complimentary developments to ensure that such guidelines are strictly followed. The focus of this study is the use of EIA, Annual self audits, EMP and OSH as environmental management tools and their application in the EPZ enterprises in Kenya to achieve sustainable development. The study seeks to assess environmental management with reference to these tools.

1.2: Statement of the Research Problem

The adverse effects of unregulated industrial development on the environment cannot be overemphasized. Most industrialists invest with the main aim of getting returns on their investment and therefore seek to cut costs to achieve optimal profits. Many governments on the other hand, have as their main aim, employment of the populace so as to improve spending power and therefore better livelihoods. The EPZA seeks to create employment for Kenyans, attract new productive investment, achieve export diversification, expand Kenya's export product market, create linkages with the domestic territory and also achieve transfer of technology.

The possibility of each interested party pursuing their own goal without paying attention to possible negative effects is very real. Herein lays the problem. Pursuit of profit without being bothered about how one affects the environment is unsustainable. When profit is the only motivation, at the cost of all else, more especially, the environment, there is cause for concern as this is not sustainable. Even more hazardous is regulators such as the EPZA and other actors compromising on standards in order to achieve the goals which they seek to achieve on behalf of the Government. Indeed as lack of gainful employment and the resultant poverty continue to bite, Kenyans are left with no option but to eke out a living whichever way they can. Many times investors seek exemption from meeting requirements. This happens in the case with environmental issues since investors are not keen to spend on these as many do not consider them immediate concerns.

The EPZs are a unique mode of development in Kenya. The EPZ management seeks to enhance investment in the country with very specific expected outputs and therefore the EPZA has to perform a delicate balancing act between its facilitative role as a promotion agency with its other equally important role of regulation and enforcement. This is paradoxical as both are essential yet at times one role is in conflict with the other. Any challenges in these twin roles may call for

different policy and management interventions within this unique set up, making this study very significant.

The problem with the environment is that damage occurs over time of cumulative acts that result in environmental degradation. This is especially so for industrial users of land. EPZs are mostly located in urban areas. Urban centers, in Kenya have experienced phenomenal growth due to the continuing population growth coupled with massive rural-urban migration over the years which has placed undue pressure on the available infrastructure, thereby resulting in dilapidation and degradation due to over use and over exploitation. The social infrastructure including schools, health facilities and sanitary facilities are poor and few and cannot adequately serve the population. There appears to be a general “breakdown” in zoning and development control in some areas resulting in a lot of developments being carried out without regard to conventional rules of sound planning and management. Many projects are implemented without ensuring that the conditions attached to the approvals are adhered to. For most developers, obtaining development approval is an end in itself. Though project proponents are given conditions including environmental standards to meet at the time approval, not enough follow up is done to ensure compliance. The problems brought about by this haphazard developments necessitates an examination of the existing environmental management arrangements. More policing and serious monitoring of project implementation may imply higher expenditure which most business minded industrialists may resist. Vested interests and ignorance lead to insufficient appreciation of how important sustainable environmental management is as many industrialists fail to understand the consequences of their actions.

With such challenges, strict regulation needs to be at the top of the priority lists for government leaders and the entire public. The deficiency in awareness and general lack of management is evident in apparent “uncontrolled” and unregulated development. Any development that is carried out affects different sectors and persons differently and to different degrees. Interests of various users or stakeholders need to be taken into considerations right from plan preparation through to actual implementation and eventual management of developments. This is not obviously evident in various EPZ companies, thus the need to carry out an examination of the situation to find out what is being done, whether what is being done is enough and if not, what could be done to improve the situation.

In the face of scarcity of resources which are fast being depleted by poor, unsustainable use, and since it is better to prevent than to cure, policies and laws should ideally provide for proper planning, implementation and more importantly monitoring, as trying to remedy causal effects of poor environmental planning and management almost always proves to be much more expensive. It is therefore necessary to look at what policies or guidelines and laws are in place, the deficiencies both in provisions and implementation, with a view to finding out what more could be done. While there are various policies and laws to guide the management of the environment, there is no specific research or literature on compliance and enforcement in the EPZs in Kenya. This is a gap that this research work seeks to fill.

This study sought to examine the status of compliance with requirements of good environmental management by activities in the EPZ enterprises. The study examined these using how the activities in EPZs employ EIA, self audits, EMPs and OSH among others to achieve good environmental management. The rationale of this study is that it is necessary to integrate consideration of environmental concerns in planning, implementation and management of projects so as to achieve development that is environmentally sustainable and sound. An integrated approach needs to be adopted. The EPZA uses EIA initially and subsequently self audits, EMPs and OSH as very vital tools in regulation. It is necessary to find out the levels of actions of project proponent, implementers and regulators so as to take necessary corrective action where a need is established.

1.3:Study Questions

The study questions were as follows;

- Do the enterprises know the set environmental standards and requirements prior to the commencement of their project implementation?
- Do the enterprises know what EIA and Initial EA is, and was it carried out?
- Do the enterprises have an Environmental Management Plan in place?
- Do enterprises carry out annual self audits?
- Do the enterprises comply with the recommendations of the EIA reports at the project's implementation and operational phase?
- Do the enterprises ensure occupational safety and Health requirements are met?

1.4: Objectives of the study

The general objective of this study is to assess Environmental management within enterprises operating under the Export Processing Zones program in Kenya.

1.4.1: Specific Objectives

To investigate whether the enterprises are aware of the requirements of good environmental management and if EIA was carried out.

To establish whether the enterprises implement the recommendations of the EIA reports and the factors influencing the levels of compliance to EIA recommendations

To investigate whether the enterprises continue to carry out annual self audits

To establish whether the enterprises have an environmental Management plan

To establish whether the enterprises adequately address requirements of occupational safety and Health

1.5: Hypotheses

The hypotheses for the study were;

H₀ Enterprises in the Export processing Zones are not significantly aware of the requirements of good environmental management

H_i The alternative

H₀ The level of compliance in reference to Environmental Impact Assessment recommendations is not significantly low in the EPZ enterprises at the inception of projects

H_i The alternative

H₀ The level of compliance in reference to Environmental Audit recommendations is not significantly low in the EPZ enterprises during the operations of projects

H_i the alternative

1.6 Justification of the Research

The EPZs were set up to encourage investment in the industrial sector specifically geared towards producing for export (EPZA act CAP 517, laws of Kenya, 1990). At the moment, the intention is to transform the EPZs into Special Economic zones (SEZ). EPZs are a section of the industrial developments in the country. One of the Millennium Development Goals (MDGs) is to work towards achieving environmental sustainability. Countries are supposed to integrate the principles of sustainable development in their policies and programs and reverse the loss of environmental resources as part of achieving this goal. In order to do this, it is necessary for project proponents to take into consideration possible impacts of the project as part of carrying out feasibility and other studies to establish viability of a project. This is what makes EIA, annual self audits, EMP and OSH good and necessary tools. As part of monitoring and evaluation, it is critical to assess efficacy, thus the need to study the compliance and enforcement aspects.

The constitution of the republic of Kenya, 2010 at article 42 notes the right of every person to a clean and healthy environment, and their right to have the environment protected to benefit them and the future generations through legislative and other means as contemplated in article 69 and 70 respectively. The EPZA, being a state corporation, and therefore part of government is one of those bodies charged with the responsibility of achieving this for Kenya's citizenry. The EPZA is obligated to ensure compliance and one of the ways is by enforcing through advising or informing those operating under the EPZ program appropriately. This study is necessary as merely informing, without carrying out an evaluation of implementation may not achieve the end results. From time to time, it is necessary to evaluate and this study will be one such evaluation.

One of the paradoxes in the operations of the EPZ program in Kenya is that the EPZA is required to approve projects within one month from the date of receipt of all required documents, yet the National Environmental Management Authority (NEMA) which oversees environmental management in the country gives approval within a minimum of forty five (45) days. This has continued to be a challenge to all investors. Sorting out issues at the EPZ to contribute to good or better environmental management will ease the process of approval, especially if NEMA which is a state corporation perceives the EPZA to be a partner keen on good environmental management in the EPZ enterprises. This may even lead to a different provision of timelines for approval of EPZ projects which would encourage more investment. The twin role of the EPZA as a facilitation

agency as well as a regulator also presents another paradox. The EPZA is on the one hand supposed to enforce regulations and ensure compliance, yet it is at the same time supposed to promote and facilitate. At times, in carrying out its regulatory roles, it may be perceived to be an impediment. This study therefore serves to give insights into this and is therefore very necessary.

Kenya's Vision 2030 sets various objectives and a number of these have to do with manufacturing. The EPZ sector has a contribution to make and so the need to develop sustainably must be underscored. This study seeks to emphasize best practice as a tool for future developments in EPZs in Kenya. It is important to learn from what has been done in the past by others, and not let it limit the development in future.

A lot of work has been carried out on the EPZ sector of industrial development. This includes the roles of EPZs in Kenya, an assessment (Chabari 2000) and the impact of EPZ development on employment creation (Mireri, 2000). Considerable research has been carried out on issues of labor and work conditions including Labor dispute settlement machinery in Kenya (Mutsotso, 2002), an analysis of the terms and conditions of employment in the EPZs (Kibuna, 2005) and are EPZs relevant in a liberalized environment (Kibua, 2005) among others. There however does not appear to be focus on areas of environmental management in the EPZs, or indeed other aspects of the EPZ developments. This research work is therefore very necessary and justified as it affords an opportunity to examine other aspects of the EPZ developments which remain inadequately researched.

The research investigates how multi-dimensional approaches are used or employed if at all, in integrating environmental concerns in planning, development and subsequent management, so as to achieve sustainability. The study aims to provide insights and make recommendations which can be used or applied in EPZs as well as other industrial areas whose set up may be somewhat similar to EPZs. The role which Kenya's Export Processing Zones play in the economy of the country is one of the main reasons the EPZ was picked as a study case for this paper. The study is important as it will contribute to better environmental management and the sustainability of public health, thus affecting the performance of the EPZ enterprises as units that would promote sustainability of mankind in Kenya in particular and worldwide in general.

1.7: Scope and Limits of the Study

This work was carried out within enterprises that were operating in some of the EPZs in Kenya in 2010. The study did not cover all the enterprises. It covers the EPZ enterprises that were in three sectors, garments and textiles, chemicals and polymers and enterprises engaged in processing of agricultural produce. Majority of the enterprises were in Athi River, Nairobi and Mombasa with others in Isinya, Voi and Thika. The research was limited to an examination of developments that have been carried out and were in operation and the effects of these and potential effects of the ongoing activities, with reference to the research contentions and arguments.

The study focuses on the area of sustainable industrial development with a bias to environmental considerations in the EPZ enterprises. The study examines some aspects of implementation of the projects and adherence or departure from good environmental management, and is specifically limited to the use of Environmental Impact assessment, self audits, Environmental management plans and Occupational safety and Health in environmental management in the EPZs. The study seeks to analyze information pertaining to the issues aforementioned and to document information on this topic for future edification of interested parties.

1.8: Operational Definition of Key Terms

Environment - Environment is the totality of nature and natural resources, but also includes the cultural heritage and the infrastructure constructed by humans to facilitate socio-economic activities.

Environmental Education - Constitutes recognizing values and concepts so as to develop skills and attitudes necessary for good environmental management.

Environmental Impact Assessment - Environmental Impact assessment is a systematic examination conducted to determine whether or not a program, activity or project will have any adverse impacts on the environment. It is a critical examination of the likely effects of a project on the environment.

Environmental Audit - A periodic evaluation of activities and processes of an ongoing project to determine if and how they are conforming to the approved environmental management plan.

Environmental Monitoring - It is the checking of what is going on in the surrounding to ensure compliance and take corrective action in case of non compliance.

Environmental Management Plan - Specific plan or arrangement put in place that includes periodic actions and their execution and the actors to ensure that the enterprises are managed well in terms of environmental issues.

Occupational Safety and Health (requirements) - Legal requirements that all investors in manufacturing are required to put in place to ensure their workers have a safe and healthy environment to work in. they vary from sector to sector.

Planning - Laying strategies for future actions after taking stock of the prevailing circumstances, past experiences and likely future scenarios.

Pollution - Introducing substances that are likely to be hazardous to human health into the Environment

Sustainable Development - Development without destruction of the environment or resource systems, soils, water and air which support life

Enterprise - A company approved under EPZ requirements to engage in manufacturing and processing within a gazetted EPZ. This term will be used interchangeably with factory in this study.

Operating enterprise – an EPZ company whose activities are domiciled within a specific easily identifiable physical location.

CHAPTER TWO: LITERATURE REVIEW

2.1: Introduction and Background

Environment is the aggregate of all external conditions affecting the life and development of an organism. It is the totality of a set of interlocking systems – natural or biophysical and manmade or social within which all living things interact. It is the surrounding or conditions in which a person animal or plant, lives or operates. Development refers to social and economic progress to satisfy human needs and improve the quality of life and it is achieved through the modification of the biosphere. (Muthoka et al, 1998).Muthoka et al (1998) observes that the environment and development are closely related. There is a strong relationship between the two as on the one hand, environment provides the natural resources for the process of development while on the other, the development process modifies the natural resources and environmental quality to meet human needs. The goal of both environment and development is the same: to improve human well being.

Interdependent though they may be, often some steps towards development end up undermining rather than stabilizing the environment. With the potential for development to mar the environment, the safest option would be to stop all forms of development in an attempt to save the environment which is an integral necessity for all life. This choice is however not one that is available to humanity because a lot of the needs of human beings are met through continued development. Consequently, the alternative left open to man is to make development sustainable. Sustainable development is “economic and social developments that meets the needs of the current generation without undermining the ability of future generations to meet their own needs”. This almost universally quoted definition was produced in 1987 by the World Commission on Environmental and Development (WCED) otherwise known as the Brundtland Commission. This means using the environment in a way that makes certain that it meets current needs while not compromising the ability of future generations to meet their own needs (Muthoka et al,1998).

Sustainable development allows for economic growth while protecting the environment. Economic growth is necessary for people in the world to live fulfilled lives and feel secure. Managing well what resources are available at the present time whilst developing new ones, allows for people to feel secure about their resources. Human activities have an immense impact on the environment. Controlling the said impact permits for security in the environment and the world’s

ecosystems. People also feel socially and economically secure if the environment is considered in the making of policies and defining the norms of society.

Because of the multi-faceted reality of sustainable development, it is necessary to employ an integrated and inter-disciplinary approach to realizing its goals. There is consensus around the general concept of sustainable development and the fact that its three pillars – economic, social and environmental – must be integrated in a balanced way. This approach should be based on a cross-section of issues, part of which this research seeks to review. Environmental management and development must be harmonized because the sustainability of development depends on proper management of the environment. Too often to get their way, project proponents play down the significance of environmental problems that need addressing. In deed some industries not only deny but misrepresent the truth about the effect that what they do is having on the environment. The other side of this coin is that the stakeholders actually recognize the problems but stubbornly refuse to fix them or otherwise do not have the means to make any amends. The skills to make changes might also be lacking among the people who identify or live with the problem, thus the need for management, regulation and enforcement by the authorities. It is recognized, as noted above that the best approach would be for industries and other developers or stakeholders to be willing to take steps to minimize the effect their activities have on the environment. This type of initiative is also required at an individual level. People need to do their part in maintaining the productivity of their environment over time. There are simple contributions like recycling that can be made by just about anyone. This is necessary because no matter how hard the industries work to achieve a balanced, clean and self-sustaining environment, all their efforts go to naught if individuals continue to abuse the environment.

Central to the concept of environmental management is the administration of factors related to how modern human societies interact with and consequently impact the environment. Diverse philosophies, perspectives and schools of thought inform the definition of environmental management as necessary. One of the most salient philosophies relates to the utmost number of particular species or organisms any given resource can sustain, referred to in biology and other disciplines as carrying capacity. Also primary to the concept of good environmental management is a consideration for sustainability and management of the environment as an important resource for humans. In other words, the importance of such management goes beyond preserving the environment for its own sake but has the further purpose of maintaining it for the sake of its

inhabitants. While it is noted that industries and indeed individuals would do well to self regulate, it is nevertheless true that often times, industries are motivated by the need to make profit and in such cases; the need to develop in a sustainable manner may take a back seat. This then means that there must be deliberate environmental management by established authorities. This study is an assessment of environmental management in the Export Processing Zones in Kenya. The assessment is done by focusing on a few salient features of good environmental management, most particularly compliance and enforcement. A broad look at the basic tenets of environmental management will give an appreciation of the need for it in industrial developments, a portion of which is the focus of this study.

2.2 Exploring Environmental Management and Management systems

2.2.1: Environmental Management

Management systems are multi-pronged covering the areas of planning, organizing, directing, and controlling, decision making and problem solving, communicating and reporting along with monitoring. It is these same arms of management that are applied in managing the environment.

Planning is a deliberate process of decision making to guide development implementation and management. It is the activity of developing an optimal strategy of future developments and commitment of resources necessary to implement the chosen strategy. It involves anticipation of future events, analysis and evaluation of situations and circumstances and making innovative choices for satisfactory and acceptable solutions. The essence of planning is the need for advance thought before action (Kippra, 2005). Within the function of planning is the process of structuring, prioritizing and basically creating a blueprint for times to come in the short and long term. Beyond creating a blueprint, action plans are also defined here. It enables one to lay ground for future actions while having taken stock of the prevailing circumstances, past experiences and then, taking these into account, lay strategies for the future. Organizing is usually done alongside implementation. It comprises actions taken to ensure optimum use of the resources available and enables project implementers to successfully carry out plans. Within organizing, too, is the function of human resource management. With respect to environmental management, this would involve ensuring that the authorities charged with overseeing good environmental management recruit staff with the necessary competencies in the area of environmental planning and management.

Environmental management is the measures and controls undertaken at individual, community, national and international levels and directed at environmental conservation, so as to ensure the quality of life for the present and future generations (UNESCO-UNEP/IEEP,1983). It helps if the staff have a good amount of Environmental education. Environmental education as defined by UNESCO (1983) is the process of recognizing values and clarifying concepts to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among man, his culture and his bio-physical surroundings. Environmental education also entails practice in decision making and self-formulation of code of behavior about issues concerning environmental quality. Directing involves leading. It provides oversight and guidance as well as supervision, giving a bearing and goals for the system and overseeing the implementation of the goals and direction identified. It therefore also involves giving guidelines' by which implementers must work so as to reach a common goal or result. Controlling or monitoring involves taking charge to ensure that all goes well. Once managers have created sufficient and adequate plans, organized implementation, made provisions for appropriate staffing and given appropriate direction, they must finally carry out monitoring and evaluation to ensure that the progress of implementation is checked against plans. This includes the role of ensuring that implementation is done according to laid down plans, rules and regulations but also to allow for modification which may be required based on feedback received.

Living species are interconnected and they are all further connected to the physical environment they inhabit. For this reason, management of the environment cannot be limited to the biological aspects of our environment but must of necessity also extend to the abiotic components of the physical environment as well. Humans as a category operate within various socio-cultural and economic spaces. It is important to focus attention too on how humans within these different spaces relate to the bio-physical environment. For efficient environmental management to be realized, clearly defined and adequate benchmarks and systems require definition and implementation and management tools to be established. As explained by Kamande (2011), an environmental management standard or system or protocol attempts to reduce environmental impact as measured by some objective criteria.

The International Organization for Standardization (ISO), provides guidance on the establishment, implementation, maintenance and improvement of an environmental management system and its

coordination with other management systems. The guidelines in ISO 14004:2004 are applicable to any organization, regardless of its size, type, location or level of maturity (ISO 14004:2004). While they may sometimes augment this standard, many other environmental management systems use the ISO 14001:2004 standard as a basis. The United Nations (UN) and World Bank; Natural Capitalism; The Green Dragon Environmental Management Standard; BS 8555; The Natural Step; US Environmental Protection Agency; and the European Union Eco- Management and Audit Scheme are standards used by various organizations. In the area under study, the ISO 14004:2004 standard is applied, together with other guidelines.

2.2.2: Managing Environmental Problems

Many advances can be employed in confronting environmental problems. The approaches used are either purely voluntary or regulatory. These two different approaches have been defined thus, by the International Network for Environmental Compliance and Enforcement (INECE),

“Some approaches are purely voluntary - that is, they encourage and assist change but do not require it. Other approaches are regulatory - that is, they require change. At the heart of regulatory approaches are environmental requirements - specific practices and procedures required by law to directly or indirectly reduce or prevent pollution” (2009)

For environmental management to be carried out, there are typical requirements which are needed and are used to command and control environmental management approaches. Industries are major sources of pollution if left to operate with no regulations or requirements. Different approaches that can be used in environmental management include: - purely voluntary approaches, command and control approaches, market based or economic incentive approaches, risk based approaches, pollution prevention approaches and liability approaches. These different approaches are particularly important in terms of enforcement where industrial developments are concerned. Depending on the particular set of circumstances, the types of industries and the general environment, different approaches may be taken to manage the environment. The level of exposure of the various players may also influence the kind of environmental management approach that is chosen. While voluntary management is encouraged, the regulatory approach to managing environmental problems is applied in Kenya's EPZs.

According to the International Network for Environmental Compliance and Enforcement (INECE,2009), Voluntary approaches encourage or assist the regulated community to take action to ensure its behavior is compliant, but do not require it to take these actions. Voluntary approaches include public education, technical assistance, and the promotion of environmental leadership by industry and non-governmental organizations. Voluntary approaches can be established by governmental or non-governmental organizations (INECE,2009). In terms of legal tools, salient are the command and control approaches. By defining clear requirements to inform necessary change and implementation plans, not just for realizing the requirements but also as a means of enforcing compliance, governments are able to realize development in the areas of environmental management and consequently social and economic development. Enforcement may be realized through regulatory government agencies or economic incentives. A more collaborative approach involves a partnership between the government and other stakeholders including players in the private sector. This is responsive regulation (INECE,2009). The aforementioned market based or economic incentive approaches include Fee systems, Tradable permits:- which allow companies to trade permitted emission rights with other companies, Offset approaches:- which allow a facility to propose various approaches to meeting an environmental goal, Auctions where the government auctions limited rights to produce or release certain environmental pollutants and Environmental labeling or public disclosure in which manufacturers are required to label products so that consumers can be aware of the environmental impacts of the products. This allows consumers to participate in environmental management by making informed choices about what products to choose based on the products' environmental performance.

Risk-based approaches to environmental management are relatively new. These approaches establish priorities for change based on the potential for reducing the risks posed to public health and/or the environment (INECE, 2009). To realize proper management of pollution reduction programs, either of the legal tools defined above can be used. Liability approaches can be used in ensuring business or individual responsibility in environmental management (Krieger et al,1977). As defined by UNEP, “examples of liability-based environmental management systems include nuisance laws, laws requiring compensation for victims of environmental damage, and laws requiring correction of environmental problems caused by improper disposal of hazardous waste (Hylton, 2008).

As with any other liability systems, this requires a buy-in by stakeholders in the form of respect or fear of the consequences to ensure a realization of the goals. In the Kenyan EPZs, a level of regulation has been applied but based on reading from various sources, as indeed indicated above, it is obvious a lot more can be done to contribute to better environmental management in the EPZs.

2.2.3: Making Implementation of environmental rules effective

Implementation not only requires the right attitude and information on the part of those in the environment, but also monitoring. The people who undertake activities which may impact the environment positively or negatively need to be equipped to do better management with particular attention to the environment. This calls for environmental education and monitoring. Environmental monitoring is the continuous or periodic checking and determination of actual and potential effects of any activity or phenomenon of the environment whether short term or long term (EMCA, 1999). Enforcement of environmental rules requires a bestowment of active and effective authority on those charged with the responsibility of enforcing the laws. Authority could extend to matters of regulation and licensure, redefinition of requirements for specific circumstances, auditing of licensed and regulated facilities, enforcement of periodic report requirements for participating groups and communities, legal action for non-compliance, and environmental intervention where necessary (INECE,2009). In the case of the EPZs, the authorities constitute not only NEMA, but the EPZA which is the main regulating body. Managing the environment is however more effective when those who are engaging in activities that may interfere with the environment understand and undertake to regulate themselves by way of prevention and compliance.

2.2.4 Environmental management and compliance requirements

There are various factors that are known to affect compliance with environmental management requirements and these are deterrence, economics, institutional credibility, social factors, knowledge, technical feasibility and impact of program design. Due to the fact that matters environment were not a big issue and they are only gaining prominence after various governments and authorities have realized the possible results of bad environmental management, a lot has to be done to ensure compliance. Having established that a buy-in to enforcement is either predicated on fear or other reasons and can serve as a deterrent, it is important for enforcing bodies to determine how much the tools and approaches that are working can be used to realize comprehensive and extensive compliance. Critical to this is the establishment of an understanding

among the community members that the enforcing agency has capacity to detect violations and having done so, will not hesitate to respond with speed or impose necessary sanctions (INECE, 2009). These factors are interrelated and should be applied in tandem and in a way that maximizes each so that they complement each other. A higher realization of compliance within regulated communities can be achieved by the use of the legal tools identified earlier in this research. Further, such compliance will be realized faster if the society is made aware of the monetary and other benefits of such compliance. Additionally, the community should not view compliance as too costly, thus leading to resistance. Enforcers like EPZA and other regulators, should therefore manage implementation in a way that appears to mitigate costs for the regulated community, and also do its best to get them to embrace tenets of good environmental management.

Economic factors are a big consideration when trying to achieve compliance and even though there may be resistance in the beginning, stakeholders usually realize that in the long run, it is cheaper to comply even though it may seem very expensive at first. Institutional credibility plays a major role in the ability to achieve compliance with principals of sound environmental management. Every country has its own social norms concerning compliance. These norms are born out of and are dependent on how credible or not the laws and institutions of its enforcement are. Countries with a socio-political norm of a failure to enforce the law will typically experience a norm of non-compliance. This failure at enforcing the law may be as a result of the laws being unenforceable or may be because those charged with the responsibility of enforcing the laws lack the necessary political power and authority to do so. They could also lack the resources. The result, as aforementioned, is low levels of compliance. Strategies to build credibility may vary from one place to another in that in some cultural, political or social environments, aggressive enforcement may provide credibility. However, before introducing the aggressive enforcement, information on what is to come should be made available to the community. In some places, it may be important to have an initial period of promotion and encouragement and general awareness creation to create a spirit of cooperation. This period of promotion and education prepares the population for the assertive and strong enforcement.

Sensitization allows for a smoother transition into and embracing of the new aggressive enforcement. It will also allow the enforcers to distribute information that non-compliance will incur stiff consequence or penalties. Besides these two approaches mentioned, some find it more productive and effective to use a multi-faceted approach from the beginning. Different approaches

are adopted according to the different circumstances prevailing (INECE, 2009). Any country or community's level of willingness to comply or even self-police their specific communities into compliance is indicative of the political governments' position on environmental laws. A strong commitment to enforcement of the said laws will normally reflect in the voluntary compliance of the people. Such a voluntarily complying community will typically be found in a country where the government encourages voluntary compliance, has strong laws in place and further enforces those laws handing down consequences for non-compliers. On the other hand, a government that does not do this or is not committed to enforcing environmental laws has the opposite effect. Communities within such a country are more likely to be non-compliant. Governments and authorities therefore, play an important role in the creation of a norm of compliance. Once such values are instilled in the populace, it is much easier to enforce compliance; indeed this becomes voluntary and does not eventually call for much policing.

In Kenya, the political will is definitely there as exemplified by the provisions in the constitution, 2010, as well as the creation of NEMA. A lot more needs to be done however on the area of sensitization so as to achieve a complete buy-in by the populace. This includes the need for more environmental education. Personal and social relationships influence behavior and this in-turn influences how people view the issue of importance of environmental management systems. Moral and communal values may motivate or otherwise restrain compliance. There are various reasons why different establishments comply. Some of these include an honest commitment to environmental sustainability, patriotism and commitment to one's country and community, or self-promotion predicated on the hope that should they be seen as being environmentally conscious, they look good to the communities within which they work, as well as to their clients. This is in fact one of the stronger motivators of compliance. Following this line of thought, therefore, it is no surprise that non-compliance is more likely to be experienced in places where breaking the laws is not met with any great disapproval socially as is evident in various parts of the city of Nairobi. For cities to realize sufficient levels of compliance to sustain the environment, a system that punishes non-compliance must be put in place (INECE, 2009).

One cannot downplay the importance of personal relationships in this process. Personal relationships between some stakeholders especially the law enforcers and heads of regulated facilities can be a deterrent to the creation of a space where there is more commitment to compliance. This is due to the lack of vigor in enforcing the laws when one has a personal

relationship with the person running a facility undergoing vetting. The maintenance of the personal relationship becomes more important than the creation of a professional relationship based on integrity and which may therefore sometimes require a disagreement between the two parties should the enforcer cite the facility head for non-compliance. Even personal relationships that develop out of professional space breed familiarity between the enforcement official and members of a facility and may result in compromising of objectivity on the part of the official. Aspects of this phenomenon can be observed within the EPZs where there is familiarity between the enterprises and the officers of the EPZA who are an enforcing agency and these occasionally present a problem. For this reason, it is important to include as part of the process, occasional supervisory visits by independent enforcement officials. It may be necessary to include the relationship factor into some compliance strategies. This can be realized by the provision of technical support to regulate groups and enhance the interpersonal skill of compliance personnel. An enforcement agency may also wish to use different personnel to avoid creation of familiarity between enforcers and the regulated (INECE, 2009). This will enhance surveillance as use of different personnel also allows for more objective assessments besides avoiding collusion and connivance. Research shows that, communal and social commitment to and respect for environmental requirements can be realized through partnerships that include leaders in industry. This is especially important if the efforts are meant to counter activities that are a risk to the environment and as a consequence, public health. If they agree to set rules that the community is well informed of and if alongside these, there is a clear mandate that is undertaken to enforce these requirements, then respect for the environmental requirements becomes easier to realize on a community level. The human factor, as afore mentioned, has to always be considered in dealing with non-compliance. Psychological spaces are especially important to look at. Human beings are comfortable with the familiar and so often resist change. They fail to see the risk in things familiar while focusing on that which is risky to their ways in new things. Compounding this is the reality that change always takes work and resource input, which many may not find very pleasant. It therefore behooves the government and other enforcers to educate the populace and the industry leaders on the benefits of planned change in terms of the environmental requirements. This along with knowledge of the consequences for non-compliance serves as enough of a motivator into action towards compliance.

The operators who are being regulated not only need to have the motivation to comply, they also require capacity to do so. They need to understand what it takes to comply. Understanding what

compliance is and its benefits does not automatically translate into capacity to realize compliance. The regulated facilities further require certain technology that would facilitate compliance including prevention, monitoring, control or pollution cleanup technology. Further they must have the technical know how to operate it correctly. A lack of sufficient and appropriate knowledge coupled with a lack of the requisite technology can be a significant barrier to conformity, a situation that can be corrected by employing education, outreach and technical assistance programs.

An understanding of the circumstances in which facilities are operating is crucial when designing a program for enforcement. This enables policy makers to determine the optimal strategy or tactic to be employed so as to motivate project proponents and enable compliance while at the same time discouraging nonconformity. Within political and social cultures with a tendency not to respect requirements and calls to voluntary and deliberate behavioral change, designing strategies for deterrence could be the most significant aspect of program design. On the other hand, countries or societies whose social norm of compliance has matured and is respected by the community, experience an easier time implementing activities aimed at promoting voluntary compliance (INECE, 2009). Where fiscal challenges pose the greatest hurdle to compliance, strategies that offer financial support may achieve change. Factors that influence behaviour and people's actions change over time and this therefore calls for flexibility, periodic review and revision of the program design so as to achieve term effectiveness.

The importance of teaching and technological assistance is captured in the following quote,

“Education and technical assistance lay the groundwork for voluntary compliance. They are essential to overcome barriers of ignorance or inability that otherwise would prevent compliance. Education and technical assistance make it easier and more possible for the regulated community to comply by providing information about the requirements and how to meet them, and by providing assistance to help regulated facilities take the necessary steps for compliance. Education and technical assistance are particularly important in the early stages of a new requirement-based program, and whenever the program requirements change.” (INECE, 2009)

If a program design requires an element of deterrence, then the information communicated should ideally include not only educational information, but also reports of enforcement activities. Having

created an “enforcement presence” a space and feeling of deterrence will result. Regulated entities will therefore be compelled to comply even while seeking assistance. It is imperative that as programs are designed, a communication plan outlining with clarity the information requiring transmission, processes of developing that information, a timetable for the transmission of the information, as well as modes of dissemination is developed. Along with this, should be a clear plan for technical assistance considering the type of assistance required, when, how, to whom and by whom it should be provided.

An initiative in the Netherlands provides a good model for using assistance to confront compliance problems. The following captures the model and some of its challenges, as well as how these have been handled to realize compliance as recorded in the Principles of Environmental compliance and enforcement handbook:

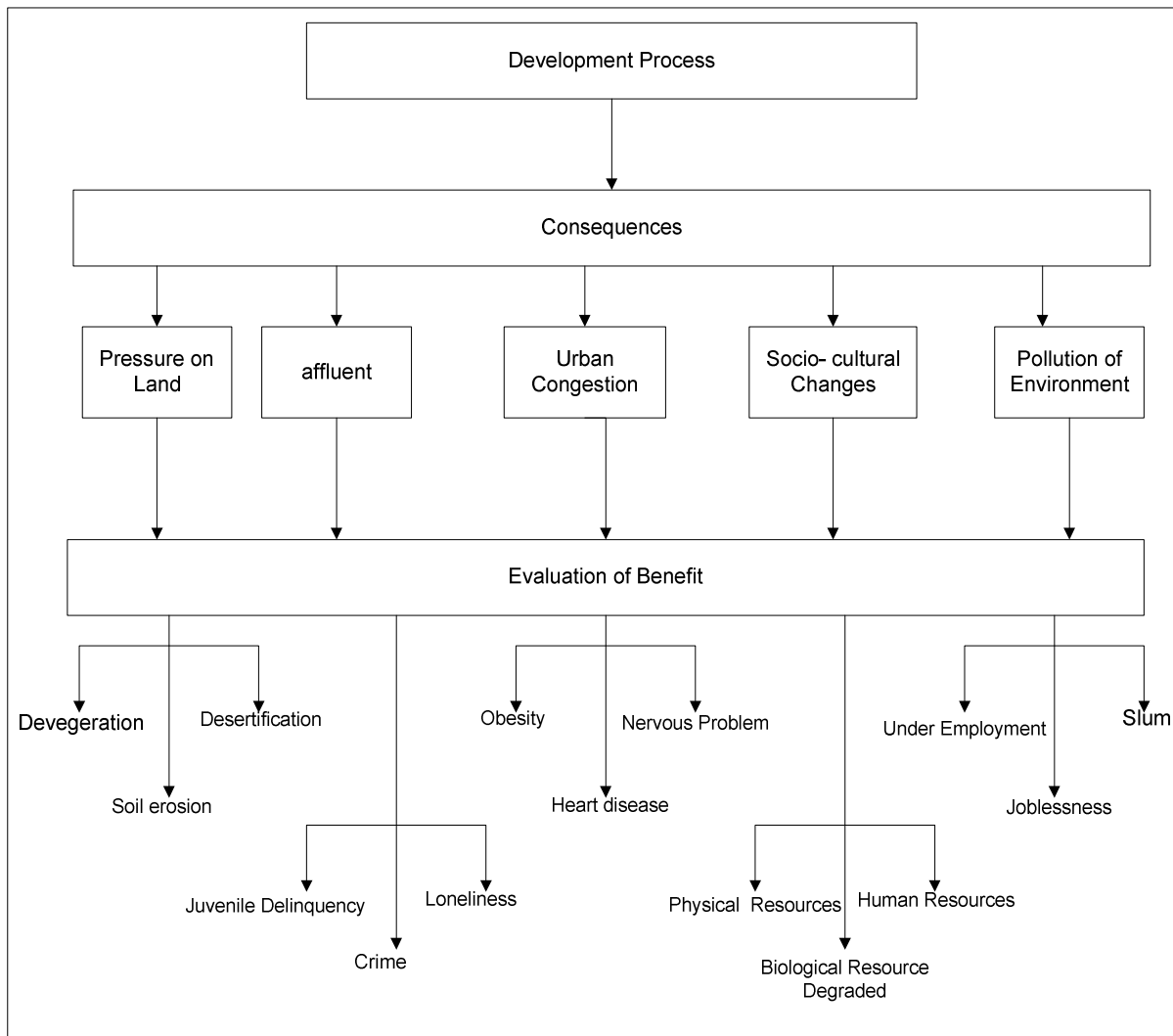
“Commercial establishments in the Netherlands are required to dispose of their hazardous wastes through permitted processors. However, getting the waste to the processor had been a problem for small businesses. The processors were often unwilling to pick up small amounts of waste, and transporting small quantities of waste over long distances to a processor placed a disproportionate economic burden on small businesses. Small companies were therefore often out of compliance with the hazardous waste rules. The Dutch government helped solve this problem by establishing a collection depot in nearly every town in the Netherlands. Both private citizens and small companies may now discard their waste at these depots at regular times. This government-facilitated cooperative arrangement was instrumental in helping solve this compliance problem.” (INECE, 2009).

The techniques described above are among those that the enterprises at the EPZ can employ to achieve compliance. Once various measures are taken, it is then possible to identify where there are short falls and which areas can be improved. Also, with a number of initiatives in place, it may be easier for partners to come on board as is necessary. This is particularly in terms of when technical and financial assistance is required. To have an appreciation of what we aim to achieve by practicing sustainable development, their it is important to understand the problems arising from development, its effects as well as the management of various types of waste, including solid, liquid and also gaseous.

2.2.5 Problems arising from development

The enterprises under study in this research are engaged essentially in development and production activities. The development process in itself gives rise to various problems, even as it improves lives. While industrial development is promoted as one of the main ways to improve livelihoods by way of providing employment and conveniences, it is however recognized that it must be carried out in a sustainable way. Figure 1 clearly illustrates some of the likely bad impacts of development.

Figure 1: Some problems arising from the development process



Source: Muthoka et al, 1998

The problem is that often times, investors emphasize on “grow first and clean later”. When investors implement industrial projects with this in mind, there are likely to be very many negative

impacts due to non compliance with requirements of sustainable environmental management. This is the reason it is necessary for those who wish to undertake development to look at all the options and try and mitigate against possible negative impacts. This applies to the enterprises in the EPZ. This then calls for enterprises to carry out a cost benefit analysis within their production processes.

2.2.6 Cost benefit analysis

Cost benefit analysis (CBA) is a technique used in environmental protection and management (Muthoka et al, 1998). Usually CBA is used to make choices for example in terms of looking at various projects, or various sites for location of a project usually in projects that are likely to have direct impacts on environmental conservation like dams, large industrial developments, national parks among others. On a smaller scale, CBA can be employed by investors to determine what the benefits of undertaking a particular action within the factory is to their overall production process and more importantly to their bottom-line which is profits management.

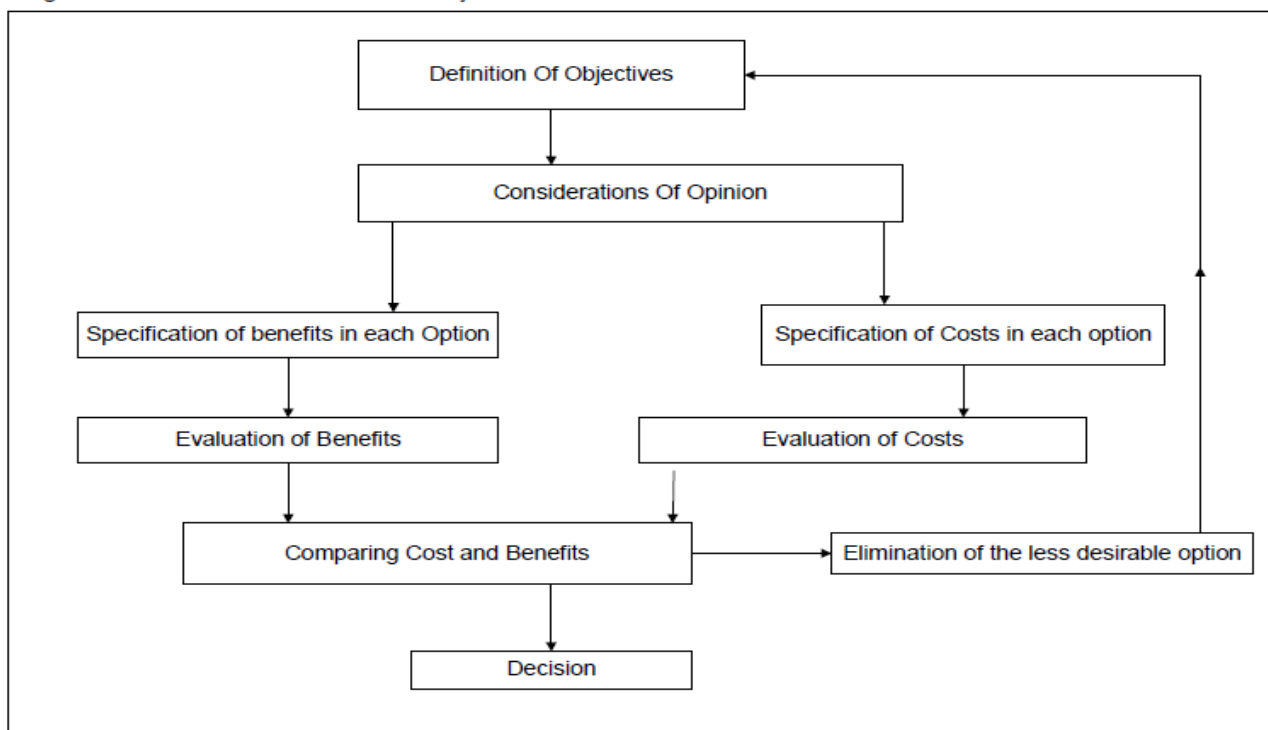


Figure 2: The process of cost benefit analysis

Source: Muthoka et al, 1998

Fig 2. above shows the various aspects considered in the process of carrying out CBA. Enterprises in the EPZ can use CBA to determine what are the benefits of undertaking sustainable industrial

production as contrasted with undertaking production without paying attention to good environmental management practices.

2.2.7 Waste Management

Waste Management in general could be broadly classified into two main categories: the preventive which addresses the causes of waste generation, and the curative which deals with controlling the harmful effects of waste. Both could be considered within a hierarchy of approaches including dematerialization of production which involves reducing material and energy inputs, recycling waste back into the production process, recovery of some ingredients, and/or treatment of waste, and dispersal, dumping or storage some of which are illustrated in Table 1.

Table 1: Waste treatment and disposal technologies

General division	Subdivision
Recycling	Gravity separation Filtration Distillation Solvent extraction Chemical regeneration
Physical/chemical	Neutralization Precipitation/separation Detoxification (chemical)
Biological	Aerobic reactor Anaerobic reactor Soil culture
Incineration	High temperature Co-incineration
Immobilization	Chemical fixation Encapsulation Stabilization Solidification

Source: UN the World Environment (1972-1992)

Poor management of waste results in pollution. The Royal Commission on Environmental Pollution (1984) defines pollution as the introduction by man into the environment of substances or energy liable to be hazardous to human health and cause harm to living resources and ecological systems, damage structures or amenities or interfere with legitimate uses of the environment.

Cleaner production as a waste management solution in industries is encouraged. Michubu (2009) notes that cleaner production puts emphasis on a paradigm shift to the notion of producing more by using less resources, which makes a lot of business sense as there are benefits. He notes that these benefits are the reason for increased adoption of cleaner production and adds that due to the self driven mechanism, voluntary initiatives such as cleaner production should be encouraged by governments of the world as a tool for environmental management and conservation. Cleaner production is particularly important in industrial processes like the ones in the EPZs. Encouraging cleaner production would contribute a lot to better environmental management. Michubu, (2009) points out that while cleaner production may require a lot of capital input for example purchase of resource saving technology, in the long run, the proprietors stand to benefit from the savings of resources such as water and energy. Barriers to cleaner production include financial, economic, policy related, organizational technical, conceptual and general lack of knowledge .There is also the general lack of information, expertise and skills (Michubu, 2009).

2.3 Legal framework

2.3.1 Environmental Law

Environmental law refers to the whole body of various treaties and international agreements, laws made by parliament, customary rules and administrative regulations to ensure or facilitate the rational management and utilization of the natural resources so as to achieve sustainable development (ILEG,2003) It consists of a complex and interlocking body of treaties, conventions, statutes, regulations, and common law that, very broadly, operate to regulate the manner in which humanity and the rest of the biophysical or natural environment interact, for the purpose of reducing the impacts of human activity, both on the natural environment and on humanity itself.

Environmental law may be divided into two major areas: one of these is pollution control and remediation, while the other is resource conservation and management. Laws dealing with pollution are often media-limited in that they pertain only to a single environmental medium, such as air, water and soil. They basically refer to the means by which the environment may be

contaminated. These laws deal with pollution in different media as they take cognizance of the different properties in each, and are therefore very specific. These set of laws control both emissions of pollutants into the medium by which it is transmitted, as well as liability for exceeding permitted levels of emissions and ultimately responsibility for cleanup process. An example of these is the water management regulations (2006).

Laws that deal with resource conservation and resource management generally focus on a single resource such as natural resources for example forests, mineral deposits or animal species, or more intangible resources such as scenic areas or sites of high archeological or aesthetic value. These laws also provide guidelines for and limitations on the conservation, disturbance and use of those resources. They include the Wildlife (Conservation and Management) Act (2010). Environmental laws derive from and are influenced by principles of environmentalism, which include ecology, conservation, stewardship, responsibility and sustainability. Pollution control laws are generally intended to protect and preserve both the natural environment and human health while resource conservation and management laws generally balance the benefits of preservation and economic exploitation of resources. These naturally occurring resources have a high premium placed on them and are exploited mostly for research or tourism which implies economic gain. They must therefore be exploited but in a very controlled way so as to preserve them, like the rest of the environment for use by future generations. From an economic perspective, environmental laws may be understood as those concerned with the prevention of present and future externalities, and preservation of common resources from individual exhaustion (ILEG,2003).

Industries in the EPZ, as indeed elsewhere are of various types. Some of them rely on natural resources for raw material for their production processes. They therefore require clean water, air and soil to be able to receive and maintain their supplies. On the other hand, those that rely on resource exploitation for example mining, require to be regulated as their activities impact the natural resources as well as communities surrounding them. This is why environmental law is important.

2.3.2 Environmental Governance in Kenya

The Community guide to Environmental management in Kenya (ILEG, 2003) defines environmental governance as a body of values and norms that guide or regulate the relationships between the state and civil society in the use, control and management of the natural environment.

It is expressed in a chain of rules, policies, and institutions that constitute an organizational mechanism through which the broad objectives and specific planning targets of environmental management must be expressed.

The Kenya government has formulated various policies and legislated, to foster quality environment values and to promote sustainable development. The Constitution, 2010 is the supreme law of the land. That the constitution has a whole section on environment is recognition of how important and all encompassing environmental issues are. Article 42 of the constitution states that every person has the right to a clean and healthy environment which includes the right to have the environment protected for the benefit of present and future generations through legislative and other measures. Chapter five of the Constitution of Kenya is on Land and Environment. Part two of the chapter deals specifically with the environment. Articles 69 and 70 covers obligations in respect of the environmental and enforcement of environmental rights respectively, while section 72 provides that parliament shall enact legislation to give full effect to the provisions of this part of the constitution. Article 69 section 1 (d) states that the state shall encourage public participation in the management, protection and conservation of the environment. Sections (f) of the same article, requires the state to establish systems of environmental impact assessment, environmental audit and monitoring of the environment, while section (g) requires the state to eliminate processes and activities that are likely to endanger the environment. Article 69 section two states that every person has a duty to cooperate with state organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources. Sessional paper No. 3 of 2009 on the National land policy which is now being implemented also focuses a great deal on environment as there is a realization that environment and good management of it affects all other sectors of life, and so it is with planning and plan implementation.

The Institute for law and Environmental Governance (ILEG, 2003) in the Community guide to Environmental management in Kenya outlines the need for Environmental governance which is increasingly being pursued and implemented to provide a basis and framework within which public and private behavior is regulated in support of good ecological and environmental stewardship. Environmental governance recognizes the need for different sectors of society however they are grouped, to manage the natural resources well. It establishes reciprocal relationships between people with respect to access and use of environmental goods and services,

and binds them at different levels to certain specific environmental ethics. Such relationships exist between persons in the global community, which comprises people relating at a regional, national and local level. While some members of society may want to pay particular attention and practice good environmental management at all times, others may deviate from this. Even among the former, there may be times when, for whatever reason, they may deviate. Besides this, each person or entity, depending on their own perceptions and from specific standpoint, may have different approaches. Each person, corporate or individual may focus on a particular area, which could at times be detrimental to the other person or area. It is in realization of this that it then becomes necessary to come up with laws, rules, regulations and guidelines to direct different people's actions with a view to achieving the same goals and meeting at least a sizeable percentage of each sector's goals.

In Kenya Environmental Laws include, but are not limited to the Constitution of Kenya (2010), Environmental Management and Coordination Act (1999), the Forest Act, Cap 385(2005), Mining Act, Cap 306(1940) Water Act, Cap 372(2002), Wildlife (Conservation and Management) Act, Cap 376(2010), Seeds and Plant Varieties Act, Cap 326(2002), Fisheries Act, Cap 378(1991), Local Government Act, Cap 265(2010), Public Health Act, Cap 242(2005), Factories and other places of work Act, Cap 514, Occupational Safety and Health Act, 2007 Cap Traffic Act, Cap 403(2009), Agriculture Act, Cap 318(2006). These acts also require the minister in charge of each of these aspects to issue certain administrative regulations to help in the implementation of the relevant law for example under the Agriculture Act, the minister of Agriculture passes regulations providing that one must not cultivate beyond fifty meters to the water point. It is important to also note that there are also some laws which though not specifically dealing with environment, have a bearing on environment, e.g. the Chiefs Act Cap 128 (2009) which is essentially administrative provides in some sections that the chief may give an order requiring people not to burn grass or cut certain trees. Environmental law therefore includes these rules and regulations that have a bearing on the manner in which the natural resources and environment are managed overall.

These rules comprising both rights and responsibilities may either emanate from customs and practices or be codified in such instruments as conventions, treaties or statutes and they are managed by different organizational forms, for example, clans, women's groups, private firms, national agencies and international organizations. Indeed such guidelines and laws are periodically reviewed and improved as people come up with different more innovative ways to take care of the

environment and ensure sustainability. In Law, a right can be described as a recognized legal entitlement, benefit, advantage and interest that a person has and that allows him or her to require another person to do or not to do a certain thing (ILEG, 2003). An environmental right may be described as the freedom to exploit an environment adequately but responsibly for long-term survival (ILEG, 2003). In Kenya, as indeed everywhere else in the world, this is embodied in the entitlement to “a clean and healthy environment” for all persons who jointly exploit the environment. When the EMCA,19991 states that “every person” is entitled to a clean environment, this includes unnatural persons such as companies, partnerships, corporations, local authorities and other types of administrative bodies, non-governmental organizations (NGOs), community based organizations (CBOs) and various other groupings including lobby groups.

Rights always come with responsibilities and so along with the right for all persons who interact in an environment expecting to have “a clean and healthy environment” comes the responsibility to contribute to the attainment of this healthy and clean environment. As noted before, the constitution of Kenya (2010) says every person has a duty to ensure a clean and healthy environment is provided and maintained at all times. This is referred to as “environmental duty”. This requires people to refrain from activities that result in harm being caused to the environment or any natural resource which is a component of it. Not all persons always act with the larger public interest in mind, thus the need to regulate. To facilitate such regulation, the law, in various acts and assisting guidelines and regulations, also prescribes punishment that may be imposed on persons who harm the environment.

Kenya entered the new century with a number of environmental challenges (ILEG, 2003). Her environmental degradation is largely associated with the destruction of such natural resources as forests, water, marine and coastal resources as well as soil erosion, and pollution- basically water, air and land. With every passing day, the challenges continue to increase. In order to deal with or respond to the said challenges whose negative impact should not be allowed to continue to increase, the country has reviewed and indeed continues to review policies and laws on various issues that touch on the environment (State of the Environment Report, 2004).

2.3.3 Environmental Management and Coordination Act 1999

One of the commendable actions taken by the Government of Kenya is the enactment of the National Environmental Coordination Act (EMCA, 1999) which created the National Environmental Management Authority (NEMA). EMCA is the framework legislation on the

environment and covers various concerns on the environment. EMCA, 1999 is an Act of parliament created to provide for the establishment of an appropriate legal and institutional framework for the management of environment and related matters. This Act was founded on the basic premise that every person in Kenya is entitled to a clean and healthy environment and had the duty to safeguard and enhance the environment. Further, part (5) of Environmental (Impact Assessment and Audit) Regulation 2003 details the guidelines for the EIA.

Section 9, of EMCA 1999 outlines the various tasks of NEMA which among others include the following;

- Exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of Government in the implementation of all policies relating to the environment.[2i]
- Establish and review in consultation with the relevant lead agencies, land use guidelines.[2c]
- examine land use patterns to determine their impact on the quality and quantity of natural resources[2d]
- monitor and assess activities, including activities being carried out by relevant lead agencies, in order to ensure that the environment is not degraded by such activities, environmental management objectives are adhered to and adequate early warning on impending environmental emergencies is given. [2i]
- Undertake, in co-operation with relevant lead agencies, programs intended to enhance environmental education and public awareness about the need for sound environmental management as well as for enlisting public support and encouraging the effort made by other entities in this regard. [2m](EMCA, 1999)

Part IV of EMCA covers Environmental Planning through the National Environmental Action Plan (NEAP) Committee in part IV 37(2). The committee is charged with producing, after every five years, a national environment action plan for parliamentary consideration. The plan is purposed to do the following as excerpted from the Environmental management and Co-ordination Act, 1999):

- a. contain an analysis of the nature of the natural resources of Kenya with an indication as to any pattern of change in their distribution and quantity over time;
- b. contain an analytical profile of the various uses and value of natural resources incorporating considerations of interregional and intergenerational equity;

- c. recommend appropriate legal and fiscal incentives that may be used to encourage the business community to incorporate environmental requirements into their planning and operation processes;
- d. recommend methods of building national awareness through environmental education on the importance of sustainable use of the environment and natural resources for national development;
- e. set out operation guidelines for the planning and management of environment and natural resources;
- f. identify actual or likely problems as may affect the natural resources and the broader environmental context in which they exist;
- g. identify and appraise trends in the development of urban and rural settlements, their impacts on the environment, and their strategies for the amelioration of their negative impacts;
- h. propose guidelines for the integration of standards of environment protection into development planning and management;
- i. identify and recommend policy and legislation approaches for preventing, controlling, or mitigating specific as well as general adverse impacts on the environment;
- j. prioritize areas of environment research and outline methods of using search research findings;
- k. without prejudice to the foregoing, be reviewed and modified from time to time to incorporate the emerging knowledge and realities; and
- l. be binding on all persons and all government departments, agencies, state corporations or other organs of Government upon adoption by the National Assembly (EMCA,1999).

The NEAP is therefore an excellent tool to be used following EIA and EA. Over time, and since the plan is prepared every five years, EIA and EA carried out in different places should be able to inform the NEAP and enable eventual continual improvement.

2.3.4 EMCA quality regulations

EMC Act, 1999 is also reinforced by several regulations established by the same Act of parliament to oversee the various components of environmental protection laws. Legal notice No. 120 EMCA (water quality) regulations 2006 has the major duty to, regulate all national water usage and protect

it from abuse such as pollution and unregulated use; Part III, gives guidelines on water for industrial use and effluent discharge. Part II gives guidelines on protection of sources of water for domestic use. The first schedule (r.5) provides quality standards for sources of domestic water, while the third schedule (r.11, 12) gives the standards for effluent discharge into the environment. The fifth schedule covers standards for effluent discharge into public sewers, and the sixth covers monitoring for discharge of treated effluent into the environment.

Legal notice 121 EMCA (waste management) regulations 2006 regulates the national waste generation, waste handling and waste disposal; Part III covers industrial waste while parts IV to VII cover various kinds of waste and how they should be handled. EMC Noise and Excessive Vibration Pollution Control Regulations of 2009 give guidelines on these components. In this study it is revealed to what extent EIA and regulation has been put in use to improve environmental sustainability of enterprises in Kenya's Export Processing Zones.

2.4 Environmental Management tools

2.4.1 Environmental Impact Assessment (EIA)

Environmental Impact Assessment (EIA) has been defined severally. The UNEP regional office for Asia and the Pacific defined it in 1988 as "a formal study used to predict the environmental consequences, of a proposed major development project" (UNEP 1988). Earlier, it was defined as "a study of the effects of a proposed action on the environment which may include flora and fauna, soil erosion, human health, urban migration or employment – in other words all physical, biological, social, and economic and other impacts (Ahmad and Sammy, 1987). The UNESCO-UNEP international environmental education program in its glossary of Environmental education terms (1983) defined EIA as "an activity designed to predict, interpret, and communicate information about the effects of an action and to ensure ecological and sociological information is included with physical and economic information as a basis for making decisions. According to the National Environmental Management Authority, EIA is a critical examination of the effects of a project on the environment. NEMA further states that an EIA identifies both negative and positive impacts of an activity, how it affects people, their property and the environment, and identifies measures to mitigate negative impacts, while maximizing on the positive impacts. From the foregoing, EIA could be defined among others as an assessment of the possible impact, positive or negative that a proposed project may have on the environment together consisting of the natural, social and economic aspects. It also implies the identification, prediction and evaluation of the

impact a proposed development may have so that either strict regulation can be laid down on governing its implementation or construction or the project can be rejected if deemed necessary. It includes the process carried out by an environmental protection Authority for evaluating a proposal including its alternatives and objectives, its effects on the environment including the mitigation and management of those effects or just simply an examination of the likely impacts of development proposals on the environment prior to the beginning of any activity. It may also refer to studies undertaken in order to assess the effects (on a specific environment) of the introduction of any new factor which may upset the current ecological balance.

The term environmental audit (EA) and EIA are sometimes used by different organizations for essentially similar activities – the main difference being EIA is at the commencement of projects while EA is usually the periodic self audits. In a number of cases,(factories in operation before 2004) where EIA was not carried out in Kenya, there was an initial EA following enactment of the EMCA 1999, and subsequent implementation of the requirements. Strategic Environmental Assessment (SEA) is equally important but concerns the cumulative impact of many projects, and thus involves assessing policies, plans, and procedures, rather than specific development activities (WIOMSA,2003). EIA procedures in Kenya outlines EIA components as; screening, scoping, assessment and selection of best options, identification of mitigation measures, preparation of environmental impact statement, reviewing and decision-making, monitoring, dispatching the reports for sector comments from lead agencies and District Environment Committees/Provincial Environment Committees, and EIA review process. Table 2 below maps out the components of an EIA as excerpted from the WIOMSA’s “Managing Marine Protected Areas: A TOOLKIT for the Western Indian Ocean”.

Table 2: Components of EIA

COMPONENT	DETAILS
Screening	<ul style="list-style-type: none"> * Establishes necessity of EIA * Establishes level of EIA * Involves checking the proposal against a set of standard criteria * Is often dependent on local legislation and/or the requirements of a donor agency
Scoping	Determines the focus, depth and terms of reference for the EIA.

	<ul style="list-style-type: none"> * Establishes key social and scientific concerns * Identifies the individuals involved * Identifies the point at which changes due to the project are unacceptable * Involves preliminary assessment of potentially suitable sites, technical options and alternatives * Involves the developer planning or environmental agencies, local communities and other stakeholders.
Assessment and selection of best option(s)	<p>The actual EIA.</p> <ul style="list-style-type: none"> * Possible techniques for use include baseline data collection, field visits and stakeholder consultation. * Documentation of the construction, operation and maintenance plans of the proposed project and the impact of these on the environment. * Identification of alternative sites, solutions and techniques. * Identification of impacts.
Identification of mitigation measures	<ul style="list-style-type: none"> * May require modifying the proposal, substituting an alternative technology or abandoning certain aspects of the project. * May lead to rejection of a project if it appears that the project cannot go ahead without adverse impact * May recommend deferring of an application and further studies if determined that this will help with a decision.
Preparation of an Environmental Impact Statement (EIS)	<p>The report of the findings</p> <ul style="list-style-type: none"> * Should be clear and concise * Should include a non-technical summary for the public and media * Should include a more detailed section on the technical aspects of the assessment.
Reviewing and decision-making	<ul style="list-style-type: none"> * Clear and consistent process. * Involves an impartial evaluation (involving the public and government agencies). * Final decision based on standard criteria. * A standard criterion is used for making the final decision.
Monitoring	<ul style="list-style-type: none"> * Ensures preventative and mitigation actions are carried out properly * Ensures the recommendations of the EIA and conditions of approval are followed.

Source: WIOMSA 2003

This study looks at the relevance of EIA/EA, EMP and OSH and why EIA/EA requirements are mandatory for all projects within the EPZs, especially those with likely significant negative environmental impacts. The whole concept of EIA can never be discussed in isolation without discussing the subject of environmental management. Politics, programs and resources are major factors in environmental management activities. The specific impact of a project and the changes it occasions can be experienced or realized in the environment once the project is operational. It is therefore necessary to have effective monitoring.

Monitoring systems designed during the EIA provide the basic information that allows for detection of changes in the environment. Based on monitoring information and on the evaluation of the actual impacts and the effectiveness of mitigation measures, the project implementation activities may be altered. In the long term, monitoring result may lead to revised economic development goals and objectives (Brimblecombe et al, 2012)

For each reasonable project alternative (that is, technology, size, site or other factors), identification and description of the major project activities and expectations during the different project phases including design, construction, operation, and other phases is done at the onset. All project activities lead to changes in the natural environment and in turn these changes lead to impacts. It is important to note that changes, per se, are not impacts on the environment as an impact is what affects human health, welfare, and ecosystems. Should project activity have the capacity to affect an environmental parameter, then it may be deemed significant (Lohani, 1997). The following criteria are considered in determining whether or not an impact is significant.

- i. spatial scale of the impact (site, local, regional, or national/international);
- ii. time horizon of the impact (short, medium, or long term);
- iii. magnitude of the change in the environmental parameter brought about by the project activities (small, moderate, large);
- iv. importance to local human populations (for example, fish for consumption, drinking water, agricultural products);
- v. national or international profile (for example, tropical rainforests, and any rare or endangered species); or

- vi. if being altered from its existing or predevelopment status will be important in evaluating the impacts of development and in focusing regulatory policy (for example, fish populations). (Lohani, 1997)

The potential impact of a project activity is assessed in space or time from a given environmental parameter. It is from this that the levels of EIA standards requirements to be applied are determined. The possibility or likelihood of Impacts, especially negative ones, leads to need to mitigate. Preferably, these should have been anticipated and planned for. If anticipated, the impact is pre-empted and so mitigated to ensure no or minimal negative impacts. The proposed mitigation plan then aids in the prevention of the impact or at least in the reduction of the intensity of the impact. One of the salient purposes of EIA is to define ways in which negative effects of projects to the environment can be minimized. It is more efficient and ultimately more effective to determine these mitigation measures at the inception phase of the project. Evaluations are then carried out during the operations phase. This is because it is necessary to revisit the measures and their suitability during the operational stages. Environmental screening on most projects is carried out in the project development stage. This is usually done at a time when all the other design and operational details of the project are not firm. For this reason, not all mitigation options can be covered and so an effective prescription cannot fully be made with absolute confidence (Lohani, 1997).

During the process of monitoring, when it becomes clear that the impact of a project is to an unacceptable level, changes are made in the project structure or operations to mitigate the negative impact. Strategic and planned monitoring is put in place to facilitate the implementation of defined strategies(Lohani,1997). This monitoring also allows for the assessment to assess whether or not there is a possibility for other unexpected impacts occurring. This is the very reason why EIA becomes a very dependable tool towards ensuring environmental sustainability. The initial determination of likely impacts enables planned mitigation and in some cases the shelving of projects, which are found to be likely to have very adverse impacts.

Periodical sectoral reviews are intended to harmonize environmental and development issues and make them sensitive to physical, environmental and socio-economic concerns. Harmonization of public policies right from the formulation stage will reduce potential conflicts and increase efficiency in environmental management. Such policies will take into account other policies and their specific concerns so that no one policy is put in place and when its being implemented, it is

found to be in conflict with the another. An integrated approach is what needs to be adopted to minimize conflict.

2.4.2 Initial environmental audit

Initial environmental audits (IEA) are undertaken in the case of projects that commenced or have been in operation prior to the coming into force of the Environmental (Impact Assessment and Audit) regulations, 2003. IEAs are carried out to provide baseline information upon which subsequent environmental control audits are based. Section 35(2) of EMCA, 1999 contains what an environmental auditor does which includes a look at the project description, objective, scope and criteria of audit. Other aspects of an IEAs entail studying the relevant environmental law and regulatory frameworks on health and safety, sustainable use of resources, and acceptable national and international standards. An auditor verifies the level of compliance with the environmental management plan and evaluates the proponent's knowledge and awareness of and responsibility for the application of relevant legislation. An IEA also entails review of existing project documents on infrastructure and designs as well as examination of monitoring programs, parameters and procedures in place for control and corrective actions during emergencies. The auditor examines records of incidents and accidents, the likelihood of future occurrence of the incidents and accidents, inspects buildings or premises where manufacturing, testing and transportation takes place within the project area, and areas where goods are stored and disposed of, and then gives a record of all significant environmental risks associated with such activities. (EMCA, 1999). Initial EA and a control audit is conducted by a qualified and authorized environmental auditor or Environmental inspector who shall be an expert or a firm of experts registered by NEMA.

2.4.3 Environmental Management Plan (EMP)

Environmental management includes protection, conservation and sustainable use of the various elements or components of the environment (EMCA, 1999). An environmental management plan is a deliberate arrangement put in place to achieve good environmental management. An EMP is usually prepared following an environmental Impact assessment to ensure that measures are put in place to not only take care of expected adverse impacts but that the operations are managed sustainably. An EMP includes a statement on potential adverse and beneficial impacts of a project, stated environmental protection objectives and control strategies to be adopted to achieve environmental protection objectives. It also includes environmental authority conditions and describes details of a projects monitoring, reporting, training and auditing schedule. These broadly

include specific targets, measurable achievements, assignment of duties to particular staff and a very clear reporting structure to ensure proper follow up at various levels (EPZA EMS, 2010).

2.4.4 Environmental audit

Environmental audit is a systematic evaluation of activities and processes of an ongoing project to determine how far these activities and programs conform with the approved environmental Management plan of that specific project and sound environmental management practices (EMCA, 1999). These evaluations are usually periodic, objective and documented. The goal is to establish if proponents of the project are complying with environmental requirements and enforcing legislation. An auditor among other things verifies levels of compliance with the EMP, examines monitoring programs, parameters and procedures in place for control and corrective actions in cases of emergencies. An auditor also examines records of incidents and accidents and likelihood of future occurrence of others. An auditor also examines health and safety issues, the project employees, the surrounding activities and also other communities who may be affected.

An audit report included past and present impacts of the project, responsibility and proficiency of operators, existing internal control mechanisms to identify and mitigate activities with negative environmental impacts, arrangements for workers health and safety and existence of environmental awareness and sensitization measures, including standards, regulations, law and policy for the personnel(EMCA, 1999).

As in the case of EIA, NEMA oversees the administration of EA in Kenya. There are certain projects for which EA is a requirement because of their potential adverse impacts.

2.4.5 Occupational Safety and Health

The occupational safety and Health Act No. 15 of 2007 at article 6(1) requires occupiers to ensure the safety, health and welfare at work of all persons working in the work place. This duty includes;

- a) provision and maintenance of safe and healthy plant and systems
- b) arrangements to ensure safety and no risk to health while using, handling, storing and transporting articles and substances
- c) providing necessary information, instruction, training and supervision to ensure safety and health of employees

- d) maintenance of work place in a condition that is safe and with no risk to health and provision of access to and exit from it that are safe and not risky
- e) provision and maintenance of a work environment that is safe, risk free and adequate in terms of facilities, and arrangements for employees welfare at work
- f) informing employees of any risks from new technologies and imminent danger
- g) ensuring that all employees participate in the application and review of safety and health measures

Every occupier is required to prepare a safety and health policy statement, implement the same and bring it to the attention of the employees. Part VI gives general health provisions, which include specific requirements for the work place in terms of cleanliness, overcrowding, ventilation, lighting, drainage of floors and sanitary conveniences. Part X covers general welfare provisions including supply of drinking water, washing facilities, accommodation for clothing, facilities for sitting and first aid. The entire act covers various aspects of workers health and safety and includes provisions for enforcement and even penalties in cases where there are defaults on the part of occupiers. These provisions are very key where industrial plants are concerned and it is important that project proponents ensure that the requirements of the occupational safety and health are met.

2.5 An Overview of Environmental Management in a few select EPZs outside Kenya

There are a number of Export Processing Zones (EPZs) the world over. This study looks at a few selected cases for the purpose of comparison.

In Sri-Lanka the Board of Investment (BOI,) is the Authority charged with the responsibility of the administration of EPZs. It has its own Environment Department to address the environmental issues and provide guidance to investors in implementing measures to mitigate any possible adverse environmental impacts. Each project proposal, within the EPZ, is subjected to an EIA and any significant likely environmental impacts are identified. The details of this assessment are discussed with the investor who may be required to obtain the required technological guidance. The applicable Act in Environmental management in Sri – Lanka is the National Environmental Act. This Act requires that, the industries which discharge, deposit or emit waste into the environment obtain an Environmental Protection License (EPL). For granting of location approval and issuing of EPL for projects within the EPZs of Sri-Lanka, the BOI is empowered to enforce the provisions of the National Environmental Act. As per the EIA regulations currently in force, EIA is carried out in a specified manner for those projects listed under the Act. The BOI assists

the investor in implementing the procedures. The BOI has its own Environmental Monitoring Laboratory and conducts environmental monitoring and compliance checks with the national discharge standards.

In Bangladesh, the Bangladesh Export Processing Zones Authority (BEPZA) plays an equally corresponding role and monitors the zone's activities through various formulated legislations within the National Environmental Policy, whose role among many others is to ensure that all new EPZs, both public and private conduct EIAs and enforce the regulations (FIAS,2006).

China in 1989 established the Environmental Protection Law (EPL). This statute lays out the general principles for environmental protection and describes key instruments for environmental management. It requires enterprises to assess possible environmental impacts of proposed projects and comply with applicable environmental standards. This statute divides environment management functions between local and national environment administrations with powers to enforce environmental legal requirements (EPL,1989). It also recognizes the right of individuals and organizations to report cases of pollution and file charges against polluters. Since 1989, at least 24 laws addressing pollution control and natural resource conservation have been enacted in China. Between 2000 and 2004, a number of new environmental laws greatly emphasizing on preventive approach and stricter response were put in place. These include; law on EIA and amendments to other acts such as the EPL as well as Air, Water and Waste Management Laws. There are more than 40 state council regulations, approximately 500 standards and more than 600 other regulatory documents that address pollution control, natural resource conservation and the management of the environmental aspects of production and consumption patterns. These documents set detailed binding rules for the implementation of the legislation and establish a number of regulatory tools for environmental and natural resource management.

India's economic development propelled by rapid industrial growth and urbanization is causing severe environmental problems that have local, regional and global significance. Air quality data in India's major cities indicate that ambient levels of air pollutants exceed both the World Health Organization's and Indian standards, particularly for particulate matter. According to the Organization for Economic Cooperation and Development (OECD) report by the Asian Environmental Compliance and Enforcement Network (AECEN,2006), it is estimated that over 96% of India's total demand for commercial energy is met with fossil fuel with coal contributing

60% and petroleum products 36%. India's rivers and streams suffer from high levels of pollution from waste generated primarily from industrial and municipal activities. Industrial wastes from large and medium sized plants contribute to over 50% of the total pollution loads. To address these environmental challenges, the state government has identified and targeted 17 highly polluting industries and 24 environmental problems. The chemical and engineering industries are on top of the government's list since they are the major contributors to air, water and land pollution. These industries include integrated iron and steel plants, non ferrous metallurgical units, pharmaceuticals and petrochemical complexes, fertilizer and pesticide plants, thermal power plants, textile, pulp and paper and tanneries(AECEN,2006). To counter these challenges the government in 2006 put forward the National Environmental Policy (NEP) which provides a guide to action in regulatory reform, environmental conservation and enactment of legislation by government agencies at all levels. While monitoring the impacts, the policy looks into the following; water resource pollution due to disposal of untreated industrial effluents; Negative impacts on health due to emissions from stack and other industrial operations; disposal of solid and hazardous waste including sludge storage; handling and use of chemicals/ hazardous materials; ground/surface water extraction; disposal of untreated waste water and other indirect impacts due to land use change; increased traffic and other developments. To ensure proper management, the following measures were put in place for the enterprises within the zones,

- common effluent treatment plants with tertiary treatment for reuse/recycle were constructed
- common hazardous waste treatment facilities
- common solid waste disposal facilities
- common waste water treatment plants with tertiary treatment for reuse/recycle
- integrated rainwater harvesting and water supply facilities
- Adequate plantation within and around the premises to help minimize pollution.

In addition, all tenants are required to conduct an Initial Environment Examination (IEE) to obtain a Site Clearance Certificate (SCC) prior to allotment of a plot to set up their operations in the initial stage and eventually to obtain an Environmental Clearance Certificate (ECC)at the advance stage. These are emphasized through the Environment Monitoring and Enforcement Plan Guidelines; Environment Best Management Manual; environment Audit of Enterprises;

Environment Enforcement Strategy; Environment Inspection Forms and Modules; and Evaluation and Rating Criteria for Enterprises, as tools for management and monitoring to improve environmental performance of the enterprise. The major reasons for emphasizing on the importance of EIA are to provide a safety cushion against the negative effects that would come with the development of these activities and end up polluting the environment.

The EPZs in Ghana are subjected to the rules as set up in the Environmental Protection Agency (EPA). Ghana established the EPA as a preventive legislation to tackle or prevent actions that might lead to environment destruction. EPA through the Environmental Assessment Regulation requires that, new developments must register with EPA, and conduct an EIA based on the type, scale and location of the intended activity. Upon being satisfied with the results of compliance and the mitigation measures proposed, EPA then issues the project with a permit allowing take off. All industries that were in existence before this legislation were required to conduct an environmental assessment (audit) of their facilities and propose ways and means of improving the levels of performance of their set up. The reports are then submitted to EPA for review after which they have to be implemented and the goals achieved within three years for the old factories whereas the new ones, must comply after eighteen (18) months in operation; they are also required to submit monthly returns of their environmental parameters monitored to the EPA; and an annual environmental report indicating how they have performed environmentally, achievements, failures and their remedies. By using these instruments, EPA is able to measure the levels of compliance. To achieve its objectives EPA works closely with all relevant government agencies to carry out compliance for example; among others, the Energy Commission which controls all activities of the investments in the energy sector. Through the Environmental Quality department of EPA in collaboration with other departments within and outside, the EPA carries out routine monitoring of the environment parameters and the results obtained are used to check against the returns submitted by the industries. To supplement this, the Environmental Inspectorate and Legal department is primarily responsible for responding to incidents of non compliance by following the indications given on the levels of non-compliance.

Chabari (2000) noted that countries like Mexico whose EPZ equivalents have performed well have put in place elaborate systems of disposal of industrial waste.

2.6 Environmental Management in the Export Processing Zones in Kenya

Protection of the environment is an integral part of business at the Export Processing Zones Authority and the Export Processing Zones. The Authority's environmental objectives are derived with a specific aim of ensuring that business operations are carried out in a manner that guarantees environmental sustainability.

The environmental management processes in place are implemented, monitored and periodically reviewed so as to ensure an effective and continually improving quality and environmental management performance. The EPZA in its environmental policy states that EPZA as an investment promotion agency of the Kenyan Government responsible for catalyzing export oriented investments in EPZs recognizes her responsibility for protection of the environment. The Authority commits to:

- Control the EPZA's services and operations activities in order to minimize their negative impacts
- Comply with relevant applicable environmental laws and other requirements that apply to the organization activities
- Set up and strive to achieve environmental objectives and targets which will be monitored and periodically reported for review
- Train and motivate members of staff to carry out their tasks in an environmentally responsible manner
- Continuously improve her environmental performance by minimizing pollution , adopt waste management best practices, minimize water and energy use

(EPZA,2008)

The EPZA requires that investors under EPZ program ensure that the envisaged projects which have potential negative environmental aspects undertake a comprehensive EIA prior to the approval of the project. When a project is presented for consideration at the EPZA, all the features of the project, including details on promoters, financing, markets, production process, implementation, timelines and environmental aspects are examined and discussed thoroughly to ensure they meet set criterion for approval of projects. If a project is found to meet approval criteria, it is given provisional approval and asked to proceed with the EIA among other conditions before final approval can be given. Projects then carry out an EIA and obtain approval from NEMA, then submit the same to EPZA so as to be granted final approval. The idea is to ensure that

all projects fulfill sustainable environmental management requirements (EPZA,2010). An Environmental Monitoring Plan is often times included and may be a condition of the financier and the EPZA.

All EIA processes in the EPZs, as indeed the rest of Kenya are subjected to review process at NEMA. On receiving the EIA reports, the process involves confirming if payment of the 0.1% of the project cost have been made, if the lead expert is registered, if it is a study report or project report, giving the report reference number and filing, and issuing an acknowledgment letter to the proponent. After receiving the reports, they are dispatched to the relevant lead agencies through the registry. It takes twenty one (21) days for a Project Report to be acted on. Preparation of summary for public consultation supplement is prepared and printed in the newspapers in case of a full EIA Study report.

EIA Review Process ensures the review criterion is guided by template for EIA review and ensures description of the report to determine completeness, acceptability and any inadequacy. These include; methodology utilized in compiling the report, description of the project and assessment of alternatives, legislative framework and non- technical summary and public consultative supplement. The decision making principles include; using the ecosystem approach, considering alternatives, using a hierarchy to mitigate impacts, applying precautionary principle, ensuring equitable sharing, and risk assessment considerations among others. Decisions of the Authority (NEMA) include; issuance of conditions for approval of the project, issuance of EIA License, after the proponent has accepted the conditions in writing. Otherwise NEMA hold approval until the adverse impacts are addressed, upgrading the project to EIA study and rejecting the application with reasons (EMCA,1999).

When carrying out project appraisal and later examining the EIA results, officers of the EPZA must have sufficient understanding of what they are looking for so as to be able to fully examine projects and also enrich the project implementation process, as well as subsequently be able to monitor and evaluate the environmental management systems put in place by various developers and operators (EPZA,2008).

The EPZA seeks to employ both the preventive waste management as well as the curative. There is however an emphasis on the preventive, thus the use of the EIA so as to mitigate against possible

negative impacts from the beginning. The curative then complements the preventive because industrial processes always have some emissions which have to be handled properly. The EIA report is a very critical tool through all the stages of environmental management at the EPZA. Officers must carry out periodic audits, and continual monitoring and evaluation while referring to the EIA report to check the implementation process against already laid down recommendations which were identified at the time of carrying out an impact assessment(EPZ, EMS, 2010).

One of the main motivations for sound environmental management for the EPZA, as indeed everywhere else, is the need to contribute to the good management of the environment for the benefit of all as a responsible state corporation. A major motivation for the investors in the EPZs, is that the buyers require it of manufacturers. The fact that business is dependent on good environmental management, along with other requirements like provisions for workers' safety, makes manufacturers have to put systems in place. They realize that buyers will not buy unless they run their set ups properly, and as by law required. The officers at the EPZA have also employed promotion of environmental auditing as an integral part of good business practice, and this includes introducing the concept of auditing to small and medium sized firms as well as dissemination of environmental information and advice to enterprises. As part of monitoring compliance, enterprises are required to carry out periodic internal self audits. Periodic inspections and audits are also conducted by the EPZA officials, government public health officers, and NEMA. Inspections are also carried out by respective buyers for the enterprises and these have proved to be a big regulatory tool as poor management translates into loss of business.

In a study carried out in 2000, Chabari noted that the EPZ programme did not seem to support a pollution free industrial environment. He noted that some enterprises in some zones pose a danger to their neighbours due to industrial waste flowing from the industries into streams which could affect those residing nearby. Chabari(2000) noted that at the time, EPZA had not established proper institutions to guard against pollution. Chabari (2000) noted that among the problems associated with the development of EPZs worldwide, is that of waste disposal, especially toxic waste. He went on to note that many firms ignored the management of toxic waste and illegal dumping is therefore prevalent.

It is gratifying to note that a few years later, the EPZA together with the managements of various enterprises have put in place various measures to manage the environment as was observed in the

course of this study. These included the employment of EIA and EA and self audits and EMPs and OSH which are the focus of this study.

2.7 Conclusions from literature review

From the literature review, the emerging scenario is that when investors in industrial plants take into account environmental concerns adequately, specifically carrying out an EIA, at the onset, they are afforded a chance to mitigate against likely negative impacts and maximize on positive impacts. The literature review further shows the importance of not only carrying out an impact assessment, but more importantly complying with the recommendations of the EIA to make it an effective tool. Various studies have been conducted in the EPZ sector including, an assessment of the roles of EPZs in Kenya (Chabari 2000), the impact of EPZ development on employment creation (Mireri, 2000), Labour dispute settlement machinery in Kenya (Mutsotso, 2002), an analysis of the terms and conditions of employment in the EPZs (Kibuna, 2005) and whether EPZs are relevant in a liberalized environment (Kibua, 2005) among others. There is no specific research on the use of EIA, self audits, EMP and OSH which are features of good environmental management. This is the gap that this study is intended to fill.

2.8 Conceptual Framework

This study is premised on the relationship between investment in industrial developments and the need to employ specific applicable tools to aid and enhance good environmental management. Investment in developments of an industrial nature continues to grow by the day. There is the realization that though agricultural production is the mainstay of the Kenyan economy, the best benefits are derived from value addition to the products of such agricultural (and other) production. Consequently, attempts are being made to encourage investment in value addition to goods as opposed to just exporting products in their raw form. There is also investment in other kinds of industries which are not agricultural based but also may have negative impacts – for example the constantly improving and innovative Information technology sector. This implies there will continue to be increase in investment in manufacturing and processing. These industries also serve other purposes as indeed is the case in the EPZs including creation of employment. Industrial development is expected to continue to grow and therefore giving adequate attention to issues of good environmental management at the start and during implementation of projects has a lot of advantages.

The very fact that one has invested in industrial production necessarily implies that there is increased likelihood of impacts or effects on the biological environment, population and ecosystem as well as the built environment.

Carrying out an EIA of a proposed project has benefits which broadly include,

1. Recognition of possible negative (and positive impacts – byproducts)
2. Mitigating against negative impacts to minimize bad effects
3. Putting in place aspects of cleaner production to ensure minimum wastage
4. Harnessing full benefits of positive by products
5. Happier workers
6. Cost cutting both at the onset, as well as during the life of the project eg by purchasing appropriate technology, as opposed to purchasing machines which may require to be disposed off sooner.
7. Allows for effective and continuous monitoring and evaluation
8. Putting in place an appropriate and effective Environmental Management Plan

Considering the environment affords the promoters an opportunity to not only plan effectively and therefore avoid possible damage to the environment, but also provides a chance to mitigate adequately right from the onset. EIA becomes a very important tool in the implementation of projects in various sectors, especially in manufacturing. It helps project not to have significant adverse impacts if applied well.

On the other hand, if environmental concerns are not borne in mind at the inception of projects, the proponent may have to contend with a significant number of issues during the implementation including major challenges if these were not anticipated and therefore prepared for. Such impacts could cost large amounts of resources both monetary and human. In case of this, there is likelihood of;

1. Pollution
2. More gaseous, liquid and solid waste
3. unhealthy and therefore unhappy workers,

4. less productivity
5. loss of man hours due to incidences of sickness,
6. unhappy buyers who may cancel orders, leading to loss of business
7. Unhappy neighbors due to impacts on the environment, including air pollution, pollution to rivers and the soil on which the neighbors depend.
8. Proprietors have a chance to put things right by carrying out an Initial environmental audit during the course of the project.

Figure 3 below is used to illustrate the likely scenario in the cases described here where the benefits of carrying out EIA and subsequent implementation are explained alongside the likely negative impacts of not doing this. In both cases, whether there was EIA or not, there will be competition for scarce resources as most investors are more keen on profits, than on the requirements of good environmental management practices.

It is recommended that in both cases, even where EIA was not done, once Initial Environmental Audit is done, there should be subsequent evaluation and monitoring to ensure adherence to the recommendations of EIA and Initial EA reports and subsequently periodic self audits.

In the past, where the past includes implementation times for projects currently in operation, EIA was not emphasized. Indeed it was not a requirement. Today, luckily, this is a requirement for industrial and certain categories of other projects which may impact the environment.

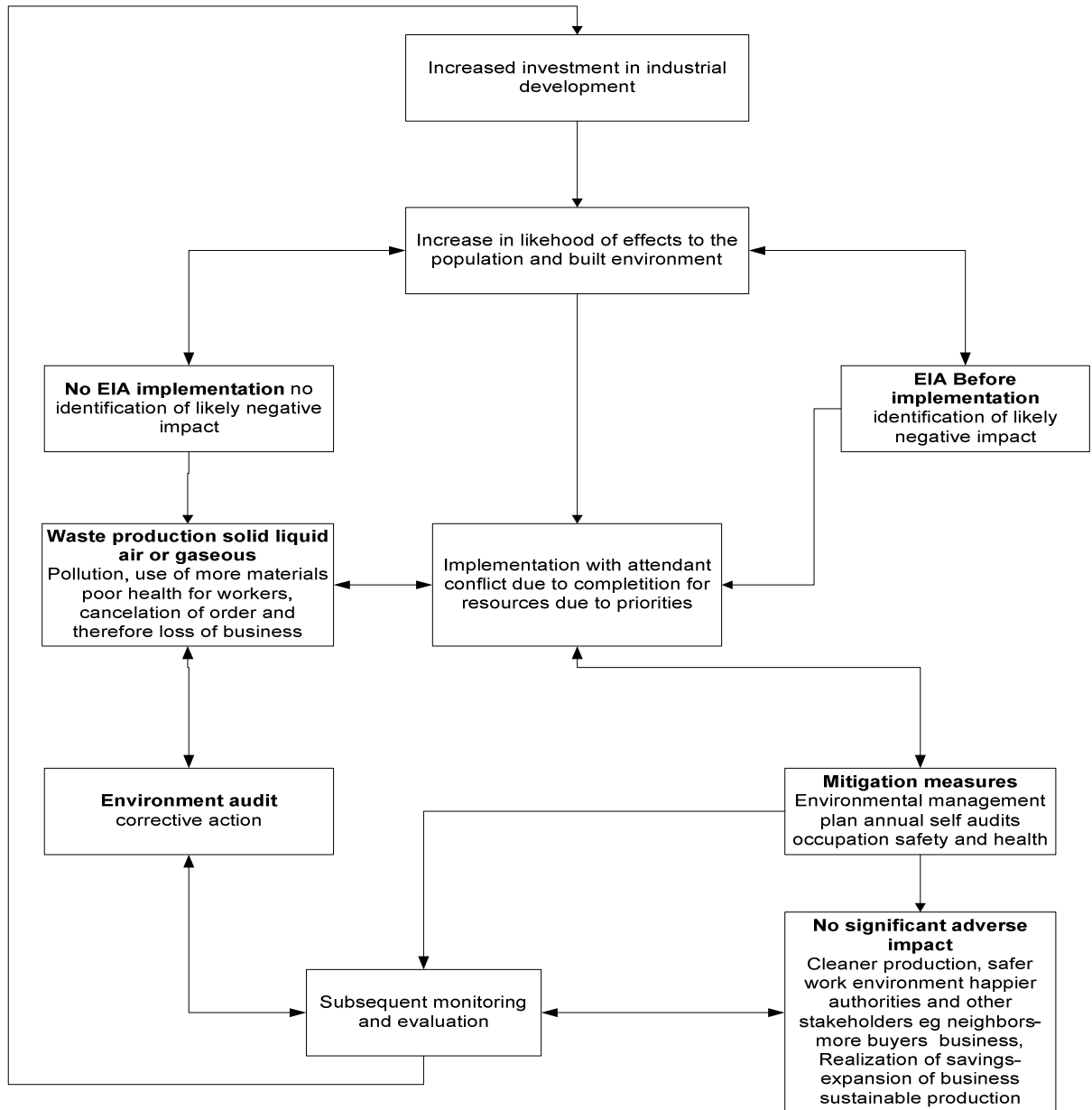
While there are provisions in law, the implementation of these provisions is what matters as legislation without accompanying strict implementation may not yield much good. Project implementers still struggle with priorities especially in terms of whether to apply more funds to the management of the environment. Project proponents understand other items of the project such as wages and provision of raw materials as more immediate needs for the implementation and eventual operation. There is a lack of full or adequate appreciation of the need to consider good environmental management as an integral part of all the planning and setting up. Not all investors understand that excellent protection of project surroundings including conservation of the environment is good, not only for business, but for the common good. This then calls for enforcement by the law by way of making inclusion of issues of good environmental management

a requirement, as well as very strict monitoring during the life of the venture. This is what calls for putting in place Environmental Management plans accompanied by adequate plans for resources both monetary and in terms of skills and manpower to implement assessment and audit recommendations. Such plans should ideally include aspects of occupational safety and Health as healthy workers should be a concern of any investor or proprietor. These must be accompanied by continuous and structured periodic evaluation of performance with reference to the requirements of the EIA, EA, EMP and OSH.

The main concern of project proponents, promoters or sponsors is usually profits. Occasionally, there may be investors to whom issues of the environment are the main concerns, or even those who invest out of philanthropy, but the larger number is those who invest purely for profits. The responsibility to ensure that projects adhere to the laid down rules of good environmental management is then left to the authorities who oversee the developments and the Export Processing Zones Authority has this responsibility with respect to development of the Export processing Zones in Kenya.

The activities that constitute an environmental impact assessment for industrial production projects and the recommendations have a direct cause and result effect on each other. In other words, the ability to achieve better environmental management in industries is directly dependent on carrying out an assessment from the beginning and continuous periodical audits, and meeting the requirements of these assessments and audits. The converse is also true. Where assessment is not done to determine possible impacts at the onset, there is no opportunity or chance to mitigate. This study seeks to analyze the use of Environmental Impact Assessment, Annual self audits , Environmental management Plans and occupational safety and Health as tools to achieve better environmental management in the EPZs. The study also seeks to determinate the relationship between good environmental management and these variables.

Figure 3: Schematic presentation of Conceptual framework



Source : researcher 2010

CHAPTER THREE: STUDY AREA

3.1 Background

The Export Processing Zone (EPZ) program was implemented as part of the industrial sector adjustment program (ISAP) initiated in 1988 to restructure the industrial sector so as to stimulate investment and make it more export oriented. The program was launched as a response to the limitation of import substitution strategy of industrialization, which manifested in decline in industrial investment and output, poor export performance and very weak job creating capability. Before 1990, the reform program concentrated on reducing the anti-export bias of the overall policy and regulatory framework. The government with the support of the World Bank implemented the export development program (EDP) in 1990 that was structured to address infrastructural and institutional constraints to export production and marketing. The implementation of the EPZ constituted an integral part of the export development program. Consequently, the EPZ Act (CAP 517) was enacted in 1990 (EPZA, 2007).

3.1.1 Mandate and Principle objectives

The Export Processing Zones Authority (EPZA) is a state corporation established under the EPZ Act (CAP 517) of the laws of Kenya. According to the act, the Authority's mandate is the promotion and facilitation of export oriented investments and the creation of an enabling environment for such investments. The Act provides for manufacturing, commercial and services to be undertaken by licensed enterprises operating in specific industrial park locations called zones, set up by zone developer/operators. These zones are designated/de-designated by the Minister responsible for Trade.

The EPZ act, CAP 517, clearly states the EPZA's Principle Objectives as:

- i. The development of all aspects of the EPZs with particular emphasis on provision of advice on the removal of impediments to, and creation of incentives for, export-oriented production in areas designated as export processing zones; and
- ii. The regulation and administration of approved activities within the EPZs, through implementation system in which the enterprises are self regulating to the maximum extent
- iii. The protection of government revenues and foreign currency earnings

The economic objectives of the EPZ program are:

- Promotion and diversification of exports
- Attraction of new productive investments
- Generation of employment
- Creation of backward linkages and foreign exchange earnings
- Technology transfer and skills upgrading

3.1.2 Vision, Mission and core values

The vision of the EPZA is to be a leading agency contributing to the socio-economic growth and transformation of Kenya into a global hub for investment and trade. The mission is to enhance economic and social development by promoting, facilitating and creating an enabling environment for investments in Kenya's EPZs and Special Economic Zones (EPZA,2010). The core values of the EPZA are Customer Focus, teamwork, Integrity, Respect and Fairness, Transparency and Accountability, Creativity and Innovation, Institutional Loyalty and Patriotism

3.1.3 EPZ Incentives

The EPZ programme offers a number of incentives to project proponents interested in setting up businesses in the EPZA. These include;

- **Fiscal incentives** (exemption from income tax, import duty, withholding tax, VAT, stamp duty and provision of an investment allowance).
- **Procedural incentives** (designed to reduce bureaucracy through exemption from compliance with various laws and defined services delivery standards by EPZ Authority)
- **Infrastructural incentives** (where infrastructure and superstructures provided by the government and private zone developer to support export oriented production, including water, sewage, roads, security fence, lighting and buildings). (EPZA , 2011)

There are two public zones owned and operated by the EPZ authority, and there are privately owned EPZs which are the majority.

3.2 Public EPZs

Athi River EPZ measures 454Hectares and was developed using public resources totaling Kshs 2,628.4 million. US \$ 30 million (Kshs 2,322 million) was spent to put up the infrastructure and administration building (Plate 1) and 12 No. industrial units with a total built up area of 160, 500 sq. feet which is fully occupied. Subsequently, phases I & II of Export Business Accelerator (EBA) premises were developed at a cost of Kshs 140 million & Kshs 111.4 million respectively.

The zone is managed by the EPZ Authority on behalf of the Government. The zone also has industrial buildings put up by private developers. Transfleet EPZ Ltd constructed 18 industrial units measuring 290,628 square feet and these too are let out to various enterprises. Capital Industrial Park EPZ Ltd put up a total area of 221,000 square feet. The zone has 35 operating enterprises involved in provision of a range of products from garments, pharmaceuticals, darts board, services, agro products, foods and electrical goods among other. 40 hectares of serviced industrial plots in Phase I have been leased out and approximately 20 hectares are available for letting. Since most of the serviced plots in Phase I are taken up, the Authority has engaged consultants to prepare designs for Phase II to extend infrastructure facilities. A few plots in this phase have been allocated.

Phase I of the EBA consists of a total built up area of industrial space of 32,514 square feet of which 23,085 square feet is occupied. The EBA aims to attract and nurture small scale local exporters to become high growth exporters within four years and thereafter graduate from incubation program. The aim is to have many local investors venturing into the export market hence increase their participation in the EPZ program and demystify the notion that the program is for foreign investors. This is in line with Government Vision 2030 goal of empowering small local investors to become full time exporters. Phase II of the EBA is complete and comprises seven go downs with a total built up area of 32,100 square feet plus management offices to cater for increasing demand for indigenous small scale enterprises.

Customers of the EPZA also include water consumers, various service providers, local authorities, neighboring residences among others. Diverse social, economic and environmental considerations influence developments and land use in the EPZs.



Plate 1: Administration building – Athi River EPZ
Source – fieldwork August 2010

Kipevu EPZ is a public zone located adjacent to the port of Mombasa measuring a total of 38 Ha. All the land is committed and it is expected that in due course its face will substantially change, as some investors have commenced development.

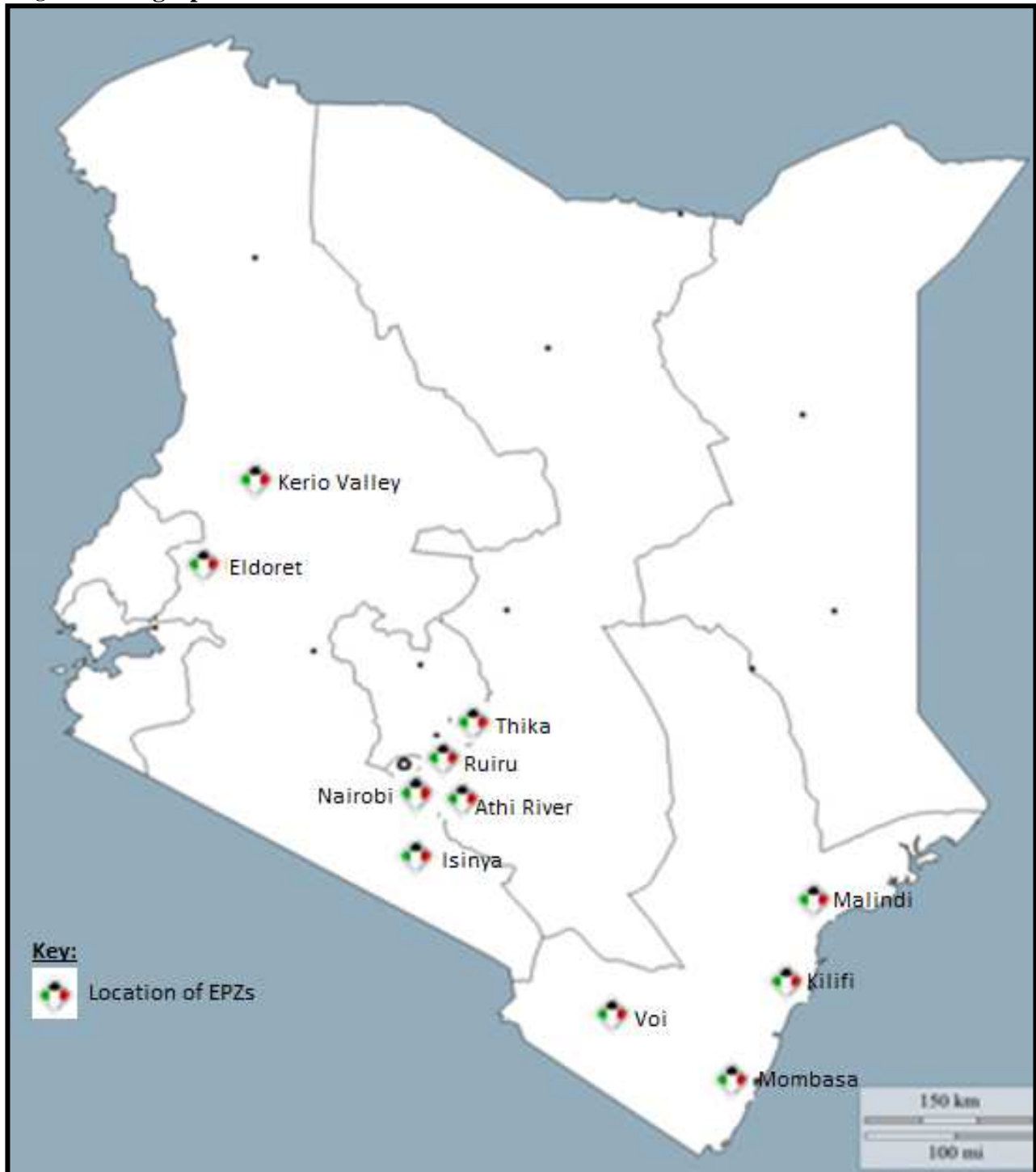
3.3 Status of gazetted zones

There are 42 gazetted zones (EPZA, 2010). Out of these, 40 are privately owned and operated, while 2 are public. Details on location and status are as indicated in Table 3 and Figure 4 below.

Table 3: Location and status of zones, 2010

	Location	Operational	Setting up	Dormant	Total
1	Athi River/ Mavoko	2	0	1	3
2	Nairobi	7	0	2	9
3	Mombasa	15	3	2	20
4	Voi	1	0	0	1
5	Kilifi	3	0	0	3
6	Kerio Valley	1	0	0	1
7	Thika	1	0	0	1
8	Isinya, Kajiado	1	0	0	1
9	Ruiru	0	0	1	1
10	Malindi	0	1	0	1
11	Eldoret	0	1	0	1
**	Total	31	5	6	42
****	% of total	73.8	11.9	14.3	100.0

Figure 4: Geographical location of zones



Source – NID, EPZA, 2010

3.4 Performance of the EPZ program

The EPZ program has contributed to Kenya's economy especially through creation of employment, attraction of new investments and value addition in terms of local resource utilization (domestic expenditure) among others. The performance of the program is measured as per certain key parameters or indicators. A summary of the performance indicators over the years is outlined in the table 4 below.

Table 4: Performance of EPZ Key Indicators: 2005 – 2010

Indicator	2005	2006	2007	2008	2009	2010	Growth % (2009 v/s 2010)
Gazetted zones (no.)	43	39	41	38	41	42	2.4
Investors enquiries	159	280	327	218	162	229	41.4
Projects approved (no)	16	21	18	24	21	19	-9.5
Project proposals	29	34	39	38	41	39	-4.9
Enterprises Operating (no.)	68	71	72	77	83	75	-9.6
Employment – (Kenyans) ^a	38,051	36,767	34,446	30,187	30,115	31,026	3.0
Employment - (Expatriates) b	800	649	511	471	508	476	-6.3
Total Employment (No)=a+b	38,851	37,416	34,957	30,658	30,623	31,502	2.9
Total sales (Kshs. million)*	23,774	25,352	29,400	31,262	26,798	32,348	20.7
Exports (Kshs. million)**	20,036	22,893	27,400	28,094	23,948	28,998	21.1
Domestic Sales (Kshs. million)	3,160	1,403	1,421	2,536	2,214	2,389	7.9
Imports (Kshs. million)	12,497	12,674	17,287	16,348	12,672	16,518	30.4
Investment Kshs. million	18,682	20,320	19,027	21,701	21,507	23,563	9.6
Expenditure on local Purchases (Kshs million) ¹	2,388	3,253	3,454	4,476	3,942	4,661	18.2
Expenditure on local Salaries (Kshs million) ²	3,017	3,299	3,197	3,044	3,274	3,583	9.4
Expenditure on power (Kshs million) ³	366	522	421	575	488	522	7.0
Expenditure on telecommunication (Kshs million) ⁴	112	117	114	88	90	135	50.0
Expenditure on water (Kshs million) ⁵	84	121	75	55	58	71	22.4
Other Domestic Expenditure (Kshs million) ⁶	2,288	1,861	1,289	3,127	3,180	4,315	35.7
Total Domestic Expenditure (Kshs million) = 1+2+3+4+5+6*	8,255	9,173	9,110	11,365	11,032	13,287	20.4

Source : EPZA annual performance report , 2010

* Foreign exchange equivalent injected into the economy

** Inclusive of exports, domestic sales and sales to EPZ/MUB & Duty Free Agencies

3.5 Sector performance

In 2010 fifteen industrial sub sectors were operational and their proportional contribution was as indicated in table 5 below. The table shows the number of enterprises in each sector, exports, total sales, direct local employment, investment and local resource utilization. The table indicates that garment sector still remains the most dominant sector within the program.

Table 5: Performance by sector - Year 2010 (Kshs)

Sector/activity	local jobs	exports	total sales	local resource	investment
Agro processing	2,919	3,972,326,577	4,036,377,097	3,371,297,725	2,303,177,790
Beverage/ spirits	102	285,885,048	285,885,048	136,088,173	220,000,000
Dartboard	246	504,855,556	506,784,268	155,331,252	710,000,000
Electricals	16	717,407,948	717,407,948	17,959,108	526,581,230
Food processing	258	316,595,175	554,654,150	495,008,201	2,676,751,322
Garments	24,114	16,296,364,205	16,912,516,481	4,010,695,006	6,958,973,880
Garments support services & accessories	25	0	30,248,207	10,639,781	66,121,370
Minerals/metals/gemstones	140	722,429,229	722,429,229	1,251,162,649	1,147,416,328
Pharmaceuticals & medical supplies	234	310,184,687	425,507,757	128,549,188	1,497,198,631
Plastics	228	269,786,671	638,347,345	137,329,635	635,308,365
Printing	316	856,694,767	2,512,580,508	444,548,394	2,185,300,000
Relief supplies	85	860,249,991	860,249,991	342,283,988	114,826,986
Services	1,917	3,706,244,370	3,962,105,158	2,657,699,561	3,052,360,168
Spinning	326	154,784,880	158,213,321	107,597,329	1,450,000,000
Other	100	24,165,435	24,389,685	21,100,900	18,955,131
Total	31,026	28,997,974,539	32,347,696,193	13,287,290,890	23,562,971,201

Source : EPZA annual report , 2010

3.6 Significance of EPZ to the national economy

EPZ contribution to the national economy has continued to rise steadily over the years and the import of the program was felt more with the coming into effect of AGOA, in the year 2000.

Contribution to Gross Domestic Product (GDP) of the economy has risen from 2.03% in 2005 to 2.20% in 2010 as illustrated in table 6 . Exports from the EPZ as compared to total Kenya exports increased from 6.94% in 2009 to 7.08% in the year 2010. Apparel and clothing accessories from the EPZs are Kenya's fourth largest merchandise export contributor after tea, horticulture and coffee.

Table 6 : EPZ contribution to the national economy 2005 - 2010

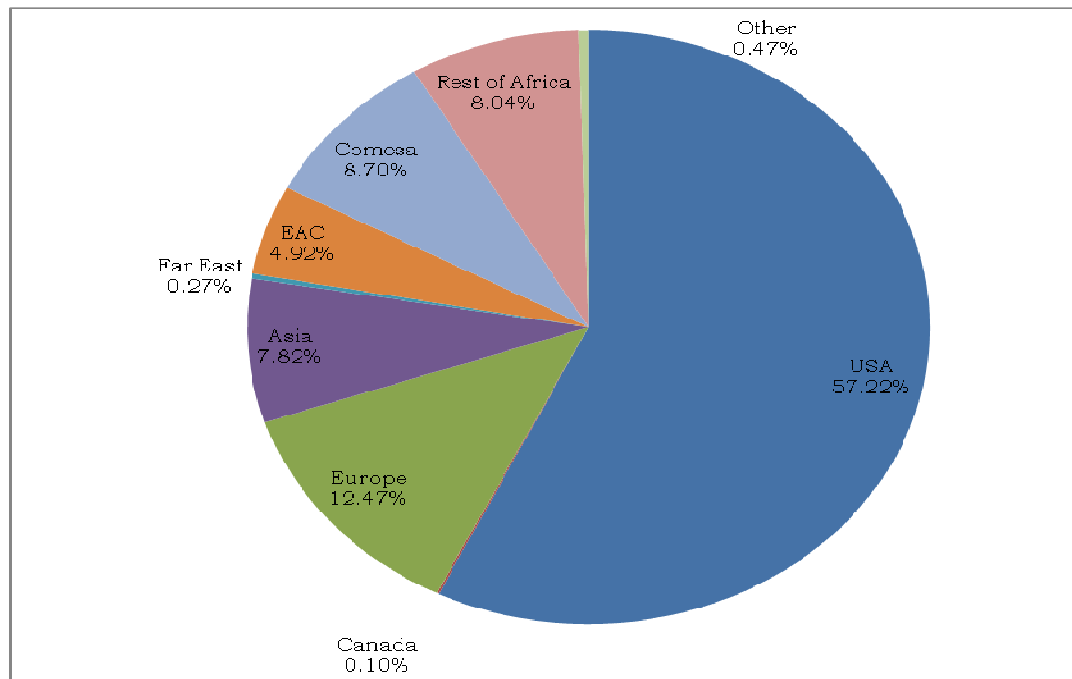
Indicator	2005	2006	2007	2008	2009	2010
Total Kenya Exports (Kshs Million)	260,423	250,994	274,603	344,947	344,950	409,794
Manufacturing sector Value of Output(Kshs Million)	499,767	558,300	626,173	717,217	738,829	861,130
Gross Domestic Product (market prices Kshs Million)	1,172,784	1,248,833	1,335,763	1,357,640	1,392,832	1,470,517
Total national employment (number)	8,271,500	8,975,600	9,450,300	9,946,200	10,456,500	10,960,000
Manufacturing sector employment (number)	247,500	254,900	264,812	264,095	265,300	268,100
Exports EPZ (Kshs. Million)	20,036	22,893	27,400	28,094	23,948	28,998
Total output EPZ (Kshs Million)	23,774	24,832	29,400	31,262	26,798	32,348
Total Employment EPZ	38,851	37,325	34,957	30,658	30,623	31,502
EPZ contribution to total Kenya Exports (%)	7.69	8.91	9.98	8.14	6.94	7.08
EPZ contribution to manufacturing sector value of output (%)	4.76	4.42	4.87	4.36	3.63	3.76
EPZ contribution to total national employment (%)	0.46	0.43	0.37	0.30	0.29	0.29
EPZ contribution to manufacturing sector employment (%)	15.37	14.71	13.38	11.43	11.54	11.75
EPZ contribution to GDP (%)	2.03	2.00	2.20	2.29	1.92	2.20

Source: Economic Survey 2011 and EPZA various reports.

3.7 Destination of Exports

Fig 5 shows the destinations of EPZ enterprise products. The USA market increased its share as a result of rebounding of the economy after the recession encountered during the previous year.

Figure 5 : Market destination for all exports, 2010



Source: EPZA annual performance report 2010

3.8 Constraints reported by EPZ enterprises

The competitiveness of enterprises in the market place has been reduced by various constraints and impediments encountered by EPZ enterprises in the course of manufacturing/service activities. These also negatively impact their profits. An indication of these constraints is as shown in table 7.

Table 7 : Constraints /impediments reported by EPZ enterprises in 2010

Constraint/impediment	Number of enterprise which reported/affected (2010)	% of enterprises affected to total no. of operating enterprises in 2010	% of enterprises affected to total no. of operating enterprises in 2009
Labour productivity/turn over/efficiency, labour unrest	6	8	6.0
Global economic down turn/ recession	3	4	9.6
High Cost of production	6	8	9.6
Customs regulations/KRA	10	13.3	4.8
High cost of power/electricity	10	13.3	10.8
Lack of locally sourced inputs	10	13.3	13.3
Issues pertaining to inefficiency of KPA/port congestion, railway transport	6	8	10.8
Competition from other countries	5	6.7	8.4
High cost of water/ unreliable water supply	5	6.7	3.6
Introduction of quota system in the US	1	1.3	1.2
Local currency fluctuation	1	1.3	3.6
Political instability	2	2.7	3.6
Poor infrastructure	5	6.7	3.6
Others (Lead time, Insecurity, price factor, delays, unfamiliarity with EPZ operations, bureaucracy, insensitiveness to investors, marketing among others).	25	33.3	25.3

Source: EPZA annual performance report 2010

The constraints that face the EPZ enterprises water down the incentives which accrue to them because they still remain uncompetitive.

3.9 Challenges facing the program

The performance of the program would have been enhanced if certain negative factors had not impacted the enterprises. Enterprises are faced with a number of constraints which require urgent address to enhance production. The EPZA annual performance report (2010) clearly outlines these to include:-

- a) Frequent policy changes without adequate consultation.
- b) High cost of production/ operation
- c) Enlargement of domestic market to include five East Africa Community (EAC) partner states.
- d) Delay in implementation of Special Economic Zones (SEZ).
- e) Phase out of apparel & textile quotas under WTO which increased competition.
- f) Expiry of third country fabric provision
- g) Delay in clearing of goods at the port.

3.11 Suggested solutions to challenges

- i. Provide subsidies to provide power at a competitive cost to the EPZ sector of US cents 5 per kwh as opposed to the current rate of between US cents 15 & 18per kwh
- ii. Stable and consistent policies enable predictability and certainty and changes only after exhaustive consultation.
- iii. Allow firms supplying petroleum products to EPZ firms to supply on VAT free basis as provided for in the EPZ Act
- iv. Increase the level of domestic sales to 70% for 5 EAC countries and remove 2.5% duty surcharge.
- v. Reduce corporate tax to 20% for EPZ firms after the expiry of the tax holiday & 12.5% for those in rural areas.
- vi. Allow for exemption from payment of withholding tax on dividends & other payments made to residents in Kenya.
- vii. Fast track Transformation of EPZ program into the Special Economic Zones (SEZs) program
- viii. Make port more efficient.
- ix. Government urged to come up with stimulus plan to cushion EPZ firms/ exporters against increasing cost of production/operation.

- x. Government urged to lobby for appropriate global trade policies including lobbying for making AGOA permanent. (EPZA, 2010)

The EPZ program contributes to Kenya's economy in terms of employment creation, attraction of new investments and value addition among others against a backdrop of hostile local and international business environment (such as global recession). The program can increase her role if the challenges are addressed as it prepares to take advantage of opportunities envisaged under SEZ program. Although the performance momentum recorded in 2010 is expected to be maintained in 2011, threats posed by increasing cost of oil remains a challenge which is likely to compound the already high cost of doing business.(EPZA strategic plan, 2009-2013)

CHAPTER FOUR: RESEARCH METHODOLOGY

4.1 Introduction

This chapter deals with the study design, target population, sampling techniques and sample size, the preparation for fieldwork, types of data that were collected and how they were collected. It also records how the data analysis was done and its presentation, gives a description of the categories of enterprises included in the study and also the limitations of the study.

4.2 Research design

Research seeks to carry out a critical examination of the study area with very specific objectives. The research must be useful to various players in the area under research. This is what informs the choice of study population, scope and methods as these must be perceived by the target audience as being appropriate. Those in management require recommendations that can enhance their management of their respective areas, while scholars look for new insights into the area under study. The research participants need to know that the information they provided has been interpreted properly and used appropriately, and also presented anonymously (Buchanan and Bryan, 2007) The participants who are usually the end users also require practical applicable recommendations. There are various techniques and methods, and the researcher has to make a choice as to what is appropriate and most suitable in the chosen research area.

At the initial stage of this study, a review of literature was carried out on the research topic. The literature review included an in-depth look at information and readings from related authorships, and write ups, books and publications and the internet. Written material on other like or similar developments worldwide was reviewed. After carrying out a comprehensive review of literature on the subject matter, it was possible to relate these to the various operational enterprises that were under study. This study explores the operations of Export Processing Zone enterprises with specific attention to issues of the environment. It analyses the extent to which environmental concerns have been taken into account in the planning and implementation of the projects using EIA, EA,EMP and OSH as key tools. By looking at various enterprises, the study examines levels of compliance and enforcement and then makes recommendations based on the findings in the field. Data collected from the various enterprises was subjected to statistical testing and the findings analyzed to enable drawing of conclusions and ultimately making of recommendations.

4.3 Target population

The study targeted operating under the EPZ programme. The enterprises were varied in activities, products, size of investments, proponents, number of employees and markets. They also had different production processes. Because the number of enterprises operating was large, it was not possible to analyze the whole population of 75 active enterprises. For purposes of carrying out meaningful analysis, it was found necessary to stratify the enterprises according to their various sectors, products and like processes. This categorization looked at most of the similar functions or operational actions within factories but also noted the differences even within factories operating within the same sector. The researcher felt that an analysis per sector would allow better and meaningful analysis and valid findings. The enterprises under research were grouped or categorized into five categories as follows.

i) Garment/textiles manufacturers

These were twenty three No. (23) enterprises which do stitching and produce garments or clothes. An enterprise will usually specialize in a particular garment, for example pants for women, shirts for men or night wear or children's wear. One enterprise in this category produces cotton yarn. This yarn is then used to produce fabric which is eventually used for making garments. This is therefore textile, rather than garment.

ii) Chemicals and polymer manufacturers'

This group of eighteen (18) included pharmaceuticals and polystyrene manufacturers. These enterprises were involved in processing of medicines and inputs into medicine. Some release their final products into the markets ready for use, while others supply products for use in producing medicine. Others manufacture tarpaulins and tarpaulin products and relief supplies.

iii) Agricultural produce enterprises

There were fourteen (14) enterprises in this category. They include horticultural and fresh produce including flowers. Some enterprises sort and package assorted fresh fruits and vegetables, including french beans, peas, avocado, chick peas and flowers. The EPZ Act CAP 517 of the laws of Kenya does not permit agricultural activity within an EPZ, only the processing. This is why it was possible to group the fresh produce factories together with the flower farmers since their processes are somewhat similar. Some flower companies export fresh flowers while others export dried flowers.

iv) Assembly, Building and Construction

The group was made of building and construction materials and product assembly and comprises Developers/operators and logistics (property leasing). These were eight (8) companies who came

into the EPZ to build premises for letting to other enterprises. Their investment is therefore in the buildings as a product, as opposed to manufacturing. There were also companies engaged in sale of machines to other companies

v) Mineral/Metal enterprises

Mining and processing of minerals/metals fall in this group. They include the soda ash mining plant in Kerio Valley and lead and metal refinery. These were a total of five (5)

vi) Business centers

These are enterprises whose business is that of providing a service . They include enterprises that provide such services as call centers and other back office operations, communications, transport, freight/ cargo clearing and forwarding services and other logistical support to companies. Some operate under an EPZ enterprise license while others operate under a business service permit for purposes of providing logistical support to EPZ enterprises. These numbered seven (7)

4.4 Sampling design

Out of the six categories, the study selected the following three categories for investigation

- i. Garment/textiles manufacturers
- ii. Chemicals and polymer manufactures'
- iii. Agricultural produce enterprises

These three were selected because;

- 1. They were statistically significant out of the total population of 75 enterprises
- 2. They were easily accessible
- 3. They could be identified physically
- 4. They had what could be referred to as ongoing operations.

The three categories excluded were not easy to observe due to the nature of their operations. The enterprises in the category of assembly, building and construction did not have “operations” in the definition of this research. Many of them were simply landlords, and the premises they had constructed were in fact occupied by some of the enterprises in the three categories which comprised the total sample size of 55. The enterprises engaged in business and front office operations did not have premises that could be examined in the same way as those in the three categories chosen had. Most had a single office or single room where there were very few aspects if any that could be studied reasonably within this study.

4.5 Preparation for the Field Work

Having decided on the sample size, a questionnaire to be distributed to the enterprises was prepared. A letter was dispatched to the management in the various enterprises. The letter requested an appointment and the enterprise proprietors' permission to interview some staff as well as carry out physical examination of facilities and peruse any relevant records. This was then followed up with telephone calls to confirm the requested interviews. Once permission was granted, the questionnaire was dispatched to operations managers. On the agreed dates, interviews were conducted. Data was collected from the 55 enterprises. The items used to collect data were; camera, paper, computer, pens, pencils. Photographs were also taken.

4.6 Data collection methods

4.6.1 Primary data

Primary data was collected during site visits and interviews carried out by the researcher at the time of carrying out the research. The researcher was assisted in this by people who had been tasked to administer the questionnaires. Questionnaires were administered to the operations manager in the respective enterprises. During the visits, corroborative information was sought from other staff including line production staff, supervisors, quality assurance staff, merchandisers, human resource, as well as management staff in the various enterprises. Other staff interviewed were shop stewards and staff in charge of the environment and workers health and safety where available. There were also observations made during visits to the various industries. EPZA staff interviewed included those who collect garbage, those who collect statistical returns from the enterprises as well as those who take care of environmental management in general.

4.6.2 Secondary data

The study also used secondary data which had been collected by officers of the EPZ Authority over time. The statistics officer EPZA and the effluent treatment superintendent indicated that, every company submits quarterly statistical returns as well as a report on the environmental issues annually. It was important to use the secondary data so as to determine trends which were likely indicators of certain occurrences or phenomena that would lead to certain conclusions. This incorporated a look at previous cumulated data and cognitive content on the subject matter. Data included information on production, staff employed, how the environment was managed, garbage collected and how it was disposed of. Staff who have had occasion to visit the factories in the past were interviewed on certain aspects of operations of factories and they were able to give valuable insights into how the areas under study were managed in the past in cases where changes had been

reported. Such interviewees were able to expand and give details on data that had been collected in the past. This was important information as it was counter checked against what the operations managers had given as responses in the questionnaire. Gathering of secondary data also included a look at previous EIA and EA reports, as well as environmental management systems documentation. Other secondary data was maps on location of EPZs as well as various tables containing information on various aspects.

4.6.3 Questionnaires

As part of good environmental management, enterprises as indeed other entities are required to not only carry out an EIA at the inception of the project, but subsequently as part of continual improvement, periodic audits are carried out. EIA considers potential impacts of proposed projects while EA deals with the actual impacts of operations. EIA is pre-project while periodic audits are post project implementation and used as a monitoring tool. This is why an examination of implementation of EIA recommendations would show clearly whether enterprises are complying or not complying with recommendations. Compliance with recommendations includes certain specifics but in the overall plan would entail enterprises not only implementing these specific recommendations but also putting in place an Environmental management plan to ensure adherence to recommended actions as a basis for monitoring and evaluation from time to time. To gauge the levels of certain characteristics in the enterprises under study, a questionnaire comprising various questions designed to give an indication of the performance of different enterprises in various main aspects was formulated. The questionnaire covering various aspects which would shed light on these issues was circulated to the Operations managers in the enterprises. A few of the questions required background information, while others required a yes or no answer. A few questions were of a general nature and included inquiry into the sector the enterprises were working in, a brief description of their activities, the length of time the enterprises had been in operation, and the number of people they employ. More specific questions which sought to zero in on issues of environmental management, including EIA, enforcement and compliance aspects were put to the interviewees, as well as questions which were complementary to the four main questions whose answers would help make inferences as to the characteristics of the enterprises. The response rate from the chosen 55 enterprises was 100%. Answers received from interviewees were noted along with observations, and then analyzed to enable inferences to arrive at findings. A copy of the full questionnaire which was administered is provided at the appendix for reference.

4.6.4 Visits, on site observations, interviews and Photographs

Visits were made to study sites where observations of the goings on were made and these provided useful information to this study and findings. On location observation allowed for a more informed understanding of the environmental management of the enterprises under study. . During visits, some photographs were taken in order to keep records depicting some of the conditions existing on the ground. Corroborative interviews were held with some staff.

4.7 Data analysis techniques

Data collected through the questionnaires, observations and interview responses sufficed for data analysis. All data collected was documented and subjected to statistical analysis in order to draw conclusions and make recommendations. Descriptive statistical tools were used to explain the main observations that were made. Graphical analysis and percentiles were used in data presentation to clearly show results. Diagrams are easier to understand and they show results more clearly, thus the option to use these.

4.7.1 Statistical techniques.

After collecting data, it was necessary to use it to test hypothesis. Hypothesis testing helps the researcher to make judgment about the claim by addressing the question. Null Hypothesis is a claim of no difference.

Alternative hypothesis is the opposing hypothesis. It is a claim of a difference in the population and is the hypothesis the researcher often hopes to bolster. Null and Alternative hypothesis refer to population values and not observed statistics.

Frequency refers to how often a phenomenon or issue is observed. It was necessary to find frequency of certain aspects under study so as to be able to group them together for purposes of statistical analysis.

4.7.2 Chi-square

Chi-square is a statistical technique which attempts to establish a relationship between two variables which are categorical in nature. The chi- square tests the difference between what we observe and what we expect. Observed frequencies consist of counts within categories obtained from a sample. Expected frequencies are counts obtained from past proportions. The past proportions are proportions we expect to find in the sample data. Chi – square compares the

proportion observed in each of the categories under study with what would be expected assuming independence between two variables. If the calculated chi – square value is greater than the critical chi -square value , the null hypothesis is rejected.

The chi- square contingency table test is a hypothesis test applied to a table with at least two rows and two columns of data in the form of counts or observed frequencies (Morien et al, 2009) . The contingency table chi square test is also used when it is necessary to determine if two variables are independent or dependent. Put another way, this test is used to determine if two variables are related or not related. Level of significance of a test as defined by Morrien (2009) is the chance one is willing to take in making a wrong decision in believing the alternative hypothesis. It is also defined as the risk one is willing to take in rejecting the correct hypothesis. It is denoted by alpha (α). Common alpha levels are 0.01 (1 %), 0.05(5%) and 0.10(10%).

Level of significance used in this case was 5% or 0.05

95 % confidence level

The degrees of freedom was worked out using the formula

$$\text{Degree of freedom} = (\text{rows}-1)(\text{columns}-1) = (2-1) (3-1) =2$$

Using the critical values of chi-square table, the critical chi square reading at 0.05 level of confidence and two degrees of freedom was 5.99147 expressed as,

$$X^2 \text{ critical} = X^2_{0.05, 2} = 5.99147$$

It was necessary to determine the expected values and these were determined using the formula applied in the case of a chi square contingency table which is

$$\text{Expected value} = \frac{(\text{row total})(\text{column total})}{\text{Sample size}}$$

The total of the observed and the expected frequencies must be the same and equal to the size of n.

The expected numbers are always calculated to 2 decimal places and never rounded because

$$n(O) =n(E).$$

The chi square is calculated using the formula

$$X^2 = \sum \frac{(O-E)^2}{E}$$

Where

O is the observed values

E is the expected values

And

1. If chi-square (calculated) is $>$ chi-square (critical), we reject H_0 . as this findings indicates that there is sufficient evidence to support the alternative hypothesis (X^2 calculated $>$ X^2 critical)
2. If chi-square (calculated) is $<$ chi-square (critical) we do not reject H_0 . as this finding shows that there is not enough evidence to support the alternative hypothesis (X^2 calculated $<$ X^2 critical) and there is need for further research

4.7.3 Bar graphs, pie charts, graphs

Bar graphs , pie charts, and graphs were then used to illustrate the quantitative relationships. A bar graph uses bars separated by an arbitrary amount of space to represent how often elements within a category occur. Usually therefore, the higher the bar, the higher the frequency of the occurrence. A pie chart is a circular chart divided into sectors, each sector showing the relative size of each value. Graphs exhibit a relationship, often functional, between two sets of numbers as a set of points having coordinates determined by the relationship. They are pictorial devices and therefore easier to understand.

4.8 Limitations of study

There were various limitations to this study including the following;

a. Finance

The study was constrained by the high cost of travel and accommodation. Due to financial constraints, the researcher had to use time very strictly as it was not possible to spend too much time away from usual residence due to cost of accommodation and subsistence. While this was a challenge, it was however surmountable. The work was satisfactorily completed within the resources that were available.

b. Time

Time was a major constraint because the entire degree programme was undertaken on a part time basis. This meant that all work obligations had to be met while at the same time class work and eventual research was carried out. Research work required being away from work for days at a time to do field work.

c. Distance

It was a major challenge carrying out work in the enterprises that were away from the researchers residential area and more so because of lack of adequate familiarity with the towns where the enterprises are located . The study required visits to enterprises Nairobi , Athi River, Isinya, Mombasa, Voi, Thika.

d. Delays in receipt of questionnaires.

As indicated, information was collected both by way of carrying out interviews in person or sending questionnaires. Some questionnaires were given to respondents and had to be collected later. Interviews in the enterprise as well as with other concerned parties had to be carried out during work. Often times, the respondents were not readily available and appointments had to be made over and over as they were giving of their time away from work. Their supervisors were not quick to allow them time off to answer questions but they were finally convinced to do so. Some could only be interviewed during their break. It became necessary to exercise extreme patience as the information had to be collected from people who were otherwise engaged.

e. Language barrier

Some of the foreign supervisors interviewed were not very proficient in the English language which called for interpretation in some cases. This was a constraint but was managed.

CHAPTER FIVE: RESULTS AND DISCUSSION

5.1 Introduction

This chapter covers the results of the study. Responses received were recorded and analyzed. Respondents gave quite detailed answers to questions and these responses, coupled with observations made on site and corroboration of information received enabled drawing of certain specific and general inferences. This chapter records the observations and findings of the study.

5.2 Results

Data was collected from a sample size of 55 enterprises taken out of a target population of 75 enterprises. This was the total number of enterprises in three categories garments and textiles, chemicals and polymers and those which engaged in processing of agricultural produce. The remaining enterprises which were not used for purposes of this study were five (5) enterprises in mineral and metal production, seven (7) business centers and eight (8) enterprise engaged in assembly and building construction. The 55 enterprises selected were considered to be representative of the total number of enterprises. The main factors that were used to carry out the hypothesis testing were;

- a. Environmental Impact Assessment (EIA)
- b. Annual self audit
- c. Environmental Management Plans (EMP)
- d. Occupational safety and Health. (OSH)

Based on the findings in these areas from information gathered in the questionnaires, the hypotheses were tested.

5.2.1 Environmental Impact Assessment

Table 8 : EIA responses

Observation	Environmental Impact Assessment			
	Garment enterprises	Chemicals and polymer	Agricultural produce enterprises	Row total
EIA	8 (12.54)	10 (9.81)	12 (7.63)	30
No EIA	15(10.45)	8 (8.18)	2 (6.36))	25
Column total	23	18	14	55

Source : Researcher (2010)

Table : 8 contingency table shows the data observed by the research during data collection and the expected values that were determined. The calculated X^2 is 9.11 as compared to X^2 critical = X^2 0.05, 2 = 5.99147 therefore, the null hypothesis is rejected and the alternative hypothesis accepted

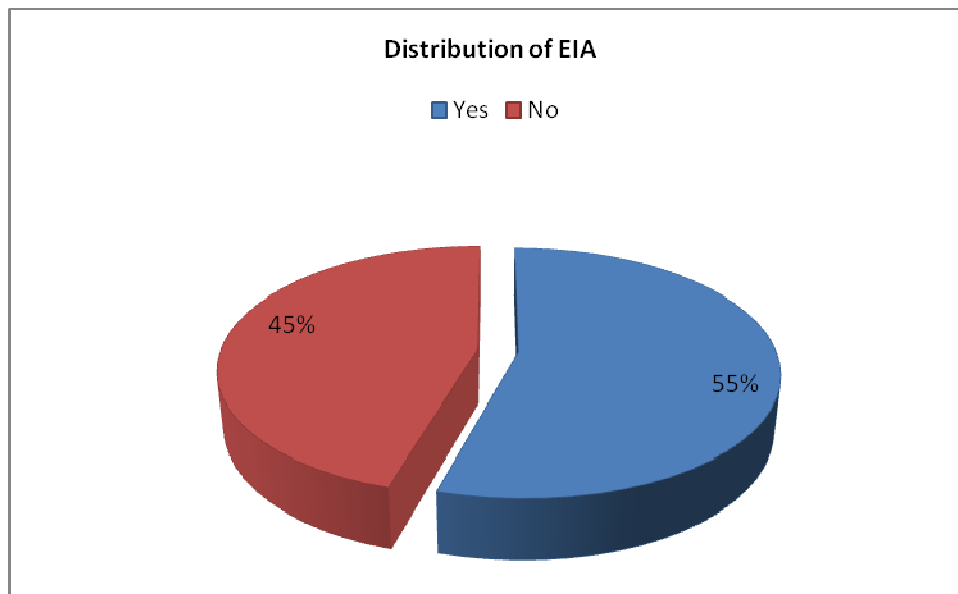
Table 9 : Distribution of EIA

Responses	Distribution		
	Frequency	Proportion	Percentage
Yes	30	0.54	54.54
No	25	0.46	45.45
Total	55	1	100

Source : Researcher (2010)

Table: 9 shows that out of the total 55 enterprises, 30 had carried out EIA of their enterprises prior to setting up. This was considered a fairly good proportion but still not ideal as this was just above the 50 % mark at 54.54 representing only 0.54 of the total number. This is illustrated in figure 6.

Figure 6 : Distribution of EIA



Source: Researcher (2010)

5.2.2 Annual self audit

Table 10 : Annual self audit responses

Observation	Annual self EA			
	Garment enterprises	Chemicals and polymer	Agricultural produce enterprises	Row total
Annual self audit	4 (7.94)	5(6.21)	10 (6.36)	19
No annual self audit	19(15.05)	13 (11.78)	4(7.63)	36
Column total	23	18	14	55

Source : Researcher (2010)

From table 10, the calculated X^2 is 7.11 as compared to X^2 critical = X^2 0.05, 2 = 5.99147, therefore, the null hypothesis is rejected and the alternative hypothesis accepted. Distribution is illustrated in table 11 and figure 7.

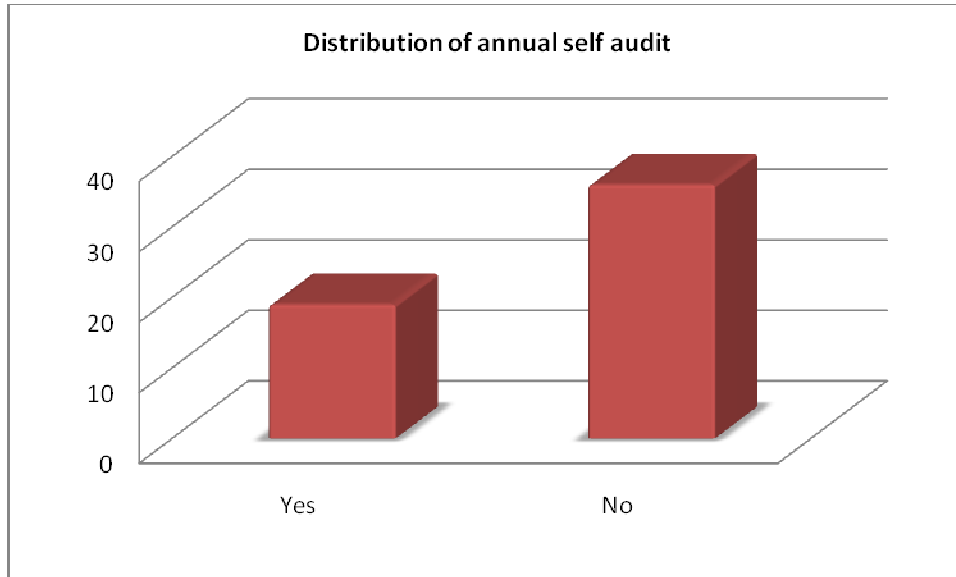
Table 11 : Distribution of annual self audit

Responses	Distribution		
	Frequency	Proportion	Percentage
Yes	19	0.34	34.54
No	36	0.65	65.4
Total	55	1	100

Source: Researcher (2010)

Of the 55 enterprises under study, only 34.5 % representing a proportion of 0.34 carry out annual self audits. This was not a good percentage as the ideal would be for all the enterprises to be carrying out annual self audits. Self audits are supposed to enable one to check against a checklist if they are on the right track in terms of whatever they are doing, and in this case environmental management which was the issue under study. It was not clear how the enterprises checked if they were complying with the requirements of good environmental management if they do not carry out self audits and so this led to the conclusion that these enterprises which were not carrying out self audits were not complying with the recommendations of the EIA.

Figure 7 : Annual self Audit distribution



Source: Researcher (2010)

5.2.3 Environmental management Plan (EMP)

Table 12 : EMP responses

Observation	Environmental management Plan			Row total
	Garment enterprises	Chemicals and polymer	Agricultural produce enterprises	
EMP	4 (7.94)	4 (6.21)	9 (4.83)	17
No EMP	19 (15.05)	14 (11.78)	5 (9.16)	38
Column total	23	18	14	55

Source : Researcher (2010)

From the findings observed and expected scores table: 12 the calculated X^2 is 9.6 as compared to X^2 critical = $X^2_{0.05, 2} = 5.99147$, therefore the null hypothesis is rejected and the alternative hypothesis accepted

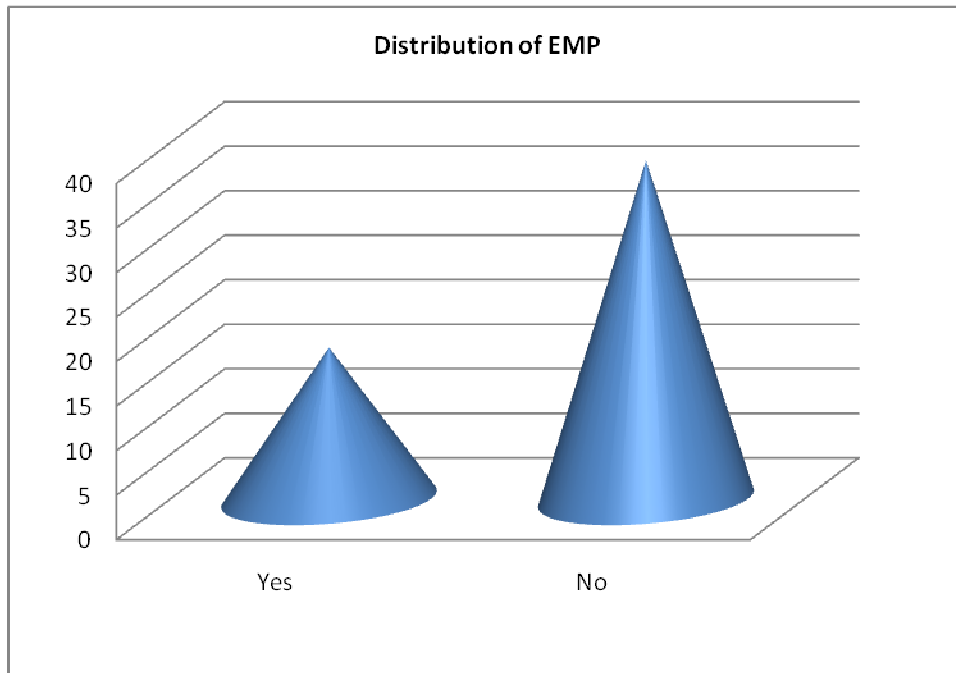
Table 13 : Distribution of EMP

Responses	Distribution		
	Frequency	Proportion	Percentage
Yes	17	0.309	30.90
No	38	0.690	69.09
Total	55	1	100

Source: Researcher (2010)

Table 13 shows that of the 55 enterprises; only 17 had put in place a proper and operational environmental management plan. Having an environmental management plan was considered a good measure of compliance since this would mean the enterprises were concerned enough to make sure there were measures in place to ensure good management of the environment across the board. That only 30 % of the enterprises had an operational and working environmental management plan was not a good score as this is not even fifty percent. Figure 8 illustrates the distribution.

Figure 8 : EMP distribution



Source: Researcher (2010)

5.2.4 Occupational safety and Health

Table 14 : OSH responses

Observation	Occupational safety and Health			
	Garment enterprises	Chemicals and polymer	Agricultural produce enterprises	Row total
OHS compliance	2 (5.01)	4 (3.92)	6 (3.05)	12
No OHS compliance	21 (17.98)	14 (17.98)	8 (10.94)	43
Column total	23	18	14	55

Source: Researcher (2010)

Based on values in table 14 the calculated X^2 is 6.82 as compared to X^2 critical = $X^2_{0.05, 2} = 5.99147$, therefore the null hypothesis is rejected and the alternative hypothesis accepted

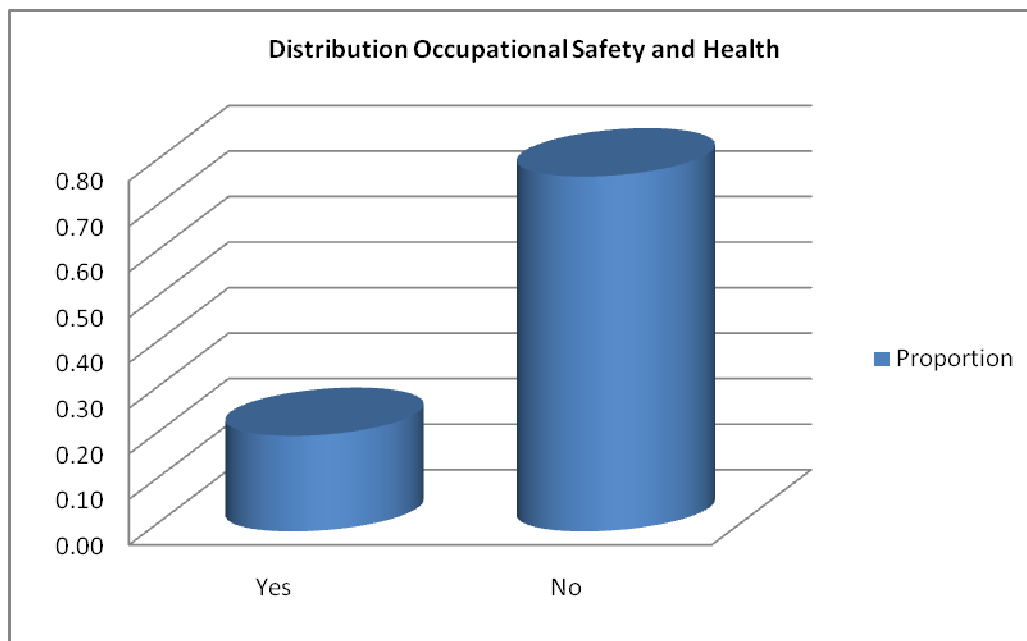
Table 15 : OSH distribution

Responses	Distribution		
	Frequency	Proportion	Percentage
Yes	12	0.21	21.81
No	43	0.78	78.18
Total	55	1	100

Source: Researcher (2010)

Table 15 shows that out of a total number of 55, only 12, representing 21.81 percent or 0.21 of the total had adequately taken care of issues of occupational safety and health. This was considered a major concern especially in view of the fact that requirements of occupational safety and health are not only a legal requirement but they are directly related to workers health and safety. Even though there were reported cases of workers refusing to wear protective clothing even where it was provided, this was not considered a good excuse because this could be attributed to lack of awareness. The findings are illustrated in figure 9.

Figure 9 : OSH distribution



Source: Researcher (2010)

5.2.5 Rule of 5 – EMP and OSH

The calculations had a finding of an expected value of 4.83 for the observations in the agricultural produce enterprises for EMP an expected value of 3.92 for chemicals and polymers and one of 3.05 for agricultural produce enterprises . These expected values were less than 5 and are therefore contrary to the rule of 5 during hypothesis testing using contingency table chi square test. In order to ensure that the rule of 5 was not valuated, the two categories EMP and OSH were combined and new expected values obtained and a new calculated chi obtained as below.

Table 16 : EMP and OSH responses

Observation	Environmental management Plan /occupational safety and health			
	Garment enterprises	Chemicals and polymer	Agricultural produce enterprises	Row total
EMP & OSH	6 (12.12)	8 (9.49)	15(7.38)	29
No EMP, No OHS compliance	40 (33.87)	28 (26.50)	13 (20.61)	81
Column total	46	36	28	110

Source : Researcher (2010)

From the findings observed and expected scores in table 16, the calculated X^2 is 15.19627 as compared to X^2 critical = $X^2_{0.05, 2} = 5.99147$, therefore the null hypothesis is rejected and the alternative hypothesis accepted

5.2.6 Relationship

After calculating the chi-square using the four variables, all the calculated chi-square (X^2) yielded scores greater than the critical X^2 . This showed that there was sufficient evidence to show a relationship between environmental management and the parameters that were used to test the state of environmental management namely the Environmental Impact Assessment, annual self audits, the environmental management plans and the occupational health and safety.

5.2.7 Aggregate findings

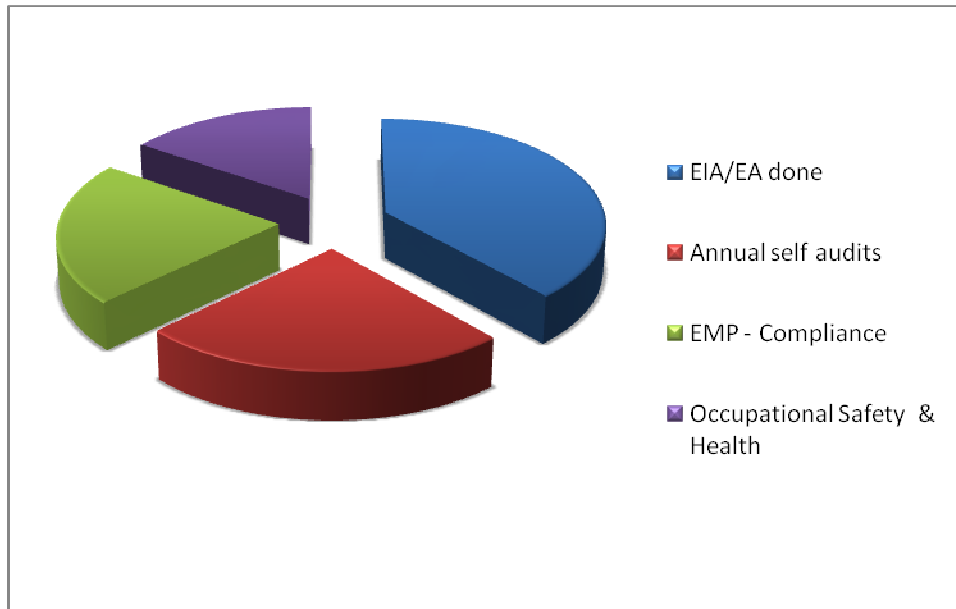
Table 17 : Aggregate responses

Parameter	Individual Proportion out of 55	Individual Percentage out of 100	Ranking	% of the aggregate findings	Degrees out of 360
EIA/EA done	30	54.54	1	38.46	138.47
Annual self audits	19	34.54	2	24.35	87.66
EMP - Compliance	17	30.90	3	21.79	78.45
Occupational Safety & Health	12	21.81	4	15.38	55.37
Total	78	141.79		100	360

Source : Researcher (2010)

Table: 17 contain the aggregate scores, individual percentages and ranking and aggregate percentage findings.

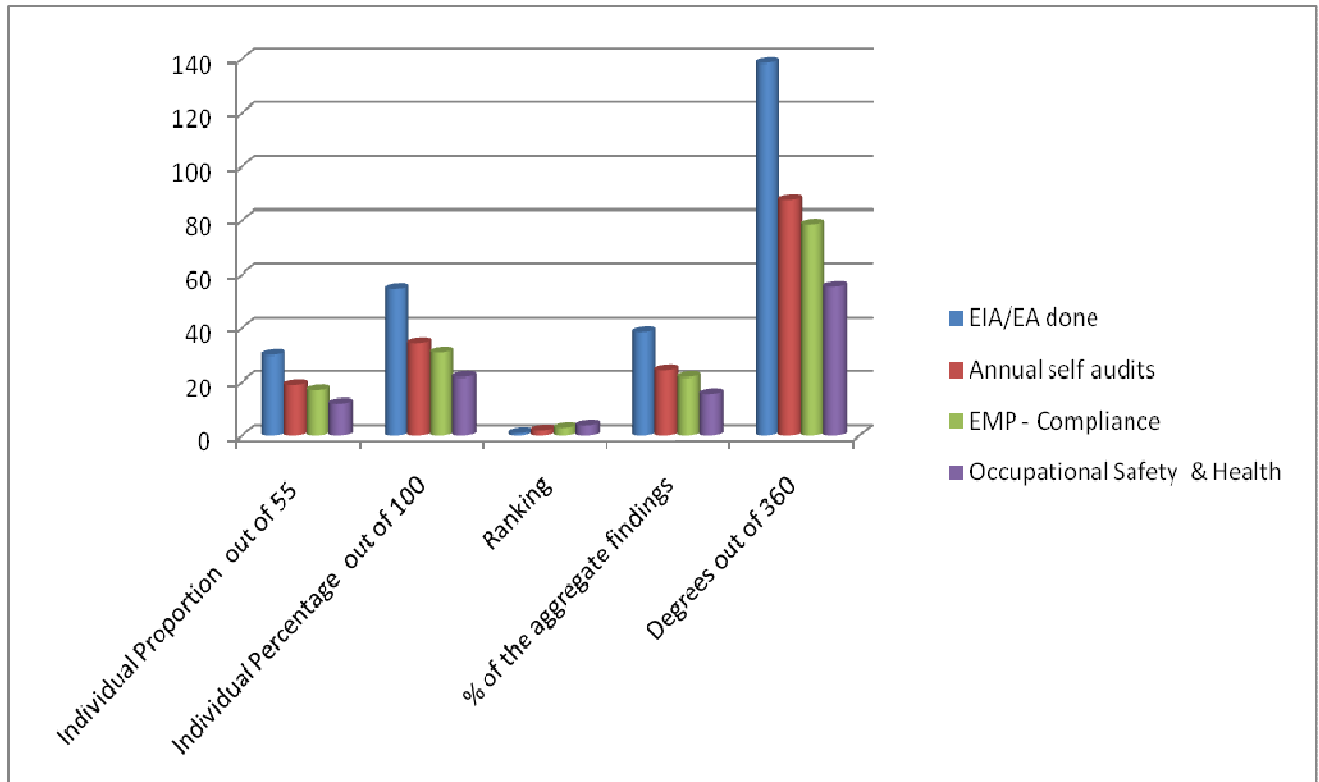
Figure 10 : Aggregate distribution



Source: Researcher (2010)

Figure 10 is a pie chart showing the overall findings. Here, it is clear to see that out of a total number of 55 enterprises, the highest percentage in terms of taking positive action in any of the aspects of environmental management was 38.46 %, followed by 24.35 %, 21.79 % and finally 15.30 %. These four aspects were considered to be representative of the status of environmental management within the enterprises in the Export Processing Zones. The confirmatory observations were an indication that an enterprise was acting as desired in the specific aspect of environmental management being used to study the performance of the various enterprises. The low scores in terms of percentage in each aspect is therefore an indication of a poor or undesirable position in most of the enterprises. Figure 11 below gives the report on the overall performance of the enterprises in the area of environmental management with reference to the aspects which were used as a basis for this study.

Figure 11 : Aggregate findings



Source : Researcher (2010)

5.3 Discussion of findings on Environmental Management and its role in EPZs

From a summarization of the observations made during visits, and interviews and an analysis of the data collected, some very specific inferences were made. These included the following;

5.3.1 Awareness and environmental education

The general objective of this study was to assess the status of environmental management within the enterprises operating under the Export Processing Zones program in Kenya. The specific objective related to awareness was to investigate whether the enterprises are aware of the requirements of good environmental management. The study question relevant to the specific area of awareness was whether the enterprises knew the set environmental standards and the requirements prior to the commencement of their development.

This question in the research was aimed at finding out if the various players in the enterprises were even aware in the first instance that they were required to run their operations in a manner that was

sustainable. This was important because being aware of this need would then lead them to be able to carry out all that they needed to do to sustain the environment. Awareness was relevant not only at the inception of the projects but also during the life of the project because there are different players at different levels and the ideal is for all to have relevant information on environmental management. This particular question as put to those who were interviewed sought to get answers to two areas of awareness, specifically whether the respondents knew what EIA and EA was and also whether they were aware of the need to carry out an EIA prior to the commencement of project implementation, and the need to carry out periodic audits subsequently. Awareness impacted capacity to then implement the recommendations of the EIA reports. Because of the importance of capacity to implement, enterprises were also asked if they had staff trained in the area of environmental management.

While the findings in the various enterprises varied in terms of the response of yes or no, the aggregated scores nevertheless showed that the awareness was not adequate as the percentage was below 40 %. From the findings, it was clear that the level of awareness was not good. There were a few factories where there was a very good level of awareness and very competent staff to handle this. It was noted that while a number of staff implementing projects had a basic understanding of the requirements of sustainable environmental management and the need for it, in many cases the information was average rather than sufficient. Many understood it as a requirement, but did not seem to have a good and proper grasp of the importance of it. It was noted that while a number of enterprises had indeed carried out an EIA, most of these were companies that were set up after the enactment of the EMCA, 1999 act. It was observed that many did it because it was a legal requirement. Since it was a requirement also, those who had not done it initially had then carried out an initial Environmental audit and a few subsequently embarked on doing the periodical Environmental audits. Most did the EIA to meet the requirement rather than as a matter of course. From the need for enforcement which was evident, it was noted that it was important to educate the proponents so that they can move from a position of carrying out EIA because they were required to do so, to a position of appreciation of its benefits. It was observed that where the staff understood and appreciated the need for EIA, they also seemed to understand issues of environmental management as a whole and so there was generally better environmental management in such enterprises as compared to those which did not embrace or appreciate the requirements. The need for environmental education was noted.

The incidence of lack of awareness among management staff was of particular concern as these were the people expected to enforce compliance among the junior staff. There was a general lack of appreciation of the importance of matters of environment and why all should be part and parcel of good and sustainable environmental management. There were cases of presence of gadgets to help manage the environment better but these were not being put to good use. This included such basic things as sorting of garbage to enable re-use or recycling where possible. As a result of this lack of ownership, especially beginning with the awareness and no real understanding, there was no seriousness in terms of actual implementation of systems. Some staff did not seem to understand that good environmental management was good, even for themselves as individuals and that it was essential.

Some consequences of environmentally adverse practices included a measure of air pollution and release of water which was stained with dye from washing machines. There were also occasions of workers being reluctant to wear protective clothing, in spite of these being provided, together with cases of lack of sufficient provision of protective clothing. This was observed to be generally due to lack of exposure and insufficient environmental education. Some workers did not recognize that the protective clothing was a “necessary inconvenience”.

In a few enterprises, it was found that management had instituted aspects of environmental education. They had also taken measures to employ people trained in environmental management for example two enterprises had a training program and sent their workers for training from time to time, including overseas training. These were enterprises where workers handled machines or equipment which was potentially dangerous and where they had to handle these with utmost care to ensure their own safety as in the case of the enterprises whose production required boilers as illustrated in Plate No 2 below. Here the workers understood the need to keep the area around the boiler clean and free of oil spills which could pose a danger to them and other workers.



Plate 2 : Cleaning of boiler in progress
Source: field work 2010

It was noted however that there was still need for a lot more environmental education to equip project proponents and the general public to enable them embrace environmental issues and make them part of their way of life as opposed to merely meeting legal requirements. In the area of skills enhancement, there was noted serious deficiency and there was need to encourage enterprise owners to not only focus on making profit but producing sustainably. For most workers in the enterprises, managing the environment was not an immediate concern.

5.3.2 Environmental Impact assessment and Environmental management

To address the specific objective of investigating whether EIA was carried out at the commencement of the projects in the enterprises, it was necessary to record how many enterprises carried out an EIA. This sought to establish the status of the enterprises with respect to issues of not only meeting the required standards in the initial stages of the project set up and development but also during project implementation.

As indeed was observed with the other aspects, it was found that the people producing medicinal products carried out full impact studies prior to the set up. This could be attributed to the fact that the requirements by the industry players are very stringent. The mandatory prerequisites are that

the enterprises in this category shall comply with international health regulations as stipulated by the World Health Organization (WHO) which emphasizes both public health and environmental compliances) Besides this, the industry required them to carry on with very strict adherence to EIA recommendations during the implementation of the project so as to meet the standards and maintain their markets. Other enterprises observed to have also carried out the necessary impact studies and audits were in the food production sector. This too was a requirement and a prerequisite for them to establish in the first place.

It was observed that enterprises with medical products and food processors were the best managed in terms of cleanliness and had the best record in terms of general environmental management including administration of the entire work place and keeping it dirt free. This could easily be related to the requirement to keep their work places sterile. . Both had in place a well laid out environmental management plan and more importantly, they adhered to it strictly. Both required workers to be clean and sterilize equipment before embarking on their daily chores of production. Even though flower packaging is categorized together with the horticultural produce, it was noted that flowers were less environmentally conscious as this is not a product to be ingested. The temperatures in the work places where there were cold rooms were a concern and the researcher inquired as to what mitigation factors were in place to ensure that workers health was not adversely affected. There were no specific answers given though, as the respondents seemed to skirt around the issue. The only protection was the warm clothing. Enterprises carrying out garment manufacturing were clean inside their premises but had some challenges in terms of managing garbage. There were pieces of cloth strewn outside the built up area as illustrated in Plate 3 below, even though the enterprises were trying their best to manage. Sorting before disposal was also being done but not entirely and there were aspects of these that were left to those engaged to collect garbage at the various premises.

It was also noted that within the garment manufacturers, there were different activities and these impacted the environment. For example while some enterprises only carry out stitching, others carried out embroidery, while others carried out washing of clothes before packaging for export. In the case of embroidery, there were no adverse effects. In fact the embroidery processes were very computerized and therefore impacts on environment were minimized. In the case of washing plants however, it was noted that sometimes chemicals used to wash the clothes colored water

being emitted from the factories. It was observed that this had been a source of complaints from members of the public from time to time. It was also noted that there were changes in the chemicals depending on what the producers sought to achieve.



Plate 3 : Offcuts from a garment factory strewn all over
Source : Field work – 2010

It was also noted that while the food processing enterprises had near impeccable standards of managing their plants due to the sensitivity or short shelf life of their inputs, they experienced challenges in terms of storage and more specifically timelines. It was critical that they store what they could process yet if there were any delays, for example, their goods which were perishable could be attacked by pests. This therefore called for maintenance of extremely high standards of hygiene as well as strict schedules for production. There were some reported cases of pests like weevils, yet removal of the subject food consignments could be delayed due to losses incurred, as well as customs procedures.

It was interesting to note that the enterprises which seemed to deal in plant extract had very varied results in terms of management of emissions into the air. Those which had invested in new technology to produce were much better off than those which had old technology. While this was

an observation across the board, it was never the less noted that in enterprises which were dealing with plant extracts, there seemed to be more need for more input in managing the environment. For example, in the cotton enterprise which produces cotton yarn, there was cotton in the air. This was also observed in enterprises which use sisal and wattle bark but to a lower extent. The enterprises using sisal and wattle bark seemed to have achieved better results in managing emissions into the air.

One of the main observations was that there was no deliberate budgeting for environmental management in many enterprises. Mostly, issues of environmental management were handled on a crisis basis, usually with contingency funds, where staff would have to justify to their superiors to make provision for these, sometimes in items as basic as garbage bins or even protective gear and wear for staff. This proved to be a major omission for management as it had an overall impact on the enterprises ability to carry out sustainable production. Generally, there were very few staff dedicated to environmental management.

It was generally possible to draw certain inferences within like enterprises.. Some of the different scenarios where there were different results within enterprises categorized together clearly showed that it is important to look at enterprises together but it is also critical to finally look at each individually so as not to miss certain aspects of their operations when carrying out evaluations. Some enterprises were engaged in similar activities but there were different levels of attention to certain aspects of management of the environment. Some differences were however slight, for example the pictures in Plate 4 below were taken from enterprises which both engage in manufacturing of fortified foods, but while one had a very well kept compound, the other had not kept the compound well. As noted however, such differences were not observed on very significant aspects. It was noted however that even the items which were not considered as significant in the production process could impact workers health for example the grass in Plate 4 could be a home for snakes which are dangerous. It was observed that all enterprises should be required to keep their premises well maintained.



Plate 4 : A well kept compound at an enterprise juxtaposed with a badly maintained one

A: Source: field work, 2010

B: Source :field work, 2010

It was noted that the enterprises which were new and had modern technology were generally cleaner than those which had old machines. These plants also had less garbage. In this respect, the enterprises which had old technology were having a challenge since they had invested heavily and changing to newer and better technology was difficult. It was also observed that there were enterprises which were not willing or otherwise were not able to invest in newer technology even though this was recommended. These posed a major challenge to their neighbors where there were impacts. The new plants or those which had new machines were generally cleaner for example the enterprise in Plate 5 below.



Plate 5 : An enterprise which is technology intensive and clean

Source: field data 2010

5.3.3 Annual self Audits.

One of the specific objectives was to investigate if the enterprises carry out annual self audits and the incidence of significant complaints from customers, both internal and external. This part of the study sought to answer two questions, one, if the investors carry out internal self audits and secondly whether there were any significant complaints either within the enterprises, that is from their internal customers or from outside which would be from neighbors and other interested parties.

On the whole, the percentage of enterprises that had a positive response to this inquiry comprised only 24.35 % which was not a good result at all. Perhaps what was more alarming was the fact that except for enterprises which required the audits in order to make sales, some carried out audits but there was no evidence of these being used for continual improvement. This was the reason why this question was paused together with the question on complaints in order to corroborate the answers given.

It was very important to note the incidence of significant complaints and if these had been addressed when raised. Significant complaints are those that are not only a nuisance but which affect the health and the environmental quality and also in some cases the business of the polluters as well as that of other enterprises. A mismatch could clearly be observed especially comparing first to the incidence of complaints and also the incidence of non correction on complaints received. Repeated incidences of significant complaints were an indication that the self audits were not being applied to the maximum as effective tools of environmental management. In many cases, it was found that enterprises complained about the neighboring ones especially in cases where there were such waste products as oil. In one such case, edible oil for both human and animal consumption had been left to spill. There was also incidence of smoke which impacted the whole environment but which became of particular concern to enterprises engaged in production of products of a medicinal nature. Complaints on air pollution from enterprises operating steam generation boilers that use both furnace oil and wood fuel were frequently realized as such impacting negatively on air hyper filters installed by pharmaceutical enterprises within their vicinities. What was notable however was that there were cases where some of the negative impacts were obvious but no complaints had been raised. Occasionally there was laxity in compliance and desirable surveillance and corrective action was not taken. Further inquiries revealed that in some cases some people did not know how complaints were supposed to be raised.

In other cases, some did not want to take time to raise complaints as they found this cumbersome. Some noted that while they had complaints, they did not see the possibility of proper solutions, as in the case of smoke.

In the cases where there had been complaints about the practices of neighboring enterprises and indeed negative impacts to neighboring factories, there was observed a general lack of initiative to take quick and timely corrective measures to avoid further inconveniences to others. This could partly be attributed to the EPZA's twin role of regulation as well as facilitation, because on the one hand, the EPZA was the corporation that engaged in the promotion to attract the investors to invest in the EPZ program, yet at the same time, it was up to the same EPZA to enforce regulations. Some enterprises reacted strongly and negatively to attempts to regulate by the same agency which was to carry out facilitation.

The general lack of quick punitive measures or perceived lack of consequences or punishment for an offending enterprise was observed to be a big hindrance to attempts to regulate. It was noted from discussions with proprietors that sometimes regulations interfered with or paused a challenge in environmental management. Since it was a requirement that customs officials give clearance for goods to leave the EPZs, sometimes if such clearance was delayed for whatever reason, there would be instances of negative impacts. In one very bad case, there were garments which had stayed in a building for so long that they had become infested with insects and dusty and therefore become a health hazard to workers in neighboring facilities, but these could not be removed soon enough for the EPZA due to customs requirements and procedures.

Another observation made with respect to regulation was the fact that customs rules require that duty be paid for anything that had value and that was being released into the local territory and not being exported. It was difficult to remove such basic things as clothes cut offs, damaged packaging materials which were mostly carton boxes and waste wood from dart boards among others. Even French beans rejected after sorting for quality could sometimes stay at the dumping area for considerable periods of time yet farmers needed these to feed animals but had to be cleared by customs.

As a part of the regulation, enterprise management was required to ensure that boilers in the enterprises were isolated to ensure minimum exposure to staff to minimize the danger as in Plate 6.

This is because the content is flammable and handlers must know how to handle them to avoid danger. This was part of managing occupational health and safety.



Plate 6 : A boiler at one of the enterprises

Source field data 2010– these are environmentally sensitive and isolating them is a major aspect of workers health and safety.

Among the issues that emerged in the area of regulation was one about zoning. There were cases of some enterprises complaining about not being happy with their neighbors where their activities impacted them. There were conflicts or complaints between enterprises due to juxtaposition of enterprises that had very different activities which did not seem to be compatible. Such enterprises had already constructed so they could not shut down. In some cases, enterprises had to endure neighbors whose activities had very severe impacts on them, especially where there were emissions into the air. This was a direct indication of lack of implementation of zoning requirements on the part of the regulator EPZA. This meant that the EPZA which is the immediate regulating authority as well as NEMA need to be more vigilant when giving approval for projects so as to enforce zoning requirements for better environmental management. .

5.3.4 Environmental Management Plan (EMP)

Another specific objective of this study was to investigate whether enterprises had in place a plan to manage the environment. This part of the study sought to answer the study question on whether the development activities had an EMP.

As indicated by the findings presented in table 13, only 30.90 % of the enterprises sampled had an EMP. This meant that less than 40 % of the enterprises had set actual and specific targets in the area of environmental management. These enterprises showed evidence of measurable achievements or lack of such achievements following set targets. They had also assigned particular staff certain duties to do with environmental management. They also had a very clear reporting system and records which were perused during the research. In some cases, it was observed that there could be no sustainability unless some businesses incorporated better environmental management, for example, in cases where the garment manufacturers dumped waste material irresponsibly or in enterprises which were dealing with very flammable materials. In the case at Plate 7 below, waste had been incinerated but had not been burnt to adequate levels.



Plate 7 : waste incinerated but not burnt at adequate temperatures
Source : Field work 2010

These were major concerns because some of this waste was waste from medical enterprises manufacturing medicine and waste especially medical waste must be handled particularly well. Even though the producing enterprise was not the one which handled the waste, it was nevertheless a concern for them because those who carried out audits required to see how their waste was handled. It was observed here that while certain aspects may not be the immediate concern of an enterprise, it could eventually impact their business so it was not enough for an enterprise to merely give their waste over to another which was in the business of handling waste but rather it was their duty to ensure that the waste they handed over was disposed of properly. The observation made here was that sustainability required action from all interested parties and all concerned with the processes. This observation was also made within other enterprises for example the garment enterprises which had given their waste to other enterprises and service providers which were not sampled for this study. Sometimes these service providers were not concerned with proper handling of the waste so they would pile up trucks and some of the waste would fall off while in transit. Their concern was to dispose off, even in a way that was not environmentally friendly or sustainable. This was a major concern since the waste was voluminous. In a number of cases there was a good amount of understanding of sustainable environmental management and there were systems put in place to achieve this. There was sufficient indication that some enterprises were concerned about issues of environment and took great care to ensure that good standards were maintained. In the case shown in plate 8 below, some of the products were actually stored for a while on the production floor but the whole place was managed well so cleanliness was maintained all around.



Plate 8 : Production floor with packed products
Source : field work 2010

It was also observed that individual enterprises had not put in place adequate, measures to take care of some very essential environmental management procedures, for example they did not adequately take care of some basics like sorting. It was noted that though attempts had been made to have the enterprises sort their solid waste, this was not done to the best or desirable level. There were constraints in terms of handling facilities. In a majority of the enterprises, there was no provision of different dust bins or dumping areas to receive different kinds of waste including plastic and polythene, food or organic waste, paper. Of even more concern was the fact that in the few where sorting was being done, the people engaged to collect the garbage and transport it to disposal sites ended up mixing it in one central conveyance vehicle. At the offices, sorting was done, only for all the waste to be combined at the collection points. This therefore negated the attempt at good environmental management considering sorting is a major aspect of good environmental management as it enables reduction, re-use and re-cycling and other environmentally friendly options like refusing to accept waste not well handled. This situation called for a lot of environmental education, regulation and enforcement.



Plate 9 : Waste that had been sorted but then mixed at the dumping site

Source: Field work – 2010

There was prevalence of the illustration in Plate 9 because on the one hand, enterprises sorted garbage at their premises but when the people contracted to transport it to the dumping site came to convey the garbage, they would mix everything in the trucks and dump together. There were also cases of casual laborers being contracted to do the loading and the off-loading of garbage trucks. The handlers of the garbage were different from the generators of it. Here, it was noted that the EPZA which was charged with the responsibility of ensuring compliance should do more and put in place measures to ensure compliance, including punitive ones. Staff at EPZA also cited lack of adequate resources to achieve good environmental standards. This was evident for example in the illustration at Plate 10 below where a leakage in a water pipeline has taken so long to be repaired that there is now algae in an open drain which should ideally have only clean water.



Plate 10 : The effects of delayed repairs- a drain with algae
Source: Field work – 2010

5.3.5 Compliance and Enforcement of EIA recommendations

Another specific objective of the study was to establish whether the enterprises implement the recommendations of the EIA and audit reports. The other aspect of this specific objective was to inquire into the enforcement mechanisms both by the proprietors as well as the supervisory bodies. Both were critical as this would explain the occurrence of certain phenomena and also give opportunity to find solutions where necessary. This part of the study sought to answer the study question on whether the development activities were complying with the recommendations made in the EIA carried out at the start of the project by enforcing. It also looked at compliance with and enforcement of periodic or annual EA reports. Examining issues of compliance and enforcement required a look at the collective situation. While it was necessary to examine each of the aspects of environmental management singularly, in order to make findings of the total situation, it was necessary to look at the aggregated findings. This would enable an observation of all aspects that are supposed to be considered to ensure continuity in achieving good environmental management.

It was observed and noted that emphasis was put on just carrying out the EIA. This was interpreted to mean, as indeed advised by a number of the respondents interviewed, that this was done since it was a legal requirement and usually required for approval of projects. These findings showed clearly that there was need to lay equal or more emphasis on implementation to

achieve a balance and consequent best results. There was need for improvement. While it was recognized that periodic self audits were important, it was found necessary to also try to find proof that these internal self audits were in fact effective. It was essential to authenticate the answers received by observing the environment within the various enterprises as well as making observations on the premises and also counter checking with the records and the findings of various self audits.

Having looked at the areas of awareness and self audits, and as part of investigating the compliance and enforcement, it was necessary to address the objective of establishing the factors influencing the levels of compliance to EIA and self audit recommendations. Establishing what these factors were would have a bearing on addressing problems discovered by the study and getting ultimate solutions. These were examined for the period at the commencement of the project's implementation and later during the projects operational phase. Besides this, there was also need to go further and enquire about the factors hindering implementation where this was observed. This was deemed very important as it would make the study make a contribution in terms of what needs to be done to improve the negative state of affairs where this was observed.

The other part of investigating the enforcement and compliance of EIA recommendations was whether the development activities undertook deliberate steps to take necessary action to correct any anomalies as part of enforcing and complying with the EIA and self audit findings in order to enhance and sustain environmental and public health quality.

The findings clearly show that the enforcement and compliance of environmental requirements and recommendations are beneath the adequate standards. The aggregate percentages scored in annual self audits (24.35%), Environmental Management Plan (21.79%) and Occupational Health and Safety (15.38%) in this area was an indication of very poor performance on this aspect. Enforcement and compliance at an acceptable level would assist in reducing negative impacts as workers, employers and enforcers or regulators and authorities would all ensure that all or at least a good percentage of some of the requirements are met. These aspects being at a low level is not an ideal situation and this means improvement is required. Even in cases where the EIA was carried out, the implementation of all the findings was not always carried out completely. In various cases, it was observed that at times the managers would ensure compliance when an inspection was scheduled. This was designed to meet the requirements and ensure that the market

was secured and maintained as the buyers have stringent rules about work environment. The problem was that once the inspections were completed, there would be laxity as opposed to continual improvement and evaluation.

It was observed that enterprises in Athi River where the EPZA had a physical presence were better off in issues of environmental management. This was due to the continuous inspections and ability for the EPZA to take action faster in cases of defaults or negative impacts in the zone. Enterprises far removed could not be afforded the same attention. It must be noted here however that there is one specific enterprise which, though far away, has impeccable environmental management. All aspects of their operations, including construction, are very green. They also demand very high standards of their workers, including no killing of animals in their compound. This is an exceptional case since this is one of the major tenets of their set up.

Some enterprises did not pay attention to managing the environment because they felt that this was the responsibility of the property owner, yet on the other hand, property owners when asked about this felt that the occupants who were their tenants should take care of the surrounding. There was no opportunity to further and adequately examine the property developers since they were not part of the enterprises under study, but the need to clearly define roles and enforce was noted in this instance. It was noted that it was necessary for the EPZA management to find means of enforcing standards in cases where the problems arising from poor environmental management arose from tenancy issues where the EPZA was not a landlord. There were noted cases of emitting into sewer systems without meeting required standards. The need for continuous monitoring as well as taking corrective action to avoid these was also noted, as in the case in Plate 11 below.



Plate 11 : Oil spillage outside an enterprise

Source: Field work - 2010

In the picture at Plate 12 , the oil which is a byproduct of the production process is collected and turned into cake for animals. The process put in place to collect it and manage it is not good.



Plate 12 : Poorly stored oil

Source: Field work - 2010

It was observed that some environmental problems were due to a failure on the EPZA management to strictly adhere to the zoning within the zones. This was an enforcement issue as it was within the means of the EPZA to ensure this did not happen. This was because different industrial plants indicated preference for certain locations. It was noted that the authority needed to do its part well to ensure no conflicts among enterprises.

5.3.6 Occupational Health and safety(OHS) -Work environment

Another specific objective of the study was to investigate whether enterprises had put in place requirements of occupational health and safety. Aspects of occupational health and safety include such things as enough toilets for the workers, enough watering points, adequate provision in terms of ventilation and fire exits and fire preparedness among others. Other considerations here were proper attire, as is the case in plate 13, including protective work gear. This part of the study sought to answer the study question on whether the enterprises ensure that the requirements of occupational safety and health are met. As indicated by the findings presented in Table 15, only 21.81 % of the sample had taken care of issues of occupational health and safety adequately. This was not a positive or desirable situation at all as these issues are very key especially those that directly impact workers health, safety and comfort on a daily basis.

The findings on OSH were of particular concern. In a number of cases, there were attempts to meet the requirements but the measures in place were not adequate which is why there was a very poor percentage in terms of those complying adequately. Often times, as indeed had been observed in various cases, some enterprises would seek to meet the requirements only at the times when there were audits by the buyers or external agencies. The garment enterprises were particularly notorious for this. They would for example find temporary storage when they had scheduled audits so as not to score poorly when it came to congestion, yet congestion in itself is a safety issue.

While there was a noted good level of awareness among a number of staff interviewed, discussions with them revealed however that most of them paid attention to environmental issues merely because they were required to do so by the work demands? Nevertheless, it was noted that the enterprises which scored high on environmental management were generally cleaner, had obviously happier staff who were more productive. Employers who ensured good environmental management also seemed to keep in mind other aspects of workers welfare and so they had comfortable and satisfied workers. For example , in enterprises where there were adequate

provisions in terms of recommended watering points, number of toilets (proportionate to number of workers), proper ventilation, fire protection and other such health and safety issues, the workers had a more relaxed atmosphere to work in and were therefore more content. Some enterprises had gone further and engaged service providers to provide subsidized lunch and tea for workers. In one garment enterprise, to ensure the workers did not worry about their small children, there was a crèche for the mothers to bring their babies to work and this was a major boost and source of comfort. The workers reported a lot of contentment. Some workers, who worked outside enterprises which paid a lot of attention to occupational safety and health as well as workers welfare, expressed an interest to relocate to the enterprises which took better care of their workforce. According to corroborative information given by some workers, the enterprises which had good environmental management and better workers welfare retained their staff while those which had problems in this area had a high turnover of staff. It is reasonable to conclude from the observations that investment in better environmental management translates into a better work place and better workers' welfare pays.



Plate 13 : Workers properly attired for work
Source : field work 2010

5.4 Reasons for non compliance

There were various reasons for noncompliance and among the key ones were the following;

a - Priorities - There were observed cases where enterprises were just keen to maximize on production and profit and were not bothered about good environmental management.

b - Lack of adequate finance - This was found to be a major constraint. Most managers interviewed indicated having no specific provisions for funds to manage environment or aspects of it. This was mainly done on a crisis basis, usually when there was a complaint to be addressed

c - No immediate consequences of non compliance - It was observed that there were no quick consequences of bad management, and especially ones that would cost the project implementers time or money. Project implementers therefore had no particular or specific stake or likely losses in the event of non compliance to set standards. Some of these were observed in specific cases for example where smoke from one enterprise impacted the production in another enterprise but the affected enterprise had to incur losses since there was no clear mechanism to force the offending enterprise to pay for losses incurred. No consequences were also observed in some general or common areas This was evident for example in the case in plate 13 where a glass processing company dumped waste and the same stayed in place for a while since there were no immediate consequences, even though this dumping affected other enterprises daily by posing a danger to workers who used this area every day.



Plate 14 : Broken pieces of glass dumped inappropriately
Source: Field work – 2010

d - Leniency on the part of regulators and enforcers - It was observed that due to the need to achieve the balance between the twin roles of facilitation and regulation, the authorities sometimes did not take drastic action and instead engaged operators in dissuasions and a lot of correspondence without quick solutions. In fact, the regulator, in this cases the EPZA, sometimes had to continually try to protect the investors found contravening some environmental management regulations

e - Lack of environmental education – there were observed incidences of insufficient appreciation of environmental requirements and how to make a contribution as this was often times considered by many to be the problem of someone else.

CHAPTER SIX:SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter covers the conclusions that were made from the research and makes recommendations for various actors in the subject area. The chapter also covers areas that were recognized as areas for further study and initiatives.

The general objective of this study was to assess the status of environmental management within the enterprises in the EPZs in Kenya by investigating a few key elements of good environmental management. Specific objectives included investigation to find out whether EIA was done at the commencement of the projects in the EPZ, investigation to determine whether the enterprises continue to carry out annual self audits and ascertain the factors influencing the levels of compliance to EIA and self audit recommendations. This included a look at what measures or mechanisms the enterprises under study had put in place to manage the environment and to take care of workers health and safety.

The usefulness of the research project is judged on its ability to confirm the existence/ or not of adequate levels of EIA, compliance with and enforcement of recommendations , the proposals it makes to achieve improvement in various areas, as well as the feasible recommendations it makes. These recommendations are targeted at achieving better and sustainable environmental management.

6.2 Summary

This study gives general descriptions, procedures and the significance of EIA, requirements and tenets of sustainable environmental management. The study has included an in depth explanation of these factors and related them to the research findings and then used the results of the study to explain a particular trend in phenomenon as was observed from the investigation conducted. For a better understanding, a case by case evaluation of the sampled operations were considered basing on the salient features felt to be a representation of the whole. Activities in the EPZs vary from manufacturing, processing, commercial, supplies, to service delivery. There were cases of both compliance and non compliance to EIA recommendations and general environmental management standards requirements; however the levels differed from one enterprise to the another as seen in the analysis of the results provided by the research. While conducting the research, questions were

put to various players in the enterprises under study. Responses received to these questions gave a good indication of levels of various specific characteristics within the said enterprises. Interviewees were asked if they were aware of what EIA was. This question was premised on the fact that those in the employ of the various enterprises under study could not adequately address issues of Environmental management if they did not have a good understanding of what it entailed and why it was necessary. It was necessary to also find out if different players were aware that carrying out an EIA was in fact a legal requirement. It was also important to find out whether the various enterprises undertook an EIA at the commencement of their project and whether or not they continue to carry out periodical self audits to establish their levels of compliance and enforcement. The study recognized that it was not enough that the companies had carried out an EIA. What was more critical was if they were actually implementing the project while keeping in mind the recommendations of the EIA and Audits as not doing so would mean the EIA was merely an academic exercise which would not be useful. It was also critical to find out if the implementers were having difficulty implementing any recommendations and if they were, what these difficulties or challenges were. An understanding of the challenges would enable enterprises seek practical solutions.

The interviewees were asked if there had been any significant complaints from other projects immediately neighboring theirs and also ones that were a distance away. From the findings, it was noted that it is possible for one to rate themselves well when they may be impacting others negatively and therefore be rated differently by others. This information was later counterchecked against information available from the immediate enforcing authority's records and staff. The question on whether the project were complying with the recommendations of the EIA and self audits was put to the interviewee to get a sense of what they themselves thought about their performance in this respect. People interviewed were also asked to give details on the work environment specifically covering issues of occupational safety and health. As expected, a number of people sought to give a good review of the enterprises even in cases where there were blatant violations. This is why there were confirmatory questions requiring a show of documentary or physical evidence of assertions. The research also included making observations and rating based on observations.

6.3 Conclusion

From the research, it was observed that there were some enterprises where the environmental management could be rated as excellent, but there were also enterprises where environmental management was poor.

The findings in this study revealed that the budgetary provisions, capacity and skills to manage the environment were largely inadequate. The level of environmental education and consequent awareness was low. There were hardly any arrangements to disseminate or train workers on the need to develop sustainably. There was observed a general lack of appreciation of matters of environmental management and sustainable development among most cadres of the workers. The fact that poor management of the environment appeared to be part of the norms of the majority of workers was noted as a major setback in attempts to carry out good management. There was a noticeable need for good environmental management practices to be taught at an early age so as to become part and parcel of the population's norms and practices and thus achieve a contribution by all players. There appeared to be no costs for damaging the environment and such a perception could definitely not improve the management. The polluters were merely warned not to repeat but they were not required to remedy nor indeed pay any damages for losses caused by their actions. This was also not applied to workers who caused damage to the environment. This situation was not ideal. Conversely, there was no recognition or indeed reward for staff who or enterprises which carried out better management and so there was no motivation for enterprises. The ideal would have been for those who carried out good environmental management to be recognized and rewarded, maybe by way of exemption from paying certain fees. The recommendations of audits carried out were not always fully implemented. The regulators too did not respond quickly when incidences of non compliance were observed. Zoning had not been strictly enforced so there were some conflicts between neighbors. Very basic waste management facilities like dust bins were not provided.

It was clear that many of the workers at all levels considered environmental management someone else's responsibility. In most enterprises, the staff did not appreciate that environmental management was the responsibility of all cadres of staff. This established an obvious need for the entire workforce and neighbors to be involved in making decisions on environmental management,. This would enable them to have a sense of ownership and responsibility. It was also noteworthy that the ability to take punitive action against polluters was reserved to only certain

bodies, in this case NEMA or public health and there was a level of bureaucracy that interfered with capacity to take action against those who damaged the environment or carried out poor environmental management. The action that could be taken by the EPZA was limited to warnings and later reporting if need arises. There were no fast punitive actions that were applied in case of violation. These would have served as a deterrent to other likely violators. In cases of violation and in the absence of corrective action after warnings, EPZ would usually refer to third parties NEMA and Public Health to try to get an amicable solution but in extreme cases, EPZA may be forced to close down enterprise operations. This is usually a last resort as the closure of an enterprise is sometimes in conflict with the EPZAs role as a facilitator and promoter. The lapse of time, in cases of violation then became a point of concern.

The findings in this study led the researcher to conclude that the level of environmental management in the EPZ enterprises was not adequate and there was a lot of room for improvement. Owing to this conclusion, it was necessary to make recommendations on possible actions that can be taken to improve the situation.

6.4 Recommendations

The findings of this research are useful not only to industrialists or investors in manufacturing, but also to scholars, planners, policy makers and the general public.

6.4.1 Recommendations for manufacturers

Based on the findings of this research, there is need to address some aspects to do with the environmental aspects of projects when planning, so as to ultimately achieve better environmental management for sustainability and a better work place. Such action has to be taken by the project planners, proponents, managers, and implementers who form part of the manufacturing team. Towards this end, the study established and hereby recommends that project proponents should;

- Budget adequately for management of environmental issues
- Build capacity for good environmental management.
- Conduct environmental education for all workers
- recognize and adhere to the polluter pays principle
- Reward good environmental management for example pay bonus.

6.4.2 Recommendations for regulators like EPZA

In the course of carrying out the research, various observations were made and based on the research findings, it is necessary to make the following recommendations as suggested action areas for EPZA and other like regulators who are charged with a similar mandate in management of various development initiatives. Regulators should;

- create awareness and carry out continuous environmental monitoring and enforcement
- ensure strict and timely response to issues raised in instances of non-compliance
- strictly enforce zoning regulations to manage negative impacts and prevent conflicts
- Recognize and reward good environmental management.
- Budget adequately for support facilities including provision of such basic facilities as garbage collection points and sorting facilities.
- Make appropriate recommendations, particularly in areas which have proved to be challenging.

6.4.3 Recommendations for administrators and policy formulators

This research sought to look at how well certain specific tools and instruments are being applied and at the end it is found necessary to make some recommendations for administrators as well as those formulating policies to guide the management of the environment. Administrators and policy formulators should;

- Promote public participation in environmental decision making by creating awareness, training and close monitoring
- Educate the public to report enterprises violating the environment
- Give tangible incentives for good environmental management including exemptions on fees payable so as to encourage the investors to carry out the best environmental management
- Make legal provisions to empower enforcing agencies to partner effectively with those ultimately in charge of environmental management.
- Make the processes easier and faster as bureaucracy interferes with environmental management.
- Strictly enforce polluter pays principle
- Make environmental education a requirement for manufacturing entities

6.4.4 Recommendations for Scholars

During the research, it was observed that even though a number of players seemed to have some environmental education, not all had adequate understanding. Many people who were interviewed indicated that they had never received any formal or indeed informal education or information on the environment, even though they had now been instructed to carry out certain aspects of environmental management. In order to address this anomaly, it is recommended that scholars;

- incorporate environmental education from primary, secondary through to civic level
- Lay special emphasis on this to encourage all to participate

6.5 Best practice

It is important to emphasize best practice as a tool for future developments in EPZs in Kenya. It is equally important to learn from what has been done in the past by others, but not let it limit the development in future. Looking at existing environmentally well managed industrial complexes in the world, the management in EPZA and indeed elsewhere can improve the environmental management processes. The Kenyan situation can heavily borrow from best practices around the world that had initially fared negatively but have turned the situation round by embracing more sustainable ways of managing the environment in industrial operations.

In Sri-Lanka, Bangladesh, China, Mexico and Ghana the concerned authorities have put resolute measures in place to ensure effectiveness in proper management of environment in the Export Processing Zones.

6.6 Areas for further research

There were observations made during the study which could not be given adequate attention due to constraints of time and finance. The research determined that there is need for further examination in the manufacturing touching on items like lead and Batteries, chemicals from garment factories, glass, e-waste and need to clearly spell out how management of these should be carried out to avoid contamination of the environment. While it was noted that factories that dealt in these products or items seemed to constantly have problems, there were no real solutions and this seemed to be a problem of lack of sufficient attention or else lack of definite recommendations from scholars, no decisive action plans and indeed no action on the part of the administration and policy makers and seeming lack of capacity on the part of the regulators charged with overseeing these industries

6.7 Contributions made by this study

Overall, it is noted that it is important to educate and thus create awareness and strive to sensitize all stakeholders so as to achieve proper and sustainable management of the environment. This is especially important within the industrial sector as these are sometimes major polluters. Not only should regulations be formulated but various methods can be employed to achieve good results including deterrence – licensing, permits (denial) and issuance of conditional approvals. More policing for enforcement is required. But even more important than policing to enforce is the need for all stakeholders to embrace the tenets of good environmental management and carry out self regulation.

The environmental management authorities need to look into measures to improve the application of compliance and enforcement instruments within the Environmental management requirements in order to build capacity and enhance their effectiveness in dealing with the challenges of sustainable environmental management in Kenya's EPZs. In many cases environmental management systems and policy implementation are still far from being effective and efficient. Lack of consistency in regulations, conflicts of interest at different levels of environmental policy administration, insufficient technical capacity and insufficient resources available to environmental policy enforcement agencies are some of the factors that have hindered effective handling of Environmental management issues. In order to increase the rates of compliance with environmental regulations, limit negative environmental and health impacts and thereby increase the positive benefits and effectiveness of using EIA, EA , EMP and OSH as environmental management tools , the recommendations made above should be taken into consideration.

The role which Kenya's EPZs play in the economy of the country is one of the main reasons the EPZ was picked as a study case for this paper. The study is important as it will contribute to better environmental management and the sustainability of public health, thus affecting the performance of the EPZ companies as units that would promote sustainability of mankind. The study is also important as it will contribute not only to environmental management in the EPZs but also management of the environment in like developments, in this case industrial areas.

A combination of measures and all other related aspects of environmental sustainability can be harnessed to build much needed long term environment sustaining policies that will go a long way towards achieving better and improved systems of environment management within the EPZs in

Kenya. It is necessary to appreciate how multi-dimensional approaches can be used or employed in integrating environmental concerns in planning, development and subsequent management, so as to achieve sustainability for all. There is room for improvement as certain areas at the EPZ, which are currently eye sore spots can be improved both aesthetically and functionally. Such areas can be identified and then after improvements are done, this can be replicated elsewhere in the economy and this will positively impact like developments.

Environmental conservation and sound environmental management should be related to socio-economic development. The industrial developments at the EPZ interact with the social and other economic sectors of society. There are very many workers who are impacted negatively or positively by the operations of the industrial developments at the EPZ. This study has looked at both the positive and negative aspects and noted in part the effects of good/bad environmental management, and how the industrial development process contributes or subtracts from this sustainability. The study recognizes and re-emphasizes the need for non-stop monitoring and evaluation to ensure continued compliance and continual improvement in both existing and new projects and the importance of the study is noted as the information will enable all stakeholders to address the environmental challenges experienced

References

- Adelegan, J., Carlsson, B. and Perelli, S. (2009). “*Eco-Innovation and Financial Performance in Africa: Evidence from the Pulp and Paper Industry*,” The Global Network for the Economics of Learning, Innovation, and Competence Building Systems (Globelics), 7th International Conference, Dakar, Senegal.
- Asian Development Bank. (1991). “*Remote Sensing and Geographical Information for Natural Resource Management*,” Asian Development Environmental Paper No.9: 202.
- Asian Environmental Compliance and Enforcement Network (AECEN) and Organization for Economic Cooperation and Development (OECD) (2006) report on “*Environment Compliance and Enforcement in India: Rapid Assessment*.” Hanoi Vietnam 4-5 Dec.2006”
- Blackburn W.R. (2007) “*The Sustainability Handbook: The Complete Management Guide to Achieving Social, Economic and Environmental Responsibility*”. Earthscan Publications, London
- Brimblecombe. P, Chan C.K, Singh H.B (2012) “*Atmospheric Environment*” Elsevier Ltd
- Buchanan,D. A & Bryman.A (2007). “*Contextualizing methods choice in organizational research,Organizational Research Methods,Vol .10 N.3*”
- Canter, L. (1996). “*Environmental Impact Assessment, 2nd edition*”. McGraw-Hill Book Company, New York, NY.
- Chabari, N (2000) “The role of Export Processing Zones in Kenya, an assessment”.
- Dee, N., J. Baker, N. Drobny, K. Duke, T. Whitman, and P. Fahringer. 1972. “*An Environmental Evaluation System for Water Resource Planning*,” *Water Resource Research*, 9: 523-535.
- Dinello N (2009), “*China, India and Beyond: Development Drivers and Limitations*” Shaoguang Wang
- Dowell, G.A., Hart, S., & Yeung, B. (2000). “*Do Corporate Global Environmental Standards Create or Destroy Value?*” *Management Science*, 46(8): 1059-1074.
- Economic and Social Commission for Asia and the Pacific (ESCAP). (1990). “*Environmental Impact Guidelines for Water Resources Development*,” ESCAP Environment and Development Series. New York: United Nations.

Economopoulos, Alexander P. (1993). *“Assessment of Sources of Air, Water, and Land Pollution: A Guide to Rapid Source Inventory Techniques and Their Use in Formulating Environmental Control Strategies. Part One: Rapid Inventory Techniques in Environmental Pollution”*. (Unpublished document) Geneva: World Health Organization.

Part Two: *“Approaches for Consideration in Formulating Environmental Control Strategies. Geneva: WHO”*.

EIA for Developing Countries. (1997). *“Methods for Environmental Impact Assessment”*.

Environment Agency v Brock Plc. (1998). Env.L.R.607; QBD. *Environmental Protection Law of the People's Republic of China* (adopted on December 26, 1989)

Environmental Management, 1: 207- 227.

EPZA(2010) *annual performance report, 2010*

EPZA (2010)*Export Processing Zones Authority brochure.*

EPZA (2007) *Concept note on Special Economic Zones,*

EPZA(2010). *Information Pack.*

EPZA (2009) *Environmental management systems procedures*

EPZA(2008) *environmental policy*

EPZA(2008) *Strategic Plan 2009-2013*

Everitt, R.R., D.A. Birdsall, and D.P. Stone.(1986). *“Beaufort Environmental Monitoring Program” in Lang, R. (ed.). Integrated Approaches to Resource Planning and Management. Calgary: University of Calgary Press.*

Fisher, D. and G.S. Davis. (1973). *“An Approach to Assessing environmental Impacts,”* Journal of Frankfurt Institute for Advanced Studies (FIAS) (2006) *“Bangladesh: Piloting Reform through the Development and Management of Economic Zones”* & South Asia Enterprise Development Facility (SEDF)

Golder, J., R.P. Ovellete, S. Saari, and P.N. Cheremisinoff. (1979). *“Environmental Impact Data Book”*. Ann Arbor, MI: Ann Arbor Science Publications Inc.

Government of Kenya. (1999). *“The environmental Management and Co-ordination Act, 1999”* . No. 8. Government of Kenya, Ministry of Environment and Mineral Resources

Government of Kenya. (1990). *“The Export Processing Zones Act, 1990, CAP 517,* Government of Kenya, Ministry of Environment and Mineral Resources

Hylton K. N (2008) *“Environmental nuisance law”* government institute, Washington dc

- Institute for Law and Environmental Governance (2003). “*Community guide to Environmental Management in Kenya*”. ILEG.
- International Institute for Environment and Development. (1995). “*Directory of Impact Assessment Guidelines*”. London, UK: IIED.
- International Institute for Management Development. (2007). Switzerland.
- International Network for Environmental Compliance and Enforcement (2009). “*Creating Environmental Laws and Requirements that are Enforceable.*”(INECE).
- International Network for Environmental Compliance and Enforcement (2009). “*Principles of Environmental Compliance and Enforcement Handbook.* (INECE).
- International Network for Environmental Compliance and Enforcement (2009). “*Promoting Compliance.*” (INECE)
- International Organization for Standardization. ISO 14004:2004. “*Environmental Management systems -- General guidelines on principles, systems and support techniques.*”
- Interim Mekong Committee. (1982). *Environmental Impact Assessment - Guidelines for Application for Tropical River Basin Development.* Bangkok: Mekong Secretariat, ESCAP.
- Journal of Environmental Management Volume 61, Issue 4, April 2001, Pages 281–300
- Kamande M W. (2011). “*Clean production and Profitability: An Eco-Efficiency Analysis of Kenyan Manufacturing Firms,*” CSAE 2011 Paper1, 2009.
- Kibua T. N and Nzioki B K (2004) “*Are Export Processing Zones relevant in a liberalized environment – the Kenya case*”
- Kibuna J. N (2005) “*An analysis of the terms and conditions of employment in the Export Processing Zones*”
- King, A., & Lenox, M. (2001). “*Does it Really Pay to be Green, An Empirical Study of the Firm Environmental and Financial Performance.*” *Journal of Industrial Ecology*, 5(1).
- Launceston Environment Centre, The. (2006). “*Submission to the RPDC on the Draft IIS by Gunns Ltd. to Develop and Operate a Bleached Kraft Pulp Mill in the Tamar Valley*” September 2006: 7.
- Leal, G.G., Fa M.C and Pasola, J.V. (2003). “*Using Environmental Management Systems to Increase Firms’ Competitiveness,*” *Corporate Social Responsibility and Environmental Management Corp. Soc. Responsible. Environ. Mgmt* 10: 101–110.
- Leopold, L.B., F.E. Clarke, B.B. Manshaw, and J.R. Balsley. (1971). “*A Procedure for Evaluating Environmental Impacts*” U.S. Geological Survey Circular No. 645. , Washington, D.C.: Printing Office.

- Lohani, B. N.; Evans, J. W.; Everitt, R. R.; Ludwig, H.; Carpenter, R. A.; Tu, S. L (1997) *“Environmental impact assessment for developing countries in Asia, Selected case studies”*
- Lohani, B.N. and N. Halim. (1983). *“Recommended Methodologies for Rapid Environmental Impact Assessment in Developing Countries: Experiences Derived from Case Studies in Thailand,”* Workshop on Environmental Impact Assessment, Guangzhou, and People’s Republic of China.
- Mireri.C (2000) *“The Impact of EPZ development on employment creation in Kenya”*
- Mutsotso , B M (2001) *“Labour dispute settlement machinery in Kenya”*.
- Muthoka, Margaret, Assumpta Rego and Zipporah Rimbui. (1998). *“Environmental Education: Essential Knowledge for Sustainable Development”*. Nairobi: Longhorn Publishers (K) Ltd.
- Michubu, Lawrence Mwithali (2009). *“The role of cleaner production in enhancing water use efficiency in the manufacturing industry: A case study of central glass industries limited and East African Breweries Limited”*
- National Environmental Management Authority, (2004). *“State of Environment report 2004, Kenya , Land Use and Environment”*
- National Environmental Management Authority, (2006) *“Waste management regulations”*
- National Environmental Management Authority (2006) *“water quality regulations”*
- NEB. (1979). Manual of NEB – *“Guidelines for Preparation of Environmental Impact Evaluation”*. Bangkok: National Environment Board.
- Otenyo M.G (2011)- *“Institutional factors affecting municipal solid waste management compliance : a case study of waste transporters in Nairobi City”*
- Palmer.A.Joy (1998) *“ Environmental education in the 21st century Theory, practice , progress and promise”* Routledge 11 New fetter lane, London E C 4 P 4 EE
- Smardon, R.C., J.R. Pease, and P. Donheffner. (1976). *“Environmental Assessment Form, Environmental Impact Assessment , A Framework.”*
- Ramus, C.A. and Oppegaard, K. (2007). *“Integrating Compliance-based and Commitment-based Approaches in Corporate Sustainability Management.”*
- RCBowen Kenya Site. <http://kenya.rcbowen.com>
- Seddon Properties Ltd v Secretary of State for the Environment (1981) 42 P. & C.R 26; (1978) 248 E.G 951; (1978) J.P.L 85, QBD.

- Shopley, J.B. and R.F. Fuggle. (1984). “*A Comprehensive Review of Current Environmental Impact Assessment Methods and Techniques*,” *Journal of Environmental Management*, 18:25-47.
- Stewart R.B (1977) “*National approaches to environmental implementation and enforcement.*” The yale law journal company
- Thornton. J and Beckwith .S. (2004). “*Environmental Law, 2nd Edition*”. Sweet & Maxwell textbook series), Chapters 1, 2, 5, 6,7,8,9, 10, 11, 12 & 13.
- UNEP, Division of Environmental Law and Conventions. “*Manual on Compliance with and Enforcement of Multilateral Environmental Agreements*”.
- Wathern, P. (1988). “*An Introductory Guide to EIA.*” In P. Wathern (ed.). *Environmental Impact Assessment: Theory and Practice*. Boston, MA: Unwin Hyman.
- WBCSD.(2000). “*Measuring Eco-Efficiency, A Guide to Reporting Company Performance,*” Business Role/CSR Sustainable Value Chain.
- WBCSD. (2000). “*Eco-efficiency: Creating More Value with Less Impact, World Business Council for Sustainable Development.*” Geneva, Switzerland.
- West Coast Wind Farms Ltd v Secretary of State for the Environment (1996) Env. L.R. 29; (1996) J. P.L 767, QBD.
- Western Indian Ocean Marine Science Association (2003). “*Environmental impact assessment, Managing Marine Protected Areas: A TOOLKIT for the Western Indian Ocean, Sheet A6*”. (WIOMSA)
- Winslow D, Woost M. D. (2004) “*Economy, Culture, and Civil War in Sri Lanka*” Indiana University Press”
- World Bank. (1991).“*World Bank Environmental Assessment Sourcebook*” World Bank. Washington D.C.
- World Bank Report on Kenya Economic Update, (2010) “*Running on One Engine: Kenya’s uneven economic performance with special focus on the Port of Mombasa*”
- World Health Organization (WHO). (1982). “*Rapid Assessment of Sources of Air, Water and Lead Pollution*”
- WHO Offset *Publication No. 62*. Geneva: World Health Organization.
- WHO. (1983). “*Selected Techniques for Environmental Management Training Manual*”. Geneva: World Health Organization.
- World Bank Report on Kenya Economic Update,(2010). “*Running on One Engine: Kenya’s uneven economic performance with special focus on the Port of Mombasa*”

Annexes

Letter to enterprises

Joy Mideva,
University of Nairobi
NAIROBI

Dear sir/Madam,

RESEARCH

The above refers.

I am a post graduate student of environmental Management and Planning at the University of Nairobi. As part of my studies, I am carrying out a research titled “An assessment of environmental management in export processing zone enterprises in Kenya”.

This is to kindly request you to spare some of your time to answer the attached questionnaire and also grant me the opportunity of an interview at your convenience. I assure you that the information you give me will be used only for the purpose of this study.

Thanking you in advance.

Yours faithfully,

JOY MIDEVA

REG : C50/P/7743/05

Questionnaire

The actual questionnaire administered was as follows;

1.0 General information on the enterprise:

1.1 Sector:

1.2 Briefly describe your production process

1.3 Number of years in operation:

1.4 The number of people on premises:

1.5 Number of operating hours in a day:

2. Are there any environmental or related licenses/permits granted?

If yes please name each and the duration in force.

Question	Score – please tick
<p>Question 3</p> <p>Do you know what Environmental Impact Assessment (and Environmental Audit) is?</p> <p>Briefly explain</p>	<p>Yes</p> <p>No</p>
<p>Question 4</p> <p>Are you aware of the need to carry our EIA prior to the implementation of your project?</p> <p>Elaborate</p>	<p>Yes</p> <p>No</p>
<p>Question 5</p> <p>Do you have a professional in the area of Environmental management among your staff?</p> <p>Give details of their training that pertains to environmental management</p>	<p>Yes</p> <p>No</p>

<p>Question 6</p> <p>Was an EIA carried out at the start of the project?</p> <p>Show documentary evidence</p>	<p>Yes</p> <p>No</p>
<p>Question 7</p> <p>Do you conduct annual environmental self audits?</p> <p>Show reports</p>	<p>Yes</p> <p>No</p>
<p>Question 8</p> <p>Is your company complying with the recommendations of the EIA and self audits?</p> <p>If not complying give reasons why</p>	<p>Yes</p> <p>No</p>
<p>Question 9</p> <p>Have you taken corrective action in case of complaints?</p> <p>If yes, explain</p> <p>If no complaints, please indicate</p>	<p>Yes</p> <p>No</p>
<p>Question 10</p> <p>Does your enterprise have an Environmental Management Plan?</p>	<p>Yes</p> <p>No</p>

Give details on what is contained in the plan	
<p>Question 11</p> <p>What challenges if any, do you face in implementing the EMP?</p>	
<p>Question 12</p> <p>Have you met all the basic requirements of Occupational Health and Safety for your type of enterprise?</p> <p>Show evidence</p>	<p>Yes</p> <p>No</p>