(i) TITLE

THE QUAGMIRE OF THE LAW ON CONTROL OF HAZARDOUS WASTES, SUBSTANCES AND CHEMICALS.

THE KENYAN EXAMPLE

A Thesis submitted in partial fulfillment of the requirements For the degree of master of Laws in the Faculty of Law University of Nairobi

By

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Nairobi

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(iii) DECLARATION

This thesis is my original work and has not been presented for a degree in any other University.

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This thesis has been submitted for examination with our approval as University Supervisors

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(v) DEDICATION

To my lovely Children Bismark and Kerubo

(vi) ACKNOWLEDGEMENT

I wish to register my illimitable gratitude to all persons who assisted me in the course of researching for and writing of this thesis. However, I am particularly indebted to a number of people, whom I must mention hereinafter for their marvelous support. Indeed, without them, the ideas propounded herein would have been disparagingly presented.

Special thanks are due to my supervisors, **DR JAMES ODEK** lecturer and chairman Public Law Department Campus and **MR. GITHU MUNGAI** Law Lecturer, Parklands Campus, University of Nairobi, for their invaluable suggestions and positive role in motivating me to endeavour to accomplish this thesis in time. I particularly thank them for their wise counsel, patient and pragmatic guidance and encouragement. I would not forget to register the same gratitude for their wonderful determination in reading my original draft. I thank them most sincerely.

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all others who assisted me in one way or the other in the course of preparing this thesis.

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Last but not least, my profound gratitude is due to my wife Mrs. Rose Monyangi and my sons Andrew and Bismark and my daughter Kerubo who understanding my predicament, groaned non of my lengthy detachment from them in the course of the authorship of this thesis.

However, it should be understood from the initial stages that the ideas expressed in this thesis are absolutely mine and therefore I take responsibility of any shortcoming discernable herein.

(vii) ABSTRACT

Hazardous wastes substances and chemicals are those materials that cause actual harm to health or cause damage to the environment. While substances or chemicals could be required for industrial or agricultural production, building industry, energy generation or and other materials used for economic or commercial activities, most hazardous wastes are by products of a broad spectrum of industrial and manufacturing process. Primarily high volume generators of hazardous waste include the chemical, petroleum, metals, wood treatment paper, leather, textile and transportation industries, secondary sources include; auto and equipment repair shops, electro plates, construction firms, Laundromats, dry cleaners or pesticide applicators. It is also true that production of such wastes goes hand in hand with population growth and technological developments of a country. These wastes then present serious risks not only to human beings but also to the environment. It is on his background that in the past two decades there have been great concern in the international level for waste control. This has led to the developing and adoption of international conventions such as the Basel Convention, Bamako Convention and the London Guidelines. It is this concern for the control of hazardous wastes substances and chemicals that has prompted me to write this thesis.

Kenya aims at industrialization in the next century. It is therefore prudent to predict that the generation of wastes substances and chemicals will increase with the intended level of industrialization . Such wastes are a threat to human health. Thus this problem of wastes

is real and can be predicted. Chapter one of this thesis seeks to investigate such problem Besides, Kenya's approach to environmental conservation and hazardous waste control is sectoral in nature. There exists various statutes that govern areas such as water, wildlife and fish. With the rapid increase in the volume of waste production, it is important for the Kenya Government to intervene by putting in place a legislation to regulate production and disposal of waste. The proposal of this thesis seeks to investigate as to whether there are comprehensive statutory provisions governing waste disposal. As it will emerge, none, of the existing legislations existing presently is such comprehensive and therefore, this thesis recommends that parliament should pass a specific legislation for the management of hazardous substances.

In the proposal, similarly, the statement of the problem, the objectives of the study, the significance and justification of the study, the theoretical framework, the literature review, the working hypothesis and the research methodology are also discussed. The proposal is our chapter one of this thesis.

The next chapter gives an overview of hazardous waste, substance and chemicals, their sources, classification and their effects on the environment. Herein we discuss the effects of hazardous wastes on human health and the environment. Hazardous substances are defined, their sources identified and their harm to human health and the environment is exposed. This section outlines some suggested disposal methods which hinge on a comprehensive policy of waste in the country. Such a policy, it emerges, aims at holistic handling of wastes, emphasis protection, life cycle analysis and evaluation of life-long

environmental protection as well as proper disposal systems. Co-operation between states as well as organs within states are also highly recommended in this part of the study in the process of handling and disposal of wastes. This chapter two lays a framework in which the succeeding chapter is presented.

Chapter three of this thesis reviews the existing Kenya Laws regulating hazardous waste substances and chemicals. It comprehensively reviews the national laws having a bearing on hazardous waste, chemicals and substances. It emerges very clearly that Kenya has no umbrella law on the environment and more specifically on hazardous waste control. However, there are several statutes touching on hazardous waste, but on statute by statute analysis, various loopholes , inconsistencies, flaws and lack of harmony are ascertainable. It is further argued that the existing laws set concentration limits which are not relevant to today's knowledge and technologies. With the free movement of various products across borders, and the emphasis on national as well as regional industrialization, without articulated and adequate measures to curb waste is a sure way of inviting uncontrolled environmental pollution. In this chapter we strongly recommend that Kenya should formulate and implement a comprehensive legislation on waste whose objective will be to reduce problems connected with waste disposal.

Our chapter four discusses the international instruments on hazardous waste control and protocols on the same. It reviews the international instruments and conventions regulating hazardous wastes and recommends that Kenya should study those conventions with a view of taking the necessary measures to domesticate them. These conventions

include the Basel Convention (1989) and the Bamako Convention (1991) as well as other important Conventions. It is also recommended that the three East African Countries (Kenya, Uganda, and Tanzania) should enter into a regional agreement aimed at creating a concrete effort to deal with hazardous waste and substances. This section explores the relevance of international conventions in the control of hazardous wastes by establishing specific standards in hazardous waste substances and chemicals management.

This thesis in chapter five looks at the Kenyan general principle on hazardous waste management. It outlines some very important policy guidelines on waste generally, taking in to account the argument in chapter three and four above and gives municipal tasks in controlling hazardous waste through recycled waste and tax imposition and cash deposits. The roles, duties and accompanying obligation of the local people and various institutions are examined. The section examines the existence or otherwise in Kenya of any guiding ethics as regards hazardous waste control and control of environmental pollution and the role of local communities in that regard.

The last part of this thesis gives the conclusion and recommendations based on the content of the whole thesis. It also outlines the contents of a proposed legislation. The provisions of the proposed legislation are to the thesis and marked annex 1.

(iii) TABLE OF STATUTES

1. The Pharmacy and Poisons Act Cap 244 of the Laws of Kenya.
2. The Public Health Act Cap 242
3. The Radiation Act No. 20 of 1992
4. The Local Government Act Cap 265 of the Law of Kenya
5. The Fisheries Act No. 5 of 1989
6. The Use of Poisonous Substances Act Cap 247
7. The Plant Protection Act Cap 324 of the Laws of Kenya
8. The Factories Act Cap 514
9. The Chemicals Control Bill 1995
10. Food and Drugs Act Cap 254 of the Laws of Kenya
11. Pest Control Product Act Cap 346 of Laws of Kenya
12. Petroleum (Exploration & Production) Acts Cap 304 of the Laws of Kenya
13. The Maritime Zone Act No. 6 of 1989 of the Laws of Kenya
14. The Merdiant Shipping Act Cap 389 of the Laws of Kenya
15. The Environment Management and Co-ordination Bill of 1996.

(iv) GOVERNMENT DOCUMENTS

1. Republic of Kenya, African Socialism and Its Application to Planning, Sessional Paper.

2. Republic of Kenya, 1974-1978, development Plan, Government Printer, Nairobi, 1974.

3. Republic of Kenya, 1979-1988, Development Plan, Government Print, Nairobi, 1979.

4. Republic of Kenya, 1984-1988, Development Plan, Government Printer, Nairobi, 1984.

5. Republic of Kenya, Sessional Paper No. 1 of 1986 on Economic Management for renewed Growth: Government Printer, Nairobi, 1986.

6. Republic of Kenya, 1989-1993, Development Plan, government Printer, Nairobi, 1994.

CHAPTER ONE

THE INTRODUCTION

1.1 STATEMENT OF THE PROBLEM.

Production of wastes goes hand in hand with population growth and technological developments of a country. The generation of wastes presents serious risks not only to human health but also the environment. Hazardous substances are defined as those substances that pose a threat or are dangerous or cause actual harm either directly or indirectly to human health and cause harm to the environment[1]. There is no consensus on inclusion of the environment in the definition. However, since total environment supports life as we know it, substances that damage it cause danger to human health either directly or indirectly. There are therefore a range of substances, materials prepared and sold to the general public, or sold for industrial use, agricultural production, building industry, energy generation or other materials required or used for economic or commercial activities. Control of the said substances has intrinsic values, which contribute towards the evolution and maintenance of life sustainig systems in the biosphere. This vital biosphere on which the future depends is increasingly facing the danger of pollution due to human and non-human activities. There is therefore an immediate need to anticipate, counter and prevent the threat through control of dumping

1 National Research Council "Oil in the Sea-inputs Fates and effects" (National Academy Press. Washington D.C. 1985).

of waste, conserving the environment and making sustainable use of biological diversity within any Geographical boundaries.

In developing countries, Kenya inclusive, the economy is mainly dependent on Agriculture. Besides the production of main food crops like maize, millet and sorghum, the cultivation and production for cash crops like tea, pyrethrum and sisal and horticultural crops like vegetables, flowers and bananas are wide spread. The sustenance of those agricultural activities demands good environmental quality which can only be achieved if disposal of hazardous waste and substances is controlled.

Hazardous wastes takes the form of either, solids, liquids or sludge's, and as indicated earlier, hazardous substances are those substances that pose threat or cause actual harm to health or cause damage to the environment and may be industrial, agricultural, domestic, clinical or municipal wastes. The degree of hazard posed by hazardous wastes varies widely. A useful distinction is between those wastes which pose a potentially high risk to human health and those wastes where the hazard is much less, but the qualities are perhaps much greater. Typical wastes in the first category might include low flashpoint flammable solvents, high toxic pesticides or persistent chlorinated materials, while the later includes such large volume mineral wastes as metaliferous slags, mine tailings and lime sludges[2].

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2 Suess, 1983, Management of Hazardous waste, policy Guidelines and code of practice. WHO regional production. pp. 94.

My concern on this study has been motivated by the fact that Hazardous wastes have only come to be recognized as a priority problem over the past 40 – 25 years, in the developed world. In such countries as it is the case today in developing countries, action to control hazardous wastes was too often precipitated by an actual or potential environmental disaster. For instance.

- Japan was one of the first countries to introduce comprehensive hazardous waste controls, following the minamata incident in the late 1960's when many people died from eating fish contaminated with mercury which had been discharged to the sea[3].
- In the UK, a high level committee had been investigating the problem of hazardous wastes for a number of years when in February 1972, public outrage arose over the discovery of drums containing heat treatment cyanide salts on vacant land where children were playing. Ten days later legislation was enacted[4].
- The rigid control system on hazardous wastes in the United States which has evolved since 1976 has been driven largely by public outcry over the widespread discovery of pollution caused by past uncontrolled dumping of hazardous wastes[5].

3 World Commission on Environment and development, our common future (Oxford University press, oxford 1987) pp 198.
4 Ibid pp.202
5 Supra note 3 pp. 207

Presently developing countries, Kenya inclusive takes action to control Hazardous wastes when there is an actual or potential environmental disaster. In this respect Hazardous waste can cause immediate, short-term, public health problem as well as long-term environmental pollution. There is need for proper control of hazardous wastes. It is true that proper control of hazardous waste does cost money, but experience in a number of developed countries suggests that cleaning up the "Sins of the Past" is much more expensive in the long term. For instance, in the United States clean up of improperly managed wastes has been estimated to cost 10-100 times as much as proper early management[6]. It is therefore imperative that all countries including Kenya should institute controls over hazardous wastes to avoid such excessive costs in the future.

The second motivating factor for this study is that even though the definition of hazardous waste excludes domestic wastes, in many countries it may be difficulty to totally separate industrial and domestic wastes. Developing countries will need some strategy to identify and quantify the risks posed by hazardous wastes in order to arrive at a list of priorities of action within their limited resources[7]. Some factors affecting the degree of risk are:

- Reactivity (fire, explosion, leaching)
- Biological effect (toxicity, short and long exotocicity.)
- Persistence (fate in environment, detoxification potential, multiple factors).
- Indirect health risks (pathogens and vectors)

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6 United States Environmental Protection Agency 1982. Using Composation and incentives when siting Hazardous waste Management facilities. A Handbook. Washington D. C. pp.81.

- Actual amounts and local conditions (temperature, soil, water, humidity, light, receiving systems their use patter).

The third problem motivating me to undertake this study is the fact that it is now clear that hazardous waste is a crisis that needs to be resolved. Thus every country needs a national control system for hazardous waste management. Such a system must provide four vital components if it is to be successful. Indeed most of the developing countries have no national control system of hazardous waste management. The dumping of waste in dumping sites is always conclusive. Nobody follows what happens thereafter. Hence there is need for:-

- Legislation and regulation.
- Proper implementation and enforcement procedures.
- The provision of adequate facilities for hazardous waste recycling treatment and disposal and managers and/or public awareness educational programs.
- Introduction of training schemes for government enforcement officers and plant operators and managers and/or public awareness educational programmes. It is my submission that all four aspects above are vital to the proper working or a national control system. No matter how perfect a system may appear on paper, it is worthless if it is not enforced. Similarly, control cannot be enforced if adequate facilities are not available or if enforcement officers are not adequately trained. Thus development

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Supra 3 at pp 105.

of legislation and provision of adequate facilities must proceed in parallel. Same is lacking in the developing countries.

From the above, it is also important to note that for the introduction of a controlled system there is need for:

- A good information on present qualities of waste and on present practices to facilitate the identification of priorities.
- A national strategy for hazardous waste management needs to be developed including a plan for the provision of facilities.
- A control system should encompass all aspects of hazardous waste management, from generation through storage, transport and treatment to disposal.
- All parties involved – generators, transporters, disposes, and government – have their role and responsibilities.

It is true then to assert that in Developing countries, there are a number of problems affecting the control of hazardous wastes namely:-

(1) General Control over pollution and waste disposal is often poor.

In many countries including Kenya dumps are predominant. In the absence of controls of hazardous waste, most waste continue to find its way into such dumps, some scavengers live and work among the waste dumps. Many of these dumps result to water pollution. Such dumps are not treated. Nobody knows what is even dumped there and the effect of the waste in this dumpsite is never assessed. Proper management of dumpsites is a high priority in developing countries.

Controls over water and air pollution resulting from dumps are often poor, and when such controls are implemented, the treatment of such sludges and dusts are often poor. Isolated efforts to control specific hazardous wastes are often ineffective and lack any overall upgrading of waste management practices. Co-ordination of controls over air and water pollution is particularly important.

(2) Generators may be unaware of the hazard of their waste.

Ignorance of the potential harm of hazardous is encountered in all countries, but it is a particular problem among small generators in developing countries, which are many. Even though each generator of hazard waste may be producing small quantities of waste, their big numbers, and general negligence gives rise to potential problems in control of hazardous waste. For example, the improper disposal of surplus pesticides or pesticide containers may poison humans or pollute sensitive ground water resources.

(3) Stockpiles of waste awaiting treatment or disposal.

In some countries Kenya included, new industries may stockpile their waste on site in the absence of proper facilities for treatment or disposal. After 5, 10, or 15 years, space begins to run out, pollution problems arise, and suddenly the problem becomes urgent.

(4) Limited Resources

Kenya lacks the necessary financial resources and skilled manpower to adequately dispose off hazardous waste. Restrictions on foreign exchanges initially and lack of foreign currency, presently and or limited access to hard currencies or corruption makes it difficult to finance such facilities. A shortage of skilled manpower and lack of seriousness by the government will impede planning management, operation and maintenance of facilities and enforcement of regulations.

(5) Socio-political reasons.

Without public education on the issues and a general awareness of the dangers of improper disposal of hazardous waste, there is too often insufficient public demand for action. Kenya like any developing countries may focus on other very real and seemingly more urgent problems and not see hazardous waste disposal as a pressing need and immediate political goal. Developing countries need to set priorities in controlling

hazardous wastes. The available resources must be focused on the most significant problems and short-term solutions implemented to bring immediate problems under control.

It may be necessary to distinguish between long-term solutions, which may involve the establishment of centralized treatment/disposal facilities and short-term solutions, which aim to eliminate the worst current practices. Even in the longer term, there will be a need to develop solutions, which are compatible with the limited resources available. Such "appropriate" solutions are required particularly for small quantities of waste or for those wastes, which should appear on the agenda for action. There is therefore the need to guidance on the assessment and planning aspects of hazardous waste management, with specific reference to developing countries, Kenya inclusive. This is what makes this study more critical.

1.2 OBJECTIVES OF THE STUDY

This research intends to provide a general definition of hazardous wastes and sketch an outline of considerations for the development of "cradle-to-grave" waste management strategies, which aim to minimize and contain adverse impacts associated with direct hazardous waste management. In this regard, I wish to design some findings which will enhance awareness at policy levels, regarding the need to consider a wide variety of handling and safety options and intended to serve as a reference study when developing management plans. The broad options provided therein are prescriptive and serve to illustrate and highlight the magnitude of the problem for further study, development and focus.

This study recognizes that priority should be given to putting in place legislation aimed at improving the confederation of aspects at all stages in the production and disposal of hazardous wastes. Dynamics and changes induced by development aims are not without environmental hazards and risks. It is necessary to identify such hazards and risks, where they arise and take early steps to prevent them. Delayed action and latter attempts at remedial action may be illusory, more costly than preventive action at the outset, and in some cases, may be so costly as to bring into question the overall economic viability of the project.

Hence, the objectives of the proposed study are:

1. To define, classify and identify the main types of hazardous waste. This will give general inventory of hazardous wastes.

2. To analyze the legal framework and the mechanisms for the control and protection of hazardous wastes. This is aimed at discovering whether the existing constitutional and legal framework are adequate in controlling hazardous waste, prevent and combat the risks to health and environment caused by wastes.

3. To look at the limitations of Kenya's legal framework and suggest appropriate changes, if any, this country should put in place for better control of hazardous wastes, promote recycling and reduce problems connected with waste disposal.

4. To forecast on future prospects of hazardous waste control and to promote the use of cleaner technologies.

5. To outline the contents of proposed legislation on control of hazardous waste.

1.3 SIGNIFICANCE AND JUSTIFICATION OF THE STUDY

The focus of this study is to recommend legislation of laws that govern the disposal of wastes and those that make for the requirements for recycling of modes of rendering such wastes innocuous not being of harmful effect. It is important to note that our case example Kenya presently has no umbrella law on environmental management

(save for upcoming bill[8]) and more specifically there is no statute dealing with hazardous waste, chemicals and substances in the country. Currently[9], there are several statutes touching on hazardous waste, chemicals and substances. When analyzed in terms of application and their effectiveness, these statutes contain various loopholes, flaws and inconsistencies. These include the non-existences of a strong legal mechanism on hazardous wastes, chemicals and substances and lack of harmony in the existing laws which are scattered in several legislation[10]. This means that the effectiveness of these laws is poor. In the absence of a convincing national and international legal regime, strong national and regional policies are imperative. Hazardous substances emanating from various sources which cause air, water and soil pollution, acidification, eutrophication and so on should be controlled . Arising from such danger, it is imperative that Kenya should come up with a national legislation to address the question of hazardous wastes chemical and substances. This will act as management tool in the generation and disposal of wastes.

In order, to undertake effective hazardous waste management strategies, it is necessary to develop an appropriate institutional framework with the authority and capabilities needed to execute the various task. An institution is needed at the national level with sufficient nation wide strategies and plans and access international resources in terms of information and structure.

8. A Chemical Controls Bill 1995.
9. Factories Act CAP 514, Food and Drugs Act CAP 254, Laws of Kenya
10. Ibid.

The natural environment has a finite capacity both to sustain life and absorb its toxins. Its absorptive limits are being interfered with at an alarming frequency as ground water tables are found to be severely contaminated with organic solvents, soils become movable because of contamination by dioxins and increasing number of insidious pollutants.

Increased population pressure and efforts to maximize economic development and human environmental resources are necessary to full development. There is less and less room for wastes in high waste generating areas and it is no longer uncommon to find entire communities and associated industries seeking waste disposal facilities in far removed location, sometimes thousand of miles away. Similar problems are also being encountered in low waste generating areas, where there is less awareness of potential waste related problems[11a].

Fear of adverse environmental and health impacts through high volume or improper waste disposal has made it difficult and expensive to dispose waste especially when hazardous. This has led to illegal interboundary trade in toxic and other wastes, the search for more efficient waste minimization and disposal technologies and strategies hence rendering our study germane.

The waste management supply industry is a growing one. No society is free of waste problems, but these only become burdensome in proportion to the role they play in competition for natural goods and services. Many African countries, Kenya included, are dependent in the primary industry for survival. Farming, fishing,

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[11a] Hill R. D. 1981. Four options for Hazardous Waste Disposal. Civil Engineering. ASCE September. P 249

forestry and mining and any limited industrial development has a great potential for polluting and contaminating air, water and soil. The combination of this with demands imposed by population pressure will reduce productivity. This has become the case in a number of countries where the environmental resource has reached such a severe imbalance through the inability either to absorb pollution or support dependent populations that the results are irreversible environmental degradation.

Clean technologies and low pollution industries are no longer a luxury but are linked to basic questions of choice for survival. It is not economically viable to buy wholesale plants banned elsewhere at advantageous costs in order to face crippling future costs. To guarantee future opportunity for choice, it is necessary to make appropriate selections up-front, based on seeking sustainable balances for resource use and for waste management.

European countries[11] have recorded great success in the use of national and regional protocols in the management of hazardous waste through national legislations and regional arrangements respectively. A case in point[12] is the use of regional instruments in abating pollution of the marine environment and transboundary air pollution. Experience therefore emerging from the use of national legislation's shows that a country can easily monitor and control the dumping of hazardous waste within

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11. European Community Countries. It ought however be noted tat the EC countries have different legal instruments for actualizing the same.

12. The 1972 Oslo Convention for the prevention of Marine pollution by dumping from ships and aircraft: as amended.

its boundary and even take corrective measures within a short span of time to remedy any pollution; already accessioned.

The valuable biodiversity is increasingly threatened with hazardous wastes, chemicals and substances. This threat stems from unregulated dumping and uncontrolled activities of man. According to Global Biodiversity strategy[13], the current threat stems from industrial and agricultural activities that impair natural ecosystem and the species within them. There is significant and growing international consensus that hazardous wastes are being produced at rates higher than those ever witnessed in the course of human evolution[14]. Because of the aforementioned facts, the legislation of a law governing production and disposal of hazardous wastes becomes imperative and this has engaged the interests of policy makers and scholars. The law in Kenya on control of hazardous wastes is gravely wanting in scope and coverage. It is for this reason that our study becomes germane.

The role played by local and indigenous communities in the control of hazardous wastes is increasingly gaining recognition[15]. The indigenous communities have always practiced biodiversity conservation with little dumping. Our study will not only provide a textual analysis of this recognition but who in the local communities control hazardous wastes and hence derive benefit from the biodiversity and thus enabling them to place more value in hazardous waste control.

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13 Global Biodiversity Strategy WRI Washington D.C. 1992 pg. 712

14 Ibid.

15 Supra note 19

It ought also to be solidly pointed out that developing countries have continued to be used as dumping sites for environmentally hazardous substances. Such substances and wastes pose a serious danger to ecosystems, individuals and animals. Let it suffice to note that this study will expressly seek to offer aggrieved parties a chance to assert their rights and also for constituting a veritable bulwark against opportunistic dumping of dangerous wastes in third world countries. Clearly the argument is that this study while providing solutions to developed country exploitation of third world country malleability of institutional framework for protection against environmental degradation will equally offer significant heuristic inputs in the area of environmental law.

We also contend that for Kenya to redefine her political sovereignty better within the parameters of international environmental law, a study examining the existence lacunae in its constitution as posed against dumping of hazardous wastes is imperative. This study will seek to fill these gaps in Kenya's Legal statutes while providing solutions thereto.

1.4 THEORETICAL FRAMEWORK.

For the last 40 years the world has been very active in looking for ways and means of controlling a hazardous waste. As indicated earlier Hazardous waste has only come to be recognized as a priority problem over the past 40 years and most countries such as Japan, UK and the USA have promulgated some legislation and or put in place some control measures in fostering protection against hazardous waste[16].

Further a number of international organization have taken much interest in hazardous waste management[17]. For instance:-

(i) In 1983, the World Health Organization (WHO) and the United Nations Environment Program (UNEP) published policy guidelines and a code of practice, which sets out the principles of formulating and implementing a hazardous waste management policy.

(ii) In the late 1955, an adhoc working group on environmentally sound management of hazardous wastes meeting under the auspices of UNEP adopted the 'Cairo guidelines' on policies and legislation.

iii) UNEP's International Register of Potentially Toxic Chemicals (IRPTC) published waste management file in 1985 which contains information on treatment and disposal options for wastes containing specific chemicals.

World Commission on Environment, our common future (Oxford University Press, Oxford 1987) pp 198 – 210.

World Bank 1998. Techniques for assessing Industrial Hazard No. 55, Washington D. C. pp 49-90.

(iv) A workshop in May 1986 organized by ASEAN, UNEP and COG developed guidelines for establishing policies and strategies for hazardous waste management in Asia and the pacific.

(v) The organization of Economic Co-operation and development (OECD) and the Commission of the European Communities have been preparing an International Convention on the transfrontier movement of Hazardous wastes. Much work has focused on standardizing a list of hazardous wastes.

(vi) The UN Economic Commission of Europe (ECE) and the Council for Mutual economic assistance (CMEA) have focussed in particular on low-waste and non-waste technologies.

(vii) The adoption of International Conventions like Basel Convention, Bamako Convention and the London Guidelines, all aimed at curbing trans-boundary movement and management of Hazardous waste.

Whereas these efforts above have been of particular relevance to developed countries the focus generally has been on formulating policies and strategies and developing legislation. Recently, increasing focus is being given to the dumping of hazardous wastes in developing countries where there are inadequate controls to ensure the safe disposal of their wastes. There has been serious need to initiate controls in dumping of hazardous wastes. In developed countries stiff penalties have been imposed on those found guilty of dumping hazardous wastes. Indeed this was emphasized in a California Dumping case[32] where a former plant manager was charged with illegally disposing 14 substances in a landfill. He was found guilty and sentenced to 18 months imprisonment and fined a total

of $68,500. Delivering his judgement, the judge was of the view that the culprit".....knew what he was doing was illegal, was dangerous .....and was profitable.....this was not a crime of desperation.....but of greed.....there was the threat of great bodily harm to a multitude of people." In this particular case the employees of the company mixed chemicals with sand dust, then placed the mix in trash bins at the Manager's direction. They were taken to a landfill, which was not licensed for such chemicals. Under California law, such an offence carries a sentence of upto a maximum of five years and fine of $100,000.

Besides, developed countries considered the issue of obtaining reliable information on the quantities or types of hazardous wastes produced by any specific country. It was realised that international comparisons have been almost impossible because of differences in the classification and definition of hazardous wastes from country to country. Thus an attempt has been made to estimate the quantities of hazardous wastes produced in different countries[18]. It was estimated that a number of Western European Countries, hazardous waste production is about 5,000 tons per billions US$ of gross domestic products (GPD). The figure for the USA is approximately 75,000 tons; the figure for the USA is higher because certain high volume wastewater streams are included in the calculations. The corresponding figure for Canada is 10,000 tons. On the basis of very limited data, it was assumed that waste production in the USSR could be estimated at 10,000 tons per billion US$ GPD, while in other countries with mature industry at 5,000 tons. In newly industrialized countries 2,000 tons and in developing countries 1,000 tons.

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32 Alina Tuged. California. The Orange County Register. July 1992. California. (1957) 2QB (169)

Such estimates can at best indicate relative orders of magnitude of hazardous waste production in different countries.

From these estimates it appears that around two-thirds of developed countries produce less than 10,000 tons per annum of hazardous wastes for many developing countries the estimates are in the range of a few hundred or a few thousand tons. While this puts the overall problem in context, it should be remembered that single heavy industrial plant can produce hundreds of thousands of tons per annum of bulk wastes, although most of these are in the 'grey' region between hazardous and non-hazardous wastes. Considerable progress has been made for the last 20 years in controlling hazardous wastes in a number of developed countries. Progress varies considerably from country to country. But generally a few elements could be recognised us being accepted by most developed countries[19] such as:-

- There is effective legislation is in place.
- There is an effective manifest system is in place to control waste transport.
- There is an increase in percentage of operators of hazardous waste treatment and disposal facilities have been licensed.
- In some cases, well-engineered and well managed facilities have been provided for hazardous waste treatment, incineration and landfill is controlled.
- In a few cases good collection and transfer systems have been established.

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19 World Health Organization (WHO) 1982. Rapid assessment of sources of Air, water and Land pollution. Offset publication No.62 Geneva WHO pp.54.

Hazardous waste disposal is a dynamic problem, and there is no-going work in these developed countries on standards and licensing procedures. Present priorities vary depending on the stage of development and implementation of the control systems. In those cases where the process is only just beginning, an effective system is a priority. In other places, continuing implementation of regulations and provision of adequate facilities, either for landfill or for treatment of hazardous wastes, or both, are seen as high priorities. In a number of countries it is not the absence of facilities that present a problem, but rather competition between landfill and treatment facilities. Landfill tends to be less expensive than waste treatment, so that given a free market, landfills tend to predominate, even though treatment would be better for environmental reasons. In these cases government control of competition is necessary. Almost all developed countries see a need to improve enforcement of and compliance with the regulations that are in place

The above is not true to developing countries, Kenya inclusive, where the general control of hazardous waste is poor, the generators of this waste are either ignorant or negligent and the decision makers still lack the critical information, institutional experience and infrastructure needed to benefit or ensure the implementation of sound waste management strategies. While many decisions must be based on appropriate scientific study and understanding, there are certain ground rules which compounds the problem. the government should encourage industries to develop and use new technologies that emit less wastes and such technologies need to be identified. There is need to put in place an effective legislation, increase the operators of hazardous waste treatment and

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19 Ibid p. 79.

disposal and the putting in place of well managed facilities for hazardous waste treatment, incineration and landfill.

In a nutshell this research is in to investigate the in adequencies confronting developing countries such as Kenya in their legislation and constitutional framework and administrative structure to control hazardous waste substances and chemicals and how will they implement the provisions of any legislation whether intended or in operation. Lastly there is need to consider whether the current political systems or government could enact compressive legislation to govern the management of hazardous waste substances and chemicals, and what the proposed act should deal with.

1.5 LITERATURE REVIEW

Hazardous wastes have been defined as those substances that pose a threat or danger or cause actual harm either directly or indirectly to human health or cause damage to the environment[20]. Control of hazardous wastes has preoccupied minds of scholars in the past two decades. However, scholars and researchers have not documented a lot on this subject. Arising from above, it can safely be concluded that there is little literature on the law relating to control of hazardous wastes control generally giving specific reference to Kenya. J. B. Ojwang in his various works[21], addresses questions of environmental protection in Kenya. In his paper, "Environmental Law and Political change in Kenya[22], the author attempts to look at the likely implications of the present political and constitutional changes for environmental law in Kenya.

He focuses on the state of environmental law in Kenya, the law's capacity to deal with the environmental problems and the role of policy in environmental conservation. He argues that there is a vital link between environmental policy and management on the one hand and political change on the other. The changes in the political terrain that have occurred across the world, with the most remarkable ones appearing in Europe, have heralded momentous political and constitutional changes that have influenced development in many countries including Kenya. He further argues that political parties have an important role to play in environmental policy and management. The laws of Kenya must respond to this concern. This paper does not entirely address the

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20 Holmes J 1983 :Practical Waste Management" John Wiley & Sons, Chichester 1983 pg. 2.

21 Ojwang J. B. "Environmental Law and Political Change in Kenya: (Acts Press, African Centre for Technology Studies, Nairobi, Kenya 1992) pg. 26

22 Ibid. pg. 30

domain of our proposed study, the control of hazardous wastes and their management. This makes our study more specific as it seeks to address the issue of hazardous wastes.

Ojwang[23] further in his paper, Environmental Law and the Constitutional Order discusses interplay between constitutional order and environmental law. He argues that it is an essential component of environmental management for local and constitutional entities to provide a framework for environmental protection. The political order and the constitutional order may contribute immensely towards addressing environmental issues. Environmental protection issues therefore need to be provided in the constitutional framework. Our research besides these recommendations, suggests that there should be a comprehensive legislation dealing specifically with management of hazardous wastes. It widens the mode of applying this while Ojwang's paper only considers the constitutional approach.

C O. Okidi on his various works[24] has considered the formative provisions of Kenya's environmental statutes and cites a number of weaknesses ranging from inadequate provision management issues. He discusses the concept of environmental policy and development. The author elucidates the linkage between environmental and

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23 Ojwang J.B. "Environmental Law Constitutional Order". Ecopolicy. (Acts Press. Nairobi Kenya 1993).

24 Okidi C. O. "Review of the Policy Framework and Legal and Institutional Arrangements of Environmental and Natural Resources in Kenya: October. 1993 (Draft). Okidi Co. Legal Aspects of the Management of Marine and Coastal Areas in Kenya. Bonn. IUCN/CEL environmental Law Central (1993). Okidi Co. "Management of natural resources and environment for self reliance" in Journal for East African Research & Development Vol. 14 1984.

development in an African context and proposes some policy initiatives for environmental protection among African countries.

He also proposes certain secondary or supporting policy initiatives which include legislation training and institutional building. It is worth noting that these contributions presents a general discussion on the loopholes on environmental conservation in various states as opposed to discussions specifically focusing on hazardous waste control in Kenya. This is the primary purpose of this research as we shall elucidate on the specific menaces of hazardous substances.

Ogolla B[25] has looked at the solvent feature of environmental management policy and law. He has dealt with a selected list of world conventions on biodiversity.

Analyzed also is the institutional arrangements in Kenya for biodiversity conservation. He further assesses the adequacy of the legal regime as a basis for the implementation of conservation policies and evaluates the capacity and effectiveness of existing institutions as mechanisms for the implementation of conservation law. The author concludes that legal and institutional arrangements in Kenya biodiversity conservation are largely deficient in their nature, content and process. This is the loophole that we intend to fill.

25 Ogolla B.D. "Environmental policy and law in Kenya" In Environmental policy and law Vol. 22 No. 3 1992 pg. 164-175

Juma c. in his book, Biological diversity and Innovation[26] analyses the state of genetic resources conservation in Kenya with specific reference to the Bungoma area of western area of Western Kenya. The main argument in this study is that the legal instruments are not well suited to the imperatives of long term biodiversity conservation. Finally the research recommends a community based approach to biodiversity conservation.

Juma C and J. B. Ojwang in their paper "Technology Transfer and sustainable development[27] assess the relationship between technology innovation and global environmental management. Their work highlights the relevance and vitality of technology of environmental management and sustainable development. The paper points out certain factors that ought to be taken into account in addressing the question of access to technology. The authors also discuss the relationship between national sovereignty innovations. The paper shows how technology issues are increasingly being recognized and integrated into environmental national sovereignty innovations. The paper shows how technology issues are increasingly being recognized and integrated into environmental agreements and policy statements. It is worthwhile to mention that this paper deals only with part of the objectives of our proposed study, that is technology, and how it can be used to control hazardous wastes.

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26 Juma C. Biological diversity and innovation: conservation and utilizing genetic resource in Kenya Acts Press African Centre for Technology Studies, Nairobi 1989, PP. 69

27 Juma C. Ojwang J. B., "Technology Transfer and Sustainable development" Act Press. African Press, African Centre for Technology Studies, Nairobi 1992, PP.72.

S. O. wandiga in his various works[28] develops a case for the pollution of soils and acidification on case studies of Nairobi, Garissa, Kericho and Meru. He argues that it is difficult to ascertain the degree of acidification. Granted that this is the domain of our study, it must be pointed out that Wandiga's paper only examines a limited number of hazardous wastes. He has also limited his research only to water and soil. In our research, we widen the scope of the effects of hazardous substances to wider areas of the environment, especially the biosphere. Thus structures constrain the abilities of the country to accumulate and utilize technological capabilities for environmental conservation. Therefore, national public policy should support the creation and development of institutional systems with space autonomy, flexibility and legal authority to develop, share and effectively utilize technologies in environmental conservation.

Mugabe J. P.[29] in his work examines the national technological capabilities for biodiversity management. He argues that the ability of a country to conserve biodiversity depends on the level of technological capabilities that are created and accumulated through time. The study argues that lack of suitable institutional structures constrain the abilities of the country to accumulate and utilize technological capabilities for environmental conservation. Therefore, national public policy should support the creation and development of institutional systems with space, autonomy, flexibility and legal authority to develop share and effectively utilize technologies in environmental conservation. What he fails to appreciate is the

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28 Wandiga S. O. 1996, "The state of chemical pollution in Kenya" Kenya Sci. series A. physical chemicals sciences 10 (1) 1.22.

29 Mugabe J. O. Technological capacity for Environmental Management the case of biodiversity conservation in Kenya. PhD. Thesis, University of Amsterdam. The Netherlands 1994. Mugabe J. O. "Technology and Biodiversity in Kenya: Technology capabilities and institutional systems for conservation, Krattiger AF et al widening perspectives on biodiversity pg. 77-91.

truism the technological advancement also has the negative effect of generating hazardous wastes. He never gives a suggestion on how this should be managed or controlled.

Hohnes J. in his article "Practical waste management[30]" has considered the interplay between environmental conservation and waste management. He addresses new approaches to the control of wastes. However, he does take into account the special and peculiar circumstances of the Kenyan populace. This is what we seek to add.

Okidi C. O.[31] discusses the concept of environmental policy and development. He elucidates the linkage between environment and development in an African context and proposes some policy initiative for environment and development among African countries. He also proposes that certain secondary supporting policy initiatives which include legislation, training and institutional building. It is worth noting that this book presents general discussions on the environment and development as opposed to a discussion specifically focusing on Kenya. Our study focuses on Kenya and specifically on hazardous waste management.

Patricia Mbote and Bondi Ogolla[32] in their study address the issue of protection of property rights associated with scientific and indigenous knowledge in the management of genetic resources. The study examines the nature and the content of

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30 Hohnes J. 1983 "Practical waste management" John Wiley & Sons. Chichester 1983 PP.2

31 Okidi C. C. Environmental and Development in Africa. (Acts Press. Nairobi. Kenya. 1993

32 Patriciah Mbote and Bondi Ogolla (Contributors) The costs Benefits and Urgent Need for Biodiversity conservation in Kenya: The Intellectual Property Rights and Ownership. The national Biodiversity Unit. February. 1992.

the legal regime concerning intellectual property rights associated with scientific and indigenous knowledge in the management of genetic resources. The study examines the nature and the content of the legal regime concerning intellectual property rights associated with scientific and indigenous knowledge in the management of genetic resources and its institutional framework for the administration of that regime for conservation of the environment, and it concludes that Kenya has a highly developed legal institutional arrangements for the protection of intellectual property rights of the regime. This is only part of the study. Apart from the protection of intellectual property rights, we advocate for the protection of the environment as a whole. We recommend the putting in place of legislation to control dumping of waste.

Kiriro A. and Juma C[33] stress the institutional approach as the key to ecological management. They recognize the role of indigenous knowledge in long-term management strategies. The authors aver that any long-term innovation must have psychological roots in the communities in which they are being adopted. Traditional technologies provide sustainable management. They also discuss other aspects of land use management in Kenya including the management of forestry, watersheds and arid and semi arid areas. Our study, apart from recognizing this aspect of traditional knowledge, also advocates for institutional management of waste. Juma C[34] analyses the state of genetic resources conservation in Kenya with specific reference to

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33 Kiriro A. and Juma C. (eds) Gaining Ground: Institutional Innovation and land use Management, (Acts Press, Nairobi, Kenya, 1991).

34 Juma C., Biological Diversity Innovation: Conserving and Utilizing Genetic Resources in Kenya, (Acts Press, Nairobi, Kenya, 1988)

Bungoma area of Western Kenya. His main argument is that maintenance of the country's botanical heritage requires innovative policies and flexible institutions. Although Kenya has made major advances in the field of environmental conservation, specific activities of conserving biological diversity still need to be undertaken. The current institutional and legal instruments are not well suited to the imperatives of long-term biodiversity conservation. The study also argues in favour of a community-based approach to biodiversity conservation. The complex indigenous knowledge that had been accumulated over several years and which plays a major role in facilitating conservation this efforts are rapidly being eroded. The study also analyses the role of biological diversity in sustainable development especially in relation to the current economic crisis in Africa, the role of the genetic resources in the historical development of agriculture in Kenya, the legal and institutional issues in genetic resources conservation and utilization. This book only examines one area of our proposed study, namely the use of indigenous knowledge in bodiversity studies. Ours is a constitutional approach not only to biodiversity conservation and control of hazardous substance but to the environment as a whole. However, the book is a source of material for our proposed study as we also consider the value of traditional knowledge in conservation besides the constitutional approach.

Gachoka P.M[35] writing on the impact of technological advancement on the protection of human rights, emphasizes the encroachment of technology upon human rights and singles out instances of environmental destruction such as acid rain, ozone layer depletion, green house effect and global warming as crucial ones. He also makes

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35 Gachoka P. M. "The Human Rights for Decent Environment; A Legal See-saw Between Technological Development and the Interest of Humanity" LLB Thesis University of Nairobi, Faculty of Law, 1990.

some remarkable recommendations on ways of guaranteeing the right to a decent environment such as providing for locus standi in respect of environmental damage. But his treatment of the status of the right to a healthy environment under the existing international law falls short of recent developments. This work acts as a good resource material for our proposed study.

G Porter and J.W. Brown[36] discuss the need for every state to protect its environment. They state that the environment is such a vital resource that should be exploited sustainably. They advise states to have regard to their neighbouring states and avoid transboundary dumping of wastes and generally global pollution. Very few states, they argue, have taken the environmental conservation concern seriously. Basically this is the background of our research work. Our common ground is that the environment is such an important resource that needs sustainable exploitation.

From the foregoing literature, it is clear that not much has been written in the focused area of our proposed study. Most of the literature so far available and reviewed above does not specifically address issues of hazardous waste control. Our proposed study will look into the issue of hazardous waste control both on the international plane and under municipal law context the latter being our major area of concern. Except works by J. B. Ojwang, the other literature does not examine hazardous waste control from a legal perspective. This is the loophole that our study intends to fill.

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36 G. P orter and J.W. Brown, Global Environmental Politics, (Western View Press. London. 1991

1.6 WORKING HYPOTHESES

The proposed hypothesis for this study include:

1. That Kenya has no umbrella law on control of hazardous waste and that the several statutes touching on hazardous waste are full of loopholes, flaws, inconsistencies, lack of harmony and are hence outdated and irrelevant.

2. That Kenya's legal and administrative structures and or institutional framework is ill-equipped to effect control of hazardous waste, specifically as it relates to environmental protection.

3. That there is no legal obligation or framework for the development and articulation of national policy and control and management of hazardous waste in Kenya.

4. That the present legal regime has not adequately recognized the rights of the local and indigenous people in relation to control of hazardous waste in their immediate surroundings.

1.7 RESEARCH METHOLOGY

This study will derive its information base from both primary and secondary data. The primary data will include statutes, official government reports, court rulings

judgements. The secondary data will include; textbooks, articles, research papers, periodicals, newspapers journals and magazines.

1.8 CHAPTER BREAKDOWN

CHAPTER ONE: INTRODUCTION

This Chapter contains mainly the proposal of this research. In the proposal, the significance and justification of this study is considered.

CHAPTER TWO: AN OVERVIEW OF HAZARDOUS WASTES SUBSTANCES AND CHEMICALS THEIR SOURCES CLASSIFICATION AND THEIR EFFECTS ON THE ENVIRONMENT.

This chapter will examine what constitutes hazardous wastes, substances and chemicals and , their effects on man and the environment. Hazardous waste will be defined, its sources identified and harm to human health and damage to the environment exposed. Same will be the case for hazardous Substances and hazardous chemicals.

The main goal of this chapter is to lay an analytical framework on which the Succeeding chapters will be based. It will show the reason why we need to control Hazardous Wastes substances and chemicals.

CHAPTER THREE: A REVIEW OF THE EXISTING KENYAN LAWS REGULATING THE CONTROL OF HAZARDOUS WASTE, SUBSTANCES AND CHEMICALS.

Chapter three of the study deals with comprehensive review of the national laws having a bearing of hazardous waste, chemicals and substances. It will emerge clearly that Kenya has no umbrella law on environmental law and more specifically on hazardous waste control. There are several statutes touching on hazardous wastes but on a statute by statute analysis, various loopholes, inconsistencies, flaws and lack of harmony are ascertainable. It will further be argued that the existing laws set out concentration limits which are not relevant to today's knowledge and technologies. With the free movement of various products across borders and the emphasis on national as well as regional industrialization without articulated and adequate measures to curb waste is a sure way of inviting uncontrolled environmental pollution. This chapter then strongly recommends that Kenya should formulate and implement a comprehensive legislation on waste whose objective will be to reduce problems connected with waste disposal.

CHAPTER FOUR: REVIEW OF INTERNATIONAL CONVENTIONS ON HAZARDOUS WASTE CONTROL AND PROTOCOLS ON THE SAME

Proceeding from the analytical framework set in chapter two and three, this chapter will review the international instruments and conventions regulating hazardous wastes and recommends that Kenya should study those conventions with a view of taking the

necessary measures to domesticate them. These conventions include the Basel convention (1989) and the Bamako convention (1991) as well as other important conventions. It will also be recommended that the three East African Countries (Kenya, Uganda, and Tanzania) should enter into a regional arrangement aimed at creating a concrete effort to deal with hazardous wastes. The aim of this chapter is to explore the relevance of international conventions in setting standards in the control of hazardous wastes.

CHAPTER FIVE: GENERAL POLICY GUIDELINES, ON HAZARDOUS WASTE, SUBSTANCES AND CHEMICALS CONTROL IN KENYA

Drawing from the preceding chapters, this chapter will look at the general principle on the hazardous waste management. It will then layout some of the very important policy guidelines on waste generally such as recycling of waste and tax imposition and cash deposits. The roles, duties accompanying obligation's of the local people and various institution will be examined.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

In this chapter, I will review all discussion in the preceding chapters and make conclusions and recommendations based in the foregoing chapters. It also outlines the contents of a proposed legislation attached hereto and marked annex 1.

CHAPTER TWO - AN OVERVIEW OF HAZARDOUS WASTES SUBSTANCES AND CHEMICALS, THEIR SOURCES, CLASSIFICATION AND EFFECTS ON THE ENVIRONMENT.

2.1 INTRODUCTION

In the last few years, considerable attention has focused on the question of what constitutes a "hazardous waste."[1] National systems differ both in the methods used for defining wastes and the type of wastes included. These differences arise partly from variations in the institutional and legal frameworks of different countries. International organzations[2] like the Organization of Economic Co-operation and Development (OECD) and Commission of the European Communities (CEC) are currently attempting to establish a cross-reference list of hazardous wastes, as a first step towards harmonization of definitions. The main concern, at present, is to implement stricter controls over the transfrontier movement of hazardous wastes.

For the purpose of this thesis, however, I am more concerned with evolving a practical definition of hazardous waste, which can then be adapted to the legal system of any particular country including Kenya.

Equally important, the possible health and environmental effects of hazardous wastes must be understood and dealt with. In order to do this, one needs to understand the chemical and physical properties of hazardous wastes.

Centaur Associates, Inc 1979, Siting of Hazardous Waste Management facility and Public oppostion. Prepared for United States Environment Protection Agency. Washington D.C. pp 3.

2.2 HAZARDOUS WASTES

2:2:1 Definitions.

Typically, the concept of "waste" refers to something which no longer has any further value or use.

This definition, however, has been complicated by the issue of wastes versus products; in other words, if a waste can be recycled or can be used in some way, it has acquired value and is no longer considered a waste. This, in turn, requires a definition of what is recyclable. There is some evidence that relaxation of controls for recyclable wastes may increase the risk of environmental damage resulting from the mismanagement of recyclable wastes. Examples of such mismanagement abound and include the use of contaminated waste oil for dust control; the long-term, uncontrolled storage of materials pending recycling; using metaliferous wastes as building or road construction materials; or using wastes as fuel substitutes, burning them under uncontrolled conditions.[3]

For these reasons, the definition of waste adopted in this thesis makes little reference to recycling and does not suggest that any relaxation of controls be considered for recyclable wastes.

A waste is thus defined as a moveable object which has no direct use and is discarded permanently.

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3 World Bank 1988. Techniques for assessing Industrial Hazards. No. 55. Washington DC pp 46.
Supra Note 1 at pp 4

All wastes must receive proper treatment and disposal so as to protect the environment and enhance the quality of life. Hazardous wastes are a special category of wastes which, due to their toxicity, persistence, mobility and flammability, require more stringent regulatory and technical controls when compared to wastes such as municipal refuse. Later in this chapter, the range of possible health and environmental problems that can arise because of the improper management of hazardous wastes are discussed.

"Hazardous wastes means wastes other than radioactive wastes which by reason of their chemical reactivity of toxic, explosive, corrosive or other characteristics causing danger or likely to cause danger to health or the environment, whether alone or when coming into contact with other wastes, are legally defined as hazardous in the State in which they are generated or in which they are disposed of or though which they are transported."[4]

Thus hazardous wastes can include solids, liquids, gases, sludges, containerized gases or contaminated containers, and can originate from a wide range of commercial, agricultural, and industrial sources. In general, hazardous wastes cannot be handled safely and effectively by the existing wastewater treatment or domestic waste disposal systems.

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[4] Supra note 1 at pp 5

A number of specific exclusions[5] are mentioned within the definition:

- Radioactive wastes are considered hazardous, but are excluded from the definition, since most countries control and manage these material in a separate organizational framework,

- Domestic refuse can cause significant environmental pollution and may also contain small quantities of hazardous substances such as, mercury from dry cell batteries and solvents from paint residues. However, some countries with well developed control systems are now turning attention to separating and/or eliminating the hazardous components in domestic waste. But for purposes of developing countries, same has been so separated.

The UNEP Working Group[6] also gave consideration to the quantity of waste:

- For small quantities, all countries have chosen to exclude "hazardous wastes" from household waste. At the same time, some countries also exclude small generators of hazardous waste as well. The United States,[7] for example, recently reduced the threshold for control from 1000 kg/month to 100 kg/month, thereby increasing the number of regulated generators of hazardous waste by tenfold;

5 Pojasek R B. Toxic and Hazadous waste disposal 1979 volume 1 Ann Arbor, Michigan: Ann Arbor Science Publishers, INC. pp 10
6 WR1, IUCN, UNEP, Global strategy policy makers Guide (WR1 Washington DC 1997).
7 Ibid at pg 241

- For large quantities, regulators may wish to control wastes containing relatively low concentrations of pollutants, since the volume will still render them hazardous to the environment. However, because of the practical problems in implementing controls over such wastes, some countries exclude certain large volume wastes, such as mining or agricultural wastes, from control under hazardous waste legislation.

It is true to say then that most countries choose to control waste-water effluents separately from hazardous wastes. However, in the United States,[8] wastewater stored or treated in surface impoundments, settling ponds and lagoons is controlled within the regulations governing the management and handling of hazardous wastes. The reason for this is that there is growing concern that such effluents contain hazardous substances that can leave with the wastewater stream percolating into groundwater reservoirs or appearing in sludge which may later be landfilled in municipal dumps or other areas not equipped to handle potentially toxic or hazardous material.

2:2:2 Identification and classification of Hazardous Wastes.

In developing an organized approach to hazardous waste assessment and management, a system of waste identification and classification must be

8 Supra note 6 at pg 241

formulated. In many countries,[9] such a system is an integral part of a legal definition of hazardous waste. Most countries have used a definition based on an inclusive listing of the following factors:

- Particular types of hazardous wastes:
- Industrial processes from which the wastes are defined as hazardous, and
- Substances, either specific or classes, the presence of which is indicative of a potential human health and or environmental hazard.

In some cases, a listing of one or more of these criteria is used as a definition. In other cases, reference is also made to a particular concentration level for each hazardous substance.

Other criteria[10] may include the toxicity of an extract of the waste, usually obtained by means of a specific leaching test. Toxicity is generally defined by reference to concentrations of specific substance in the extract:

- the ignitability or flammability of the waste;
- the corrosiveness of the waste, and
- the reactivity of the waste.

Grand F. P. Environmental Control: Prontics Policies and the law. Columbia (University press. Newyork 1971).

US environmental protection Agency 1984. Financing capability summary Foldvutor A simplified Approach. Washington, D. C.

Each of these approaches have their advantages and disadvantages. The use of inclusive lists provides a relatively simple approach, requiring no testing and also give a certain flexibility to the waste controlling authorities in making qualitative judgements with respect to an individual waste disposal option. It has the disadvantage, however, of placing the burden of decision on the waste controlling authorities as to which of the industrial process wastes should be controlled.

Supplementing (or replacing) such lists with testing procedures and/or concentration limits has the advantage of presenting a clear and accurate description of wastes, theoretically leaving no doubt as to whether the waste should be classified as hazardous or not. These precise definitions, however, require detailed testing protocols and a surveillance system which, in practice may pose problems as regards manpower, laboratory facilities, among others for both waste generators and controlling authorities.

For instance US[11] has a procedure namely Toxicity Characteristic Leaching Procedure (TCLP). It is designed to identify wastes likely to leach hazardous concentrations of toxic constituents into the groundwater as a result of improper management. During the procedure, constituents are extracted from the waste in a manner designed to simulate the leaching actions that occur in landfills. The extract is then analyzed to determine if it possesses any of the toxic contaminants.

11 Brenner W. in procedures of the 8th Annual symposium on land disposal of hazardous wastes. Ft. Mitchell, Kuntucky: United States Environment protection Agency, pp 59.

If the concentrations of a particular toxic constituent exceeds the level already listed, the waste is classified as hazardous.

The characteristic of ignitability/flammability as per Brenner[12] is a concern because these wastes could cause fires during transport, storage or disposal. Typical examples are waste oils and used solvents. These wastes often have the properties of:

a) being a liquid, except for aqueous solutions containing less than 24% alcohol, that has a flash point less than 60 degrees C;

b) a non-liquid capable, under normal conditions, of spontaneous and sustained combustion;

c) an ignitable compressed gas; or

d) an oxidizer.

Brenner[13a] Materials that might be considered hazardous because of corrosivity are:

An aqueous material with pH <2.0 or pH >12.5; or a liquid that corrodes steel at a rate greater than one-quarter inch per year at a temperature of 55^0C. wastes with high or low pH can react dangerously with other wastes or cause toxic contaminants to migrate from certain wastes. Wastes capable of corroding steel

12 Ibid pp 99
13a Ibid pp 104

can escape from their containers and liberate other wastes. Examples of such corrosive wastes include acidic wastes and used pickle liquor.

A reactive waste[13] might be expected to have one or more of the following properties:

a) normally unstable and reacts violently without detonating;

b) reacts violently with water;

c) forms an explosive mixture with water;

d) generates toxic gases, vapors or fumes when mixed with water;

e) contains cyanide or sulfide and generates toxic gases, vapors, or fumes at a pH of between 2 and 12.5;

f) is capable of detonation if heated under confined conditions or subjected to a strong initiating force; and

g) capable of detonation at standard temperature and pressure. Examples of reactive wastes include water from TNT operations and used cyanide solvents.

The choice of the most appropriate system depends upon the use to which the classification system will ultimately be put. For the purpose of this thesis, three objectives are considered of particular importance:

[13] Supranote 9 pp 105

- to allow the waste controlling authority to use its knowledge of industry to draw up a short-list of wastes;
- to identify wastes in a way that is consistent with the discussion of technologies for recovery, treatment and disposal; and
- to provide the waste controlling authority with a framework appropriate for establishing their own hazardous waste control system.

To achieve these objectives I will adopt a classification scheme which proposes qualitative listing, as indicated by the World Bank 1988 report[14a] using a combination of some specific types of waste with classes of substances specific substances and industrial processes to identify waste types.

(A) **Inorganic Wastes**

Acids and alkalis are among the major components of the total amount of hazardous waste generated. They occur in many sectors of industry, although in terms of quantity, acid wastes come mainly from the surface preparation and finishing of metals.

The major hazard with acids and alkalis is their corrosive action, complicated in some cases by the presence of toxic constituents.

14a World Bank 1988. Techniques for assessing Industrial Hazards. No. 55 Washington D. C. pp 149.

Cyanide wastes are generated primarily in the metal finishing industry and in the heat treatment of certain steels.

The principal hazard associated with cyanide waste is their acute toxicity.

Heavy metal sludges and solutions of most concern are those containing the toxic metals, arsenic, cadmium, hexavalent chromium, lead, mercury, nickel, zinc, and copper. These wastes are generated from a wide range of manufacturing processes, including chlorine production, pigment production, wood preserving, battery production, textiles, metal plating and tanning.

Asbestos wastes normally arise from lagging wastes, power stations, industrial manufacturing plants, gas works, dock yards, hospitals and educational establishments. Materials containing asbestos may also appear as waste from the demolition or rebuilding of locomotives and railway carriages, and from building and demolition sites.

The health hazards associated with inhalation of asbestos fibers and dust stem from the carcinogenic potential of the material. Asbestos cement pipes and sheets are typically much less of a problem than loose fibres or dust

Other solid residues are generated from a variety of sources of which the most significant is the smelting and refining of metals. Dusts and sludges generated from these processes typically contain toxic metals including nickel, arsenic, zinc, mercury, cadmium and lead.

(B) Oily Wastes

Oily wastes are generated primarily from the processing, use and storage of mineral oils. Examples include waste lubrication and hydraulic fluids, bottom sludges from oil storage tanks, waste cutting oils and interceptor waste. In some cases, these materials may be contaminated with toxic metals such as sludges from leaded petrol storage tanks.

(c) Organic Wastes

Halogenenated solvents are generated primarily from dry cleaning operations, metal cleaning in the engineering industry and, to a much smaller extent, from degreasing and deoiling processes in the textile and leather industries. The hazards associated with these wastes are a result of their toxicity, mobility, and relatively high persistence in the environment.

Non – halogenated solvent wastes include a large number of hydrocarbons and oxygenated hydrocarbons, of which some of the most commonly used are white spirit, methanol, isopropanol, and ethanol. They find wide application throughout industry in the production of paints, inks, adhesives, resins, solvent-based wood preservatives, toiletries, food flavorings, cosmetics, and also for plant and equipment cleaning and as thinners. They are also used as degreasants in the engineering and vehicle manufacturing

industries and are used for the extraction of natural products from animal and vegetable sources.

The toxicity of these materials varies greatly, and in many cases the major hazard posed is flammability.

Paint and resin wastes are generated from a variety of formulation and other tertiary chemical processes, and also in the application of paints other tertiary chemical processes, and also in the application of paints and resins to finished products. They are typically combinations of solvents and polymeric materials including, in some cases, toxic metals.

Biocide wastes are generated both in the manufacture and formulation of biocides and in the use of these compounds in agriculture, horticulture and variety of other industries. The range of biocides used runs into several thousand compounds.

In addition to the concentrated organic waste streams described above, organic chemical residues are also generated from coal carbonization and by-products operations; and from the manufacture or primary, secondary, and tertiary chemical products. Distillation residues and filter materials are common components. These waste streams include both halogenated and non-halogenated chemicals, and are generated by a broad range of industries, including petroleum refining and the manufacture of chemicals, dye stuffs, pharmaceuticals, plastics, rubbers, and resins.

(D) Putrescible Organic Wastes

Putrescible organic wastes include wastes from the production of edible oils, as well as leftovers from slaughter houses, tannaries, and other animal-based products. The proper handling of putrescible wastes is of particular importance in developing countries where extreme climatic conditions can exacerbate the possible health hazard associated with these organic wastes.

(E) High volume/low hazard wastes

High volume/low hazard wastes include those wastes which, based on their intrisic properties, present relatively low hazards, but may pose problems because of their high volumes. Examples include: drillings muds from petroleum and gas extraction, and fly ash from fossil fuel-fired power plants, mine tailings, metaliferous slags.

(F) Miscellaneous Wastes

In addition to the waste classes described above, there are a number of other miscellaneous waste types which have not been addressed. These include: infectious wastes associated with diseased human or animal tissues; redundant chemicals, which

may have deteriorated or exceeded their shelf-life, and come from retail shops, commercial warehouses, and governmental and industrial stores; laboratory wastes from manufacturing and research facilities; and explosive wastes from manufacturing operations or surplus munitions. Although these wastes typically do not represent a large proportion of total hazardous waste generation, special provision should be made to ensure their safe and proper disposal.

2:2:3 Effects of Hazardous Wastes on Health and the Environment

(a) **General effects**.

Mixing chemical wastes containing incompatible chemicals may cause explosions and fires. Contact with strong acids or alkali may cause corrosion and etching of the skin as well as severe corneal damage. Skin absorption of certain pesticides may cause acute poisoning. Most empty containers or jars for hazardous chemicals can if not properly disposed off result in incidents of severe poisoning if left unguarded at waste storage or dumping sites. Children are especially vulnerable. In the developed world[14], one of the main causes of child mortality between the ages of 1 and 10 are accidents which involve accidental poisoning. If chemicals are introduced on the consumer market and no provisions made to Ocollect the empty containers, bottles, or jars, they are likely to be stored in households or disposed of in an uncontrolled way. This has resulted in a substantial number of poisoning cases involving small children.

14 De Renzo D. Unit operation for treatment of Hazardous waste 1988. Park Ridge, New Jersey: Noyer. Data Corporation. Pp 147

As previously noted, the release of chemical waste into the environment may result in long-term exposure of the population, causing adverse health effects due to poisoning. The following example[15] is illustrative. Water containing a large amount of cadmium was discharged from the Kamioka zinc mine in Japan into a river that was used for drinking water downstream from the mine. The river water was also used for irrigating paddy rice. Because of the large amounts of cadmium in the water used for both drinking and irrigation purposes, the long-term exposure of the local population to this chemical resulted in serious kidney malfunctions in a large percentage of the population. The effects, which were most severe in pregnant women with low calcium intakes, as well as those women suffering from close-spaced births, included de-calcification of the skeleton, multiple bone fractures, invalidity, and death (Itai-itai disease).

The cadmium intake interfered with normal calcium metabolism, resulting in the de-clarification of bone tissue (osteomalacia). In many industrial countries both the body burden and the kidney content of cadmium have been considerably raised due to environmental exposure from chemical waste or cadmium impurities in fertilizers. However, so far no adverse health effects have been reported. These increased levels have, nontheless, caused a great deal of concern and measures have been taken to limit population exposure until a satisfactory safety

[15] Kiang. Y. Hazardous wastes processing Technology 1982, Ann Arbor, Michigan: Ann Arbor Science Publishers. IX

margin has been identified between cadmium levels present in the kidneys and levels at which impaired function is likely to occur.

In other areas of Japan[16] industrial use of mercury catalysts resulted in the presence of mercury in the effluents from wastewater treatment plants entering coastal waters. The mercury was then converted, by micro-organisms present in seawater, into methylmercury, a highly toxic form of mercury. At Minamata Bay and the Agano River at Niigata, methylmercury accumulated in fish and shellfish. As seafood is an important part of the Japanese diet, many local inhabitants were poisoned and developed severe neurological symptoms, such as impaired vision and hearing loss and difficulties in walking or standing. Children exposed in utero exhibited cerebral palsy syndrome or retarded psycomotor development. These Japanese outbreaks of methylmercury poisoning are still the best documented cases on record. Nevertheless similar outbreaks have occurred in other countries.

Chemical elements[17], like mercury, are indestructable and hence can only be redistributed into the environment. By contrast, organic chemicals are often degraded in the environment to elemental components or simple organic compounds such as carbon dioxide and water. However, some chlorinated or halogenated organic compounds are extremely persistent in the environment and tend to accumulate in the food chain or in the biosphere in general. Examples of

16 Calabres. G. Tragic Choices: 1978 32 Newyork. Norton
17 Supra note 15 at 79

such compounds include: Polychlorinated biphenyl PCBs, dioxins, and chlorinated hydrocarbons; the latter being used extensively in the past as pesticides such as DDT, dieldrin, and aldrin. PCBs and dioxins may be formed by incineration of waste containing hydrocarbons and chlorides. They are spread with atmospheric emissions and precipitate in the environment. Once released, they often end up in human food chains, lodging in fatty tissues in the bodies of humans and animals. It is known that in some industrialized countries[18] notably Sweden and Japan, levels of PCBs and dioxins in breast milk and human fat are on the increase. The health significance of this increase is still uncertain, as the body burden at which adverse health effects might occur is still unknown. However, experience from accidental high level exposures has shown that these compounds may cause serious effects on human health.

Leakages from landfills and dumping sites often contain large amounts of nitrates. This has often resulted in high levels of nitrates in adjacent drinking water wells. Levels of nitrates in drinking water exceeding 45 mg/l run a risk of methemoglobinemia in infants. This condition, which interferes with the oxygen transportation in the bloodstream, can be fatal. There are several reports in the literature about severe methemoglobinemia in infants caused by contaminated drinking water[19].

[18] Ibid at pp 85
[19] Supra note 16 at p 168

Another important consequence of finding nitrate in leachate from landfills, is the simple fact that the site is leaching contaminants into the environment. If industrial residuals are being placed in the site as well, then the possibility exists for a whole host of contaminants to find their way into drinking water including some which are considerably more deadly than nitrate.

Other land disposal catastrophes can be noted. For instance, at Love Canal in New York State[20], chemicals and vapors began to leak into homes and schools causing adverse health effects and eventually resulting in the complete evacuation of the town. In the United Kingdom, drums containing heat treatment cyanide salts were discovered on waste land used by children as a playground

To prevent and/or control adverse effects on health and the environment, it is necessary to control all chemical and infectious materials introduced into the human environment. The chemical nature of each product should be determined, together with impurities, by-products and degradation products. The potential effects of these substances on health and the environment should then be assessed together with a quantitative estimation of levels occurring in the environment. Exposure commitments for human populations, as well as other organisms, should be undertaken in the final risk evaluation. From such an evaluation, measures should then be taken to ensure that unacceptable adverse effects are avoided. The

20 Ibid at p. 190

effectiveness of these control measures should then be monitored on a continuous basis[21].

(B) Hazardous waste disposal in Kenya.

As indicated earlier waste is material that is discarded by either an individual or industry because it is no longer of use to them. We have already discussed liquid wastes under eutropication and agriculture. In this section we focus on solid waste.

Anybody who lives in Nairobi and indeed any major municipal council of Kenya know what a nuisance the problem of solid waste is. Uncollected solid wastes strewn all over the roadsides and around buildings is not only an irritant to the eye but causes a bad smell, breeds flies and rats that are agents of diseases. Domestic solid wastes pose health hazards. Inability of municipal councils to have an effective waste collection and disposal system calls from an urgent re examination into waste disposal laws in the country[37].

Development of controls over solid waste disposal and their implementation have been left to local governments. As a result, very low priority has been given to improvements of control measures. Today land-fills which are controlled and unhygienic are the predominant mode of disposal. Open-air incieration which is banned in most countries is widely practiced in Kenya. Widespread uncontrolled combustion of wastes causes air

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Supra note 15 at p. 81

See Editorial, Dailly Nation Newspaper, Thursday 17th March, 1990.

pollution problems. The low priority given to waste disposal by both central government and local government is in stark contrast to the harm inadequate management causes human health and environment.

Some governments in developing countries have allowed their territories to be used as the dumping grounds of toxic wastes by developed countries. In exchange for such dumping, they are paid small amounts of foreign exchange. Often the receiving countries have no technical, financial, managerial and personnel to handle toxic waste disposals or clean-ups. Evidence has accumulated showing that uncontrolled dumping of wastes at sea may damage marine environment. Dumping of toxic wastes either on land or at sea is illegal and is the concern of international Conventions.

Kenya's population is growing at about 2.9 per cent, the urban population is growing about 7 per cent[38]. The economy has shown an upturn and in 1996 it grew at about 5 per cent per annum. With such growth it is expected that both the amount and variety of solid wastes generated by industrial, domestic and other activities will rapidly expand. Left unattended, Kenya will bury itself in wastes. The problem is very critical and requires urgent attention.

In its National Development Plant, 1997-2000 the Kenya Government has recognized the problem posed by municipal solid waste[39]. The plan calls for "the need to adopt a waste treatment and a sound management approach focusing on generating as little waste as possible, recycling waste to such an extent that appropriate technology is used to avoid

38
39 Republic of Kenya, Development Plan, 1984-1985, Government Printers. Nairobi
Republic of Kenya Development, 1997-2007, Government Printer, Nairobi.

environmental destruction and to maintain economic feasibility of such technology." The Plan[40] identifies four types of wastes, namely organic wastes, inorganic wastes, agricultural waste and other secondary wastes. The policy on the first two types of waste is to utilize the produced wastes, to recycle the wastes and to study methods of collection and potential markets for recycled products. For agricultural wastes, the policy advocates briquetting, review and development of technologies that can reduce mass volumes of such wastes. Under other wastes the plan calls for use of such wastes as a source of raw materials especially for metallurgical industries. The plan however is silent on other wastes. It may be argued that silence does not mean exclusion or minimization of the problem.

With the indiscriminate allocation of public lands within municipal boundaries, it is improbable that more space will continue to be found for landfills. While some waste will continue to be disposed of through landfills, it is prudent to advocate that future developments in waste management should place greater emphasis on minimization of wastes arising from reclamation and recycling.

The major issues on solid waste disposal are :-

- The increased volume and variety that must be handled and the overloading sites with bulky non-biodegradable materials.

40 Ibid

- The proliferation of new unclassified materials and chemicals, whose behaviours when they enter the streams, (which are persistent in the environment), for example, plastic and dioxins, are unknown.
- Harmonization of waste disposal standards in all municipal and rural communities with neighbouring states.
- Reduction of waste discharge in the Indian Ocean and fresh waters and inland lakes.

Development of waste management strategies require knowledge of not only the amount of waste generated and their sources but also the materials in each waste stream, their properties, potential toxicity, and hazards to human health and the environment. The lack of reliable time series of waste arising and ranges in wastes streams is a serious drawback to setting priorities in waste management.

Wastes are generated from every society's activities and include. household and consumers wastes; agricultural wastes; industrial process wastes; demolition and construction wastes; extractive wastes; sewage sludges; litters dredged spoils and energy productions wastes.

The households and consumer wastes constitute the major component of solid municipal wastes. One per capita municipal waste production in Kenya stands at about 1.2 tonnes per annum[41]. They consist of a mixture or organic materials, paper plastics, textiles, glass, metals and ash and grit. Food also remains a major component of household

[41] S. O. Wandia Supra note 9.

wastes in Kenya. The moisture content of local household waste is high and makes it not readily combustible.

Litter does not constitute a major fraction of all wastes but is ubiquitous in all cities. It is a threat, spoiling cities, towns and countrysides and impairing the aesthetic quality of beaches and even streams. It is a hazard to many animals and a possible health hazard to humans. Packing materials such as plastic bottles, cans, paper clips, paper and plastic wrapping are the major constituents of litter. The use of non-returnable containers has increased the volume of litter. Furthermore, the production and the spread of use of non-biodegradable plastics in packaging materials has made the finding of a solution to our problem more difficult. Plastic litter in marine environment arises from fishing gear such as nylon, buoys and nets, packaging bands, straps and synthetic ropes, general litter-bags, bottles and plastic sheetings. The same litter is also found in large inland surface water and is a concern to both marine and freshwater envirnments[42].

Treatment of domestic and industrial wastewater and plants yields sewage sludge. It is slurry of the organic-rich particles with a high variable chemical composition and which depend on the sources of effluent and the type and efficiency of the treatment process. One characteristic of sewage sludge is its ability to concentrate heavy metals and water-soluble organic compounds. They may also contain greases, oils and bacteria. These substances when used as agricultural manure could lead to solid poisoning. Dredged materials are excavated from river, bores and other waterways to aid navigation. Typical contamination includes oil, heavy metals, nutrients and organichlorine compounds.

Sources of these contaminants include shipping, industrial and municipal discharges and urban and agricultural run-off[43].

Demolition and construction wastes arise from reconstruction of buildings and new building materials. At present contractors are left on their own to find dumping sites for their wastes. Mostly tailing and nails are the major waste material for commercial mining sites. The waste may include soil, rock and dirt or tailings from an extraction which are contaminated with metals or chemicals used for mining. There are no major mining activities in operation in Kenya. New regulations to control future activities need consideration.

Other hazardous waste from spent nuclear fuel needs mention. Although Kenya has no nuclear power presently, the possibility that it will remain so in view of the rapid expansion in energy demands in uncertain.

Disposal of spent nuclear fuel requires technology that is not available locally. There is need to develop such technologies should the power demand require Kenya to "go nuclear." At present the disposal of experimental nuclear material is not regulated by legislation[44]. Enforcement of the legislation is lax as there are very few laboratories open to the public for disposal of such wastes.

Future national policy on waste management should focus on development of effective legislation, encouragement of research to provide technical solutions to reduce waste and

42
43 Ibid
Supra note 20.

the establishment of education programmes for changing people's understanding, attitudes and behaviour[45].

The country needs to adopt a holistic waste management approach. This can only be done by legislation, which stipulates regulatory framework within which enforcement and implementation practices are possible. Solid waste management strategies should go beyond safe storage and disposal practices and consider comprehensively all the available alternatives[46]. The framework should emphasize minimization of waste production as well as waste characteristics.

Once the legislative framework has been establish, control measures should include licensing of operators who meet the agreed upon conditions. Hazardous wastes disposal should carry an added condition of mandatory consignment notes. This will enable tracer study of waste movement from generation to disposal. Educated enforcement officers should be trained to enforce compliance to the law.

In order to enforce controls the country should invest in building adequate and suitable disposal facilities. Mechanisms to handle waste from households and small producers should be availed to the public and information on such facilities and conditions of operation should be made public.

Holiness J. 1983 'Practical Waste Management'. John Wiley & Sons. Chichister.

Ibid.

Khabanda, O. and Stallworthy E. 1990, Waste Management, Towards a sustainable Society" Gower, Aldershort, Surrey?

2.3 Hazardous Substances.

Hazardous substances are defined as those substances that pose a threat or danger or cause actual harm either directly or indirectly to human health or cause damage to the environment. There is no universal consensus on the inclusion of environment on the definition. However, since total environment supports life as we know it, substances that damage it pose danger to human health, safety and environment. It is important to note that Hazardous wastes are made of substances but not all Hazardous substances can be Hazardous waste. Hazardous substances may also be defined in terms of their physical and chemical characteristics such as flammability or toxicity, or in terms of concentration or specific substances that they contain. In this respect toxicity has been defined as deleterious effects, whether legal or sub-lethal, to an organism, population or community. Hazardous substances are therefore a range of substances, materials, preparations sold to the general public or sold for industrial or agricultural production, building industry, energy generation and other materials required or useful for economic or commercial activities. They also include human or sewage waste, municipal and agricultural wastes.

It becomes clear that there Is need to bring order by classifying hazardous substances. Hazardous classification of a substance only takes into account the intrinsic hazardous properties of the material. Therefore classification only takes into account two aspects of the substance: that is a) Considering some simple exposure related properties, and b) some effect-related (fate) properties of substances. Exposure-related properties are

derived from biodegradability, potential for bio-accumulation and solubility in water. Effect-related properties are derived from molecule-specific physio-chemical data and from experimental data derived from strictly standardized toxicity tests[22].

Therefore the basic philosophy of hazardous substances classification and subsequent labelling of such substances is aimed at protection of the safety and health of the user of the substance and protection of the environment. Classification criteria may be the same or different, but labelling should be different. The aim of user-protection is quite different from the protection of environment from uncontrolled use of hazardous substances. The fundamental differences are in the role of exposure in two cases. The health hazard assessment is based on a "worst case scenario" that is directly exposed exposure depends on properties of the involved substance. Thus "Fate" assessment is not given high priority. Safety is exclusively based on effect related properties of their constituents or of the material itself.

On the other hand, the protection of the environment[22] from hazardous substances does not rely on use alone as a sufficient reason that a compartment of the environment will be exposed to the substances. There is involvement of the transportation phase[23]. A substance moves from site of use through the atmosphere, waste water treatment, and plant from a dumping site, among other to one or several environmental compartments. During its transportation, the substance may be transformed and/or partitioned between

22 S. O. Wandiga (1996) "The State of Chemical. Pollution in Kenya." Kenya J. Sci. Series A physical and chemical Sciences pp.22.

23 Ibid at pp 19.

phases, according to its inherent exposure and related properties. Consideration of fate of substance must address both exposure and effect-related (fate) properties. The hazardous substance assessment steps are as follows; hazard identification, hazard assessment, and risk assessment.

The level of assessment depends on the purpose of the exercise and the amount and the quality of the data. The primary aim of health-hazard labelling of substances is to avoid or reduce direct exposure of human targets while the main aim of environmental hazard labelling of substances is to avoid – or reduce to a minimum - the transport, via various pathways of dangerous substances to site, where they may cause indirect exposure of sensitive environmental targets. The objective is to safeguard the non-living physio-chemical targets, for instance the ozone layer) as well as the multitude of living organism making up the biotic parts of natural ecosystem from inadvertent-exposure, which may result in adverse effect, either direct or indirectly.

For avivid coverage of Hazardous substances on their effect on the environment. It is crucial to consider the impact of such substance from agricultural activities, that cause eutrophication, that cause acidification and that cause oil pollution.

2.3.1 Hazardous Substances from Agricultural Activities.

The Kenyan economy is mainly dependent on agriculture. Besides the production of main[illegible] crops like maize, millet and sorghum, the cultivation and production of cash crops like tea, coffee, pyrethrum and sisal, and horticultural crops like vegetables,

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Supra page 1 note 1.

flowers, bananas, are wide spread. The sustenance of agricultural activities demands good environmental quality. On the other hand agricultural activities demands are a major cause of habitat loss, extensive water use, eutrophication and release of nutrients, trace elements and pesticides. Waste products are a source of large-scale atmosphere emissions of methane with climate change consequences.

Professor Wandiga[23a] argues that the combined effect of intensified agricultural development on the environment is that there will be more pristine land converted to agricultural land. These include present reserved and unreserved tropical forest land, grassland, savanna reserved for wildlife or range land. There is a real and imminent danger that all these will be converted to crop production or intensified animal husbandry Consequently, more biomass will be burned in order to clear land for agriculture. Most of the land is unproductive, therefore more fertilizers will be applied to the soils which do not retain nutrients very well. Nutrient losses will be and have been experienced through water drainage and high topsoil erosion. The losses in fertilizers have resulted in eutrophication of lakes and swamps. Nitrate accumulation in ground water, acidification of soil and emission of greenhouse gas nitrous oxides may exceed their present level in future. The use of waste organic, such as manure and sewage sludge, may cause accumulation in ground water and acidification of soils. Lastly, irrigation may cause siltation of soils and water logging. Disturbance of nutrient imbalance, especially the natural global cycle of the most important nutrients phosphorus and nitrogen by over-supply has contributed to changes in surface waters and coastal

[23a] S. O. Wandiga (1996). Methodology in Environmental standards UNEP workshop for Eastern Africa Region 16 – 20 September 1996.

ecosystems. Many receiving waters have become over-fed with these nutrients. Under supply of nutrients have led to overgrazing and overcropping on soil with limited nutrient capacity. The ultimate result is soil erosion and desertification.

Processing of berries has resulted in severe pollution of receiving rivers. In addition to coffee, the other major offender is sugarcane processing. Alternative improved disposal methods such as land fills and lagoons still cause air pollution due to nitrous oxide emissions. Animal farm waste can be used as fertilizer and spread over land. Organic fertilizer looses considerable ammonia which at first is basic but becomes converted to nitric acid after atmospheric decomposition and microbial conversion in the soil. A relatively safer method of agricultural waste disposal is controlled biogasification process. This produces energy which is used in farms and prevent pollution[24a].

Drainage of wetlands has been an objective of the Kenya Government. However, these areas are of extraordinary importance for the conservation of wildlife. Wetlands are a refuge for birds, breeding grounds for fish and include some of the most productive and diverse ecosystems of the world. Wetlands have an important function as a water reservoir in dry season and can contribute considerably to the self-purification capacity of rivers.

[24a] Ibid pp.16.

When utilized on a sustainable level, forestry and fishery products, recreational, educational and nature values together with regulation and protection functions, may well outweigh the benefit of reclamation[24].

In conclusion, the following policies that encourage sustainable agriculture should be encouraged. Over use of fertilizers should be prevented by such application as would reduce leaching, denitrification and nitrification. The use of analytical technique to supply the required fertilizers by a crop should be instituted. Policies that encourage prevention of solid and structure loss such as recycling of organic wastes, biological nitrogen fixation and anti-erosion measures should be instituted as a matter of urgency. Stimulation of traditional agricultural practices together with Integrated Pest Management approach should be re-introduced through education and research. The controlled use of bio-gasification and the prevention of heavy metals or organic wastes contamination should be encouraged. Irrigation should only be implemented after a careful assessment of the specific carrying capacity of the soil. Processing of agricultural products should not pollute surface waters. Cleaner processing technologies should be introduced or where not available researched upon. Ratification of international Conventions on pesticide should be undertaken. Further, the establishment of a national/regional pesticides registry should be undertaken. Deforestation for unsustainable agriculture should be stopped and desertification caused by whatever reason urgently needs to be controlled.

24 Marchand, M and Udo de Haes, HA (Eds.) 1990, "The Peoples Role in Wetland Management" Proceedings of the International Conference Leiden, The Netherlands, 5-6 June 1989, Centre for

2.3.2 Hazardous Substances that cause Eutrophication.

Accelerated europhication, both in fresh and marine water, has emerged as a critical environmental problem in Kenya in the last few years. First it was seen in the case of Lake Naivasha with blooms of water lettuce pistice almost in all municipal concentration ponds. Of recent regional and global attraction is the water hyacinth eichornia bloom in Lake Victoria. The macrophytes over – abundance in Kenya's fresh waters is a symptom of water environmental degradation as a result of anthropogenic activities up stream.

Eurtrophication means becoming well-fed[25] and in the context of fresh and marine waters it is the process of receiving excessive fertilization by nutrients, especially phosphorus and nitrogen. The stagnant or slow flowing rivers then become invaded with overgrowth of acquatic plant materials, such as algae and macrophytes. This in turn leads to water quality deterioration, taste and other problems, oxygen depletion, reduced transparency, decline of fisheries, possible fish kill, logging of water ways and toxic effects on animals and human beings.

Eutrophication is a natural phenomenon, which takes place over a time-span of several thousands of years. This is a result of lakes being recipients of nutrients and as long as there is imbalance between nutrient inputs and outputs the aging process will occur. The

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Environmental Studies, Leiden, The Netherlands.
Wanyaki PGB 1996 Microbiological Contamination of Surface Water with Preference to the Nairobi River and its Implication to Health Proc. Disimination workshop on Cncentrations of Heavy Metal, Oran chlorine Pesticides, Organic and Microbia Pollution in the Nairobi River and its Tributaries, June 4-5, Fairview Hotel, Nairobi.

fact that the aging process of our lakes is taking a very short life span has become the concern of our day.

Some of the activities that have led to accelerated eutrophication of fresh and marine water originated from past policies and inappropriate implementation of them. Certainly, there was nothing wrong with the government's policy of intensified agricultural production. The application of tons of fertilizers in upstream fields led to the carrying of excess fertilizers to the lakes through excess water drainage and soil erosion. The nutrient rich lakes have become fertile grounds for macrophyte growth. Therefore control of microphyte growth in lakes without the control of fertilizer use is like treating the symptoms of a disease.

Increased discharge of raw sewage wastes into the water has exacerbated the problem. sewage treatment in most municipal treatment plants has deteriorated to the extent that the majority does not cope. Worse still, even rivers and streams that have no sewage treatment plants upstream have become loaded with human excreta. The caliform counts in some of the rivers is high, for example, River Kuja 1800/100 m., River Yala 2400/100 ml, that[26] caliform count should be zero of close to zero for every 100 ml of water. These polluted rivers drain their content into the lakes and oceans. The consequence has been that the use of lake water for drinking has become a health hazard. Discharges of agricultural process, such as sugar, coffee berry, pulp paper waste etc. have worsened the water quality standards of receiving waters[25(b)].

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26 Ibid 6

25(b) Ibid at pp 130.

Control of eutrophication is a necessary action if its negative impacts on environment and human health are to be averted. Control measures should involve the following:-

- Proper tertiary treatment of domestic sewage, proper sludge treatment, proper municipal and industrial sewage treatment and disposal, treatment or recycling of animal wastes and a change of agricultural practices. Discharge of phosophogypsum or sewage sludges to the seas should be stopped.
- Impact studies for development projects, nutrients mass balance, and soil carrying capacities should be undertaken before implementation of any project.
- Encourage nutrient recycling in preference to landfill and incineration.
- Re-design the classical municipal wastewater treatment plants to include tertiary treatment.
- Enter into international co-operation to stop discharge of waste and sewage into large bodies and seas.

2.3.3 Hazardous Substances that cause Acidification.

Many soils in Kenya, especially soils around Eldoret and Kitale regions, require liming from time to time due to their acidic nature. In general, agricultural soils that have been reclaimed from former tropical forests are very sensitive to pH changes[27]. Acidification, in the environmental context, can be considered as a change towards more acidic conditions in one or more compartments of the biosphere or a reflection of the process

[27] Chemical pollution: A Global Overview 1992. Earth Watch, United Nations Environment Programme.

which brings these changes. The process of acidification occurs slowly. Initially, acid deposition may be absorbed and neutralized even in sensitive areas. However, once the natural buffering system has been exhausted then sets in the acidification process.

The compounds that cause acidification are found in the atmosphere and include sulphur dioxide, sulphuric acid, hydrogen sulphide and other mercaptans; nitrogen oxide and nitric acid, hydrochloric, hydrofuoric and organic acids. Ammonium slats have both acidifying and bufering properties. In the atmosphere ammonia acts as a buffer by forming ammonium salts. once deposited on the soil the bacterial nitrification produces nitrate that leads to acidic soil. The release into the atmosphere by natural or anthropogenic means of alkaline dust serves a neutralizing function.

The major source of these acids into the atmosphere is energy related. For instance, fossil fuel combustion is a leading source of Sulphur dioxide into the atmosphere mainly as a result of fossil fuel burning the contribution of which is estimated at about 2272.8 x 10^4 kg per year[28]. The use of undesulphurized fuels is the major cause of Sulphur dioxide emissions. The amount of sulphur oxide could be considerably reduced if a desulphurization process was installed. Kenya's contribution is significant given the increasing number of vehicles and energy processes requiring fossil fuels[29].

Formic and acetic acids play an important role in solid acidification. However, very little is known of the atmosphere source of formation.

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[28] Ibid pp 148

One common feature about the substances that cause acidification is that they are air-borne. They are stable in air and can be transported to several kilometers from source point. In many instances they cross borders with ease. Depending on which circulation, the threat posed by neighbours that pollute the atmosphere is real and becomes a matter of international co-operation. Dry or wet precipitation is the two major atmospheric cleaning processes. Few pH studies done on rainwater of Kenyan towns between 1977 and 1982 indicate a pH range of 5.64 and 7.10 over Nairobi, Kericho, Meru and Garissa[30]. Complete record of rainwater pH in Kenya is scarce and need monitoring. At the moment it is difficult to say whether the acidification process has set in place in Kenyan soil. Luckily, Kenya has no large scale mining activities.

Mining often produces highly acidic waste waters and may have to be regulated. Industrial process such as elecroplating with chromium, tannery of hides and skins and pulps and paper industry also often produce acidic waters and their effluents need strict control. The pH of Kenyan lakes is still around neutral[31].

Acidic waters do not affect crop yield but cause fish kills. Not only are the fish killed but also evidence accumulated shows that other components of fresh water biota change when pH is consistently below 6.0. forests are very sensitive to acidity and declines have been recorded all over the world. Acidity accelerates the aging process of buildings and ornaments. Marble is especially sensitive to acids, so are copper and chrome-plated

29
30 Ibid pp 160
S. O. Wandiga (1996). "Methodology in environmental Standards, "UNEP Workshop for Eastern Africa Region, 16-20 September, 1996.

statues. The life of power lines and telephone cables are shortened as well. In humans acidity affects the respiratory tract and asthmatic patients become more vulnerable.

Control measures include reduction at point sources and remediation. Energy conservation by industry and domestic use is the major control mechanism. Cleaner technologies like flue gas desulphurization and motor vehicle emission controls are important steps to this phenomenon control

International co-operation has shown that sulphur dioxide emission can be reduced. The enforcement of the 1979 Convention on Long-Range Trans-boundary Air Pollution (LRTAP) on the Reduction of Sulphur Emissions or their Trans-boundary Fluxes, though restricted to the North where 30 countries have ratified it, show that national suphur emissions or their trans-boundary flow can be reduced by at least 30 per cent. A similar protocol has been adapted in 1984 for nitrogen oxides. Kenya needs to critically study the need to enter into such protocol with its neighbours[31(a)].

2.3.4 Hazardous Substances that cause Oil Pollution.

Oil slicks and oil spills have been ubiquitous in he environment, especially the open seas. Oil has become a major energy component of modern energy needs. Since 1859 when the first commercial oil wells were drilled, global oil demand has grown by about 50 per cent of fuel supply. Given the wide-scale production, transport, use and disposal of

31 S. O. Wandiga (1996). "The State of Chemical Pollution in Kenya." Kenya J.Sc. series A. Physical and Chemical Sciences. 10(1) 1-22.

petroleum globally, it has become a leading contaminant in prevalence and quality in many environments, but especially the ocean. Of the 3.2 billion tonnes of oil produced per year approximately 0.1 per cent or 3.2 million tonnes enter the marine environment[32]. The use of petroleum oil has significantly contributed to the global warming through increase in greenhouse gases.

Kenya has a long coastline. Some of the coastal areas have beautiful beaches, which are centers of tourist attraction. The aesthetics and beauty of the Kenyan beaches have been spoiled by petroleum concentrations and tar ball accumulation brought to the coastline by sea waves. The sources of coastal oil come from offshore production, marine transportation, atmosphere and land based ones. In addition, trans-boundary ships ballast their engines in the high seas and dump the engine wash there. Incidences of oil spill from the only oil refinery in Mombasa have been experienced but have been of low magnitude. However, the effect of the spill is still evident.

Disposal of used engine oils from garages, especially the "Jua Kali" garages, have become a nuisance to most municipal sewage treatment plants. There are no laws that regulate such disposals. These oils from garages contain polycyclic aromatic hydrocarbons with heavy metals and long chain and branched hydrocarbons whose disposal cause chronic problems to municipal sewage treatment plant[33].

32 Ibid pp 35
33 Supra note 1 opp. Cit.
Supra note 31 at pp 54.

Freshwater environment are also contaminated with petroleum oils from land run-offs, airborne contaminants, shoreline facilities, and leaks and spills from vessels, pipelines and underground storage tanks. Above-ground water are contaminated with leaks from storage tanks.

At least 25 general micro-organisms participate in the biodegradation of oil in our environment[33(b)]. In soils, bacteria are the predominant decomposers followed by fungi. In fresh water, bacteria, fungi, yeast and moulds participate in hydrocarbon decomposition. In marine environment, bacteria are the predominant types of decomposers. The ability to decompose oil depends on previous experience, size of tar balls or oil slick and temperature. Decomposition is slow in cold climates. Dispersants have been used to increase the surface area of the petroleum to attempt to speed degradation. Most dispersants are very toxic and inhibit microbial activity.

The biological effects of oil spills are similar in tropical, temperate and Arctic marine environments. The effects of oil spills on a shoreline depend on the geomorphology of the area. Aquatic macrophytes are highly susceptible and often constitute the dominant vegetation of the impacted ecosystem. Many animals will be killed outright or experience sublethal effects that may cause death later. Recovery of affected shorelines also depends on frequency of oil spill, episode type, amount and duration of hydrocarbon persistent on sediments[34]. Often grazing species disappear and detrital-based food web appear and predominate. Considerable social and economic losses due to missed opportunities to use shoreline for recreation and fishing, etc do occur.

33(b) Ibid at pp 65.

34 Supra pg. 1 note 1.

Control measures have been based on environmental Conventions and regulations developed nationally and internationally. The first Convention dates back to 1954 when the International Convention for the Prevention of Pollution of the Sea of oil (London) was developed.

This was followed by the Stockholm Conference of 1972, which enunciated the principle of Sovereignty and the obligation to protect and preserve the marine environment[35]. The driving force behind this Conference was the realization of the popularity of ocean shipping, the building of bigger ships and more dramatic marine spills since 1954. The conference resolutions were codified in MARPOL (1973/83) which came into force in 1983. UNEP was established in 1972 and immediately set up a NUEP'S Regional Seas Programme later called Oceans and Coastal Areas Programme Activity Centre (OCAPAC) by 1989. This programme established twelve regional action programmes to protect the environment against marine pollution[36]. Member states have an obligation to protect and preserve the marine environment, a duty not to transfer or transform pollution, and a right to a quality marine environment. Kenya should take the necessary steps to implement its obligations.

35 Borges E. M. & Ginsberg, N. (Eds.) 1986 Ocean Year Book 6, University of Chicago Press. Chicago, Illinvus.

2:4 HAZARDOUS CHEMICALS.

The chemical industry in Kenya is in its infancy. Compared to other developed countries, the industry has a potential for growth but cannot at present be considered developed A majority of chemical firms are engaged in formation and packaging of imported products. Those which do some manufacturing import all or most of their raw materials. At present Kenya does produce little volume of phosphate fertilizer. Therefore pollution caused by high volume production is not typical in the country. However, some imports are in several thousand tones and are capable of causing concern to human health and environment.

A second area of local concern is whether within the industries stringent measures are taken to protect workers. The same concern is similarly true for those who are employed in the farms and handle large quantities of chemicals. This leads to the question of how successful public education and public awareness campaigns on the use of chemicals are.

The importance of the chemical industry to the economy of a nation cannot be understated. The fact that the industry is not fully developed does not minimize its potential. For instance, chemicals are important in agriculture, industry, housing, transport, textile and health. Chemical fertilizers help to develop the agricultural base while pesticides help to control disease and insect pest. Synthetic fibre and yarns such as nylon, polyesters and acrylics now predominate the textile industry. In transport and

[36] Supra note 8.

housing, chemicals are used as fuels or for thermal insulation, (polyurethane) wood substitutes, water purifiers or durable finishes. Plastics are everywhere in the pharmaceutical products.

2.4.1 Hazardous Chemicals From Industrial Activities.

As most chemicals are produced outside Kenya's territory there is need for a clear policy on how the government will co-operate at the international level in the development and implementation of measured responses to deal with hazards and risks to the environment and to human health. Some of the chemicals of concern are heavy metals and metalloids, and aromatic polychlorinated compounds.

a) Heavy Metals and Metalloids.

Large-scale mining and smelting of mineral, though non-existent in Kenya, are the major sources of heavy metals and metalloids in the environment. In this respect the mining, processing and wide spread use of lead, arsenic, cadmium and mercury require special attention. These elements once exposed to the environment enter the food chain either through direct ingestion or though microbially transformed products. They persist forever and are a threat to human health and the environment.

Lead for instance is a toxic chemical with no known physiological function. Exposure to lead comes from inhalation of lead emitted into the air from the combustion of leaded gasoline.

Kenyan vehicles emit about 6.6 x 10^4 kg of lead into the air each year[47]. This amount accumulates each year either in the blood stream, water sediments or soil. In addition to obtaining a substantial dose of the element from air, foods contaminated with lead are consumed by the population. Use of leaded pipes for drinking water is an added source of the chemicals as well as the use of tinned cans laminated with lead. Paint is another source of lead to the environment. Lead is a danger to infants and children. It affects the central nervous system and reduces its sensitivity to stimulate. The concern for lead in the environment is mitigated by its insolubility. However, it is a hazard to aquatic species and waterfowl. An estimated two million ducks die every year in North America from ingestion of spent gunshot and discarded fishing weights. Lead in an ecological environment reduces the cycling of nutrients[48].

Like lead, mercury has no known biological function. It is used primarily in the alkali, electrical and paints industries. Inorganic mercury is also used in dental amalgams and skin-lightening soaps and creams. Bacteria under anaerobic conditions transform the insoluble inorganic salts into methyl and dimenthylmercury which are volatile and most poisonous. Methylmercury, the most poisonous of them all enters the food chain especially through fish which accumulate high levels of the compound. Pregnant women and nursing mothers are likely to be at a greater risk to the adverse effects of

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47 S. O. Wandiga Supra pg. 11 note 9.

methylmercury. The compound adversely affects the central nervous system, resulting in changes in the sensory and co-ordination functions[49]. Its damage to the foetal brain could be the critical effect. Epidermis of mercury poisoning have occurred in Japan, the manimat disease due to consumption of poisoned fish, and in Iraq due to ingestion of grains dusted with alkymercury fungicides[50].

The major sources of cadmium are electroplating and plastic, where it is used as a stabilizer. The element with its compounds are accumulating in arable soil land taken up by food crops. Workers exposed to the element may develop lung cancer. It accumulates in the kidneys where it induces renal damage. Tobacco smoke is a secondary source of the metals in humans. Its use is now restricted in galvanizing and plating of food processing equipment, enamel and pottery glasses, and cadmium based pigments and as a plastic stabilizer.

Environment exposure arises from smelter sites, sewage sludge disposal, and application of phosphate fertilizers with cadmium as constituents. In some polluted locations, microbial and invertebrate populations have been most affected, with a resulting decrease in the rate of some soil processes such as litter breakdown.

All humans, plants and animals have low concentration of arsenic as a result of its wide prevalence in the environment. Its major sources are in the production of pesticides (restricted today), plant desiccants and wood preservatives. In air it is mainly emitted

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Supra pg. 23 note 1.
Supra page. 19 note 23

from smelting plants, combustion of fuels, especially brown coal and the use of arsenical pesticides. In humans it causes cancer, especially lung cancer and skin cancer. Besides occupational exposure it is often got from food, particularly fish and shellfish as well as air and drinking water. In solid it is either leached or forms volatile methylated compounds. This explains its lack of accumulation in the environment despite wide use as pesticides and herbicides.

b) Polychlorinated hydrocarbons.

Some chlorinated and brominated organic compounds are non-biogradable and hence pose concern to environment and human health. The group of most concern is the polychlorinated biphenyl (PCBs). They are synthetic aromatic hydrocarbons whose degree of chlorination can vary between 21 and 68 per cent (w/w)[51]. They have properties like low electrical conductivity and are extremely resistant to thermal breakdowns. Which make them used as heat transfer liquids in electrical equipment. They find wide use in closed, semi-closed and open systems in capacitors and transformers, hydraulic and heat exchanger pumps, platicizers surface coating, paints and adhesives. They are distributed in the environment through atmospheric transport. Humans are exposed to them through inhalation and dermal contract. They may cause an increase in the risk of cancer, especially to the liver and biliary tract[52]. PCB level foods

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51 Supra note 3
52 WHO 1990 "Inorganic mercury" Enviornment Health Criteria 101, World Health Organization
Ibid at pp 205

are low although some high levels have been found in isolated cases[53]. Its effect on iota is unqualified though it accumulates in fish in isolated inland waters[52].

Polychlorinated benzenes such as hexachlorobenzene (Lindane, Benzene hexachloride) have been restricted because of its wide spread prevalence and harmful effects on humans. As a result of the restriction on the use and production its levels in the environment are going down.

The herbicides such as dichlorophenoxyacetic acid and trichlorophinoxyacetic acid have wide spread use as herbicides[54]. Their wide use and application in the Vietanm War has raised human concern on their safety especially due to the highly toxic polychlorodibenzoparadioxins (PCDDs) and polychorodibenzofurans (PCDFs) which may occur as impurities. Pentachlorophenol is produced in its own right as a fungicide and bactericide in quantities of about 30,000 tonnes per annum. The highly toxic impurities PCDDs and PCDFs may be produced in the processing of the three polychorobenzenes. The use of polychlorobenzenes is banned or restricted because of the possible occurrence of the impurities[53].

c) Chemical Preparation.

Chemicals in detergent, wood preservatives, flame retardants and washing powders are produced in high volumes. Each contains several chemical ingredients whose effect

53 UNEP/FAO/WHO 1988 'Assessment of Chemical Contamination in Food. Report of the results of UNEP/FAO/WHO Programme on Health Related Environmental Monitoring. UNEP. NAIROBI. Pp 49

singly or collectively may cause injury to human health or the environment. As Kenya develops its chemical industry, other chemicals of concern will emerge. It is advisable to have in place policy that screens potential commercial, chemicals before they are put in use in high volumes. Industries should be required to prepare a plan that analyses chemical from cradle to grave. The policy should also encourage substitution of toxic chemicals like PCBs and establish public education programmes on safe disposal of chemicals.

2.4.2 Hazardous Chemicals that Cause Air Pollution.

A broad and encompassing definition of air pollution is given as the presence in the out-door or in-door atmosphere on one or more gaseous or particulate contaminants in quantities, characteristics, and of duration such as to be injurious to human, plant or animal life or to property, or which unreasonable interferes with the comfortable enjoyment of life and property[54].

Air pollution is caused mainly by the demand for energy by increasing populations. Communities that use coal as fuel mostly pollute the environment. Coal emits both Sulphur dioxide and particulate matter. Combustion of carboniferous fuels result in exothermic oxidation of carbon, hydrogen, suphur and nitrogen. Most fuel filling takes place under incomplete combustion conditions and compounds such as Arsenic, Cadmiun, Lead and Mercury released into the atmosphere

54 Ibid at pp 76.

Once in the atmosphere, hydrocarbons are further oxidized to produce photochemical oxidants, nitrogen dioxide ozone and peroxyacynitrates (PANs) and acid aerosols. Fuel combustion indoors produce Carbon and sulphur Oxide. Other indoor fumes come from chemicals used as wood preservatives and furnishing and finishes, (formaldelydes and other hydrocarbons), natural emissions from ground (radon and methan), and biological aerosols and household dust. The major indoor pollution's source in Kenya is biomass burning.

Comparatively, Kenya is a clean environment except for isolated cases. Some of the worst air pollution incidents come from vehicular emissions. It is estimated that Kenya produces 33.1 x 106 metric tonnes of Carbon dioxide and 66 metric tones of Lead and 22,728 metric tones of sulphur dioxide per year[56]. As impressive as the numbers may seem, they are dwarfs compared to the amounts produced by developed countries

Therefore, the contribution of Kenya to combustible pollutants from combustible energy may be significant when one considers Africa's contribution only. Scarcity of data does not allow derivation of binding conclusions. However, as pointed out earlier the fact that so much sulphur dioxide and lead are emitted to a fragile and sensitive soil raises concern. Furthermore, biomass burning releases polcyclic aromatic hgydrocarbon (PAHs) which are toxic chemicals[57].

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56 Ibid.

57 S. O. Wandiga, Supra, note 9.

S. O. Wandiga 'Environment and Development' Kenya Academy of Sciences Press 1996, Nairobi. Pg 41

Each year between the months of May and August, Nairobi area experiences episodes of cloud invation with reduced visibility. Often aeroplanes have been diverted to Mombasa as a result of those effects of the pollution. Photochemical smog has been shown to adversely affect humans especially the elderly and young. Preventive measures need to be put in place now rather than later. The increase n atmosphere carbon dioxide and other "greenhouse" gases, lead to an increase in average global temperature by 1.5 to 5^0C. The effect of such increases have both socio-economic implications whose details cannot be adequately covered in this review[58].

In order to ensure a clean environment there is need for the government together with regional states to lay for air pollution control. Once established, implementation and compliance to emission standards set should be assured by all. The government should encourage industry to develop and use new technologies that emit fewer pollutants. Such technologies include modification of fuel, use of advanced combustion techniques or alternatively removal of pollutants from fuels[59].

Several International protocols on air pollution control exist. These include the UN-ECE 1979 Convention on Long-range Trans-boundary Air Pollution: Protocol on the Reducatin of Suphur Emissions of their Trans-boundary Fluxes; Protocol Concerning the Control of Emissions of Nitrogen Oxides or Their Trans-boundary Fluxes and Protocol

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59 Ibid
Suess M. Management of hazardous waste, policy Guidelines and code of practice. WHO Regional Publications European series No. 14. Capenhagans pp 79.

the Control of VOCs with a view to limiting the formation of photochemical oxidants The government should study the existing instrument with a view to ratify the appropriate ones[60].

2.5 EXPOSURE OF HAZARDOUS WASTE TO MAN AND ANIMALS.

Hazardous waste can affect human and animal health through different mechanisms and routes of exposure. The most obvious route is direct contact with the hazardous agent during handling of the waste, or waste adsorbed to oil matter or via empty containers, jars or bags left at disposal sites, dropped during transportation or reused without proper cleaning. This could also be a source of disease as well as chemical contamination[61]. Children are an especially vulnerable group as they are likely to play around waste bins and may put fingers or contaminated articles in their mouths. Inhalation of dust from waste storage and dumping sites may also constitute a hazard. This is, for example, the case for asbestos-containing material. Inhalation of vaporized chemical waste is also a potential way of exposure, but is only likely to be of significance to the on-site workforce[62].

Groundwater can be contaminated from dumping sites and landfills. Hazardous agents, such as bacteria, viruses, and chemicals can be transferred to drinking

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60 Ibid at 340
61 Ibid at 342
62 Supra note 15 at p. 140

water wells in this way. Certain viruses and bacteria may survive for weeks to months in soil and/or inadequately treated sewage sludge, thus increasing the risk of such agents being transferred to drinking water supplies.

The transport of contaminants in surface waters results in a rapid and extensive dispersion which can greatly increase the size of the exposed population. Drinking water can also be contaminated by direct transfers from disposal sites or by animals such as birds to surface reservoirs. Seabirds can also transfer bacteria from coastal sewage outlets and treatment plants to drinking water reservoirs. Other animals such rats and insects may also transfer contagious diseases or dangerous chemicals from dumping sites to households in the community.

Chemicals from hazardous waste may be taken up by crops from soil-bound particles or contaminated surface – or ground waters, or if contaminated water is used for irrigation purposes. The spreading of wastes on agricultural land and deposition of air emissions from smoke stacks and a variety of industrial point sources constitute other ways for chemical contamination of vegetation and crops. Consumption of contaminated vegetation by animals can result in the tropic transfer of hazardous chemicals. Livestock may ingest large quantities of soil when feeding on pasture and this is often a significant source of exposure in areas with contaminated soils[63].

63 Ibid at 280

Finally, release of waste materials into the sea and via freshwater sources leaching from disposal sites and treatment plants as well as atmospheric deposition, may lead to the uptake of chemicals by aquatic organisms. Those compounds with high partition coefficients tend to bio-accumulate in aquatic food chains. This is of particular significance for compounds which are persistent in the environment as these show marked accumulation in fish. Consumption of contaminated seafood can be a significant source of human exposure, particularly for fishing.

2.9 ASSESSMENT OF HEALTH RISKS

With identification of a hazard, accessing health effects data-including dose-response information on the particular contaminant (s) –and determination of public exposure to the hazard, a risk assessment can then be made. The risk of adverse effects on human health and the environment from the presence of hazardous chemicals or pathogenic organisms present in waste is fully assessed by quantifying target organism exposure. This will determine whether there is a potential adverse health risk and whether there is a sufficient safety margin between exposure levels and levels known to cause adverse health effects[65]. If the risk assessment reveals that the hazardous waste will impose an unacceptable risk to human health or the environment, then measures must be taken to limit the risk to an acceptable level.

During the period 1964-1972 an estimated 300,000 barrels of liquid and solid wastes were buried in shallow trenches at a 200 acre dump site in Hardeman

County, Tennessee (U.S.A). in 1972, a nearby test well was found to be contaminated with hazardous chemicals, and the site was closed. An analysis of water from private wells close to the dump showed no contamination. However, five years later, in 1977, the situation changed dramatically. Residents in the area of the dump became alarmed by the unusual and unpleasant odor and taste of their well water. Some people experienced skin and an irritation, weakness in the upper and lower extremities, severe gastrointestinal symptoms including nausea, diarrhea, and abdominal cramps[66]. The local authorities launched an investigation. Analysis of the well water revealed high concentrations of carbon tetrachloride and small amounts of other organic compounds known to have been dumped at the site by a pesticide manufacturer. The highest concentration of carbon tetrachloride found in one well was 18.7 mg/1. As no method for biological monitoring of carbon tetrachloride was available, it was decided to look for effects on liver function, as this is the main target organ in carbon tetrachloride toxicity. Liver function tests were performed on 36 exposed individuals and compared to a reference population of 56 people. A higher prevalence of enlarged liver and impaired function tests was observed in the exposed group. All signs returned to normal after cessation of exposure when examined a year later in a follow-up study[67].

Environment Protection Authority of Victora. 1985. Draft Industrial waste strategy for victoria. Melbourne. Pp 19.
Ibid at pp 40.

It is important that in any case where potential exposure is discovered from hazardous wastes, the public is informed immediately about the source of exposure and the potential health risks involved. Such risks should then be compared with other risks, such as those associated with smoking, traffic accidents, alcohol consumption, and other estimable risk factors[68]. An information system should be set up to ensure that the progress of ongoing investigations is being reported adequately. Such information is necessary in order to prevent the public from over-reacting and falling victim to political exploitation[69].

2.12 CONCLUSION.

In a nutshell it's important to emphasize that this chapter has essentially dealt with waste substances and chemicals that are dangerous to Flora and Fauna. The chapter examined in detail how and why various wastes substances and chemicals are a danger to the environment and therefore provide a launcing pad for a legal analysis of available municipal and international machinery for correcting such anomalies.

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68 Tinnah. L. M. Methods presently used to treat and dispose of hazardous wastes in California
California Department of Health, Sacramento, California. Pp 520.

69 Ibid at pp 626.

CHAPTER THREE: A REVIEW OF THE EXISTING KENYAN LAWS REGULATING THE CONTROL HAZARDOUS WASTES, SUBSTANCES AND CHEMICALS

3.1 OVERVIEW

Proceeding from the two chapters above, this chapter seeks to bring to fore the various existing legislations in Kenya regulating the control of hazardous wastes, substances and chemicals with a view of pointing out the strength and weakness of the existing regime. Our focus is mainly on those laws which regulate the generation of wastes, substances and chemicals and those that make for the requirements for recycling or modes of rendering such wastes innocuous.

Presently, Kenya has no umbrella law on environmental management, (save for a an upcoming bill)[1] and more specifically there is no statute dealing with hazardous wastes, in the country. Currently, there are several statutes touching on hazardous wastes, chemicals and substances[2]. When analyzed interms of application and their effectiveness, statutes contain various loopholes, flaws and inconsistencies. These include the non-existence of a strong legal mechanism on hazardous wastes, chemicals and substances and lack of harmony in the existing laws which are scattered in several legislations as will be seen in this chapter. This means that the

1. It is governed by numerous statutes. A chemical Control Bill, 1995 is yet to become Law. There is also the Environmental act which has not been assented to by the president to become law.

2. Such statutes include: Factories Act, Cap 514, Pharmacy and Poisons Act, Cap.244 of the Laws of Kenya.

use, accessibility, applicability and effectiveness of these laws is very low. In the same vein, lack of a clear definition of hazardous wastes, chemicals and substances exists making it even worse. Although, for example the Factories Act[3] mentions hazardous substance, it does not define what they are. Of consideration will also be institutional arrangements and enforcement mechanisms in the statutes. The Food Drugs and Chemicals Substances Act[4] establishes a Public Health (Standards) Board which is meant to control potentially dangerous and harmful chemicals. But it fails to identify the lead institution to co-ordinate chemical management.

Although there was a Chemical Controls Bill, this bill known as "A chemical Control Bill" was not passed in parliament. Poor institutional arrangements and weak enforcement mechanisms have been clearly identified as lacking in several statutes hence weakening the enforcement and management of the Acts.

Penalties and offenses are not severe as they should be to realize proper management of hazardous waste and chemicals substances. For instance, a person found guilty of an offence under the Pharmacy and Poisons Act[5] is liable to a fine not exceeding 5,000/= or to imprisonment for a term not exceeding one year, or both. The Radiation Protection Act[6] which deals with hazardous radioactive a fine not exceeding 20,000/= or one year imprisonment, or both. This is the trend in most of the legislations and statutes currently in place. There is therefore a need to revisit these Acts and come up

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3. Ibid
4. Food Drugs and Chemical Substances Act Cap 254 Laws of Kenya.
5. Supra note 2
6. The Radiator Protection Act, Act No. 20 of 1982, came into operation in 1984.

with comprehensive penalties for contravention of these Acts. Clearly, these rates and penalties have been overtaken by economic developments and time.

As mentioned elsewhere in chapter 2, governments policy is geared towards the prohibition of importation of hazardous wastes. Thus a national Law should be formulated to prohibit from Kenyan waters, ports, borders and air any vessel or ship carrying hazardous wastes within the meaning of the 1972 London Dumping Convention, the 1989 Basel convention, and the 1991 Bamako convention except under special License. In this part, we shall examine the various legal regimes governing the generations and regulation of hazardous wastes and substances on their movement. We shall consider the common law regime, constitutional law provisions and legislative regimes.

3.2 THE COMMON LAW AND HAZARDOUS WASTES

The corpus of Laws in use in Kenya regulating the environment are derived partly from statute (Acts of parliament) and from common Law.

The Judicature Act, chapter 8 of the Laws of Kenya, section 3 provides for resort to common law and doctrines of equity and statutes of general application in some circumstances more specially in the absence of specific statutory provisions and the rule applied must be suitable to the local circumstances. The common law is not to be found in any one document but in reported decisions of judges and in England today it

consists of the whole corpus of non-statutory Law of England excluding the rules of equity. As defined in Chapter 2, Hazardous waste substances and chemicals cause environmental harm which affects individuals in a society.

The common law being the ancient law of England as modified by the judges provides for recourse to courts in case of environmental damage by both individuals and groups (public) in a very restrictive manner. Terms such as nuisance, negligence, strict, liability, trepass and riparian rights have all acquired special significance and form the fundamental foundations of juridical formulations of common law. However, the development of national environmental law in various countries, the procedures for bringing individual actions have varied from one country to another. The above, terms are also associated with questions of harm caused by hazardous wastes, chemicals and substances to both individuals and groups.

Traditionally in common law, a plaintiff is required to have a Locus Standi in a case involving nuisance, unless one is authorized to sue in the name of the Attorney - General. The Plaintiff must show a violation of his substantive rights and more specifically the damage he/she has suffered as result of the alleged nuisance.

In one of the leading cases, Walter vs. Selfe[7], the Plaintiff claimed that he had suffered from obnoxious smells emanating from the defendant's brick-works. The court acknowledge, in effect, that the Plaintiff has the right to a healthy environment, for it treated the brick-works as a nuisance, the court decided at page 148 that;

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7 Qouted in Jolante Nowak (ed.), Environmental Law; International and comparative Aspects (Newyork Ocean Publication Inc 1976)

"The Plaintiff entitled for ordinary purposes of breath and life to an unpolluted and untainted atmosphere - this does not necessarily mean air as fresh, free and pure as it was at the time of building the Plaintiff's house ..... but air not incompatible or at least not rendered incompatible with physical comfort or human existence; ... with reference to the climate and habitat of England".

With respect to private environmental harm (private nuisance), the affected individual(s) is required to show specific damage suffered. The same act of nuisance may become public when it affects a number of people. Victims of public nuisance may not be required to show specific personal injury or damage to their other interests as required in the case of private nuisance. In the words of Lord Denning, public nuisance as a concept is so widespread in its range or so indiscriminate in its effect that it would not be reasonable to expect one person to take proceedings on his own responsibility to put a stop to it, but that it should be taken on (as) the responsibility of the community at large[8]. A public nuisance is a public wrong punishable under the penal law of most countries. Though in theory anybody may bring action against anyone who causes a public nuisance, such matter's are essentially dealt with by the Attorney-General.

The Court in the common law system are generally reluctant to front standing to individuals who want to sue on behalf of the community. However, there is what is known as class action in many countries where a group of individual may institute action to protect their common interest. Despite rare possibilities of getting authorization to sue in the interest of the public, group action when authorized may

8. Lord Denying in Jolanta Nowak, Ibid.

help in solving problems of environmental pollution. In many instances, group failed due to failures to show direct injury to the group members.

In Sierra club Vs. Morton[9], the Plaintiffs, members of the Sierra Club, were required to show the direct injury they had sustained, as result of the alleged environmental impairment from the Mineral King Valley. The U. S. Federal Courts have on several occassions[10] ruled that an individual cannot sue on behalf of a given natural resources such as forest, mountain.

In many of the common law countries, the problem of locus standi is being redefined and the issue of proof of direct personal damage is being questioned. In Kenya, the high court traditionally required the individual to have locus standi. In the case of Wangari Maathai -V- Kenya times Media Trust[11], the Plaintiff sought a permanent injunction to restrain the defendant from building a multi-strorey complex at a major park in Nairobi. She alleged that the erection of the building would cause environmental degradation. The high court ruled that the Plaintiff had no locus standi in the case. In 1992, in the case of Maina Kamanda and another -V- Nairobi City Council and another[12], a new chapter in the issue of locus standi was opened. In this case, two rate payers of Nairobi City sought to restrain the Nairobi City council from permitting the former chairman of the commission to enjoy the facilities of the council once the commission was dissolved. The Court dismissed the objection that

9. US Federal Courts Reports. 405 US 727
10. Ibid.
11. Nairobi HCCC No. 5403 of 1989 (Unreported)
12. Nairobi HCCC No. 6153 of 1992 (Unreported)

the Plaintiffs had no locus standi. The import of this new decision is that nobody has ever moved the courts to adopt and appreciate this position. Generally speaking, a person affected by hazardous wastes, chemical and substances can have recourse to court and may plead for compensation.

Under the common law of nuisance, negligence or trespass, plaintiffs may be entitled to compensation for damage. Problems of environmental pollution are usually dealt with under this principle. One of the leading cases in this respect is Rylands Vs. Fletcher[13]. The famous rule established by this case is that any person "who for his own purpose brings on his land and collects and keeps there anything likely to do mischief if it escapes, must keep it at his peril, and if does not do so is prima facie answerable for all the damage which is the natural consequence of its escape". The thing that escaped in this particular case was water from the artificial reservoir which caused damage to the Plaintiff's mine, by flooding. Such actual damage to purport is coverable in the form of monetary compensation. Hazardous wastes, chemicals and substances as discussed in chapter 2 emanate for various sources and if not probably managed, they are bound to escape and cause harm. A person affected can seek redress under the above principle.

When the damage in question is to the comfort and health of the Plaintiff, the actual amount of damages recoverable is difficult to assess. The victim of the pollution may seek both monetary compensation and injunctive relief. The purpose of seeking an injunction is to stop further injuries in the future.

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13. (1868) ALL.EL.R. 3-330

When environmental pollution is of a serious nature, courts normally grant an injunction. But injunction are not granted as of right in common law. The courts have a discretion whether to grant an injunction or award compensation. The most common grounds for the grant of injunction are, widespread pollution, and rapid environmental pollution at any level.

3.3 THE CONSTITUTION AND HAZARDOUS WASTES

The constitution of Kenya is the supreme law of the land having the force of law throughout the country. The constitution does not expressly provide for environmental protection and more so hazardous waste management. However, there are some salient and residual provisions which have a bearing on the environment Section 70 of the constitution enshrines the right to life which inheres from various international human rights instruments for instance Art, 6(1) of the international convent on civil and political Rights (1966) which is associated with the right to food and shelter. All these rights revolve in one way or the other around environmental protection as one can hardly complete the reality of life without paying regard to its supporting elements. All these are linked to the most articulated concept of right to a healthy and clean environment which has become a universal human right of everybody. A degraded quality of life is encroachment upon the right to life. Infact, as a matter of fact, all human rights are compliments to the right of life.

In India, the supreme court of India, in Subhash Kumar V state of Bihar[14] held at p 103 that:

> "right to life is a fundamental right under Art.21 of the constitution (India) and it includes the right of enjoyment of pollution-free water and air for full enjoyment of life. If anything endangers or impairs that quality of life in derogation of laws a citizen has a right to have recourse to Art.32 of the constitution (India) for removing the pollution of water or air which may be detrimental to the quality of life".

In a very celebrated human rights case which sought to define the word "Life", the supreme court of Pakistan on 12th February 1994 ruled that:

> "The word "Life" has not been defined in the constitution but it does not mean nor can it be restricted only to the vegetative or animal life or mere existence from conception to death. Life includes all such amenities and facilities which a person born in a free country is entitled to protection of the law from being exposed to hazardous of electromagnetic fields or any other such hazardous which may be due to installation and construction of any rigid station, any factory, power station or such like installation[15]".

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14 Quoted in Nandan S. Nelivigi et al "The Judiciary and the environmental. Recent Trend and Development" in EPL Vol. 123 1993.

15 M.S. Shehla & others Vs. Warda Pakistan Legal Decision PLD 1994 Supreme Court 696 Vol. XLVI Human Rights Case No. 15 I. C of 1992.

A residual provision is found in section 75[16] which prohibit compulsory acquisition of private property by the government except for reasons of public health, town and country planning or the development or utilization of property so as to promote the public benefit. In the same vein property may be acquired compulsorily by the government if it is in a dangerous state or injuries to health of human beings, animals or plants. This residual power can only be involved when save disposal of such items is required.

Section 76[17] protects individuals against arbitrary search except where it is found reasonable for reasons of public safety, public health or the development and utilization of mineral resources. This means that a search is not arbitrary under the constitution if it is done for the reason above. One can envisage a situation where somebody keeps containers suspected to contain hazardous waste, chemicals and substances in his house or compound as an example of where section 76 can apply. The test here is one of reasonableness.

The increased national initiatives in Kenya on environmental protection persuasive decisions from other jurisdictions like in the above two cases can be used to counter and control the consequences of human activities such as the generation, storage, disposal and transboundary movement of hazardous waste as well as those undertaken in the process of scientific and technological advancement.

16 Section 75, Kenya Constitution

17 Section 76 Ibid

The looming danger caused by hazardous waste, can be averted in good time depending on how our courts construct and interpret these provisions. Alternatively, Parliament could pass specific regulations for the management of hazardous substances. Over and above this, Parliament can consider addressing the problem posed by hazardous substances vide a direct constitutional provision.

3.4 A REVIEW OF THE STATUTES AND LEGISLATIONS TOUCHING HAZARDOUS WASTES

A review of the various legislation governing environmental protection generally has been done by various Kenyan authors. Okidi C. O[18] in various studies reviews the normative provisions of Kenya's environmental statutes and he cites a number of disabling weaknesses ranging from inadequate provisions to management issues . Ojwang J. B.[19] has examined the question of environmental law in the context of the

18. C. O. Okidi Review the Policy Framework and Institutional Arrangements for the Management of Environmental and Natural Resources in Kenya October 1993 (Draft). C. O. Okidi'The Practice and Principles of Environmental Law in Kenya' a paper prepared for KWA/IDRC public lecturers at the Kenya National Academy of sciences, Nairobi, Kenya 1996. C. O. Okidi 'Management of Natural Resources and the Environment for Self Reliance' in Journal of east African Research and Development Vol. 14 (1984) pg. 92. C.O. Okidi. Legal Aspects of the Management of Marine and coastal Areas in Kenya. (Bonn: IUCN/CEL Environmental Law Centre. 1993)

19. Ojwang J. B. Constitutional Development in Kenya: Institutional Law and Political Change in Kenya (Act press, Nairobi 1990) Ojowang J. B. Environmental Law and Political change in Kenya (Acts press Nairobi, Kenya 1992) Ojwang J.B., Environmental Law and Constitution Order. Ecopolicy. Acts Press, Nairobi Kenya 1993.

Changes in Kenya's constitutional order while Ogolla B.[20] has looked at the salient features of environmetal policy and law.

Generally speaking, Kenya's approach to environmental conservation is sectoral and hence therefore its legislative regimes are also sectoral in nature. Statutes exist which govern various biomes such as, forest resources, wildlife, fisheries, water as well as land and minerals. There are also legislations on functional sectors such as factories, shipping, agriculture, health, mining, chiefs authority, and such other related sectors. To avoid any confusion the statute by statute analysis done below does not adopt any classification or categorization of the statutes but it is limited only statutes touching on hazardous waste, chemicals and substances with special emphasis on transboundary movement.

(a) THE FACTORY ACT

The factories Act, Cap 514 of the laws of Kenya came into operation on 1st September, 1951 with the aim of regulating the health, safety and welfare of persons employed in factories and other places of work. Its specific objective is the protection of persons employed in the factory from injuries within the working environment. However, it was extensively amended in 1990 to enable enforcement officers to deal with hazards on the spot, protect people other than those at work from risk arising

20. Ogolla B.D. "Environmental Policy and Law in Kenya "In Environmental Policy and Law Vol. 22 No. 3 of 1992 pg. 164-174.

from activities of work place and to ensure prompt reporting and documentation accidents, dangerous occurrences and occupational diseases.

Section 13[21] provides that every factory shall be kept in a clean state and free from effluent arising from any drain, sanitary convenience or nuisance. Section 51[22] provides that in every factory in which any dust or fumes or other impurities of Such a character and to such extent as to be likely to be injurious and offensive to persons employed therein or any substantial quality of any kind, all practicable measures shall be taken to protect persons therein. It is also provided further that engine from discharging exhaust gas into the atmosphere without treatment to prevent air pollution, ill effect on life or property.

Pursuant to the said amendments a new section 52(A) was inserted which provides that:

"52 A. containers with hazardous substances shall be:-

(a) Plainly painted, marked or labeled in a distinctive manner, so as to be readily identified; and

(b) accompanied with instructions for safe handling of the contents"

This is a very important provision as far as marking or labeling of containers is concerned. However, the principle act or the amendment does not define what is a

21 Section 13, Factories Act Supra

22. Section 51 Ibid.

"hazardous substances" or what makes a substance hazardous. It also does not specify how the labeling and packaging is to be done. The offences prescribed for failure to do the above are specifically not mentioned. Under the section on offences and penalties, if any person is found guilty of contravening the provisions of the Act, he/she is liable to a fine in the range of Kshs.10,00/= - 20,00/= or to imprisonment for 6 months or both. Compared to the nature of offence and their impact on peoples lives, welfare and health, these penalties are very light.

The Act and the subsequent amendments also make provisions for handling and dealing with highly flammable liquids with a view to avoiding hazardous occurrences. "Highly flammable liquids" are defined as any liquid, liquid solution, emulsion or suspension which gives off a flammable vapour at a temperature of less than 32 degree centigrade.

The underlying principle behind this act, is the fact that an employer is under a duty to take reasonable care for the safety of his/her employees and the public at large so as not to expose them to unnecessary risks. This is a common law principle reflected in our statutes and applied by our courts.

We seek to have these legal regime amended so as to make it difficult for offenders not to continue with such harmful tendencies.

(b) THE PHARMACY AND POISONS ACT

The Pharmacy and Poisons Act[23], is the principal act regulating and controlling the profession of pharmacy and trade in drugs and poisons. It was enacted and came into operation in 1957 after the first Pharmacy and Poisons Ordinance, 1943 was repealed. The act emerged as a reaction to the introduction of the then 'new' and 'powerful' drugs like anti-bodies and the suphonamides which required new techniques for their handling and storage. The fundamental philosophy of the act is to ensure that the conduct of trade in drugs should be largely guided and controlled by professional people who are properly qualified to do so. The law was therefore geared towards the tightening of the sale, possessions and distribution of drugs and poisons. In the Light of this the act and its subsequent amendments is divided into various parts namely.

(a)	Part I	:	Preliminary section and interpretations as well as the establishment of the board and its functions and duties
(b)	Part II	:	Pharmacy
(c)	Part III	:	Poisons
(d)	Part IIIA	:	Manufacture of medicinal substances
(e)	Part IIIB	:	Establishment of a national quality control laboratory
(f)	Part IV	:	Miscellaneous provisions

[23] Cap. 244 of the Laws of Kenya

There are also several schedules dealing with a number of issues arising from the above parts. This act is used to manage pharmaceutical products in the country. It establishes a pharmacy and poisons board headed by a chairman and several members representing various groups dealing with pharmaceutical products and poisons in the country. This body is an independent legal entity and under it, there are several other bodies like the National Drug Quality control Laboratory Board of management appointed by the pharmacy and poisons board (Sec, 35F)[24].

In a bid to protect the gullible public from the consequences of their own ignorance of medicines arising extravagant misleading advertisement places, the act has strict provisions to guard against claims for preparations which people or pharmaceutical industries claim to be having but do not possess.

The minister on the advise of the board is empowered to make rules regulating the pharmaceutical industry as well as poisons in the country. To-date no such rules have been made. Rules relating to classification to toxic and hazardous chemicals in accordance with their toxicity and the hazardous they present to human health and the environment, registration, labeling, packaging, control of imports and exports of chemicals, distribution, storage, transportation, handling; monitoring of their effects and their residue on human health and the environment and disposal of expired surplus of chemicals ought to have been made.

24 See '35F', Pharmacy and Poisons Act, Supra

The penalties precribed for in contravention of this Act are very low. Section 51[25] provides that:

"A person who is guilty of an offence under this Act, shall except as otherwise provided be liable to a fine not exceeding five thousand or to imprisonment for a term not exceeding one year, or to both, and in addition to any penalty imposed under this Act the Court may order any article in respect of which the offence has been committed or which has been used for the commission of the offence to be forfeited"

(C) THE PEST CONTROL PRODUCT ACT, CAP. 346

This is the principle Act, regulating the importation, exploration, manufacture, distribution and use of products used for the control of pests and of organic function of plants and animals. The Act is managed and administered by a Board, consisting of a chairman and a number of other officers representing a cross-section of interests. Section 6 outlines the functions of the Board and Section 8, provides for the appointment of inspectors with wide and far-reaching powers. Regulating on licensing of premises, labeling, advertising and packaging, registration, importation and exportation of pesticides are made in the Act.

The Act makes it an offence to manufacture, package, store, display, distribute; use or advertise any pest control product as well as importation, exportation of pest control products without a license. A person found guilty with such an offence shall be liable for imprisonment for a term of not exceeding two years. A person found guilty of any

[25] Sec. 51 Ibid.

other offence under the Act is liable to a fine not exceeding ten thousand shillings or to imprisonment for a term of not exceeding six months or to both.

Under the Act "label" include a legend, work mark, symbol, pictogram or design applied or attached to, included in, belonging to or accompanying any pest control product. "Package" include any container, wrapping, covering or holder in which any pest control product or material is wholly or partly contained, placed or packed. The Act further defines a "pest" to mean any injurious, noxious or troublesome insect, fungi, bacterial organism, virus, weed, rodent or other plant or animal pest and includes any injurious, noxious or troublesome organic function of a plant or animal.

"Pest control product" means a product, device, organism, substance or thing that is manufactured, represented, sold or used as a means for directly or indirectly controlling, preventing, destroying, attracting or repelling any pest and includes:-

(a) Any compound or substances that enhances or modifies or intended to enhance or modify the physical or chemical characteristics of a pest control product to which it is added.

(b) Any active ingredient used for the manufacture of a pest control product.

The Act, under Sec. 15 gives the minister power to make regulations in consultation with board on several issues. However, to-date, these rules have not been made.

Under the first schedule, classification of pest control product is made. Three classes are made namely: restricted class, commercial and agricultural class and domestic class. The second schedule contains cautionary symbols and words.

The pest control products board has registered and monitored very few products since the enactment of the Act due to the large amount of work and the very limited funds, personnel and facilities to accomplish the work.

(d) THE PUBLIC HEALTH ACT

The Public Health Act[26], was enacted and came into force in 1921. The basic philosophy behind this Act with respect to the environment is the maintenance of high quality or decent environment. Section 117-118 requires that land, buildings, houses and sanitation including associated infrastructure must be properly maintained in order to avoid nuisances and health hazards. The public health officials are empowered to take legal action in furtherance of this.

This act makes it an offence[27] for any land owner or occupier to allow nuisance or any other condition liable to be injurious or dangerous to health to exist on his land What constitutes nuisance is broadly described to include any obstruction, smell, accumulation of waste or refuse, smoky chimneys, dirty dwelling or premises used without proper sanitation; factories emitting smoke or smell and improperly crowed

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26 Cap. 242 of the Laws of Kenya

27 Section 120, Ibid.

or kept cemetery or burial place, so long as it can be demonstrated that the situation endangers or is liable to endanger health.

A medical officer of health[28] once satisfied about the danger, may issue an order requiring the owner or occupier of the land to remove the nuisance. Should the owner or occupier fail to comply within the time allowed in the notice, the medical officer is required to cause a complaint relating to the nuisance to be presented a magistrate The court may impose a fine not exceeding two hundred shillings. Further, the court may order the perpetrator to pay the costs of removal of the nuisance. Should the court be satisfied that even though removed, the nuisance might recur the magistrate may order the perpetrator to conduct such works as are necessary for permanent cessation of the nuisance. A medical officer is further empowered to enter premises to effect the removal of any nuisance.

A magistrate[29] may also issue an order authorizing a medical offer, a sanitary inspector or a police officer above the rank of an inspector to enter any building or premises to ascertain the existence of a nuisance. The health authority may also conduct or cause the drains in such premises to be tested or construction works be carried out to facilitate effectual examination of the premises.

Any person who fails to comply with a closure order or the direction to remove nuisance, if guilty of offence and, upon conviction, liable to a fine not exceeding eighty shillings for every day during which the default continues. However, should a local authority effect construction for purposes of testing for nuisance and, in the end,

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28 Section 122, Ibid.
29 Section 125, Ibid.

no nuisance is found to exist, the officer is to restore the premises at public expenses. Nuisance or similar phenomena as discussed above including those that injure health affect the public, first and foremost. Therefore, where the law authorizes only the public officials to have the locus standi the local community can suffer gravely before such an action is taken.

The public Health (Ports, airports and Frontier) Rules made in the 1970's under the Public Health Act, authorizes a health officer to take all practicable measures to control the discharge of a ship sewage or refuse which might contaminate any waters of port, river or canal. A health officer is empowered to take all practicable measures to control such discharges. Under Section 74(2) of the said rules, it is an offence to violate these rules and upon conviction, the perpetrator is liable to a fine not exceeding One thousand Shillings or imprisonment without option of a fine for a term of not exceeding three months or both.

(e) THE RADIATION PROTECTION ACT, ACT NO. 2 OF 1982

The Radiation Protection Act was enacted in 1982 Act No.20 of 1982 and came into operation in 1984. Its aim is to provide for the protection of the public and radiation workers from the dangers arising from the use of devices or materials capable of producing ionizing radiation. This Act is primarily concerned with radioactive and wastes as one of the forms of hazardous wastes.

The Act in conjunction with the associated code of regulations stipulates standards and regulations governing the use of nuclear energy and protects human beings from

injury by such tradition wastes. Registration, licensing, inspection and control of the sources of ionizing radiation are provided for the Act. Section 4-6[30] of the Act establishes a radiation protection board and further provides for its power duties. Section 8 of the Act prohibits any dealing with radioactive materials except in accordance with the Act Section II deals with licensing and Section 12 imposes a duty on the holder of a license to be responsible in ensuring that exposure form ionizing radiation resulting from its operation, conditions of storage, transportation or disposal is kept as low as is reasonable practicable.

The office of the chief radiation officer is created under section 13[31]. A radiation officer has power to enter, inspect and examine, require the production of a license and generally ascertain whether the provisions of the Act are being complied with. Offences committed under the Act are punishable by a fine not exceeding twenty thousand shillings or imprisonment for a term not exceeding one year.

The increase in the use of nuclear technology in agriculture, medicine, geology and environmental pollution monitoring means that the basic radiation protection infrastructure in the country needs close re-examine especially in the area of disposing of hazardous radioactive wastes as well as their transportation, storage and management. Safe management of radioactive waste requires the existence of a legislation which gives the legal base of requirements and responsibilities. The existence of such legislation will ensure effective nuclear waste disposal facility that will take good care of both liquid and solid wastes. The legislation will strengthen the responsible authorities in order to be able keep a tight surveillance against the

30 Section 4-6. Radiation Protection Act No. 20 of 1982
31 Ibid.

possibilities of illegal importation of toxic and radioactive waste material into the country. The existing legislation can as well be strengthened to cater of this. Provision for the construction of disposal laboratory or cide or designation of such laboratory as reciportory of radioactive waste is missing in the Act. Users of radioactive materials are not given guidance on disposal sites if outside Nairobi City where the laboratory exists.

The penalties attached to offences committed in contravention of the Act are ridiculously low. A person who commits the offences outlined in Section 16 is liable to a fine not exceeding Kshs.20,000/= or one year imprisonment or both. These rates have been overtaken by economic development and inflation rates in particular.

Under section 18[32], the Minister is empowered in consultation with board, to make regulations for better carrying out the objectives of the act, and may include, inter alia, precautions against injury; disposal or radioactive wastes; the structural and safety requirements for buildings used for storage of radiation devices, materials or substances, modes of packaging and transport, treatment or disposal or vessel or containers of irradiation devices or radioactive waste; and dispensing and compounding or relevant materials; maximum working hours and exposure of persons employed in relevant fields. To-date, no such regulations have been made. A close reading of Section 18 has in contemplation an environmental impact assessment.

(f) THE PETROLEUM (EXPLORATION AND PRODUCTION ACT[33]

[32] Section 18, Ibid.
[33] Cap. 308 of the Law of Kenya

This is an act of parliament whose objective is to regulate the negotiation and conclusion by the government of petroleum agreements relating to the exploration for development, production and transportation of petroleum. It was first adopted in 1984 and revised in 1986 without any criminal sanctions against its violators. The Act empowers the Minister to make regulations for the better implementation of the Act which includes such issues as the conduct of petroleum operations, conservation of petroleum resources and measures related to safety, environmental protection and avoidance of wastes, pollution or accidents.

A critical examination of this shows that it has pitfalls which include inter alia lack of precautionary measures, the impact of wastes on the environment and resources, the question of penalties and so on.

(g) THE LOCAL GOVERNMENT ACT CAP. 265

The Local Government Act[34] which came into operation in 1963 provides for the establishment of authorities for local government, defines their functions and as well as providing for other matters connected therewith or incidental thereto. Under the Act, municipal councils are required to provide and maintain sanitary services, sewerage and drainage facilities, to control or prohibit industries, factories and business which emit smoke, fumes, chemicals, gases, dust, smell, noise, vibration or any danger, discomfort or annoyance to the neighbourhood, and to prohibit or control work or trade of disinfection or fumigation by cyanide or other means.

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34 Local Government Act, Cap 265 of the Laws of Kenya

Section 266[35] of the Act provides for penalties for obstruction of officers of a local authority in the execution of their duties. It is an offence to do this and one found guilty is liable to a fine not exceeding one thousand shillings or to imprisonment for a term not exceeding one month or both.

We have also had the other acts which have a bearing on hazardous wastes, chemicals and substances. Dumping especially in the sea such as the Fisheries Act, 1989 (No. 5 of 1989), The Maritime Zone Act, 1989 (No. 6 of 1989), The Merchant Shipping Act (Cap 389). The Use of Poisonous Substances Act, Cap. 247 and The Plant Protection Act Cap. 324 as well as other Land Laws in use in the country. The question of hazardous waste, chemicals and substances is not given adequate attention in the Acts.

3.5 RECENT ATTEMPTS TO ADDRESS THE PROBLEM

From the foregoing section on the review of the array of statutes and legislations touching on some of the aspects of hazardous waste, it has emerged clearly that Kenya does not have a statute dealing with the management of hazardous waste, chemicals and substance. However, there are recent attempts to address this problem The government in 1994 tried to come up with a comprehensive bill on chemicals which however, never went through parliament and currently there is a draft bill on environmental management and coordination, 1996. It will be only fair on our part to highlight the contents of these two documents.

(a) THE CHEMICALS CONTROL BILL, 1995

35 Section 266, Ibid.

The increased use of chemicals in agriculture and industry has raised several issues relating to their regulation and management. A bill was placed before parliament in early 1995 but was not passed. The proposed bill was aimed at providing the supervision, management and control of use of chemical substances and for connected purposes. The bill provided for the establishment of a statutory control board whose aims included inter alia.

1. regulate the importation, exportation, manufacture, distribution and use of chemical substances.

2. maintain a national register of all chemical substances imported into or manufactured in the country as well as premises licensed for the manufacture, use of storage of chemical substances;

3. license all persons who handle chemical substances such as manufactures, dealers, users or distributors,

4. advise the Government on matters relating to the handling of chemical substances.

The bill provides for the composition of the board and for the terms and conditions of the members of the board as well as for the conduct of its business. For the discharge of its functions the board will appoint chemical control inspectors whose duty will be to enter and inspect premises licensed for the manufacture, use, distribute or storage

or chemical substances, and to seize, remove or detain any chemical, chemical substances in respect of which offence is committed.

This bill also provides for the issue by the board of licenses to persons who use, manufacture, export, import or distribute and defines as well as for appeals to the Minister against decisions of the board with respect to the bill are self-explanatory.

(b) THE DRAFT BILL ON THE ENVIRONMENT MANAGEMENT AND CO-ORDINATION, 1996

The Draft Environment Management and Co-ordination Bill, 1996 is the only document which mentions directly and defines as well as making provisions on hazardous waste, chemicals and substances. In the administration of the Act when it comes into force, the bill sets up a national authority vested with powers to formulate policy, propose exchanges to legislation, enforce laws and co-ordinate the management of the environment and natural resources. It is proposed that the authority shall have representation at both national and district levels.

In its inter precaution section various terms are defined, 'Waste' is defined to include any matter prescribed to be waste and any matter, whether liquid, solid, gaseous or radioactive, which is discharged, emitted or deposited in the environment in such volume, composition or manner as to cause an alteration of the environment.

Hazardous waste means any waste which has been determined by the authority to be a hazardous waste or to belong to any other category of waste provided for in section 75.

Though the bill purports to be comprehensive, there are several loopholes especially with regard to hazardous waste, chemicals and substances. The bill fails to come up with a sharp and focused definition of hazardous waste leaving the authority in consultation with the so called 'Lead agencies' too decide what is hazardous waste as well as the criteria for the classification of hazardous waste.

The bill also envisages the promulgation of guidelines and regulations for the management of hazardous wastes. From experience, this might be a nightmare as such provisions are made in various Acts but no one acts on them.

The penalties prescribed for contravention of the section are fair. However, the imprisonment should have been a deterrent one that is slightly higher (may be above 3 years). This issue of corporate bodies contravening the Act and how they will be dealt with are not provided for in the proposed bill.

3.6 CONCLUSION

As indicated earlier, there being no statute clearly making provisions for hazardous waste control and/or management; one can safely conclude that like other developing countries in Kenya the general control over pollution and waste disposal is poor. Open dumps are predominant and scavengers live and work among the wastes as

many dumpsites are already causing water pollution. Control over water and air pollution are poor and the isolated efforts of control of specific hazardous waste are often ineffective as there is no overall upgrading of waste management practices. There is even improper disposal of surplus wastes which may cause poison to humans. As a result of this mismanagement it is not uncommon in Kenya like other developing countries to see stockpiles of waste allegedly awaiting treatment or disposal which is mostly never occurs.

CHAPTER FOUR - REVIEW OF INTERNATIONAL CONVENTIONS ON HAZARDOUS WASTES

4.1 INTRODUCTION

It is worth to note that since the 1940's when this problem of hazardous wastes was fully realized countries world over have moved swiftly to contain the same. As indicated earlier in the preceding chapters a number of international organizations and developed countries have so far taken important initiatives in hazardous waste management. The focus has been in formulating policies and strategies in curbing and managing hazardous wastes[1] This has been in form of treaties and legislations. This has left developing countries, Kenya inclusive to lag behind in controlling hazardous waste substances and chemicals. It is important at this stage to consider what has been accomplished globally in managing hazardous wastes. This will at the end of the day clearly indicate the standards already put in place in curbing the effects of Hazardous wastes, substances and chemicals from causing environmental destruction. There are over 170 multilateral treaties and agreements adopted on environmental issues some of which have been ratified by Kenya. In this chapter will review through most of the critical conventions. I will be interested on treaty law on hazardous waste as propounded in international conventions and regional conventions which shall be analyzed separately. The specific focus of on this chapter will be on the 1972 Oslo and London Conventions, dealing with

1 See Alexandre C.Kiss. 1983 UNEP 1991.

dumping, the Basel Convention and Bamako Conventions among other related conventions[2]

4.2 INTERNATIONAL CONVENTIONS.

Environmental control measures governing hazardous wastes can be traced back to the 1940's. The 1947 ECOSOC Recommendations on the Transport of Dangerous Goods also known as "Orange Book" as revised from time to time is the first of such measures[3] The recommendantions which are global in scope were developed by the UN Committee of Experts on the Transport of Dangerous goods and kept upto date in the light of technical progress, the advert of new substances and materials, the requirements of modern transport systems as well as the need to ensure the safety of people, property and the environment. These recommendations which form the basis of national regulations applicable to the transfer of dangerous goods in most industrialized countries cover principles of classification and definition of classes, general packaging requirements, testing procedures, marking, labelling and shipping documents. The recommendations aim at presenting a basic scheme of provisions that will allow national and international regulations governing various modes of transport to develop within a uniform fashion

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2. The Basel Convention on Control of Transboundary Movements of Hazadous Wastes and their Disposal, Basel, 22 March 1989, The Convention on the Ban of Important into Africa andd the Control of Transboundary Movements and Management of Hazadous wastes within Africa, Bamako, 30th January, 1991 ("Bamako Convention 1991").

3. The 1947 ECOSOC Recommendations on the Transport of Dangerous Goods, as revised, Geneva, 26 April 1957, 7th Ed. 1990.

These recommendations have been used for the determination of classes of wastes under the Basel Convention[4] and they are also the basis for the International Labour Organization's efforts to harmonize chemical classification international pursuit to its 1990 convention on safety in the use of chemical at work[5]. It is further expected that governments and inter-governmental organizations when revising or developing regulations for which they are responsible, will conform to the principles laid down in these recommendations. These recommendations are implemented through international agreements such as European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)[6].

The growth in world trade in chemicals during the 1960's led to the development of binding international conventions as well as regional instruments. The conventions for the mutual recognition of inspections in respect of the manufacture of pharmaceutical products came into force in 1971[7]. The objective of this convention is to contribute towards the removal of obstacles to international trade, establishment of strict national control, that is the official inspections and testing on the manufacture of drugs (especially those intended for export), exchange of information between parties regarding drug manufacturing inspections and testing on the manufacture of drugs (especially those intended for export), exchange of information between parties regarding drug manufacturing inspections and mutual acceptance of national inspections carried out but

4 Supra, Note 2.
5 ILO, The Convention Concerning Safety in the Use of Chemicals at Work, ILO Convention, 170, 24 June 1990 ('Chemical Convention 1990')
6 The European Agreement Concening International Carriage of Dangerous Goods by Road (ADR) as amended, Geneva, 30th September 1957.
7 The Convention for the Mutual Relignition of Inspecions in Respect of the Manufacture of Pharmaceutical Products, Geneva, 8 October 1970.

in conformity with the convention. The Swedish government is the depository of the convention. The admission of new member states occurs by invitations to accede and is limited to those countries with national arrangements necessary to apply an inspection system comparable to that referred to in this convention.

The development of the International Code of Conduct on the Distribution and Use of Pesticides by Food and Agriculture Organization of the United Nations (FAO) and the London Guidelines for the Exchange of Information on Chemicals in International Trade by the United Nations Environment Programme (UNEP), arose out of the need to minimize risks associated with the use of chemicals. The FAO Code of Conduct was adopted by the FAO Conference in 1985[8] and the London Guidelines were adopted by the UNEP Governing Council in 1987[9].

Both the Code of Conduct and the London Guidelines included provisions aimed at making existing information about hazardous chemicals more freely available, thus permitting competent authorities in countries to assess the risks associated with use of chemicals under their own conditions of use. The first of these provisions concerns information exchange on chemicals in international trade[10]. Provision known as prior informed consent (PIC) was added in international trade.

8 FAO, International Code of Conduct on the Distribution and Use of Pesticides, Rome, 19th November 1985, as amended in 1989.

9 UNEP London Guidelines and Principles for the Environmentally Sound Management of Hazardous wastes, UKNEP Governing Council Decision 14/27 of 17th June 1987, Nairobi, amended in 1989.

10 Ibid

to help control imports of unwanted chemicals that have been banned or severally restricted in order to protect human health or the environment. This PIC procedure which is voluntary implemented jointly by FAO and UNEP through the FAO/UNEP Joint Programme on Operation of Prior Informed Consent. It has been unanimously accepted by the governing bodies of FAO and UNEP and is supported by Governments, leading chemical industry associations and a variety of non-governmental organization (NGOs). It helps participating countries learn more about the characteristics of potentially hazardous chemicals that may be shipped to them, initiates a decision-making process on the future import of these chemicals and disseminates these decisions to participating countries. The aim of the PIC procedure is to promote a shared responsibility between exporting and importing countries in protecting human health and the environment from the harmful effects of certain hazardous chemicals. In order to participate in the PIC and information exchange procedures, Governments must nominate a Designated National Authority (DNA) to act as a national focal point. The DNA is responsible for the operation of the PIC and information exchange procedures at the national level, that is co. acting and providing national information to FAO, UNEP and other countries and ensuring that the information received is transmitted to all relevant authorities and organizations within the country. Some countries have nominated one authority for all chemicals, while others have designated more DNA's e.g. one with responsibility for pesticides and a second for industrial and consumer chemicals. The DNA is generally a government department or office responsible for broad policy decisions with the authority to decide which chemicals may be used in the country. In the case of pesticides, the registration authority or equivalent is generally nominated to serve as the

DNA. The need to designate one or more authorities depends on the administrative and legislative organization in each country.

Governments, following the experiences obtained from implementing a voluntary PIC procedure have agreed to turn it into a legally binding instrument. This is seen as a first line of defense in our global strategy to manage chemicals safely. Negotiations are still on-going and were expected to be concluded before the end of 1999. The benefits of the conclusion of a PIC convention will include but not be limited to the following

i) Its implementations will enhance chemicals safety measures in all countries such as controlling international trade in hazardous chemicals through PIC procedures.

ii) It will become an instrument for enhancing the ability of those countries that presently do not have adequate chemical management schemes to make decisions regarding imports of chemicals.

iii) It will also be a starting point for governments to collectively solve problems associated with hazardous chemicals in international trade.

The Cairo Guidelines[11] of UNEP adopted by Governing Council in 1987, for the Environmentally Sound Management of Hazardous Waste is also another step towards the management of hazardous chemicals and substances. However, in 1989, the world's

[11] Cairo Guidelines adopted by UNEP Governing Council at Cairo, 1987

governments gathered in Swiss town of Basel to sign the Basel convention on control of Trans-boundary movements of hazardous wastes and their disposal[12].

The aim of this Convention is the environmentally sound management of hazardous wastes. This means that Parties should minimize the generation of hazardous waste, disposal of them (including final disposal, recovery, reuse and recycling) as close as possible to their source of generation in a manner designed to protect human health and the environment and to reduce trans-boundary movements to a minimum. It obligates parties to refrain from illegal traffic in hazardous wastes but it does not totally ban their export and import[13]. The objectives of the Convention therefore is to set up obligations for parties with a view to:

a) Reducing trans-boundary movements of wastes subject to the Basel Convention to a minimum consistent with the environmentally sound and efficient management of such wastes and controlling any permitted trans-boundary movement under the terms of the convention.

b) Minimizing the amount of hazardous wastes generated and ensuring their environmentally sound management (including disposal and recovery operations) as close as possible to the source of generation, and

c) Assisting developing countries in environmentally sound management of the hazardous wastes they generate.

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12 Supra, note 2.

13 Sheaver H. Russel, Comparative Analysis of the Basel & Bamako Conventions on Hazardous Waste' in Environmental Law, North Western school of Law, Lewis and Clark College, Vol 23 No. 1 1993

Membership is open to States and political and/or economic integration organizations. No reservations are possible. However declarations have been made in certain ratification instruments in accordance with Article 26(2). Technical and scientific co-operation between Parties and competent international organizations are encouraged, for the purposes of exchange of information, planning, education among others. Developing countries participated and played a prominent role in the drafting of this convention. In accordance with Article 25(1) the convention entered into force on 5 May 1992.

Commitments of Parties to the Convention include various general obligations (under Article 4) such as the designation of a competent authority and focal points as well as a duty to re-import, transmit certain information and co-operate with each other in order to improve and achieve environmentally sound management of hazardous and other wastes.

Available compliance mechanisms include information and decisions taken at the conference of the parties and obligations of the Secretariat (Article 15, 16 and 19). The States Parties to the convention inform each other through the Secretariat of the measures they have adopted to ensure its application. The information is then transmitted to the Conference of the Parties established under Article 15 of the Convention.

The Convention allows settlement of disputes through negotiation or any other peaceful means of the choice of the parties to the dispute. If the dispute cannot be settled by such peaceful means, if the Parties agree, shall be submitted to the International Court of

Justice (ICJ) or to countries to implement. The technical and financial aspects of this Convention are limited and therefore assistance in these areas will be essential. Mechanisms and subsidiary bodies may become necessary taking into consideration the extremely specialized and technical nature of this Convention. Resolution makes provision for the establishment of an adhoc working group to consider the necessity of establishing mechanisms for the implementation of this Convention.

The Convention has been published in all official UN languages and distributed to all governments. The interim Secretariat currently distributes current status information of the convention. Added obligations of the Secretariat are contained in the provisions of Article 16.

Additional materials to provide guidance for the implementation of this Convention has been made available by UNEP through the publication of several booklets, summarizing the Convention and explaining its importance to African countries in particular[14]. UNEP has also prepared draft model national legislations related to the convention. Training workshops on implementation of the Convention have been undertaken. The Secretariat is endeavoring to explain and describe the convention at various conferences and meetings with national officials.

The Convention provides for a very strict control procedure, based on the prior written notification and consent for any trans-boundary movement of hazardous wastes and other

[14] UNEP/FAO/WHO. 1988 "Assessment of Chemical Contaminants in Food. Report of the Result of UNEP Conference.

wastes. The exporter or generator cannot initiate such movement until consent is given by all States Parties (and non-parties if relevant), including States of transit, for the movement to take place. The prime determinant for whether a waste is subject to the Basel Convention is based on the hazard characterization of the waste. Materials are subject to control under the Basel Convention:

a) If the material in question is defined as a waste. The Basel Convention[15] defines waste in the following terms: "Wastes are substances or objects which are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law"'; or

b) If the waste belongs to any category contained in Annex I (Categories of Wastes to be Controlled) and exhibits or possesses any of the hazardous characteristics contained in Annex III (List of Hazardous Characteristic); or

c) If the waste belongs to either of the two categories of Annex II requiring special consideration (i.e. wastes collected from households and residues arising from the incineration of household wastes); or

d) If the waste is not characterized as hazardous under Annexes I and III, but is defined as, or considered to be hazardous waste by the domestic legislation of the Party of export, import or transit.

It is important to note that the Convention provides obligations to Parties to aim at the highest possible standards in terms of the environmentally sound management and disposal of waste, whether they are moved across frontiers or generated locally.

In 1995[16], a decision was adopted at the third Meeting of the Conference of the Parties to the Basel Convention to amend the Convention with respect to a prohibition by each Party member of the Organization for Economic Co-operation and Development (OECD), the European Community (EC), and Liechtenstein, of all trans-boundary movements of hazardous wastes which are destined for final disposal to other States. It also phased out by 21 December 1997 and prohibited as of that date, all trans-boundary movements of hazardous wastes for recover, recycling, reclamation, direct reuse or alternative uses from Party members of the OECD, EC and Liechtenstein to other States. The wastes subject to such prohibitions should be characterized as hazardous under the Convention.

This was a historic move which means that the world's industrialized nations were forced to stop using the developing world as their toxic dump. The amendment also made toxic waste trade illegal and the erection of the "notification and consent procedure" established by the Basel Convention nugatory.

It is worth noting that this agreement only banned the export of poisons or hazardous wastes and non-toxic wastes can still be exported for recycling or disposal. This means that industrialized countries can employ certain "unorthodox tactics" to defeat the above through amending the list of wastes banned by the Basel Convention or redefinition of "Hazardous". However, individual Governments, Kenya included can enforce, the

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16 Supra Note 2
Conference of Parties to the Basel Convention, Geneva, September, 1995.

convention in their own countries or regions and also erect strict regulations on Hazardous wastes.

The Kenya government has in the recent past articulated and emphasized the need for environmental conservation, management and control than never before[17]. Industrial growth and development are on the increase both in the private and the public sector thereby increasing the amount of waste being produced. Trans-boundary movement of wastes is likely to increase also as a result of the free trade arrangements being encouraged in the region.

It is therefore important for Kenya to participate fully in international activities designed to combat and control Trans-boundary movements of Hazardous wastes. Besides this, the Government was effectively represented at the forums where this convention was discussed. The country will considerably therefore benefit from the ratification of this convention. As of 1996, several African states had ratified this convention[18].

4:3 CONVENTION GOVERNING MARINE POLLUTION.

There are currently over 23[19] global and regional instruments regulating marine environment and marine pollution. The first of such a web of treaties or international conventions dates back to 1954 when the International Convention for the Prevention of

17
18 See 1994 – 95 Development Plan, Government Printer, 1995
19 See note 20 below.
Knight & Chill. The International law of the Sea; Cases Documents and Readings (Applied Sciences, London & New York, 1991) Pg 23

Pollution of the sea[20] in case of oil pollution was developed. This Convention with its series of amendment was designed to ban offensive discharges to the seas. The next convention was the 1969, Brussels Convention relating to intervention on the High seas in case of oil pollution casualties which came up in the wake of the Torrey Canyon incident in 1967, and confers power on the coastal state to intervene in the event of a pollution casualty on the high seas, threatening to damage its coastline or related interest. The Convention further provides that parties to the convention may take such measures on the high seas as may be necessary to prevent, mitigate or eliminate or threat of pollution of the sea by oil, following upon a maritime casually or acts related to such a casualty, which may reasonably be expected to result in major harmful consequences (Art. 1). The convention only relates to the extension of rights of the coastal state and provides for action to be taken to end threats to the coasts of states but it does not address special circumstances of developing countries. The Convention on Civil Liability for Oil Pollution Damage signed in 1969 and which came into effect in June 1975, provides that the owner of ships causing oil pollution damage were to be liable to paying compensation. This treaty has two protocols: The protocol to the international convention on civil liability for oil pollution Damage, London, 1976 and The protocol of 1984 to amend the international convention on civil liability for oil pollution damage[21]. Further this agreement was supplemented in 1976 by the Convention on the establishment of an international fund for compensation for oil pollution damage which sought to provide for compensation in circumstances not covered by the 1969 convention and aid ship owners in their additional financial obligations. This two conventions on

20 International Convention for the Prevention of Pollution of the Sea. 1954

21 Knight & Chill Supra at 26

civil liability focus on "Ultra – hazardous" activities and try to balance two conflicting goals: Relieving third-party victims caused by risk-creating activities and receiving operators of unnecessary obstacles in carrying out such activities. Generally speaking, liability is to be determined by: channelling liability to a signly clearly identifiable person, compulsory insurance or other financial securities limited in amount and procedures for civil liability in competent national courts. The Conventions therefore reflects the "polluter-pays principle." The 1971 OSLO convention[24] for the prevention of marine pollution by dumping from ships and Aircraft as amended aims at controlling dumping of harmful substances from ships and aircraft in the sea. Membership is open to any state which participated in the conference on marine pollution, or any other state unanimously invited by the contracting parties to accede to the convention. This convention was followed by the 1972 London – Convention on the Prevention of Marine Pollution of Dumping of Wastes and other matter. Its main objective is to ensure that pollution of the sea by dumping of waste and other matter that is liable to create hazards to human health, harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea. Article 2 makes some allowance for the special circumstances of developing countries by requiring contracting parties to take effective measures individually according to their scientific technical and economic capabilities. The Convention further provides annexes of substances which are prohibited. Annex 1 of the convention lists some highly hazardous substances. Commonly called "black list" substances in which their dumping is prohibited. Annex II contains the so called "grey list" of substances in which are less hazardous than the black

[24] The OSLO Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft. OSLO 19-22 Oct. 1971

list ones and may be dumped subject to some controls[23]. The determination of the criteria for classifying substances as polluters in either of the annexes is left to the scientific community.

Another array of conventions followed the above: The 1973 MARPOL Convention for the prevention of pollution from ships, and the 1974 Paris convention for the prevention of marine pollution from land-based sources. In 1982, UNEP issued the UNEP guidelines concerning the Environment Related to offshore mining and drilling within the limits of National jurisdiction[24]. These guidelines which are global in scope impose no commitments and lay down basic standards for incorporation in national and regional rules, regulations, practices and procedures which will ensure that environmental considerations are effectively protected in national and international systems of authorization, environmental assessment, environmental monitoring, consideration of transfrontier impacts, safety measures, contingency planning, liability and compensation.

The 1982, United Nations Convention on the Law of the Sea[25] which is global in scope heavily devotes 50 articles to the protection of the marine environment. The basic fundamental objective is to establish "a legal order for the seas and oceans which will facilitate international communication and will promote the peaceful uses of the seas and oceans, the equitable and efficient utilization of their resources, the conservation of their

23
24 Birnie, P. International Law and the Environment; (Claredon press, oxford, 1992) Pg. 301-343
25 Ibid at pg.318
United Nations Convention on the can of the sea, opened for signatures on 10th Dec. 1982 at Montego Bay, Jamaica entered into force on 16th Dec. 1994.

living resources and the study, protection and preservation of the marine environment[27]. This convention addresses the special circumstances of developing countries throughout the convention. Its provisions consistently recognize the special interests, and needs of developing countries and especially in such contexts as the conservation and utilization of the living resources, technical assistance with respect to marine pollution, marine scientific research, and various aspects of the deep sea bed regime. The Convention further lays down the fundamental rule linking development to environmental protection. "states have the sovereign right to exploit their natural resources pursuant to their environmental policies and in accordance with their duty to protect and preserve the marine environment (Art.193). Under Art.194[28] states are under a basic obligation to protect and preserve the marine environment. The article provides that:

1. States shall take, individually or jointly as appropriate, all measures consistent with their Convention that are necessary to prevent, reduce and control pollution of the marine environment from any source, using or this purpose the best practicable means at their disposal and in accordance with their capabilities, and they shall endeavor to harmonize their policies in this connection.

2. States shall take all measures necessary to ensure that activities under their jurisdiction or control are so conducted as not to cause damage by pollution to other States and their environment, and that pollution arising from incidents or activities under their jurisdiction or control does not spread beyond the areas where they exercise sovereign rights in accordance with this Convention.

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27 Ibid

28 Article 194, United Nations Conventions on the Law of Sea, 1982

3. The measures taken pursuant to this part shall deal with all sources of pollution of the marine environment. These measures shall include, inter alia, those designed to minimize to the fullest possible extent:

a) the release of toxic, harmful, or noxious substances especially those which are persistent, from land-based sources, from or through the atmosphere or by dumping.

b) Pollution from vessels, in particular measures for preventing accidents and dealing with emergencies, ensuring the safety of operations at sea, preventing intentional discharges, and regulating the design, construction, equipment, operation and manning of vessels,

c) Pollution form installations and devices used in exploitation of the natural resources of the seabed and subsoil, in particular measures for preventing accidents and dealing with emergencies, ensuring the safety of operations at sea, and regulating the design, construction, equipment, operation and manning of such installations or devices.

d) Pollution from other installations and devices operating in the marine environment, in particular for preventing accidents and dealing with emergencies, ensuring the safety of operations at sea, and regulating the design, construction, equipment, operation and manning of such installation or devices.

4. In taking measures to prevent, reduce or control pollution of the marine environment, states shall refrain from unjustifiable interference with activities carried out by other states in the exercise of their rights and in pursuance of their duties in conformity with this Convention.

In 1985[28], UNEP issued the UNEP Montreal Guidelines for the protection of the marine Environment against pollution from Land-Based sources at assisting governments in the process of developing appropriate bilateral, regional and multilateral agreements and national legislations for the protection of the marine environment against pollution from land-based sources. These guidelines which are global in scope are of a recommendatory nature and serve as a checklist of basic provisions rather than as a model agreement. The special circumstances of developing countries are taken into account by recognizing that states should act in accordance with their capabilities and that internationally agreed rules and standards should take account of the economic capacity of states and their need for sustainable development. The guidelines also recognize the desirability of promoting programmes of assistance to developing countries for the purpose of improving their capacity to prevent, reduce and control pollution from land-based sources, to assess its effects on the marine environment, and to enable them establish infrastructure for the effective implementation of the internationally agreed rules criteria, standards and recommended practices and procedures related to protection of the marine environment. Since 1985, several protocols and Bilateral agreements have been negotiated pursuant to these guidelines. These include; the protocol for the protection of the Mediterrannean sea against pollution from land-based sources (Athens, 1980), the protocol for the protection

[28] UNEP Montreal Guidelines for the Protection of the Marine Environment Against Pollution from Land-Based sources. Montreal, 1985.

of the marine environment against pollution from land-based sources (Kuwait, 1990), the protocol for the protection of the Black Sea marine Environment against pollution from land-based sources(Bucharest, 1992). A draft protocol on the protection of the marine environment from land-based activities is currently being developed under the wider Caribbean Action Plan. On November 3, 1995, a Global Programme of Action to control the pollution of the marine environment form land-based activities was adopted as well as a declaration on protocol of the marine environment from land-based activities[29].

In 1989, the International Convention on Salvage[30] was adopted whose objective is the establishment of uniform international rules on salvages operations in order to improve the safety of vessels, protect the marine environment and provide incentives for person carrying out salvage operations. This convention which is open to all states and not yet in force is global in scope but does not make any provisions for the special situations of developing countries. The International Convention on Oil Pollution Preparedness Response and Co-operation[31] was adopted in 1990 and is open to all states. The first objective is to prevent pollution by oil in accordance with the principles in the convention. It further seeks to advance the adoption of adequate measures in the event that oil pollution does occur. There is not direct reference to special needs of developing countries. However, the treaty envisages mutual assistance and co-operation between party states.

29 For a trend of development of these conventions see generally Bowett D.W. The Law of the Sea
30 (Manchester University Press, USA Oceans Publications Ins 1967) Pg. 1
31 International Convention on Salvage, 1989
International Convention on Oil Pollution Preparedness Response and Co-operation, 1990

4.4 CONVENTIONS AND PROTOCOLS ON CONTROL OF AIR POLLUTION

As discussed above, air pollution is caused by gaseous emissions generated by industrial and Transport sectors, through the burning of fossil fuels, such as fuel oil, petrol, diesel, coal, petroleum gases and also through production and use of chemicals. The impact of these gases on the environment with respect to human health, natural ecosystems and climate have been documented at the international level and sizeable number of conventions as well as protocols for air pollution control exist, which can be traced way back to the 1960's. The first of such treaties was the 1967 Outer Space Treaty[32] initiated by the U. N Committee on the peaceful use of outer space (COPUOS) which enjoins states to ensure that their space activities do not harm the environment. In addition, there are several other treaties: the 1968 Agreement on the rescue of Astronauts, the return of Astronauts and the Return of Objects Launched into Outer Space, (Rescue Agreement); the 1972 Convention on International Liability for Damage Caused by Space Objects (the Liability Convention) and the 1979 Agreement Governing the Activities of States on the Moon and other Celestial Bodies (the moon treaty). Under these treaties states are under obligation to conduct their space activities with due regard to the peaceful co-existence of humanity and to the preservation of the space and earth environment. The Liability Convention in particular seeks to enforce environmental protection by making states liable for space activities. Article II provides that states will be absolutely liable for the damage caused by its space objects on Earth and Article VIII provides for a compensation scheme that an insured state may present to the liable state.

Increasing volume of vehicle exhaust emissions and other trans-boundary air pollution since the 1960's led to the adoption in 1979 of The Geneva Convention on Long-Range Trans-boundary Air Pollution by the United Nations and European Union. This convention which was the outcome of protracted East-West negotiations in the wake of the 1975 Helsinki conference on security and co-operation in Europe aims at limiting as far as possible plus gradual reduction and prevention of air pollution including long-range trans-boundary pollution. Article 1 (b)[33] defines long-range trans-boundary as air pollution whose physical origin is situated wholly or in part within the area under the national jurisdiction of one state and which has adverse effects in the area under the jurisdiction of another state at such a distance that it is not generally possible to distinguish the contribution of individual emission sources or groups of sources. The question of state liability for damage resulting from such pollution is not addressed in the convention. However, states are to develop policies and strategies by means of exchange of information and consultation as well as developing co-operative programmes for the monitoring and evaluating the long-range transmission of air pollutants in Europe. There is no reference to the special circumstances of developing countries in this convention. Several supplementary protocols have been concluded since the convention came into force in 1983. These include:

1. The 1984 Geneva Protocol on Long-term Financing of the Co-operative Programme for Monitoring and Evaluation of the Long-range Transmission of Air

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32 Outer Space Treaty, Adopted by the UN in 1967

33 Article 1, The Geneva Convention on Long-range Trans-boundary Air Pollution; UN, Geneva, 1979

pollutants in Europe (EMEP), original established in 1977. This protocol deals with long-term financing of the project.

2. The 1985 Helsinki Protocol on the Reduction of Sulphur Emissions or their Trans-boundary Fluxes which came into force in 1987 and requires parties to reduce sulphur emissions. The reduction was to be done by the year 1993 using the 1980 levels as a basis for the percentage. Some countries like Germany unilaterally adopted higher targets.

3. The 1988 Sofia Protocol concerning the Control of Emissions of Nitrogen Oxides or their Trans-boundary Fluxes. Under this protocol the contracting parties undertook to reduce their national annual emissions of nitrogen oxides or their trans-boundary fluxes so that by the end of 1994 these do not exceed those of 1987. It also contains a package of other abatement measures as well as technical annex thus amended in 1991.

4. The 1991 Geneva protocol of Emissions of Volatile Organic Compounds or their Trans-boundary Fluxes. This protocol provides a range of options for emission abatement with four technical annextures.

Apart from the above protocols, the European community has also adopted instruments in the field of air pollution under Council Director 88/609, emissions of sulphur dioxide and nitrogen oxide from existing large combustion plants are to be reduced by 15% by 1993 and by 30% by 1998. Council Directives 88/76, 88/436 and 89/458 deal with emissions.

In 1986, a protocol to the Paris Convention for the Prevention of Marine Pollution From Land Based Sources extended the agreement to atmosphere emissions of pollutants In 1990, North sea states agreed to achieve by 1999 a reduction of 50% or more in atmospheric and river borne emissions of hazardous substances using the best available technology.

The Geneva convention, together with the protocols as well as the Council Directives show how specific commitments from a regional level can be developed These arrangements have also facilitated specific legislations by the EEC and some of its party members. It has also been shown that these arrangements have had an impact on air pollution control and air quality management which has resulted in international action into improving the environment, to reduce pollution emissions and to develop control technologies.

Ozone Depleting Substances (ODSs) which were invented in 1930's such as chlorofluorocarbons, hydrochlorocarbons, and halons, have received international attention. The first serious effort to tackle the problem started in 1982 and culminated in the adoption of the Vienna convention[34] for the protection of the Ozone layer in 1985 whose major objective is to protect human health and the environment against adverse effects resulting or likely to result from human activities which modify or are likely to modify the ozone layer. The parties also agreed to co-operate in the collection of relevant materials and in the formulation of agreed measures, and to take appropriate legislative or administrative action to control, limit, reduce or prevent human activities under their

jurisdiction or control the convention provides the institutional structure for the elaboration of protocols. In 1987 the Montreal protocol on substances that deplete the ozone layer was adopted and entered into force on 1 January, 1989. The protocol consists of 20 articles and a comprehensive schedule for phasing-out the production, use and exports and imports of ODSs. The control measures of the protocol are based on the regulation of the production of control substances by the freezing of their consumption at 1986 levels followed by a progressive reduction, so that by mid-1998 consumption is to be reduced by 20% in comparison with the 1986 figure. From mid-1998 onwards consumption is to be reduced to 50% of the 1986 level. A ten year grace period was granted to developing countries to enable them to find ways of implementing the protocol.

Since the signing of the protocol in 1987, scientists discovered that the deterioration in the ozone layer is taking place more rapidly than originally predicted.

More stringent measures were needed to include new substances and an adjustment of the phase-out schedule. In 1989, the parties to the convention and protocol adopted the Helsinki Declaration on the protection of the ozone layer in which the parties agreed to phase out the production and consumption of CFCs controlled by the protocol as soon as possible, but not later than the year 2000, and to phase out halons, control and reduce other substances which contribute significantly to ozone depletion as soon as feasible.

Vienna Convention on the 'Protection of the Ozone Layer, adopted at Vienna on 22 March 1985.

In June, 1990, the parties to the Montreal protocol made a series of adjustments and amendments to the protocol. The parties to the protocol agreed that 1992 consumption and production levels were not to exceed 1986 levels, while 1995 levels were not to exceed 50% with 10% exception to satisfy basic domestic needs. 1997 levels were not to exceed 0% with 15% exception permitted. Halons were also to be phased out on almost similar targets. Further discussions[35] have also been going on relating to methylbromide and use of CFCs. The European community council regulation 594/91 of the 4th March 1991 provides that after 30th June, 1997 there shall be no production of CFCs unless the European commission has determined that such production is essential.

In June, 1992, more than 150 countries agreed by signing the Framework Convention on Climate Change (FCCC) to commit themselves to stabilize greenhouse gas (GHG) concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate systems. To achieve this objective, all parties are called upon to develop National Action Plans containing information on their greenhouse gas emissions and efforts to mitigate or adapt to climate change. In the preamble of the convention, it is stated that developing countries, need access to resources required to achieve sustainable social and economic development. In order for developing countries to progress towards that goal, their energy consumption needs to grow taking into account the possibilities for achieving greater energy efficiency and controlling greenhouse gas emissions in general, including the application of new technologies on terms which make such an application economically and socially beneficial.

35 Montreal Protocol on Substances that Deplete the Ozone Layer, 1987.

Further, the convention in its preamble calls for the widest possible co-operation by all countries and their participation in an effective and appropriate international response in accordance with their common but differentiated responsibilities and respective capabilities and their social and economic conditions. Article 4(2) stipulates that developed countries and other parties included in Annexture I commit themselves to come up with policies and measures to address the problem of climate change. These parties may implement such policies and measures jointly with other parties and may assist other parties in contributing to the achievement of the objectives of the convention., this provision intimates joint implementation as an instrument through which countries may co-operate in implementing measures aimed at mitigating or adapting to climate change.

In a nutshell it can be concluded that innumerable conventions have been promulgated to cater for various sectors in the environment on hazardous waste management. This have led to developed countries to lay clear policies and strategies in the control of hazardous waste. It is however note worthy that despite such humble existence of rules and principles through conventions, developing countries including Kenya have either neglected or not taken much interest on the same so as to incorporate them as part of their rules.

4:5 REGIONAL ARRANGEMENTS

Several Regional Conventions have been entered into aiming at regulating the Environment more so hazardous wastes chemicals and substance. The OECD in 1981 and 1989 adopted the OECD Recommendations on mutual acceptance of Data in the Assessment of chemicals and Good Laboratory practices. The main objectives being to encourage the generation and acceptance of valid, high quality scientific data on the safety of chemicals by means of uniform testing guidelines and principles of good laboratory practice, protect public health and safety, increase ability to share information and thereby minimize costs, improve harmonization of chemicals control and avoid technical barriers to trade. The recommendations do not refer to the special circumstances of developing countries.

In 1991, the OAU adopted the Bamako Convention on the Ban of the importation of hazardous wastes into Africa and on the control of their Trans-boundary movement within Africa[36]. It initiated a counter action to the Basel Convention (above) on the control of Trans-boundary movement of hazardous waste and their disposal.

The convention attacked the prior informed consent procedure adopted by the Basel convention and other documents which might have contemplated Africa as a possible dumping site for the industrialized countries. The objective of the Convention is to prohibit the import of all hazardous wastes for any reason, into Africa and to control the

trans-boundary movement of such wastes generated in Africa (Article 4). This Convention which takes into account the special circumstances of developing countries in Africa is open to member States of the Organization of African Unity (OAU). The African Heads of States, The OAU Council of Ministers, and their representatives and delegates have played a prominent role in the drafting of, and the participation in the preparation of this convention. No reservations may be made to this convention (Article 26). The scope of the convention is broader than the Basel Convention and it provides for a total ban on the Export and Import of hazardous wastes.

In accordance with Article 25(1), the Convention shall enter into force on the 19th day after the date of deposit of the tenth instrument of ratification from Parties signatory to this Convention. It is still not in force as only four countries have ratified it so far.

Commitments of Parties to the Convention include various general obligations including the adoption of precautionary measures which entail, inter alia, prevention of the environment, without waiting for scientific proof regarding such harm. These precautionary measures also include the application of clean production methods (Article 4) which means "production of industrial systems which avoid, or eliminate the generation of hazardous wastes and hazardous products in conformity with Article 4, section 3 (f) and (g) of this convention". Further obligations are the designation of competent authority, focal point and a dump watch (Article 5), trans-boundary movement and notification procedures (Article 6), duty to re-import (Article 8), inter-Africa and international co-operation (Article 10 and 11).

Supra note 2

Article 13 provides for transmission of information. This procedure serves as a compulsory reporting mechanism. Furthermore, the States Parties to the Convention are expected to inform each other through the Secretariat the measures they have adopted to ensure its application.

The information is then transmitted to the Conference of the Parties established under Article 15 of the Convention. Compliance monitoring and enforcement has not yet begun because the convention is not yet in force.

Article 20 of the convention concerns the settlement of disputes about the interpretation or application or compliance with this convention, through negotiations and subsequent submission to the International Court of Justice or arbitration to be carried out under the procedure set out in Annex V of the Convention. Although this Convention is not yet in force, factors such as financial resources, technical assistance, scientific resources, and the role of parliament, industries, NGOs and public opinion are likely to influence its implementation. The Secretariat distributes to the Parties reports and current status information on the convention. After entry into force, the Secretariat has additional obligations found in Article 16 of the Convention including the preparation and transmission of reports. The interim Secretariat now provides information and guidance on specific questions from countries.

The Secretary-General of the Organization of African Unity, who is the depository of the convention, ensures its administration, through the ESCAS department which is acting as

its interim Secretariat in Addis Ababa. The cost is covered by the budget of the OAU. The scale of financial contributions to the convention by the Parties will be established at the first Conference of the Parties held after entry into force of this convention. The issue of a revolving fund, to assist in the event of waste emergencies, and the funding for the establishment of centres for training and technological transfers regarding the management of hazardous wastes and the minimization of generation will also be discussed at that time (Article 14). In accordance with Article 15 of the Convention, future review of the Convention by the Conference of the Parties must take into consideration available, scientific, technical, economic and environmental information.

Kenya under the auspices of OAU participated in, the formulation and all the discussion of this convention as well as in adopting it in 1991. It will no doubt be a beneficial convention to this country and the entire region if it comes into force as it will curtail shipments of hazardous wastes into Africa. It is therefore recommended that Kenya becomes a party to this convention at the earliest possible opportunity.

4:6 REGIONAL INSTRUMENTS GOVERNING MARINE POLLUTION.

Other than the above International Conventions there are several other regional agreements regulating pollution of the marine environment. These include:

- The 1971 Nordic Agreement Concerning Co-operation in Measure to Deal with Pollution on the Sea by oil;

- The 1972 Oslo Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft, as amended;
- The 1974 Helsinki Convention on the Protection of the Marine Environment of the Baltic Sea Area, as amended;
- The 1974 Paris "Convention on the Prevention of Marine Pollution form land-based Sources, as amended;
- The 1976 Barcelona Convention for the Protection of the Mediterranean Sea Against Pollution, and its protocols;
- The 1978 Kuwait Regional Convention for Co-operation on the Protection of the Marine Environment from Pollution, and its protocols;
- The 1981 Abidjan Convention and Protocol for the Protection of the Marine and Coastal Environment of the West and Central African Region;
- The 1981 Lima Convention for the Protection of the Marine Environment and Coastal Area of the South-East Pacific, and its protocols;
- The 1982 Memorandum of Understanding on Port State Control in Implementing Agreements on Maritime Safety and Protection of the Environment;
- The 1982 Jeddah Convention and Protocol for the Conservation of the red Sea and Gulf of aden Environment;
- The 1983 Cartagena Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, and its protocols;
- The 1983 Bonn Agreement for Co-operation in Dealing with Pollution of the North Sea by Oil and Other Harmful substances;

- The 1985 Nairobi Convention and Protocols for the Protection, Management and Development of the Marine and Coastal environment of the Eastern African Region;
- The 1986 Noumea Convention for the Protection of the Natural Resources and Environment of the South Pacific Region, and its protocols; and
- The 1990 Lisbon Agreement on co-operation for Combating Pollution in the Northeast Atlantic.

The conventions which are regional in nature are also of international importance. For instance, the February 15th 1972 Oslo convention on Dumping is the first international agreement aimed at controlling dumping. This was the basis of the December 29th 1972 "universal" London convention on Dumping discussed above. Prof. Okidi, in his paper, 'regional Control of Ocean pollution: legal and institutional problems and prospects[37] discussed the ratione materie of the above two conventions as well as the classification of substances contained in the Annexes of the conventions.

Another convention form the above list of regional conventions worth mentioning here are the Paris Convention of 1974 and the Helsinki conventions.

The Paris Convention[38] adopted on 21st Feb. 1974 for the protection of the marine environment form pollution arising from land-based sources requires contracting parties to take all necessary measures individually or jointly to prevent pollution from land-based

37 Prof. C. O. Okidi. "Regional Conrol of Ocean Pollution: Legal and Institutional Problems and Prospects." pp69.

38 Paris Convention, adopted at Paris. 1974.

sources. It further establishes a commission as the implementing body of the convention. The convention contains a list of substances according to their persistence, toxicity and tendency to bio-accumulate as well as mankind distinction of those substances that are entirely prohibited in water courses and the marine environment and those that require strict control.

The Helsinki Convention depicts another regional attempt to prevent pollution of the sea. It provides that member states shall individually or jointly take all appropriate legislative, administrative or other relevant measures in order to prevent and abate pollution and to protect and enhance the marine environment of the Baltic Sea area. In its annextures dusts of noxious substances and materials subject to the control of the convention are provided for as well as general guidelines of goals, criteria and measures to prevent such substances form reaching the marine environment.

4:7 STANDARDS OF PROPER HAZARDOUS WASTES, SUBSTANCES & CHEMICALS MANAGEMENT.

From the aforesaid analysis on International Conventions same appears to have created and upheld a clear waste management system which has established internationally standards. These waste management standards are applied in the control of Hazardous wastes substances and chemicals right from the generation of such waste through all subsequent stages to the final treatment and disposal or utilization. These standards of control entail a series of management actions to control and contain waste, substances or

management actions to control and contain waste, substances or chemicals and is so well co-ordinated among various persons and groups of persons. Thus the simplest form of standards in hazardous waste substance and chemicals management system consist of three units namely:-

- Storage upon generation.
- Collection/transportation.
- Final treatment/disposal or use.

My argument in this thesis is that these standards emanating from practice in all conventions in the international plain have been put in place to create the needed structures in the overall management of Hazardous wastes substances and chemicals.

4:7:1 Storage upon Generation.

The first stage in this infrastructure is storing waste after it is generated. The waste generator needs to have a system to safely store waste until it can be transferred for further storage, treatment, or disposal. Typically, this storage is done in containers or bulk tanks. Methods which are used depends largely on how and where the waste is generated and the physical state of the waste.

a) **Containers.**

Containers offer the advantages of being very portable, suitable for any physical state of waste, and flexible as to means of filing. They can be kept next to the waste generating process until full, then easily moved to a waste storage area awaiting further transfer.

Most containers are suitable for many types of waste, form liquids, sludges to bulky solids. Containers may be filled by any available method, for example, pumping, shovelling, or tipping. Empty containers which had contained raw material may be suitable for storing waste, depending on the compatibility of waste with the container and with any residues which may be left in the container. Compatibility with the container is important so that the container's intergrity is not impaired. For example, a plastic container should not be used to store solvent waste. Care must be taken that residues from the container's previous contents will not react with the waste; example, a container which had contained cyanide salts should not be used for waste acid.

Disadvantages of containers are:

(1) they are easily damaged and toppled,

(2) because they are easily moved and stacked, they accumulate easily and may lead to over-storage at the waste producer's site; as seen in most developing countries such as Kenya, in city council dumping areas and

(3) large groups of stacked containers are difficult to inspect for leaks and pills

(b) Tanks.

Tanks are useful for accumulating wastes that are easily handled by bulk materials handling systems such as pipelines, shutes, or belt conveyors. Tanks offer more rigid and integral containment than containers and are easier to inspect for leaks and spills.

4:7:2 Collection/Transportation.

a) Packaging/Labelling

All containers or tanks containing waste destined for transportation should be clearly labelled with the type of waste and its hazards. The packaging should be secure enough to prevent leaks, spills, and vaporization during transport. Suggested[19] packaging includes:

- Wastes oils and solvents: 200 litre steel bung drums or steel tankers;
- Solid or semi-solid organic wastes: 200 litres steel clap-lid drums;
- Inorganic liquid wastes: 30,45 or 200 litre plastic cans or polyethylene tanks; and
- Inorganic solids and sludges: 200 litre steel or plastic clamp-lid drums.

[19] Kiang Y. Hazardous waste processing Technology Ann Arbor, Michigan, Ann Arbor Sciences Publishers, in. pp 290

b) paperwork Tracking System

Many countries have adopted a paperwork tracking or manifest system to document the generation of a hazardous waste, all the later processes that it may go through, and offsite waste transportation. The paperwork accompanies the waste shipment and provides a record of waste movement from the waste producer through each intermediate management stage to final treatment and disposal. The paperwork serves as a chain of custody" document. Every time the waste shipment changes hands, the responsible person sign the paperwork. Often the government regulatory agency must receive a copy of the paperwork at crucial stages in the transfer to monitor the transfer. The system is properly upheld in the State of Victoria, Australia[40]

c) Direct Transfer/Collection Station

Waste may be transferred offsite either directly or via a collection or transfer station. Direct transfer is economical if a large enough shipment can be sent from a single waste producer, or if a truck picks up waste form more than one waste producer. The Danish Kommunekemi[41] system is a model for collection and transfer station operation, moving chemical wastes from households. These typically consist of a 4m x 5m x 2m shed with fireproof walls, concrete floor and in circulation, preventing the accumulation of toxic and explosive gases. Inside the shed are two 200 litre drums for liquid wastes, two 200

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40 Ibid at pp 301

litre clamp-lid drums for packaged wastes and a box for storing toxic wastes. Private households are not obliged to deliver their wastes, but have the right to do so without charge.

The municipality transports from the collection stations to a smaller number of transfer stations, owned and operated by a group of municipalities. Industrial waste producers and farms inform the local authorities of waste accumulation, and notify them when waste is to be moved, using forms. Transportation, directly to the transfer stations, is provided by the generators themselves or by private contractors.

In Denmark, sites for transfer stations were selected so that the system could use the existing railway network. A transfer station consists of tanks for bulk liquid storage, and oil separation systems and covered bays for the storage of drummed waste and solids. Staffing consists of 1-2 men working 8 hours per day. Besides handling waste deliveries and loading wastes on railcars, some control and administrative work is carried out. A waste transport certificate completed by the generator accompanies the waste. After ensuring that the information contained in it is correct, the transfer station attendant hands one copy to the transporter and retains one for his records. The waste is sent by rail from the transfer stations to the central treatment plant. Firms may also transport the waste themselves direct to the site the procedure and documentation is similar.

World Health Organizatin (WHO) Rapid Assessment of sources of Air, Water and land Pollution. Geneva Who pp 104.

The Kommunekemi system also accommodates waste in small quantities. For example, redundant medicines from private households, doctors and hospitals are received by the pharmacists, who bring them to the collection stations for subsequent transportation and disposal. A further collaboration with producers and importers of mercury batteries ensures that stocklists are supplied with boxes for the collection of used batteries. These boxes are also dispatched to the collecting stations.

d) Transportation.

The most common means of transportation of hazardous chemical waste is by road. Hazards associated with on and off-loading activities pose a greater risk than the transport itself. Provided trained drivers in reliable vehicles are employed, and waste is properly packaged, the risks to the community are small. But transport risks should be assessed. The following controls are desirable:

- transportation of hazardous waste should be subject to a permit issued by the regulatory authority to contractors with approved vehicles and trained drivers;
- each vehicle carrying prescribed hazardous waste should be identified using the appropriate hazard symbols;
- each movement of waste on public roads should require a transport certificate showing its origin and destination;
- the carrier must ensure that he has the necessary information on the material to be transported, and has formulated an emergency plan in the event of spillage.

4:7:3 Management Plans and Programs

Any hazardous waste management facility, whether a complex central treatment plant or a simple onsite storage facility, needs plans and programs to guide day-to-day operations and prevent incidents which may cause a health or environment problem[42]. The level of complexity of these plants will vary according to the type of activity, but the essential elements are the same.

a) Waste Characterization

Waste characterization plays a crucial role in the day-to-day operations of any waste management facility. Before a facility agrees to accept a waste for management, the facility must characterize the waste. Proper characterization begins with obtaining a sample which is representative of the waste. Representative sampling can be difficult since a waste may not be homogeneous. It may consist of anomalies such as various phases, particle sizes, concentration gradients, and "pockets of contamination". Any sampling plan should be designed to discover such anomalies and collect a sample that reflects them. An analysis plan should prescribe analytical procedures, equipment, calibration methods, and quality assurance/quality control procedures.

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42 Wilson D C waste management – planning evaluation. Technologies. Oxford. Oxford University Press. Pp 65

Sampling and analysis procedures should satisfy three goals:

- Identify the inherent hazards of the waste;
- Characterize the waste enough to effectively manage it; and
- Find a characteristic to easily identify shipments of waste as delivered.

Inherent hazards of the waste need to be known so one may take precautions to prevent accidents caused by the waste. For example: wastes which are flammable, reactive, corrosive, or incompatible with certain materials require special care and handling; wastes which contain highly soluble contaminants should be protected from rain; wastes which create explosive dust clouds should be managed so dusting is minimized.

Specifications of the waste are particularly important to design a program of effective treatment and disposal of the waste. A waste which contains heavy metals and cyanide requires a much different treatment scheme than waste caustic soda.

Waste shipments arriving at a facility must be identified to ensure that it is the same waste that the facility has agreed to accept. The facility should decide upon a test that will easily and readily identify each waste the facility agrees to accept. The test might be for example, pH, flashpoint, chloride, sulphate, TOC, calorific value, cyanide, heavy and metals among others.

b) Site Security

The facility should maintain adequate security to prevent unauthorized access to the site. There are three reasons for maintaining security. First, to prevent people and livestock form wandering onto the site and becoming harmed from contact with wastes or equipment. Second, it protects equipment from damage. Third, it prevents scavengers from being exposed to and from carrying off contaminated materials. Security can be maintained with fences, natural barriers, or guards.

c) Equipment Inspection/Maintenance.

The facility should establish an inspection program that will check the condition of process equipment, storage vessels and containers, process control devices, emergency equipment, and other equipment necessary for operation of the facility. The inspection checklist and frequency depends on factors such as expected rate of deterioration, sensitivity, and how accident-prone the equipment is. For example, process monitoring equipment crucial to controlling waste treatment requires more frequent and detailed inspection than a drum storage area. The inspection program should include a program for repairing items which are found to be deficient during inspections.

d) Employee Training

Properly trained employees are necessary for effective operation of any facility. The facility should have training procedures which show, for every job at the facility, the level and type of training necessary for that job and how that training is accomplished. The training may take many forms: from supervised on-the-job training to formal classroom training. The objective of training is to ensure that the employees know how to perform their functions in an effective and safe manner and to respond to an emergency. The level of training increases with complexity of equipment and process. Training, at minimum, should include: safe job practices and procedures, the hazards of wastes employees handle, and emergency procedures, both onsite and offsite.

e) Operating Record

The facility's operating record should document what the facility has done and reflect the present status of the facility. Examples of what should appear in an operating record are: process control data, waste types and quantities, locations of wastes, and environmental monitoring data. Maintaining an accurate operating record is necessary for scheduling waste deliveries, treatment operations, and facility planning.

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f) Incident Prevention and Preparedness.

Hazardous materials, including wastes, present hazards which can cause incidents such as spills, fires, and explosions. By identifying these hazards and preparing for the incidents that could happen, you can prevent many incidents from occurring and minimize the effects of incidents that do occur. The risk analysis approach is useful for identifying hazards an potential incidents. Preparing for incidents depends on the hazards and potential incidents identified. If fire from flammable wastes is identified as a potential incident, a preparedness measure could be installation of appropriate fire fighting equipment near the location where fires could occur. The necessary fire protection measures should be designed for each site by appropriate experts and tested frequently. If liquid spillage is a potential problem, curbing in the area may prevent a contamination incident.

g) Emergency Planning

Facilities should have a set of procedures for employees to follow if an emergency occurs. These procedures should identify the type of emergency, the type of waste, and what to do to minimize the effect of the incident. Safety analysis is a useful tool in designing these procedures. The following should be emphasized:

1) how to protect employees during the incident;
2) how to minimize effect of the incident on the environment;

3) protection of facility equipment;

4) interaction with community services such as police and fire department, to develop full scale emergency planning. Also drills and tests need to be conducted at regularly scheduled intervals to test the plan and ensure employee preparedness.

h) Closure Planning

Experience has shown that the best time to plan for final closing of waste management facility is during the design of the facility, which should be updated as experience is gained during operation. The objective is to have a clear, orderly method of closure so that after closure the facility poses minimum risk and requires minimum post-closure maintenance. The closure of a waste facility involves one of two approaches, depending on the nature of the facility.

- Final treatment and disposal of all wastes and residues and decontamination of equipment; or
- Onsite containment of waste.

The first approach applies to treatment and storage facilities, the second how the facility will be decontaminated, and how wastes and residues will ultimately be disposed of.

4:8 CONCLUSION.

From the above analysis, various regions having similar or sharing similar geographical economic resources have designed some regional agreements or protocols providing for the standards analyzed hereinabove to combat hazardous wastes, chemicals and substances. In the absence of a convincing global regime on management of hazardous waste substances and chemicals strong regional and national regulations and policies containing the aforesaid standards are imperative[13].

From the above review, many regions have recorded great success. A case in point is the use of regional instruments in abating pollution of the marine environment and trans-boundary air pollution. Experiences therefore emerging from the use of regional agreements with clear provisions of standards of control shows regions can easily monitor the implementation of the agreement and take corrective measures within a short span of time.

In this chapter hazardous waste substances and chemicals within the region emanating from various sources which therefore cause air, water, and soil pollution, acidification, eutrophication so on have been reviewed. Other than that, international co-operation aimed at controlling and abating those causes were also examined in this chapter and fully discussed. Arising from the above long discourse, it is imperative that Kenya and

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[13] Ojwang J. B. "Kenya's Place in International Environment law Initiatives," in the Advocates vol. 2 No. 3 October 1993.

developing countries in general should come up with regional convention or protocol making provisions of the aforesaid standards to address the question of hazardous waste, chemicals and substances. This will act as a management tool in the generation of wastes and its management. It is also clear that the International plain is wealth of conventions in the protection of the environments Kenya and other developing countries need to take this conventions seriously. They need to domesticate them into their rules. Life of all Kenyans need to be taken seriously.

CHAPTER FIVE -A GENERAL POLICY GUIDELINES ON HAZARDOUS WASTE, SUBSTANCE AND CHEMICALS CONTROL IN KENYA.

5:1 Preliminary

The preceding chapters have analyzed the loopholes that exist in the Kenyan law on Control of Hazardous Wastes, substances and chemicals in Kenya. Further a review has been made on the steps undertaken by the International organizations and developed countries in creating standards on control of hazardous wastes substance and chemicals. For Kenya such standards can be upheld if there is a clear policy guideline on how hazardous wastes, substances and chemicals can be controlled. Currently, as has been explained, Kenya lacks a central directing legal mechanism for management of hazardous wastes. Although there exists numerous statutes, they are no more than merely administrative bodies without legally sanctified tools of controlling hazardous wastes. For example, there is no law governing dumping or environmental monitoring. Any form of waste can be dumped anywhere. No dump sites have been identified for specific wastes or substances. There is no legalized hierarchy of authority on control of hazardous wastes. This lack of hierarchy is exacerbated by the existence of scores of enactment dealing with specific elements of wastes (as discussed in chapter 3) each on its own terms and through its own (essentially autonomous) bureaucrat agency. The effect is that there exists an entirely random basis of control of hazardous wastes and there is no centralized mechanism of control[1].

There is urgent need for Kenya to enact a comprehensive legislation to curb these menace of hazardous wastes. This is besides formulating a comprehensive policy guideline as to the control of the same. Viewed from the foregoing, the following policy guidelines should act as a lead. Although not comprehensive, they will go along way in remedying the situation.

5.2 WASTES

The government policy in waste should:

- Emphasis prevention.
- Institute lifecycle analysis; an environmental evaluation of a product from its production to the end of useful life.
- Institute life-environmental protection measures directed at the entire cycles of polluting materials and products circulating in society.

5.3 MUNICIPAL TASKS.

The municipal should be assigned the following task.

- Enact laws and regulations governing waste and recycling.
- Give responsibilities to municipals and should include the following:

M. Korik-koech "Evolution of Environment Management in Kenya" in Akiiro and C. Juma (eds). Gaining Ground: Instituion Innovatins in Land Use Management in Kenya. (Nairobi Acts Press

a) Provide disposal facilities for household wastes. Consumers covered by such arrangements should be obliged to use them exclusively.

b) Collect newspapers, magazines and glass from private households in areas with more than 200 households.

c) Collect paper and cardboard from trading companies.

d) Collect food waste from large scale kitchen catering as animals feeds.

e) Collect paper from all public institutions.

f) Collect oil and chemical waste from companies and household.

- Institute waste disposal system to include:

a) Incineration in waste heating plants.

b) Land fills.

5.4 HAZARDOUS WASTE

- Organize a meticulous system for collection of problem waste form households.
- Establish at least one collection point in each of the municipalities.
- Allow private individuals to deliver problem wastes to the collection points.
- Designate dispensing chemists to receive pharmaceutical wastes.

1991) pg. 21-34.

- Establish several municipally owned receivers/stations and collection points where companies and chemists can deliver problem waste. A final sorting is made at the receivers/station before shipment to community owned waste disposal plant.
- Establish a common waste disposal plant owned jointly by all municipalities in the country (region). The plants shall dispose waste through incineration, neutralization or depositing.
- Train and acquire expertise of new technologies through consultancies with a number of industrial companies and private and public organizations at home and in towns.

5.5. RECYCLED WASTE

The per capita municipal waste production is very high and continues to increase. Presently, there exists a waste paper recycling plant. Several such plants need to be encouraged and established. New recycling plants should be established and hence increase the amount of waste recycled until 50% of the waste is reached. The public sector should provide development funds to support high priority areas such as domestic waste, industrial waste and construction waste disposal plants. The government should provide resources and incentives to companies that use cleaner technologies of production and recycle wastes. The government should establish licensing of operating and or treatment, consignment notes for monitoring every sludge of hazardous waste generation through storage, transport to final disposal should be instituted. It should establish regulations to impose certain mandatory methods of disposal for some

hazardous wastes e.g. PCBs must be incinerated. Further, it should provide, advise and give incentives to the use of biogas generation plants in rural areas.

5.5 TAX IMPOSITION AND CASH DEPOSITS.

Apart from the traditional methods such as legislation and regulations, the government should make use of a number economic instruments within the field of waste prevention, including a general waste tax per ton on waste for incineration and tax per ton on waste for disposal on landfills. A levy on certain form of packaging should be introduced Thus all waste removal should be fully paid for by the consumer.

An extensive deposit scheme for beer and soft drink bottles should be established. This should ensure that beer and soft drink bottles return remain at the highest rate possible preferably 99.5%.

The aforegoing policies if implemented to the letter will go along way in alleviating this menace.

CHAPTER SIX

6.1 CONCLUSION AND RECOMMENDATIONS

From the preceeding chapters, it has emerged clearly that Kenya does not have a comprehensive statute dealing with the management of hazardous wastes, chemicals and substances. We have also seen that even if Kenya has not ratified the Basel and Bamako Conventions, its general policy is geared towards the prohibition of improtation of hazardous wastes in Africa and Kenya in particular.

Further, we have observed that some documents such as the Environmental Management Co-ordination Bill 1996, envisages the development and adoption of a National Legislation on the Management (including disposal) of hazardous waste. As said earlier, the envisaged statute will deal with:

- Definition of hazardous waste, chemicals and substances.
- Classification of hazardous waste, chemicals and substances.
- Handling and disposal of hazardous waste.
- Development of a comprehensive inventory on hazardous waste, chemicals and substances.
- Liability for injuries and liability for costs of taking emergency measure and question or reparation.
- Insurance scheme.

- Treatment facilities and procedure as well as the role of the private sector in handling and disposal.
- Condition for importation.
- The question of international agreements on trans-boundary shipments of hazardous wastes like the Bamako and Basel Conventions.

On the other hand, we have also seen that there is need to develop a treaty (regional) or arrangement on hazardous wastes chemicals and substances. Kenya as well as her counterparts in the East African region have signed trade pacts aimed at increasing trade and co-operation. The freeing of trade in the region as well as other parts of the world may lead to illegal trafficking of hazardous wastes. Trade may also broaden volume of hazards such as pesticides and other dangerous chemicals. It is therefore highly recommended that the region should come up with a regional agreement (treaty) on hazardous wastes chemicals and substances. Such issues like definition of hazardous wastes, handling and disposal of hazardous waste, labelling of hazardous chemicals, liability for injuries, preparation, insurance schemes, treatment facilities and procedure of disposal need cohension of methods for treatment. The proposed legal framework will be fashioned in the spirit of the 1972 London Dumping Convention, 1989 Basel Convention and the 1991 Bamako Convention. The benefits of such a regional arrangement will be many. It will facilitate a concerted effort of combating trans-boundary movement of hazardous wastes, ensure establishment of a regional pesticides and chemical registry.

The purpose of this thesis will be incomplete unless we provide, as we hereby do, for a draft legislation for the control of hazardous wastes, chemicals and substances. The proposed legislation is marked as annex 1. There is dire need for parliament to consider the proposed legislation and at lest enact it at the earliest. This will not only save our environment but also our country from the looming crisis of food shortage.

ANNEX 1

PROPOSED DRAFT LEGISLATION

ON

HAZARDOUS WASTES, CHEMICALS AND

SUBSTANCES

THE HAZARDOUS WASTES, CHEMICALS AND SUBSTANCES BILL, 1997

A Bill for:

A draft of Parliament to provide for the control, safe handling, use and storage, Disposal and Management of hazardous wastes, chemicals and substances, genetically engineered wastes, waste products and radioactive wastes which endanger the health and life of human beings, domestic and or other all wild animals and the built and natural Environment in general by reason of their toxic corrosive, irritating, sensitizing, inflammable or radioactive properties and for incidental or connected purposes.

PART 1 - PRELIMINARY

Short Title: 1 This Draft may be cited as the Hazardous wastes, chemicals and substances Act.

Interpretation: 2 In this Act, except where the context otherwise requires:

"Chemical" means a chemical substance in any form whether by itself or in a mixture or preparation whether manufactured or obtained derived from nature and for

the purpose of this Act includes industrial chemicals consumer use, pesticides, fertilizers and drugs, pharmaceuticals including human and veterinary.

"Environment" means built and or natural environment and includes both the physical and biological factors.

"Hazardous pesticide formulations" means those pesticides formulation that are likely to produce severe health, environmental effects and chronic effects through exposure under conditions of use.

"Hazardous waste" means any waste which has been determined to be a hazardous waste or to belong to any other category of waste provided for in this Act.

"Legal Agency" means any ministry, department, parastatal agency, local authority or public officer in which or whom and law vests functions of control or management of any segment of the environment.

"Substance" means any materials or preparations required for industrial agricultural production, building

industry, energy generation or any material used for economic or commercial activities.

"Regulations" means regulations made under this Act.

"Trade" means any trade, business or undertaking whether originally carried on a fixed premises or at verying places which results in the discharge of waste and includes any activity prescribed to be a trade, business or undertaking for the purposes of this Act.

"Waste" includes and matter prescribed to be waste and any matter, whether liquid, solid or gaseous, or radioactive, which is discharged, emitted or deposited in the environment in such volume, composition or manner as to cause an alternation of the environment

3.1 Every person is entitled to a clean and healthy environment and has a duty to safeguard and enhance the environment and where this has been violated, a person may apply to the High Court for renderness.

2. The High Court shall have original jurisdiction to hear and determine the application and may make such orders, issues such writs and give such directions as it deems fit to remedy the situation.

PART II: GENERAL PROVISIONS

3. The minister for Environment and Natural Resources in consultation with the Legal Agencies shall make provisions under this Act for the purpose of protecting the Environment touching on:

(a) production from enterprises, plants, engines, tools furnaces and means of transport and the design, operation and maintenance of such activities.

(b) pollution from sewage, plants, waste-water treatment plants, incineration plants and waste and waste deposits and on the design, operation maintenance of such plants.

(c) Hazardous process and storage and transport of hazardous substances in such way that interruption of operation or accidents may result in imminent risks of pollution.

(d) Notification of the regulatory authority of the use in an enterprise or plant of raw materials, auxiliary substances and other materials and or emissions to water, soil and air in connection with operation, including waste generation, of the enterprise or plant.

(e) Notification of temporary location and use of plants, means of transportation mobile plants, engines and tools likely to cause pollution, including conditions for such location and use.

4. The Minister for Environment and Natural resources shall make provisions under this Act for the purpose of protecting persons against risks posed by hazardous wastes, chemicals and substances arising from

(a) the storage, transport, sale and disposal of those hazardous wastes, chemical and substances.

(b) the employment of employees at places in which or on which those substances are being or have been used.

PART III: ADMINISTRATION

5. This Act shall be administered by the Minister of Environment and Natural resources through the National Environmental Secretariat (NES) as the regulatory Authority hereinafter referred to as the "authority".

6. The Authority shall in consultation with other Lead Agencies formulate and adopt rules, regulations, schemes and guidelines in order to implement this Law.

7. Without prejudice to the generality of section 6 above, regulation under the Act may provide for:

(a) Disposal of waste, and no notification, separation, storage, collection, transport, treatment and processing of waste. The rules may also apply to specified waste types, waste materials and waste products.

(b) Imposing restrictions or conditions or ban on the importation, sale, disposal, storage, transport or use of hazardous wastes, chemicals and substances.

(c) Requiring persons concerned with importation, sale, disposal, storage transportation or use hazardous wastes, chemicals and substances to be registered or licensed.

(d) Imposing restrictions or conditions as to the purpose for which, the circumstances in which or the methods or means by which hazardous waste, chemicals or substances may be used, including restrictions or conditions involving a general prohibition of the use thereof.

(e) Requiring the provision of, and submission to, instruction and training in the use of things provided in pursuance of the rules and in the observance of precautions.

8. Anyone producing, storing, treating or disposing of waste if responsible that such activities do not cause unhygienic conditions or pollution or air, water or soil.

10.(1) The functions of the Authority are:

(a) to advise the Minister for Environment and Natural Resources on all matters relating to the control, use manufacture separation, collection, storage, transportation and disposal as well as management of hazardous waste, chemicals and substances or related by products.

(b) to make regulations prescribing the procedure and criteria for classification of hazardous wastes, chemicals and substances in accordance with their toxicity and the hazardous they present to human health and to the environment.

(c) To establish and direct a hazardous waste, chemicals and substances inspectorate to control the use, generation, storage, transportation, importation, exportation and management of hazardous waste, chemicals and substances under this Act.

(d) To regulate the use, generation, control, possession, storage or disposal of hazardous wastes, chemicals and substances under this Act.

(e) To grant licenses and registration under this Act.

(f) To establish procedures for labeling packaging, distribution, handling and hazardous waste, chemicals and substances.

(g) To carry our research on hazardous wastes, chemicals and substances generally for the benefit of public health and the environment

(h) To make regulations restricting and banning of hazardous wastes, chemicals and substances.

(i) To perform other acts which are connected with or incidental to the foregoing.

(j) The authority shall have all the powers necessary for the performance of its functions under this Act.

11. (1) The authority shall appoint Public Officers to be hazardous waste, chemicals and substance control inspectors.

(2) Every inspector appointed under subsection (1) shall be issued with a Certificate of Appointment signed by the Minister which he shall produce to the occupier of, or any other news on holding a responsible position of management or control of the facility at, the premises in which hazardous wastes, chemicals and substances are believed to be present and where and inspection is to be carried out by the said inspector.

12. (1) subject to this Act, the inspector may:

(a) enter, inspect, take samples, examine any premises or any part thereof, both, motor vehicle, aircraft or any other vessel in or upon which he has reasonable cause to believe that any hazardous waste, chemicals or substances is stored, manufactured, generated transported or disposed off.

(b) require the production of license authorizing such owner or occupier of the facility to carry on the activities with hazardous chemical substances, or a register kept under this Act, and inspect, examine or take copies thereof.

(c) Seize, remove and detain any hazardous waste chemical and substances and any other articles which may appear to him to contain or comprise substances or materials in connection with which he has evidence of an offence having been committed under this Act or regulations made thereunder, and for like cause seize, remove, detain or take charge of any premises, facilities, containers; receptacles and any books of account or other documents;

(d) Require the owner or occupier of the premises of facility to explain and give information relating to the presence in the

premises of facility of any hazardous waste, chemicals or substances; and

(e) Make such examinations and inquiries as may be necessary for carrying out the provisions of this Act or regulations made thereunder.

(2) An inspector appointed under this Act shall be deemed to be a government analyst for purpose of the Criminal Procedure Code, Evidence Act and the Food, Drugs and Chemical Substances Act.

(3) The inspector may act without a warrant whenever it appears to him that the delay which may be occasioned in obtaining a warrant would seriously hinder him in the performance of his duties or tend to defeat the purpose of the section

(4) Every seizure under this section shall be reported to the nearest magistrate without undue delay.

13. (1) The local councils and Municipal Councils shall monitor compliance with:

(a) the Act and the rules laid down under the Act.

(b) Prohibition and enforcement orders.

(c) Terms stipulated in approvals and licenses.

(d) Environmental requirements stipulated in agreements and the state of the environment in the municipalities and local council areas.

(2) The Minister of Environment and Natural resources may decide that supervision shall in some cases be carried out by other authorities who shall ensure that illegal activities shall be terminated and the Act is being complied with.

14. (1) The local councils and municipal councils are in charge of disposal of waste and the Minister for Environment and Natural resources in consultation with the lead agencies may lay down rules on local and municipal waste schemes in particular on:

(a) the obligation of the local and municipal council to assign waste disposal facilities.

(b) the obligation of the local and municipal councils to undertake collection and disposal of waste, including recycling of materials and products.

(c) The obligation of citizen, land owners and enterprises to use the assigned disposal facilities or waste schemes.

(d) The obligation of citizens, land owners and enterprises to notify and submit data on waste, and carry out investigations relating to waste.

(2) The rules on collection of materials and products for recycling provisions shall be laid down that the local council or municipal council shall on certain conditions exempt industrial enterprises from obligation to use a collection scheme.

(3) The local council and municipal councils may issue orders or prohibits to prevent, and to ensure sound storage, treatment and disposal of waste.

(4) The local councils and municipal councils collects information on existing and planned waste qualities broken down on types and material and on the treatment and disposal of waste and such information shall be forwarded to the regulatory authority.

(5) The local councils and municipal councils shall prepare plans for disposal of waste in their local areas. The Minister for Environment and Natural Resources shall lay down rules on the contents of local waste plans timetables and establishment procedures, and on reversion of plans and also rules on the information to be passed to the regulatory authority in subsection 4 above.

(6) The local councils and municipal councils shall fix fees to cover costs in respect of:

(a) Planning, establishment, operation and administration of waste scheme including assignment schemes, and of separation, collection of wastes and the establishment and operation of waste processing and disposal facilities.

(b) Collection and registration of information as well as advance payment of planned investment in the waste field.

(c) The Minister for environment and natural resources can work out standard payment regulations in which distress may be levied for non-payment.

(7) (a) The Minister for Environment and Natural Resources can make provision for the setting up of inermunicipal or interlocal council waste disposal facilities including recycling facilities.

(b) The Minister for Environment and Natural Resource shall lay sown rules governing such facilities.

(8) New plants for waste deposition may be owned by private enterprises in which the Minister cah lay down rules on collection of fees from such private owned deposits and on security required respect of monitoring pollution from the deposit facilities and possible remedial action.

PART IV: RECYCLING AND CLEANER TECHNOLOGY

(15) (1) To promote recycling and cleaner technology and minimize waste disposal problems, the Minister for Environment and Natural Resources in consultation with other lead agencies can lay down rules or decide that:

(a) specified raw materials additives or auxiliary substances shall not or shall only in specified materials and products thereof shall contain specified proportions or recycled or recyclable materials or products.

(b) specified materials and products thereof shall contain specified proportions of recycled or recyclable materials or products.

(c) The use of specified materials or types of materials in products or goods for specified purposes, including packaging and their manner to design.

(d) Public authorities or public owned or controlled and private enterprises shall to the extent possible use goods or products containing recycled or recyclable materials or otherwise for environmental reasons to be preferred to other goods of products fort the same applications

(2) The provision of this part of the Act does not apply to materials and products manufactured abroad and transported trough Kenya and transit goods or stored ad transit goods.

PART V: HAZARDOUS WASTES, CHEMICALS AND SUBSTANCES IN TRANSIT THROUGH KENYA.

(16) (1) The authority shall be notified of all proposed transboundary movement of all hazardous, chemicals and substances through the country. Such notification shall include detailed information on:

(a) the final destination of the waste

(b) A timetable specifying expected date of transit through the area under the national jurisdiction of the authority.

(c) Proof that the exporter, the carrier, the disposer and the site or facility for disposal are authorized to carry out the operations in relation to the waste.

(d) A contingency plan detailing emergency procedures incase of the occurrence of accidents.

(e) A guarantee by the generator or exposure to fully compensate any damage caused to human health, property, or to the environment by the waste in question during its passage though the area under the national jurisdiction of the authority.

(2) The language of the notification, labeling and contingency plan shall be in a language understood and acceptable to the Authority.

(3) Upon evaluation of all the above the authority shall issue license to such a person who intends to carry out such transboundary movements.

PART VI: LICENSING PROVISIONS

17. (1) Every person intending to use, generate, purchase, deal in, manufacture, transport, dispose, import, or export hazardous waste and substances shall apply for a license under this Act.

(2) An application under Sub-section (1) shall be made to the Authority in the prescribed form.

(3) Upon receipt of an application under sub-section (2) the Authority shall, on examination, issue or refuse to license to the application.

(4) A license issued under this section shall be subject to such conditions as may be prescribed an the Authority.

(5) The Authority shall have powers to cancel or suspend a license when it determines:

(a) that such cancellation or suspension is necessary or expedient for the proper control of the particular hazardous waste, chemical and substances; or

(b) that the license has been used in contravention of any regulations any conditions therein.

18. (1) Any applicant or license aggrieved by any decision of the Authority under this Act may appeal in writing to the Minister for Environment and Natural Resources within one month of the communication to him of the written decision stating the grounds of his appeal.

(2) The Minister's decision which shall be made after consideration of the grounds of the appeal lodged under sub-section (1) shall be final.

19. (1) A complaint against licenses, approvals or exemption shall not have suspensive effect, unless otherwise decided by the Minister of Environment and Natural Resources.

(2) The Minister for Environment and Natural Resources shall lay down rules that certain approvals and licenses shall not be used beforeexpiry of the time limit for complaint, and that complaints shall have supensive effect.

(3) The provisions of sub-section 18(2) above does not restrict the power of the appeal authority to change or revoke an pleaded license, approval or exemption.

20. (1) The holder of a license issued under this Act shall ensure that no contamination of the environment or injury to persons is causedby hazardous waste chemical and substance resulting directly or indirectly from his chemical facility during the manufacturing, generation operation, storage or disposal of waste.

(2) Every owner of a licensed facility shall appoint a person experienced in handling hazardous waste substances as a safety officer within the facility.

(3) The appointment under sub-section (2) shall be communicated in writing to the Authority and the safety officer shall ensure:

(a) that all persons using or working in the facility are supplied with protective accessories necessary while handling hazardous waste, chemicals and substances.

(b) that the workers employed in facility are given proper instruction on safety measures.

(c) That all the workers employed in the facility receive such periodic medical check-ups as the Authority may direct.

(d) That the code of practice for handlers and users of hazardous waste, chemicals and substances is strictly adhered to, will be formulated by the authority.

(e) That proper care is taken to dispose hazardous waste, chemical and substance only in accordance with terms and conditions of the license; and

(f) That any instruction issued by the Authority are properly implemented.

PART VII - PROHIBITION OF CERTAIN ACTS

21. (1) No person shall:

(a) discharge any hazardous, chemical and substance in any waters or any other segment of the environment except in accordance

with guidelines prescribed by the Minister for Environment and National Resources in consultation with lead agencies.

(b) detach, alter or destroy labeling as prescribed under this Actor regulating made thereunder.

(c) Change the composition, use or dispose into the environment hazardous waste, chemical and substance in contravention of the provision of this Act.

(d) Distribute, sell, offer for sale, hold for sale, import, deliver for importation to, or receive from, deliver or offer to deliver to any other person any hazardous waste, chemical or substance.

(2) (I) A person who discharges hazardous waste chemicals and substances into any water or other segment of the environment contrary to section 21 (1)(a) commits an offence and shall be liable upon conviction to a fine of not less than Kenya Shillings five hundred thousand or to imprisonment for a term not less that two years or both and such person may in addition to any other sentence imposed by the court,

(a) pay the cost of the removal including any costs which may incurred by any Government agency or organ in the restoration of the environment damaged or destroyed as a result of the discharge.

(b) the costs of third parties in the form of reparation, restoration, restriction or compensation as may from time to time be determined by the authority.

(ii) The owner or operator of a production or storage facility, motor vehicle or vessel from which a discharge occurs contrary to sec 21(2)(I) shall mitigate the impact of the discharge.

(a) giving immediate notice of the discharge to the authority and the relevant government officers or local and municipal council where applicable.

(b) immediately begin a clean-up operation using the best available clean-up method (technology).

(c) Comply with such directions as the authority may from time to time prescribe.

(iii) Until the owner or operator of a production or storage facility, motor vehicle or vessel has taken the mitigation measures prescribed in Sec.21(2)(ii) the authority may seize the production facility motor vehicle or vessel.

(iv) Where the owner or operator fails to take the necessary measures under Sec.21(2)(ii) after the passage of a reasonable time in all the circumstances the authority may upon an order of court, dispose of the production or storage facility, motor vehicle or vessel to meet the costs of taking the necessary measures under Sec. 21 (2)(I)(a) and other remedial and restoration measures.

(v) The court in conviction a person of an offence under Sec. 21(2) shall take into account the measures taken by the person to comply with Sec. 21(2)(ii).

(4) Any person who, being the holder of a license issued under this Act, contravenes any of the conditions of such license shall be guilty of any offence and liable to a fine not exceeding two hundred thousand shillings or to imprisonment for a term not exceeding five years or both.

(5) Any person who aids, abets or conspires with any other person to carry our a or attempts to carry out or attempts to carry out transboundary movement of hazardous wastes chemicals and substances in contravention of this Act will be guilty of an offence.

(6) Where an offence under this Act or under any regulation made under this Act which has been committed by a body cooperate is proved to have been committed with the consent or connivance of, or to be

attributed to neglect on the part of, a director, manager, secretary or other similar officer of the body corporate, or any person property to act in that capacity, he as well as the body corporate shall be liable to be proceeded against and punished accordingly

PART IX: COMPLAINT AND LEGAL PRECEEDINGS

(23) (1) Unless otherwise provided for in this Act, complaints against the decision of the local council municipal council etc under this Act or rules laid down under this Act can made to the Minister of Environment and Natural Resources.

(2) A complaint should be lodged within four weeks from the day the decision was notified.

(3) Where notifications was made by public announcement the time limit shall be calculated from the day the decision was announced.

(4) Where the time limit expires on a Saturday or a holiday, the limit shall expire on the following working day .

(5) Complaints shall be lodged in writing before the authority making the decision and upon the expiring of the time for complaint the authority submits the complaint to the Minister for Environment and Natural

Resources, accompanied with the decision involved and with material on the review of the case was based.

(6) Complaints against compulsory acquisition of property have suspensive effect unless otherwise decided by the Minister of Environment and Natural Resource. Complaints against the decisions of local council and municipal council can be made by:

(a) the party to whom the decision is directed

(b) any party having an individual, significant interest in the outcome of the case.

(7) The Minister for environmental and Natural Resources shall lay down rates or decide how complaints against decisions under this Act may be lodged by specified authorities in other countries or how complaint may be lodged by local associations, organizations or groups working primarily to protect the environment and how appeal by such bodies shall be lodged.

(8) (I) Legal proceedings to re-examine decisions taken under this Act or rules laid down under the Act shall be instituted within six months form the day the decision was notified.

(ii) Where the decision was notified by public announcement the time limit for institution legal proceedings shall be calculated from the day the decision was announced.

(iii) Legal proceedings concerning compulsory acquisition under this Act shall be instituted before the High Court of Kenya.

PART X: APPEAL BOARD

24.1 (1) The Appeal Board is hereby established with the authority of complaints against administrative decisions to the extent defined in the law.

(2) The Board is independent of any instruction relating to the review of land decision in individual cases.

(3) Complaints can be made to the Appeal Board against:

(a) decision made by the Minister for Environment and Natural Resources Robby Agencies empowered by the Minister.

(b) decision in matter of major or principle importance made by the Minister of environment or by an Agency empowered by the Minister relating to anything under this Act.

24.2 (1) The appeal board consists of a chairman, one or more Deputy Chairman and a number of appointed expert members.

(2) the administration of the board is carried out by the Secretariat which also assists in the review of cases brought before the board.

(3) The Minister for Environment and Natural Resources can lay down rules on the activities of the Board.

(4) The Chairman and the deputy chairman of the Appeal board shall have the qualification of a High Judge.

(5) The number of appointed member who shall serve upto four years shall be fixed by the Minister for Environment and Natural resources.

(6) Decision in each individual case shall be made by the chairman or a Deputy or two or four appointed members and the decision of the board are made by majority vote.

(7) In special cases the Chairman or the Deputy chairman may decided on behalf of the Board.

24.3 (1) Complaints can be brought before the Appeal board by parties entitled to complain against first instance decision under this Act.

(2) The Minister for Environment and Natural Resources can lay down rules on or decide that decision under the Act can be appealed to the Appeal board by specific authorities in other countries.

(3) The time limit for lodging any complaint shall be as specified in the Act.

(4) A complaint against a prohibition or an order which is set down for review in the Board has suspensive effect unless otherwise decided by the Board.

(5) The appeal Board may procure information and carry our inspections as specified in the Act.

PART VI: CONVENTIONS AND TREATIES ON HAZARDOUS WASTES CHEMICALS AND SUBSTANCES

25. (1) Where Kenya is a party to an international convention or agreement or any regional treaty concerning hazardous wastes, chemicals and substances, the Minister for Environment and Natural resources in consultation with relevant lead agencies shall initiate legislative proposals for consideration by the Attonery General, for purpose of giving effect to such conventions or agreement in Kenya or for

(2) The Minister for Environment and Natural Resources can lay down rules on or decide that decision under the Act can be appealed to the Appeal board by specific authorities in other countries.

(3) The time limit for lodging any complaint shall be as specified in the Act.

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enabling Kenya to perform her obligations for exercise her rights under such convention or agreement.

(2) The regulatory authority shall keep a register of all international conventions or agreements relating to hazardous wastes, chemicals and substances to when Kenya is a party.

PART XII - REGULATIONS

(26) The Minister for Environment and Natural resources in consultation with the authority and lead agencies, shall have powers to make regulations prescribing:

(a) the precaution to be taken to prevent injury being caused by hazardous waste, chemicals and substances to the health of persons and the environment likely to be exposed to the harmful effects of those substances;

(b) methods of disposal of hazardous waste, chemicals and substances of any kind or hazardous pesticides formulation.

(c) The structure requirements for building or premises, or areas used in connection with generation, production, treatment, use, storage or disposal of hazardous waste, chemical and substances.

(d) the precautions to be taken for safe transportation of hazardous wastes, chemicals and substances.

(e) The method of packaging or labeling of hazardous wastes, chemicals and substances.

(f) The method of treatment of disposal of any vessel, vehicle, package or container that has been used to convey, hold or store any hazardous waste chemical and substance.

(g) Any exemptions of any chemical substances from the provision of this Act.

(h) Generation, use, manufacture, production, possession, importation, storage, transportation, packaging and labeling of any specified hazardous waste and chemical substances exempted from the licensing requirements of this Act;

(I) the fees payable in respect of any license;

(k) the classification on license;

(l) the interval at which inspection of hazardous waste chemical and substance may be made, and the fees to be paid in respect of such inspection;

(m) chemicals, analytical, biochemical, biological and forensic services and payable or waiver of fees payable for such services; and

(n) the measures to be taken to prevent hazardous waste chemical and substances from poisoning.

PART VIII - MISCELLANEOUS PROVISIONS

(27) The government chemist shall provide such chemical, biological laboratory services as the authority may require.

(28) No action, suit, prosecution or other legal proceedings shall lie against an inspector or an officer for anything done in good faith and without negligence under this Act or under regulations made thereunder.

(l) the interval at which inspection of hazardous waste chemical and substance may be made, and the fees to be paid in respect of such inspection;

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Annex (ii)

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