

**AN ANALYSIS OF ENVIRONMENTAL PROTECTION AND POLLUTION  
CONTROL VISA VIS DEVELOPMENT - INDUSTRIAL AND  
TECHNOLOGICAL: A CASE STUDY ON ZAMBIA.**

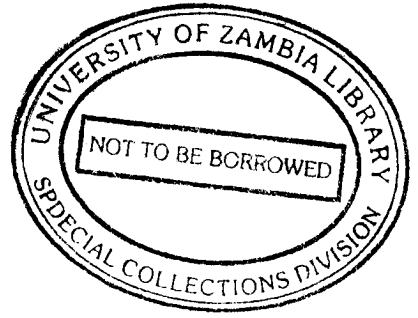
**By**

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**AN OBLIGATORY ESSAY SUBMITTED TO THE UNIVERSITY OF ZAMBIA  
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SCHOOL OF LAW**



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**CHOLA J. MUSONDA**

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**AN ANALYSIS OF ENVIRONMENTAL PROTECTION AND POLLUTION  
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TECHNOLOGICAL: A CASE STUDY ON ZAMBIA.**

*Be accepted for examination. I have checked it carefully and I am satisfied that it fulfills the requirements relating to format as laid down in the regulations governing obligatory essays.*

Date... 22/01/07 .....

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**Supervisor**

**Mr. Fredrick Mudenda**

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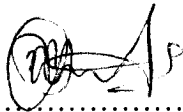
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## DECLARATION

I **Chola J. Musonda** (COMP.# 21040176) do hereby solemnly declare that I am the author of this work entitled: **AN ANALYSIS OF ENVIRONMENTAL PROTECTION AND POLLUTION CONTROL VISA VIS DEVELOPMENT - INDUSTRIAL AND TECHNOLOGICAL: A CASE STUDY ON ZAMBIA.**

Save as herein expressly acknowledged every piece of idea is a result of my ingenuity and the views expressed herein do not necessarily represent those of the University of Zambia, the School of Law or the Supervisor of this Directed research

Declared by the said **Chola J. Musonda** (21040176) this 12<sup>th</sup> day of **January** 2007

A handwritten signature in black ink, appearing to be 'Chola J. Musonda', is written above a horizontal dotted line.

**Signature**

## **ACKNOWLEDGEMENTS**

In the first place I wish to thank the Lord God Almighty who has been faithful and gracious to me both in good times and trying times to whom I owe all my life's achievements and success.

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Lastly, I wish to thank various persons who assisted me in my research, particularly unreservedly gratitude to ECZ staff.

## **DEDICATION**

TO

My late Dad, I wish you were here to see this work, Mum

And

Lungowe, my brothers and sisters



## Chapter One

### 1.0 INTRODUCTION

The environment is a useful and sufficient resource for living organisms. Life cannot take place in abstract but only in a viable environment. Most life related activities of whatever nature depend on the environment. The environment is therefore indispensable to every living organism be it human, plant, animal, insect to mention but a few. It is indisputable that living organisms depend on the environment for their survival. Consequently it is necessary to maintain or keep the environment in a state or condition viable to support life. Environment here refers to land, water, air and other external influences and conditions which affect the development and life of all organisms including man<sup>1</sup>.

The environment is an asset and therefore every effort must be made to prevent undue depreciation of the value of this asset so that it may continue to provide aesthetic and life-sustaining services. There is also need to support attempts to maximize the value of the environmental asset by creating a balance between the preservation and use of that asset. To defend and improve the environment for present and future generations has become an imperative goal for mankind<sup>2</sup>.

In view of the foregoing it has become imperative for developing nations of which Zambia is no exception to care for the quality of the environment in their endeavors for development. Human activities should not encroach adversely on the environment in the name of development. Development should not be achieved at the expense of the environment. The environment is fundamental for development to occur. However, it must be realized that in absence of any control man's so called peaceful constructive activity turns into aggression against the very foundations of life on earth.

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<sup>1</sup> See section 2 Cap. 204 of the laws of Zambia

<sup>2</sup> the declaration of the UN conference on human environment, Stockholm (1972).

The paper in this chapter discusses the topical environmental problems which have been identified in Zambia. The discussion will consider aspects of environmental protection in relation to development and the legal framework for environmental protection in Zambia, in subsequent chapters.

## 1.2 Topical Environmental Problems in Zambia

It is undeniable that man's pursuit of life committed on the environment has led to a number of environmental problems which may not be solved within the shortest possible time. In Zambia's case the National Environmental Action Plan of 1994 hereinafter called NEAP and the Zambia National Policy on Environment (NPE)<sup>3</sup> whose draft copy has been sent to Cabinet for approval, has outlined a Number of environmental concerns viz: land degradation, air and water pollution, wildlife depletion, deforestation and inadequate sanitation. The outlined environmental problems mostly resulting from developmental activities are now analyzed in detail.

### Land degradation

Laboring to give a precise definition of land degradation may be futile given the fact that there are many factors which may be responsible. This however, does not defeat attempts made to define what it is. Barrow defined it as *"the loss of utility or potential utility or the reduction, loss or change of features or organisms which cannot be replaced"*<sup>4</sup>. Land is said to be degraded when it suffers a loss of intrinsic qualities or decline in its capabilities

Land degradation is the major environmental threat to Zambia's land whose magnitude in area is 750,000 sq km (75 million hectares)<sup>5</sup>. This is mainly due to deforestation and unsustainable land use and practices especially in agriculture and mining. In the agricultural sector the use of agricultural pesticides as well as technologies which are not

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<sup>3</sup> Final Draft, may 2005. p 18

<sup>4</sup> Barrow C.J. Land degradation. 1991. Cambridge. Cambridge University Press p.i

<sup>5</sup> See the Mungomba Constitutional Review Report p.786

environmental friendly have affected the quality of land in Zambia negatively. On the other hand the mining industry has had the greatest share in contributing to land degradation especially in the copperbelt and now western province which is being opened up for mining. For instance land dereliction caused by subsidence of the overlying ground is a feature of most underground mining areas. It is caused by both ore extraction and geological characteristics and can have disastrous consequences. For example the subsidence of tailing dams into a mine at Mufurila in 1970 killed 89 miners<sup>6</sup>. Further mining dumps caused by the disposal of very large quantities of waste rocks, tailing dams and slag also reduce the quality of land.

Land is a habitat for various living organisms. It is also a raw material essential for agricultural purposes. For it to provide these survival services, it must be in good quality. Once degraded land will not be a viable habitat for some organisms neither will it be fit for the agro industry. Land degradation therefore affects both the life support systems of some organisms as well as the economic livelihood for man in terms of agriculture and generally reduces the quality of the environment.

## **Deforestation**

Simply put deforestation is the act of cutting down or burning the trees in an area<sup>7</sup>. Deforestation in Zambia is mainly caused by the uncontrolled exploitation of forest products, illegal settlements, encroachment, clearing of land for agricultural purposes, bush fires and the use of wood as a source of energy. Deforestation is a serious source of environmental concern. It is estimated to be occurring at a rate of roughly 850,000 hectares per year<sup>8</sup>.

Excessive cutting down of trees for charcoal production, illegal settlements and cultivation in protected forest reserves and over-exploitation of timber are especially rampant. In areas where there is population pressure and high demand for more

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<sup>6</sup> see NEAP at p.43

<sup>7</sup> Advanced Learners Dictionary. 2000 ed. P306

<sup>8</sup> see the Mungomnba constitutional review commission report

agricultural land, significant encroachment into the forest reserves has occurred. Forests in open areas (outside forest reserves) under customary law are especially vulnerable to deforestation. The pressure on forests is especially heavy near big towns and along the main roads. Wood fuel is still the major source of energy at household level, supplying about 90% of urban households<sup>9</sup>.

The effects of deforestation are manifest and have severe implications on the environment and the health of living organisms. Forests help to maintain the temperature at lower levels. In the absence of forests, the entire heat that is not absorbed by the earth's surface is reflected leading to increases in atmospheric temperature. And the ultra violet rays which can no longer be absorbed by the ozone layer and the forests due to deforestation threatens the health of the people<sup>10</sup>.

## POLLUTION

Pollution as defined by the tenth report of the Royal Commission on Environment is the introduction by man into the environment of substances or energy liable to cause hazard to human health, harm to living resources and ecological systems, damage to structure or amenity or interference with legitimate use of the environment<sup>11</sup>. In other words, it is the process by which substances called pollutants whose effect is that of affecting the quality of the environment are introduced in the environment usually by man's activities. Air and water pollution are but examples of the many forms in which pollution can occur. The Environmental Protection and Pollution Control Act EPPCA defines pollution to mean<sup>12</sup>:-

*the presence in the environment of one or more contaminants in such quantities and for such duration and under such conditions as may cause discomfort to or endanger the health, safety and welfare of persons, or which may cause injury or damage to plant or animal life or property, or*

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<sup>9</sup> ibid

<sup>10</sup> Karpagam M. Environmental Economics. 2006 ed. P134

<sup>11</sup> Quoted by Jeremy C. in Air Pollution: An Introduction. 1997. p.1

<sup>12</sup> Section 2

*which may interfere unreasonably with the normal enjoyment of life or use of property or conduct of business.*

## **Water pollution**

Without water all life ceases. Man is two-thirds water and the surface of the globe is seven-tenths of water<sup>13</sup>. Yet mankind pollutes water in all possible ways. Water pollution is the process of altering the properties of any water which renders it unfit or less fit for the purpose its unaltered form was used – the use being natural or artificial<sup>14</sup>. “A river may be considered to be polluted when the water in it is less suitable for all or any of the purposes for which it would be suitable in its natural state”<sup>15</sup>. Water pollution may also be defined as a natural or induced change in the quality of water which renders it unusable or dangerous as regards food, human and animal health, industry, agriculture, fishing or leisure pursuits<sup>16</sup>. The relevant legislation on environment<sup>17</sup> in Zambia defines water pollution as *the introduction, directly or indirectly of pollutants into an aquatic environment*. Unless the water resource is utilized in a sustainable manner, it will be difficult to ensure its continued availability in terms of both quantity and quality.

Water pollution in Zambia, is mainly caused by mining, agriculture and manufacturing activities, largely along the line of rail. Ground water pollution mainly results from leachate processes. The Kafue River is probably the most polluted river in Zambia, being in the nerve centre of Zambia’s social and economic development. It receives sewage and effluents from various activities, including mining, manufacturing industry and agriculture. Added to these problems is the fact that water and sanitation service delivery has been inadequate and inefficient<sup>18</sup>.

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<sup>13</sup> Park, C.C. Ecology and Environmental Management. 1980. Folkestone: Adwson. Boulder, Colo. Westview Press

<sup>14</sup> *ibid* 8 p.119

<sup>15</sup> Dr. Key, British expert.

<sup>16</sup> *Supra* 3 at p. 69

<sup>17</sup> See section 22 of EPPCA cap. 204

<sup>18</sup> *Ibid* 4 p.788

The effects of water pollution are multifaceted. Water pollution affects humans, industries and agriculture in one way or another. Water is a significant vehicle in the transmission of disease when it contains water borne pathogens or disease producing organisms<sup>19</sup>. Polluted water is a viable environment for these disease causing organisms. Whenever man is exposed to the use of polluted water, he has suffered from diseases such as dysentery, typhoid fever, cholera and infections hepatitis<sup>20</sup>. Many a time, cholera outbreaks has been reported in many parts of Zambia and people have died in numbers on several occasions subsequently.

In terms of industrial effects water pollution may reduce the utility of water for industrial purposes. The range of quality of water required in industrial application is quite wide. Some industrial processes require soft water. So polluted water can involve substantially high costs in purifying the water, repairing damaged equipment or making extensive adjustments to industrial processes themselves. As regards agriculture, water pollution can greatly affect the productivity of irrigated land. It must be noted here that irrigation itself is a cause of water pollution. Salt concentrates left in wet soil as irrigation water evaporates, if allowed to accumulate, fertility would diminish and eventually land would become barren. Further specific toxins or oxygen depletion in polluted water can directly kill fish in rivers among other things.<sup>21</sup>

## **Air pollution**

In time past the problem of air pollution in cities was mainly due to coal burning in heating systems which emitted smoke ashes and sulphurous gas<sup>22</sup>. At present industries and automobiles are the primary sources of atmospheric pollution. Increasing industrialization and urbanization has led to growing demands to use the atmosphere as a waste disposal medium. It must be pointed out here however, that the accumulation of waste gases and particles from combustion, production and other economic activities

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<sup>19</sup> Hynes H.B.N. The Ecology of Flowing Waters in relation to Management. *Journal of Water Pollution Control Federation* p.42

<sup>20</sup> Howe, G. et al (ed). *Environmental Medicine*. 1973. London. Heinemann

<sup>21</sup> Hodges, L. *Environmental Pollution*. 1973. Philadelphia. Holt.

<sup>22</sup> Supra note 8

exceeds the natural dispersion capacity of the atmosphere. This makes the air movements unable to disperse wastes at the rate they enter the atmosphere, hence the air quality deteriorates and the seemingly infinite supply of clean air diminishes and thus air is polluted.

Air pollution as rendered by the World Health Organization is;

*the presence in the air of substances put there by acts of man in concentrations sufficient to interfere with the comfort, safety, or health of man or with the full use or enjoyment of his property. The presence of contaminants in the atmosphere is considered to be in sufficient quantities and duration, to cause them to be injurious to human health, animal and plant life, and reduce welfare in general*<sup>23</sup>.

Air pollution is also defined by the EPPCA<sup>24</sup> as;

*a condition of the ambient air arising wholly or partly from the presence of one or more pollutants in the air that endangers the health, safety or welfare of persons or that interferes with the normal enjoyment of life or property or that endangers animal life or that causes damage to plant life or property.*

While ambient air is defined by the said Act as *the atmosphere surrounding the earth, but does not include the atmosphere within a structure or within any underground space*, and a pollutant is said to be *any substance or energy which if it enters or is discharged into the ambient air is likely to render the air offensive or harmful to human, animal or plant life*. There are a number of substances which pollutes the environment upon their emission into the atmosphere such as sulphur dioxide, carbon monoxide, hydrocarbons to mention but a few.

The mining industry on the Copperbelt, Maamba collieries in Southern Province, Lumwana and other mines being opened up in North Western province can be said to account for the largest percentage of air pollution in Zambia. However other industrial activities such as power plants, manufacturing industries like the Nitrogen Chemicals of Zambia among others also contribute to air pollution. Sulphur dioxide emissions from

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<sup>23</sup> Quoted in pollution Control Hand book; Utility Publications Ltd. Secunderabad.1986.

<sup>24</sup> Cap. 204 of the laws of Zambia section 35

roasting and smelting operations and the burning of fuels containing sulphur dioxide are the main sources of air pollution in the Copperbelt area. It has been noted that concentrations of sulphur dioxide exceed recommended levels at times. Sulphur dioxide is a colorless suffocating gas which is poisonous to both plants and animals. The other major source of air pollution in Zambia as mentioned earlier, are automobiles. Most cities like Lusaka have recorded a steady increase in a number of second hand automobiles from Japan and other places. This entails that the amount of carbon monoxide emission from these automobiles have been on the increase as well. Carbon monoxide is a colorless and odorless gas produced from the incomplete combustion of carbon fuels such as diesel and petrol mainly used by these automobiles. It poses a serious health problem. It is highly toxic at significant levels of concentration and can cause decreased human efficiency in low but chronic doses. It interferes with the transfer of oxygen in the body in both human beings and animals.

Generally air pollution has had detrimental effects on the environment. In the recent past there has been a dramatic rise in respiratory diseases. Substantial losses of cattle can also be caused by fluoride emissions from factories processing phosphate deposits for fertilizers (i.e Nitrogen Chemicals of Zambia). Air pollution has also affected plants<sup>25</sup>. For instance, tree foliage along turnpikes is damaged in a band, where fumes from diesel truck exhaust, touch the leaves. Acids absorbed on the particles on buildings accelerate corrosion in humid areas. Sulphur oxides speed the deterioration of building materials. Finally, there have been indications that air pollution changes the climate. For example high concentrations of carbon dioxide result in an increase in the absorption and radiation of infrared rays which warms the lower atmosphere<sup>26</sup>.

### **Wildlife depletion**

In general terms, wildlife may be defined as all components of the ecosystems in national

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<sup>25</sup> Supra 20 at p. 102

<sup>26</sup> supra 4 at p. 110



parks and all wild animals and their habitats outside national parks<sup>27</sup>. According to the Zambia Wildlife Act, wildlife means wild animals or birds of species which are found in Zambia in a wild state and vegetation which is indigenous to Zambia and grows naturally without cultivation<sup>28</sup>. Zambia like many other countries has been faced with wildlife depletion concerns. There are a series of factors that have actuated and still continue to fuel this environmental problem. The opening of up of some of the natural habitats for wildlife by industrial activities, agricultural purposes as well as for settlement purposes are some of the factors which can lead to the depletion of wildlife. The Mung'omba commission ably commented thus;

*Although the designated area of National Parks is impressive, close to 50% of the parks are either depleted of game or encroached. Over 59% of the 35 Game Management Areas are depleted of game. According to the World Monitoring Centre (1993), 28 animal species/sub-species found in Zambia are considered endangered or vulnerable. The fact that human settlements and other land uses are permitted in the Game Management Areas predisposes these areas to stock depletion and degradation<sup>29</sup>.*

### **Ozone layer depletion**

Ozone is a naturally occurring gas present in trace quantities in the atmosphere and is most abundant in the stratosphere where it forms the stratospheric Ozone layer. A number of industries in mining, health, electronics and tourist sector in Zambia have been cited to be using Ozone-depleting substances<sup>30</sup>. Emission of certain chlorofluorocarbons, nitrous oxides and nitrogen oxides upsets the balance between production and destruction of ozone thus depleting the ozone layer above the earth's surface. The thinner the layer the more radiations it allows into the earth's surface. Ozone provides a protective shield as it filters ultraviolet radiations, which are high – energy radiations. Radiations known as the

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<sup>27</sup> Mungomba CRC report 789

<sup>28</sup> Cap. 201 Act number 12 of 1998

<sup>29</sup> *ibid* 4 p.791

<sup>30</sup> See the Report on Ozone Depleting Substances Survey in Zambia. April, 1999.

ultraviolet B can cause serious consequences on living organisms including humans. It can cause sunburn, damage DNA, depress immune systems and has been linked to skin cancer and development of cataracts<sup>31</sup>.

## **Environmental noise**

Environmental noise can also be regarded as a form of environmental pollution. This problem has gained ground in our time and age due the advent of industrialization. Concerning environmental noise it was stated in 'Motor Vehicle Air Pollution: Public Health Impact and Control Measures'<sup>32</sup> that noise has been an environmental problem for man. However, noise problems of the past are incomparable with those of modern society. Noise means any undesirable sound, that is intrinsically objectionable or that can cause adverse effects on human beings, animals or the environment<sup>33</sup>.

There are many and varied environmental problems prevailing in Zambia and elsewhere. Most of these problems have been caused largely by industrialization and other factors associated with developmental. The problems analyzed above only help in establishing the basis of this analysis. The list is by far not exhaustive.

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<sup>31</sup> Supra note 10 at p. 274

<sup>32</sup> Edited by David and Oliver, 1992. Geneva, E.J. Press.

<sup>33</sup> Section 66 of the EPPCA, Cap. 204

## Chapter Two

### ENVIRONMENTAL PROTECTION VERSUS INDUSTRIAL DEVELOPMENT (Part A)

#### 2.0 ENVIRONMENTAL PROTECTION

##### 2.1 Historical Genesis

Throughout the long history of a civilized man the record has been one of continued destruction of environmental resources by man. As his abilities for destruction increased with the development of industries and technology, man accelerated the pace of that destruction. Black J in his *Management and Conservation of Biological Resources* lamented *inter alia*, that environmental destruction has almost gone a full circle now and the land that has to feel the destructive forces of man's activities has deteriorated in quality. He further observed that man at last has come face to face with the realization that from now on he must learn to live with his environment and keep his developmental endeavors in a balanced relationship with that of the environment<sup>34</sup>.

The irrepressible human curiosity and the unquenchable thirst for knowledge are the fundamental basis for scientific development. A major part of innovations in scientific and technological development has been directed towards generation or elevation of human comforts thereby increasing the standard of living in society. This led to increase in industrialization. Some of the important improvements to our standard of living that can be attributed to the application of science and technology among other things include:-production of more and better quality food, elimination of many infectious diseases, invention of new faster communication systems, creation of reliable and faster transportation, supply of safe water and invention of machines to replace human and animal power<sup>35</sup>.

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<sup>34</sup> Black, J, *The Management & Conservation of Biological Resources*, 1968.pp68&69, Philadelphia. Davis Company

<sup>35</sup> See p.71 of Black's *Management & Conservation of Biological Resources*.

Consequent to these improvements disturbing side effects such as environmental pollution, deforestations, urbanization, loss of arable land, evolution of new organisms resistant to control have emerged. These effects are considered to be potential threats to both the environment and man.

In agrarian society, people lived essentially in harmony with nature, raising food, gathering firewood and making clothing and tools from the land. The wastes from animals and humans were returned to the soil as fertilizer. Hence there were no appreciable problems of air, water or land pollution.<sup>36</sup>

After the Second World War the industrialized countries had an economic boom due to burgeoning population, advanced technology and rapid increase in energy consumption. These activities increased considerably from 1950 onwards thereby increasing the variety and quality of wastes discharged into the environment.<sup>37</sup> New chemicals, including pesticides and insecticides, used without adequate data regarding their environmental and health effects caused and continue to cause enormous environmental problems<sup>38</sup>. Alarming, these problems are aggravated further since the types and amounts of such pollutants discharged into the environment are increasing inexorably as against the limited capacity of our water, air and land systems to assimilate these waste materials.

The financial crunch since 1970 forced changes in the priorities of many countries, Zambia inclusive. Issues like unemployment, inflation, energy, and effects of globalization, resource crunch, high technology, war threats, social and political compulsions became major concerns. Thus it appears that concern about the public health and safety aspects of hazardous wastes will continue to increase for a long time. It is in this backdrop that development and implementation of environmental protection and pollution control assume paramount importance<sup>39</sup>.

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<sup>36</sup> Ibid

<sup>37</sup> Supra 33 at p. 81

<sup>38</sup> 'Fundamentals of Environmental Pollution' by Krishnan Kannan, S. Chand & Company, New Delhi. 1991.

<sup>39</sup> OECD Papers; Economic Measurement of Environmental Damage. 1980. London. Duceworth.

The United Nations Conference on the Environment and Development (UNCED), known as the "Earth Summit" held in June 1992<sup>40</sup> is considered as another historic event involving virtually all member states of the United Nations such as Zambia. This conference identified the practical environmental and developmental challenges and opportunities and their inter-linkages up to the end of this century and even beyond.

*The quality of the environment is affected in various ways. Take for instance wastes from commercial and residential sources, they stress the environment just like affluence and poverty also cause pollution in their own ways. Further, natural calamities, illiteracy and lack of environmental ethics are also partially responsible. Despite the fact that there are many factors that contribute to environmental deterioration, industrial activities in Zambia the major source of environmental deterioration.*

From the foregoing it is clear that industrial and or technological development has been the major factor causing devastating effects on the environment. This in many instances has been demonstrated by resulting poor environmental quality especially along the mining regions of Zambia. The development of the mining industry on the Copperbelt has reduced the environment greatly from the state it was in prior to the commencement of mining activities on the Copperbelt. For instance, due to the perpetual discharging of toxins from mining activities into the Kafue River, its water is not as useful as it used to be.

The savagery attack on the environment necessitated the genesis of the age of environmentalism. It became more than apparent that mankind needed to advance civilization in more environmental friendly manner. Man began to take cognizance of the need to manage environmental resources or they get depleted in which case, adverse effects would be spelt for mankind. Environmental issues which were mostly the offshoots of the advent of civilization, justified environmental protection. Protection has been viewed by the NPE as a term used in contrast with conservation for the prevention

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<sup>40</sup> Quoted by R.W. Jackson in his 'Environmental Science'

of harm to organisms or the environment, usually with tangible intervention and active management.<sup>41</sup>

## 2.2 Objectives of environmental protection

Environmental protection thrives on a number of objectives upon which the whole concept is premised. It follows therefore, that even institutions like the Environmental Council of Zambia (ECZ) have been established in order to achieve particular objectives pursuant to environmental protection concerns. The main objective of ECZ is to deal with issues relating to the environmental protection and pollution control. The legislation which provides for environmental issues and or matters incidental thereto highlights its main objective in its preamble. The provision in question reads in part *'An Act to provide for the protection of the environment and the control of pollution...'*<sup>42</sup> The objectives of environmental protection as deduced from the NPE objectives<sup>43</sup> include:

- *Regulating the exploitation of natural resources*
- *Protecting environmental degradation and maintaining environmental quality*
- *Balancing the ecosystem*
- *Preserving the biological diversity*
- *Adopting engineered technology without creating adverse effects on environment.*
- *Formulation of suitable environmental laws and regulations and effective implementation of the same.*<sup>44</sup>

Unprecedented developmental projects done rather in haste without taking into account environmental concerns are retrogressive to the above alluded to, objectives of environmental protection, in that they make realization of the said objectives difficult. It can be argued therefore, that protection of the environment must be a prime concern in all developmental endeavors.

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<sup>41</sup> National Policy on Environment, p. viii

<sup>42</sup> Cap 204 of the laws of Zambia

<sup>43</sup> Ibid p.16

<sup>44</sup> The NPE outlines some of these objectives comprehensively, see p. 16

## 2.3 Components of environmental protection

Environmental protection is a broad subject besides its complexity and sensitive nature. Due to the broadness and complexity of environmental protection it is only prudent to highlight the components of particular importance involved in protecting our Zambian environment. The major components of effective environmental protection are:<sup>45</sup>

- *Control of atmospheric pollution and environmental degradation*
- *Adopting technologies which ensure sustainable development*
- *Conducting environmental impact assessment to review the existing technologies and making it mandatory for clearing major projects of environmental concerns*
- *Instilling environmental perception among people by conducting awareness programs*
- *Environmental education and education at schools, colleges and universities*

NB: the importance of Environmental Education was highlighted at the Environmental Education Conference held at Belgrade and Tblisi in 1975 and 1977 respectively<sup>46</sup>.

## 2.4 Environmental Impact Assessment

Environmental Impact Assessment (EIA) is an activity designed to identify and predict the impact on the biogeophysical environment and on the human health and well-being of legislative proposals, policies, programs, projects and operational procedures and to interpret and communicate information about the impacts<sup>47</sup>. EIA is widely accepted as a tool in environmental protection. It has been adopted in many countries with different degrees of enthusiasm and evolved to varying levels of sophistication. An Environmental Impact Statement (EIS) is of prime importance in any EIA process. An ESI is a public document written in a format specified by authorized national state or local agencies. In

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<sup>45</sup> Singer, S.F. Changing Global Environment, 1975. New York. Reidel. P. 163

<sup>46</sup> United Nations Education Program Report (1977)

<sup>47</sup> Chand's Environmental Chemistry and Pollution Control p254

simple terms, it is an *environmental inventory* - a description of the environment as it exists in an area where particular proposed action is being considered<sup>48</sup>.

## Historical background

When ever new development project is planned which is likely to affect environmental quality, it is useful to carry out Environmental Impact Assessment EIA. In many jurisdictions EIA is mandatory before according permission to proceed with development projects such as power plants, smelters, petrochemical industries to mention but a few.

The first comprehensive legislation which contained a requirement for carrying out EIA was passed on 1<sup>st</sup> January, 1970 in USA<sup>49</sup>. Two of the main sections provided for; specification for the preparation of Environmental Impact Statement on actions which significantly affect the environmental quality and institutionalization of the Environmental Impact Assessment in the Executive office of the president through the establishment of the council on Environmental quality among others. In Canada, the environmental assessment and review process stated in 1973 for planning, decision making and implementation of new projects, programs and activities with potentially significant environmental effects<sup>50</sup>.

In Zambia with the enactment of the Environmental Protection and Pollution Control Act (EPPCA) by Act number 12 of 1990 later revised by act number 13 of 1994 saw the inception of the EIA process. This could be deduced from the functions which the said Act conferred upon the Environmental Council of Zambia a body legally established for purposes of looking into environmental issues. Section 6 of the Act outlines the functions of the Council. Some of these functions are to<sup>51</sup>;

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<sup>48</sup> Peter Wathern. Environmental Impact Assessment. 1989. Unwin Hyman

<sup>49</sup> Ibid 46

<sup>50</sup> Discussed by Chand in his Environmental Chemistry and Pollution Control p.255

<sup>51</sup> Section 6 (j) and (k) respectively



- *identify projects or types of projects, plans and policies for which environmental impact assessment are necessary and undertake or request others to undertake such assessments for consideration by the Council;*
- *consider and advise, on all major development projects at an initial stage and for that purpose the Council may request information on the major development projects;*

Today the EIA process has been accepted in both industrialized and developing nations. It may suffice to categorically state here that carrying out EIAs prior to issuing mining and prospecting licences must be a requisite condition for mining ventures it be small scale or large scale. It may also be necessary to require the production of annual environmental audits for subsequent extension of developmental projects. In a nutshell the environmental impact assessment process is a useful tool in environmental protection and has now become a legal requirement which must be satisfied before carrying out any developmental project likely to have substantial effects on the environment.

## **2.5 Environmental Awareness**

This is equally a very important aspect of environmental protection and pollution control. If significant progress is to be made in environmental protection and pollution control environmental awareness campaigns cannot be dispensed with. The importance of environmental awareness cannot be over estimated. It is paramount that information about environmental issues and how best the environment can be cared for is disseminated to ordinary members of communities as well as other stakeholders. For it is only then that masses will be able to participate in managing our environment. Efforts of the ECZ must be complemented in spearheading environmental awareness. However, there is need to do more than is currently being done. Quite commendable are the efforts of Zambia Consolidated Copper Mining (ZCCM) Investment Holdings. Under the Copperbelt Environment Project; ZCCM has established Environmental Public Information Centers in Kabwe, Kitwe and Mufulira in its bid to raise awareness and

effective participation of stakeholders and the general public in environmental management<sup>52</sup>.

Cognizance is taken of the current situation on environmental awareness and it is observed that the opening information centers must be extended to rural districts especially in the current wake of calls to extend developmental projects like infrastructure development and manufacturing industries to rural areas. These centers must be ceased with the purpose of documenting and making available to the public, information on various environmental issues. This will greatly promote environmental awareness and values on the importance of preserving the environment on which our daily lives depend today and in future. For everyone of us has a responsibility to protect the environment and make a difference in ensuring that our homes, communities and districts are environmental friendly. It is further observed that even media organizations can play a pivotal role in disseminating information about environmental concerns thereby enhancing environmental awareness.

## **2.6 Analysis of environmental protection in some provinces**

### **Eastern Province**

The main issues demanding environmental attention as identified by the NEAP in Eastern province include deforestation, overexploitation of game, soil erosion, bush fires, water pollution and poor sanitation. Currently, in order to protect the environment, projects such as Luangwa Integrated Resources Development Project, ADMADE Wildlife project and Agroforestry Extension program<sup>53</sup> have been embarked on. It is the view of this paper that problems such as water pollution and deforestation has largely resulted from industrial activities and use of agricultural technology in the province.

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<sup>52</sup> 'Promoting Sustainable use of environmental resources through information dissemination' by ZCCM-investment Holding

<sup>53</sup> National Environmental Action Plan NEAP p.77

## **Central Province**

Deforestation, soil erosion, shifting cultivation, bush fires, overgrazing, overexploitation of fish and game, agro-chemical pollution, land dereliction caused by sand quarrying, mining pollution among others are familiar problems in this province. Current activities in the province being carried out in response to these problems include soil conservation and Agroforestry Extension program<sup>54</sup>. It is asserted here that land in central province is the mostly affected component of the environment and its quality will continue to reduce if the current protective measures are not supplemented. This is mainly due to the use of agricultural technologies by commercial farmers in the province. The spill over of the mining activities in Kabwe still bears some effects on land and wastes dumped on land contribute to water pollution during the rain season.

## **Lusaka Province**

Industrial pollution, soil erosion, drought, overgrazing, overexploitation of game and fish, unplanned urban settlements, poor sanitation and deforestation are the main environmental problems in this province. It has to be noted that in Lusaka province there is presence of both light and heavy industries. This being the case it is imperative that agents and institutions charged with monitoring industries to ensure compliance with environmental protection and pollution control should not relent from carrying out these duties duly placed on them or else industrial pollution may be compounded to greater proportions by uncontrolled industrial activities.

## **Luapula Province**

In this province the major environmental issues include water pollution, deforestation and soil acidity to mention but a few. Wetlands development project focusing on local community participation in resource development utilization and development are some of the environmental activities being carried out to mitigate environmental problems and

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<sup>54</sup> NEAP p.77

promote protection of the environment. It is likely that the mining activities by Anvil Mining transporting copper ores into Zambia via lake Mweru may accelerate water pollution on the said lake due to oil discharge from the pontoon. It would be apt to conduct on site inspection regularly in order to protect lake Mweru from pollution.

### **North Western province**

Salinization, pollution and deforestation are some of the environmental problems in the province. These problems will be compounded if adequate measures are not taken by the opening of this province to further mining activities as well as oil exploration. It is considered here that conducting EIAs, geographical surveys and inspection of mines and other industries should be encouraged.

### **Copperbelt Province**

Environmental problems on the copperbelt are quite complex and deserve detailed assessment in order to continue developing appropriate environmental strategic actions for the province. This province is a victim of problems such as deforestation, soil acidity, pollution, land dereliction and noxious weeds arising from eutrophication of waterways by sewage effluents not to mention the impact of tailing dams and land dereliction which claimed lives of miners in 1970. To mitigate these problems the ECZ conducts regular inspections of the mines and other industries which encroach on the environment in the province.

The environmental issues in the provinces just highlighted are mainly due to developmental activities from industries. To protect the environment from unreasonable reduction in its quality, it is paramount that protective measures need to be enforced in the provinces. It should be ensured that EIAs are carried out prior to any industrial developmental project and inspection of industrial plants should be strengthened.

The quality of the environment is a concern that can not be dispensed with on account of advancing our industries and technology. Development of whatever sort cannot be sustained in an environment whose essential resources have been depleted. Industries and technology will only be more meaningful if the quality of the environment is maintained to reasonable standards. Therefore, the cogent need to take precautions before carrying out the developmental project being called in question which may have substantial impact on our environment. This however, does not underscore the fact that there have been progressive steps that have so far been made. With the legal requirement of carrying out EIAs on major developmental projects, some mining companies have lived up to this challenge. The Konkola Copper Mines, Mopani Copper Mines and Chambishi Metals Plc have complied with the EIA requirement and have since submitted their environmental impact assessment reports to ECZ.<sup>55</sup>

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<sup>55</sup> EIA 'Progress Report', the Mining Sector, July 2004

## Chapter Three

### ENVIRONMENTAL PROTECTION VERSUS INDUSTRIAL DEVELOPMENT (Part B)

#### 3.0 INDUSTRIAL DEVELOPMENT

##### 3.1 Review of the Industrial Sector

Zambia's industrialization strategy since independence has always revolved around state ownership and direction of important industrial enterprises<sup>56</sup>, major public investments in intermediate sectors (chemicals, fertilizers, cement and consumer durable), and restriction of foreign competition through import licensing and tariffs and promotion of import substitution industrialization through high levels of protection, investment controls, restrictive licensing and other regulatory devices. The resources for the strategy mainly came from the mining industry's foreign exchange earnings and tax revenues<sup>57</sup>. This reliance on the mining sector posed an indirect danger on the environment in that there was need for the sector to produce to the best of its capacity regardless of environmental effects.

The leading role in industrial development was played by the parastatal sector, which in the mid 1980s accounted for 69% of manufacturing assets, 66% of value added tax and 54% of total formal employment<sup>58</sup>. The poor performance of the parastatal sector took various forms and was caused by many factors including deterioration in capacity

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<sup>56</sup> In the first and second republic direct government and political intervention in the industrial sector led to lack of clear cut policy as was reported the Mwanakatwe Commission, p.131

<sup>57</sup> World Bank 1992

<sup>58</sup> Report of the Commission of inquiry into the salaries, salary structures and conditions of service of the public Service and parastatal sector Vol. I.p132

utilization and efficiency, large financial losses due to government price control, intrusive political intervention, general economic decline, over employment, shortage of skilled manpower and unavailability of imported inputs. The poor performance entailed that environmental resources were being sacrificed for almost no gain and thereby spelling their depletion.<sup>59</sup>

In order to boost industrial development, the government introduced a number of measures, such as, the Industrial Development Act of 1977<sup>60</sup>. The major objective of the Act was to promote private investment but this objective was not fulfilled. The Act was repealed and replaced by the investment Act of 1986, which although more supportive of the private sector and with better targeted and more streamlined incentives, still failed to stimulate private sector development largely because of government tight controls on manufacturing registration. The Act was revised in 1991 to minimize government controls and attract foreign investment. In addition, the Act provides guarantees against nationalization of foreign owned enterprises and attractive incentives. The Act also established the Investment Centre to promote investment in the country<sup>61</sup>. It must be observed here that although it is important to attract investment, our environmental resources should not be auctioned in the name of attracting investment.

It is common knowledge that Zambia has made considerable efforts in creating a favorable environment for industrial development. There have been calls for rejuvenating industries which are not performing as well as opening up new industries in the wake of cogent demand for tangible development. One hopes that if positive strides continue to be made and conditions remain favorable there might be a significant boost in manufacturing activities country wide. Given this scenario, environmental protection and pollution control must be are of prime concern as far as the development of industries and technology is concerned.

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<sup>59</sup> *'Control of the parastatal Sector,'* Law in Zambia, Muna Ndulo. 1987. Lusaka. Kenneth Kaunda Foundation

<sup>60</sup> Prior to the enactment of this Act there was no specific Act that provided legal guidance in the development of Industries – State of Environment in Zambia, 2000 report (ECZ)

<sup>61</sup> NEAP p. 56

### 3.2 Environmental Issues in Industry

Indications suggest that there is now more interest in investing in manufacturing sector. During 1993 about 25% of the approved new investment licenses were for manufacturing. The anticipated growth in manufacturing activities implies more generation of industrial wastes such as gases, waste water and solid wastes. Noise pollution is probably more important as an in-factory occupational health hazard. It must be observed further that liberalization of the economy has promoted the importation of finished consumer goods and beverages whose packaging has worsened the solid waste disposal problems<sup>62</sup>.

Currently the trade effluents into sewers and water ways from many industries exceed the recommended standards. A typical example is the situation at Kafue Township where concentrations of pollutants in industrial waste water are above acceptable levels. In public water ways, such discharges can have negative impacts on health, wildlife and the environment<sup>63</sup>.

The main problem with solid waste relates to disposal of packaging material especially plastic, glass and tin containers, of consumer and industrial goods which are not recycled. There are few industries which in Zambia which recycle wastes from industries and consumer goods. However, industries such as the Zambezi Paper Mills which recycle waste paper and should be promoted in industry.<sup>64</sup>

Air pollution occurs in the forms of gases, vapors and particulates. The most common industrial air pollutants in Zambia are sulphur dioxide, ammonia, nitric acid and ammonium nitrate gases. The Nitrogen Chemicals of Zambia discharges about 21000 tones of nitrogen dioxide into the atmosphere per year<sup>65</sup>. Some of this enters the Kafue river through precipitation and direct absorption. Such industrial emissions accumulate

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<sup>62</sup> Ibid

<sup>63</sup> Supra note 42

<sup>64</sup> Supra note 59 at p.78

<sup>65</sup> Salter 1978-79



during thermal invasions to form a low brown haze over Kafue Township and undoubtedly contributes to human ill-health and environmental pollution. The transport industry also contributes to air pollution through engine emission<sup>66</sup>.

Use of radioactive substances is common in some industries. These substances can cause cancer in human beings. Since radioactive materials are used in the country, there is clearly need to enforce the Ionizing Radiation Act and Statutory Instrument No 171 of 1992 to regulate the importation, use and disposal of radioactive materials and waste<sup>67</sup>. Legal instruments in Zambia are silent on the discharge of radioactive waste. The legal instruments are required to control the importation of radioactive waste for use in the country. Lack of legal provisions can be taken advantage of by defiant industries using radioactive materials. It is therefore important to advocate for legal provisions to regulate use importation and disposal of radioactive materials.

### **3.3 Mining Industry**

Zambia's mining history dates back to 1951 but large scale mining only began in the 20<sup>th</sup> century with first discovery of Kabwe Mine in 1901. Commercial copper production came from Kansanshi Mine-1908, Mbwana Mkubwa-1913, Mufulira Mine-1929, Luanshya Mine -1931, Nkana Mine-1931, Nchanga-1936, Nchanga Open pit and Konkola-1957. Chibuluma Mine-1963, Chambishi Open pit-1965, Kalengwa Mine-1969, Mbwana Mkubwa open pit-1971, Chambishi Underground-1972 and Baluba-1973<sup>68</sup>.

Two companies emerged namely Anglo American Corporation ACC and Roan Selection Trust and dominated the industry for 40 years until Nchanga Consolidated Copper Mines ACC and Roan Consolidated Copper Mines for RST were born in 1969 with government having 51% shares, which later increased to 60.3% in 1979. The two companies were

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<sup>66</sup> At present there is no substantive regulation of engine emissions

<sup>67</sup> the enforcement of the two legal regimes to a full extent will be a step forward considering the activities of ionizing radiation in Kabwe which poses a risk on our environment.

<sup>68</sup> State of Our Environment in Zambia 2006 p. 83

further merged into Zambia Consolidated Copper Limited ZCCM in 1982. The continued deterioration of copper and cobalt led to the closure of most mines by 1994<sup>69</sup>.

Since 1994 the mining industry has experienced some tremendous changes. This is a result in change in the Zambian government's mining policy, which now encourages private sector participation in the various aspects of mining and industry and the enactment of the Mines and Mineral Act of 1995 complemented by the Environmental and Pollution Control (Environmental Impact Assessment) regulations of 1997<sup>70</sup>. These developments have increased activities in the mining sector. The Ministry of Mines for instance, has tried to promote small-scale mining particularly in the gemstone industry, exploration and addition of value by local processing of minerals. In view of these policy objectives, the government had begun to privatize the assets of the mining conglomerate-ZCCM and many industries<sup>71</sup>.

The privatization of ZCCM and the Change to a favorable mining policy has attracted a considerable number of investors in mineral exploration and that by 2000 about 366 exploration licenses valued at more than US\$50million had been issued<sup>72</sup>. Of these, 246 licenses were for gemstones, 115 for base, precious and energy minerals and 5 for industrial minerals. By 2000 there were 29 large scale mining licenses, 40 small scale mining licenses and 11 prospecting permit holders<sup>73</sup>.

Given that mining industry has been in existence in Zambia for 70 years and is likely to go on for some considerable time, pollution due to mining activities will continue and that already there are serious pollution problems in localized areas mainly on the Copperbelt. Throughout the 65 years of the industry, mining was done under the norms of the mining company being governed by the Companies Act<sup>74</sup>, mines and minerals

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<sup>69</sup> opcit 48

<sup>70</sup> Statutory Instrument No. 28 of the Laws of Zambia

<sup>71</sup> supra note 48

<sup>72</sup> opcit 63 at p. 83

<sup>73</sup> ibid

<sup>74</sup> Cap. 388 of the Laws of Zambia

regulations<sup>75</sup> with setup facilities meant for making profit with no 'built-in' management plans to protect the environment from the inception of mining operations to closure until recently when environmental concerns have been raised.

Obvious indicators to the state of environment are the mineral resource reserves themselves that have to be exploited for economic gain, which has accounted for over 90% of the Zambia's foreign exchange earnings. For example, copper and cobalt production had risen to the highest of about 75000 tones in 1970 before declining to slightly over 30000 tones per annum by 1998<sup>76</sup>.

As a result of these huge tonnages of copper and cobalt, former ZCCM alone held about 9 licenses, issued by the Environment Council Zambia, to discharge tailings effluents into public streams<sup>77</sup>. It further held about 7 licenses to operate domestic waste disposal sites, about 25 licenses to operate tailing dams occupying 9562 hectares<sup>78</sup>. The Kafue river, one of the major Zambian river, flows through this mining zone, ZCCM added about 500000 cubic meters per day of water into the Kafue river in addition to effluents from agriculture in Mazabuka and manufacturing in Kafue<sup>79</sup>. Further more since 1960, Zambia has experienced a rapid increase in small-scale mining activities. These activities have become a significant environmental concern, both in rural and urban areas. These mining activities have left behind unattended to pits and trenches of various sizes.

### 3.4 Environmental Impacts

The impact of mining activities in Zambia on the environment can be assessed through comparison of natural environment and disturbed environment<sup>80</sup>. It is well known that production of material without planed environment may result into physical or chemical pollution. Chemical and physical pollution may take many forms. Uncontrollable

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<sup>75</sup> Annexed to Cap.213 of the Laws of Zambia

<sup>76</sup> supra note 48 p. 84

<sup>77</sup> Supra note 71 at p. 84

<sup>78</sup> ibid at p. 84

<sup>79</sup> Masinja, 1997

<sup>80</sup> State of Environment in Zambia, 2000, p.93

excavations for example from small-scale mining in the Lusaka area has resulted in landscape destruction. Siltation and sedimentation may result from the disposal of sediments into the drainage system and natural waters either as discharges, overflows from tailings impoundments spillage or by erosion of overburdened dumps or tailings impoundments<sup>81</sup>.

Water pollution is caused by the release of dissolved substances including heavy metals and other chemicals as well as oil to rivers, wetlands and underground water either as direct discharge, seepage or overflow from pollution control facilities. Air pollution results from emissions of sulphur dioxide, carbon dioxide and nitrogen dioxide into the atmosphere as well as dust dispersal from dried surfaces of tailing impoundments and process operations. The major sources of air pollution largely are the mining Smelters, Indeni Petroleum Refinery, Chilanga Cement and Nitrogen Chemicals of Zambia<sup>82</sup>.

### **3.5 Responses to Environment Concerns**

As a result of regulatory reporting by companies to ECZ and requirement for EIA before starting up any project, a health state of the environment is being created slowly. However, it remains paramount for enforcing agents such as the ECZ to continue ensuring that companies comply with the regulatory requirements. It has been observed in the recent past that efforts have been made and are still being made in putting up programs in industry which encourage companies to invest in cleaner technology. Further, there has been a realization that development either of technology or industries should be sustainable, hence the concept of sustainable development.<sup>83</sup>

### **3.6 THE CLEANER PRODUCTION PROGRAM**

Cleaner Production (CP) is a modern environmental concept which in simple terms can best be defined as the continuous use of industrial processes and products to prevent the

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<sup>81</sup> ibid

<sup>82</sup> Maambo, *Total Finished Copper Production (1930-1998)*, Mines Development Department.1998.

<sup>83</sup> Cleaner Production in Zambia, ECZ,2004

pollution of air, water and land, reduce wastes at source and minimize risks to humans and the environment<sup>84</sup>. This definition embraces the strategy to conserve or to efficiently use raw materials, water and energy as well as to eliminate toxic and dangerous raw materials in the production process; these should maximize savings while reducing pollution.

This is a “win-win” strategy which Zambia adopted way back in 1997 at a National workshop of stakeholders comprising environmental authorities, industry, academia and non-governmental organizations held at Ibis Gardens Chisamba<sup>85</sup>.

In Zambia, the overall objective of the Cleaner Production program is to improve the environment in the Zambian Industry, to enable companies begin to comply with existing environmental legislation as well as improve profits through savings. In partnership with Det Norske Veritas (DNV) of Norway, the Environmental council of Zambia started the training program on cleaner production program in 1998, with funding from NORSAD<sup>86</sup>. However, the program has since been transferred to the Zambia Association of Chambers of Commerce and Industry.

So far, 50 companies have been trained resulting in more savings being made on the part of companies, in addition to numerous environmental improvements implemented. Future plans for the program include the conducting of advanced courses such as Environmental Management systems<sup>87</sup>.

### 3.7 SUSTAINABLE DEVELOPMENT

This concept has been variously defined and there is no single definition which everybody accepts. Nevertheless most definitions are built upon the view expressed by the Brundtland commission. According to this commission sustainable development is

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<sup>84</sup> opcit 51 p.87

<sup>85</sup> National Workshop for Stakeholders report 1997

<sup>86</sup> ibid

<sup>87</sup> 1998 Program Progressive report

defined as *"development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs"*<sup>88</sup>. This definition implies three concepts namely: needs, development and future generation<sup>89</sup>. Needs may be closely linked to the distribution of resources, development refers to improvement and progress in all dimensions and future generations embraces the moral obligation to handover the planet in good order to future generations. In other words the present generation should bequeath a better environment to the future generations. Elsewhere in the Brundtland report, sustainability was defined as meeting the basic needs of all and extending to all, the opportunity to satisfy their aspirations for a better life<sup>90</sup>.

### **Components of sustainability**

There are mainly three basic components of sustainable development. These are economic, social and the environment component. The three components are interdependent. Of particular importance here is the environment component. This component demands sustainable resource use, efficient sink function and maintenance of stock of natural capital. In simple terms the environment should be able to perform its three functions efficiently and uninterrupted so that ecological stability and resilience are not affected<sup>91</sup>. With current environment problems there is absolutely no justification for the existence of saprophytic relations between development either of industries or technology and the environment.

Economic sustainability requires that societies pursue development paths that generate optimal flow of income while maintaining their basic natural capital as well. On the other hand, social sustainability is premised on the twin principles of justice and equity. In this sense for industrial development to be sustainable, environmental resources should be equitably shared. From this analysis it therefore, remains vital to pursue economic, social and environmental goals in a sustainable manner.

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<sup>88</sup> Fisher, Antony C. Resource and Environmental Economics. 1981. London. Cambridge University Press

<sup>89</sup> Simmons, I.G. Conservation in Practice. 1966. London. Wiley, P.397

<sup>90</sup> Karpagam M. Environmental Economics. 2004. New Delhi. Sterling Publishers

<sup>91</sup> *ibid*

## **Sustainable Industrialization**

Since the Stockholm Conference<sup>92</sup> on Environment there has been a growing realization that human activities increasingly threaten the health of the natural systems. The activities which damage the environment are unsustainable as they alter the environment irreversibly. Currently there is a scientific consensus that environmentally damaging activities cannot continue in future because they have destroyed the environment necessary for their continuation. The Business Council for Sustainable Development stated in its report to the UNCED;

*"We cannot continue in our present methods of using energy, managing forests, farming, protecting plant and animal species, managing urban growth and producing industrial goods"*<sup>93</sup>

Historically, rapid industrialization has taken place only by tampering with the functions of the environment, the cumulative effects of which have today resulted in environmental crisis. Sustainable industrialization requires integrating environmental considerations at every stage of decision making in the supply of the product from resource extraction to disposal of the product.

In developing and sustaining an atmosphere of industrial sustainability in Zambia, it is important for our industrial sector to embrace new approaches in sustainable development. Actors in the industrial sector must adopt a deliberate approach of preventing pollution in the day to day running of industries.

### **Pollution prevention**

Pollution prevention is a proactive multimedia management approach to pollution to achieve 'front-end' reduction of pollutants in the waste streams by controlling the industrial processes with respect to process upsets, undesirable emissions and by

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<sup>92</sup> The conference was held in order to consider the impact of man's activities on the environment.

<sup>93</sup> P.431 of the said report

improving the product quality, reducing loss of raw materials to waste effluents and recycling the by products<sup>94</sup>. It eliminates the transfer of pollutants from one media to another because pollutants are not generated in the first place. Most Zambian industries are yet to live up to this challenge. Therefore, new developmental projects must embrace this approach from the on set.

### **Plan for Environment**

Besides the strict control during the manufacture of products, it is essential to review the overall synthetic sequence in the production of chemical substances and consider the substitution or elimination of hazardous chemicals wherever possible<sup>95</sup>. Considering the new emphasis on pollution prevention by both the industry and regulatory agencies world wide and also due to the huge costs of treatment, disposal and compliance, selection of any synthetic processes solely on the basis of yield is no longer valid and can no longer be justified in Zambia. Scientific, environmental and economic impacts should be incorporated into the process being selected to ensure environmentally benign synthesis of chemical substances in most Zambia industries.

Other approaches that must be embraced include *Industrial Ecology* and *Green Chemistry*. Industrial ecology is based upon an analogy of industrial systems to natural ecological systems. It offers a rather unique systems approach within which environmental issues can be comprehensively addressed. Green chemistry was a program initiated by the United States Environmental Agency. In simple terms green chemistry is the use of chemistry for pollution prevention by environmentally-conscious design of chemical products and processes that reduce the use of and generation of hazardous substances. There are very few industries in Zambia which are environmentally conscious of chemical products especially wastes. Adopting green chemistry program would be a step in the right direction.

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<sup>94</sup> supra note 31p. 321

<sup>95</sup> supra 68



It also remains imperative that the National Environmental Policy once adopted must be embraced and the policy guidelines strictly adhered to. One of the challenges of the Policy is to facilitate development whilst at the same time conserving natural resources and without hindering social and economic objectives as defined in national sectoral policies and in the Millennium Development Goals<sup>96</sup>. It has been purposed by the Policy to create an umbrella policy for the welfare of the Nation's environment so that socio-economic development will be achieved effectively without damaging the integrity of the environment or its resources<sup>97</sup>.

### **Sustainable Technologies**

Despite the dire need for advanced technology in any nation, certain technologies have grave impacts on the environment. Use of such technologies cannot be justified in the light of the current trends as far as protection of the environmental resources is concerned. It is in this vein that campaigns for the use of environmental friendly technologies lie justified. The rather needed advanced technologies should be used and applied in a sustainable manner. It is therefore logical that western technologies which may not be appropriate for our environment should be applied with modifications in order to suit our local environment.

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<sup>96</sup> Challenges, NPE Final Draft, May 2005, p. iii

<sup>97</sup> Purpose, NPE Final Draft, May 2005, p. iii

## Chapter Four

### 4.0 LEGAL REGIME FOR ENVIRONMENTAL PROTECTION AND POLLUTION CONTROL

Without the legal framework regulating the use of environmental resources, development of industries, environmental protection and pollution control would be difficult. Conversely, a legal regime without the machinery for enforcement is no better than the absence of the laws. In view of the foregoing, the legal regime for environmental protection and control of pollution as well as the machinery for enforcement are discussed hereunder.

Zambia's legal regime for environmental protection and pollution control as well as natural resource conservation has been scattered in various pieces of legislation from the time Zambia was born. The Mung'omba constitutional review Commission further observed that:<sup>98</sup>

*Zambia has a long history of natural resource conservation. Since the country attained political independence in 1964, its list of legal instruments in support of natural resources conservation and pollution control has grown steadily.*

Statutes which provide for matters of environmental protection and pollution control include among others Environmental Protection and Pollution Control Act<sup>99</sup>, Forests Act<sup>100</sup>, Zambia Wildlife Act No.12 of 1998; Fisheries Act<sup>101</sup>, Land Act<sup>102</sup>, Agricultural Lands Act<sup>103</sup>, Mines and Minerals Act<sup>104</sup>, and Water Act<sup>105</sup>. It must also be appreciated that there exists constitutional provisions on environment.

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<sup>98</sup> Mung'omba Constitutional Review Commission June 2005 Report

<sup>99</sup> Cap. 204 of the Laws of Zambia

<sup>100</sup> Cap.311 of the Laws of Zambia

<sup>101</sup> Cap. 200 of the laws of Zambia

<sup>102</sup> Cap. 184 of the laws of Zambia

<sup>103</sup> Cap. 292 of the Laws of Zambia

<sup>104</sup> Cap. 213 of the Laws of Zambia

<sup>105</sup> Cap. 198 of the Laws of Zambia

## The current Constitution

Issues of environmental management are provided for under Part IX of the Constitution<sup>106</sup>. However, the scope is narrow and it addresses the subject in the form of non-justiciable Principles<sup>107</sup>

Directive Principles of State Policy. Article 112 states in part:

*“(d) The State shall endeavor to provide clean and safe water ...;*

*(h) The state shall strive to provide a clean and healthy environment for all; and*

*(i) The State shall promote sustenance, development and public awareness of the need to manage the land, air and water resources in a balanced and suitable manner for the present and future generation.”*

## The Draft Constitution

The Mung’omba led constitution review commission made deliberate efforts to provide substantively for matters pertaining to the management and protection of the environment. Its draft constitution devoted part XX to environmental protection provisions. The salient articles of the said draft are:

*“The management and development of Zambia’s natural resources shall<sup>108</sup> –*

*(a) respect the integrity of natural processes and ecological communities, including conservation of habitats and species;*

*(b) ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources for the present and future and generation;*

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<sup>106</sup> Cap. 1 of the Laws of Zambia

<sup>107</sup> Part IX of the Current Constitution

<sup>108</sup> Article 361

- (c)ensure equitable sharing of benefits, amongst the local communities, accruing from exploitation, utilization and management of the environment and natural resources;*
- (d)ensure equitable access to all natural resources;*
- (d)recognise that natural resources have an economic and social value and this should be reflected in their use;*
- (e)not bestow private ownership of any natural resource or authorise its use in perpetuity;*
- (f)ensure gender mainstreaming by promoting equity between women and men and involving women in decision making processes relating to the use of natural resources and efforts to reduce poverty are reflected in all decisions;*
- (g)ensure that social and cultural values and methods traditionally applied by local communities for the sustainable management of the environment and natural resources are observed;*
- (h)ensure that planning and utilization of the environment takes account of disadvantaged areas and their inhabitants;*
- (i)promote energy saving and the use of solar energy and other renewable energy sources;*
- (j)prevent pollution and ecological degradation; and*
- (k)allocate adequate resources to reclaim and rehabilitate degraded areas and those prone to disasters to make them habitable and productive.*

*Every person has a duty to co-operate with State organs and institutions and other persons<sup>109</sup> –*

- (a)to ensure ecologically sustainable development and use of natural resources;*
- (b)to respect, protect and safeguard the environment;*
- (c)to prevent or discontinue an act which is harmful to the environment;*
- (d)to direct the appropriate authority to take measures to prevent or discontinue an act or omission which is harmful to the environment; and*
- (e)to maintain a clean, safe and healthy environment*

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<sup>109</sup> Article 362

*In the utilization and management of the environment the State shall<sup>110</sup> –*

*(a) protect genetic resources and biological diversity;*

*(b) discourage waste and encourage recycling;*

*(c) establish systems of environmental impact assessment, environmental audit and monitoring of the environment;*

*(d) encourage public participation;*

*(e) protect and enhance the intellectual property in, and indigenous knowledge of, biodiversity and genetic resources of the local communities; and*

*(f) ensure that the environmental standards enforced in the Republic are of essential benefit to all citizens and are the accepted international standards.”*

### **Environmental Protection and Pollution Control Act (EPPCA)<sup>111</sup>**

This act was enacted in 1990 by Act no. 12 and has since been revised by Act no 13 and 12 of 1994 and 1999 respectively. The main objective of this Act is to provide for the protection of the environment and control of pollution. This is reflected in its preambular clause as follows:

*An Act to provide for the protection of the environment and the control of pollution; to establish the Environmental Council and to prescribe the functions and powers of the Council; and to provide for matters connected with or incidental to the foregoing.*

### **Salient Provisions**

The EPPCA has endeavored to provide substantively for various matters of environmental concerns. As regards the protection of water from contamination part IV of the said Act provides in part:

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<sup>110</sup> Article 363

<sup>111</sup> Supra note 71

"23. The Council<sup>112</sup> shall<sup>113</sup> -

- (a) establish water quality and pollution control standards;
- (b) determine conditions for the discharge of effluents into the aquatic environment;
- (c) formulate rules for the conservation of fishing areas, aquatic areas, drinking water sources and reservoirs, recreational and other areas, where water may need special management;
- (d) identify areas of research and initiate or sponsor research in the effects of water pollution on the environment, human beings, flora and fauna;
- (e) order or carry out investigations of actual or suspected water pollution including the collection of data;
- (f) take steps or authorize any works to be carried out which appear to be necessary to prevent or abate water pollution from natural causes or from abandoned works or undertakings;
- (g) lay down the analytical methods by which water quality and pollution control standards can be determined and establish or appoint laboratories for the analytical services required by the Inspectorate;
- (h) initiate and encourage international co-operation in the control of water pollution, in particular with those neighboring countries with which Zambia shares river basins;
- (i) collect, maintain and interpret data from industries and local authorities on the pre-treatment, nature and levels of effluents;
- (j) collect, maintain and interpret data on water quality and hydrology which is relevant to the granting of licences under this Part;
- (k) enforce rulings made under this Part; and
- (l) do all such things as appear to be necessary for the monitoring and control of water pollution.

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<sup>112</sup> Council here refers to the Environmental Council of Zambia

<sup>113</sup> Section 23 of Cap. 204

*No person may discharge or apply any poisonous, toxic, erotoxic, obnoxious or obstructing matter, radiation or other pollutant or permit any person to dump or discharge such matter or pollutant into the aquatic environment in contravention of water pollution control standards established by the Council under this Part<sup>114</sup>.*

*(1) Owners or operators of irrigation schemes, sewage system, industrial production plants, workshops or any other undertaking which may discharge effluent shall submit to the Inspectorate such information about the quantity and quality of such effluent.*

*(2) The inspectorate may require an owner or operator of irrigation schemes, sewage system, industrial production plants, workshops or any other undertaking which the Inspectorate has reasonable grounds to believe may cause or causes the discharge of effluent into the aquatic environment to submit all information relating to the quantity and quality of effluent as the Inspectorate may require.*

*(3) The Inspectorate may order an owner or operator referred to under this section, at his expense, to install such metering devices, and to have such samples taken and analyzed, and to keep such records, as the Inspectorate may require<sup>115</sup>*

*The owner or operator of a trade or industrial undertaking who wishes to discharge into an existing sewage system effluent from his plant shall obtain written permission to do so from the local authority operating or supervising the sewage system<sup>116</sup>.*

*(1) The local authority operating or supervising a sewage system may impose conditions under which any effluent can be accepted or may prescribe methods of pre-treating the effluent prior to acceptance into the system<sup>117</sup>.*

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<sup>114</sup> Section 24

<sup>115</sup> Section 25(1),(2) and (3)

<sup>116</sup> Section 26

<sup>117</sup> Section 27

*Any person who discharges any effluent into a sewage system in contravention of the conditions imposed by the local authority, shall be guilty of an offence<sup>118</sup>.*

*(2) No person shall withdraw water from a water course or any other source for the purpose of diluting any effluent to make it acceptable except under a licence issued by the Inspectorate<sup>119</sup>.*

*(1) No local authority operating a sewage system or owner or operator of any industry or trade shall discharge effluent into the aquatic environment without a licence<sup>120</sup>.*

*(1) Any person intending to erect, install or develop a new industrial or trade plant, an agricultural scheme or an undertaking likely to discharge effluent shall inform the Inspectorate of his intention during the early planning stage<sup>121</sup>.*

Part V of EPPCA provides at length for prevention of air from pollution. The pertinent sections provides as follows:

*“ The Council<sup>122</sup> shall<sup>123</sup> -*

- (a) establish ambient air quality and emission standards and guidelines;*
- (b) on the advice of the Advisory Committee, specify the analytical methods for monitoring air contaminants and establish laboratories for analytical services needed by the Inspectorate;*
- (c) identify areas of research and initiate or sponsor research on the effects of air pollutants on human beings, the environment, flora and fauna;*
- (d) order or carry out investigations of actual or suspected air pollution including the collection of data;*

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<sup>118</sup> Section 28

<sup>119</sup> Section 29(2)

<sup>120</sup> Section 30(1)

<sup>121</sup> Section 31(1)

<sup>122</sup> supra 83

<sup>123</sup> Section 36



- (e) initiate and encourage international co-operation in matters of air pollution, especially with neighboring countries;*
- (f) order any industry or other source of air pollution to file such returns and provide such information as the Council may require;*
- (g) enforce rulings made under this Part; and*
- (h) do all such things as appear necessary for the monitoring and control of air pollution.*

*(1) When establishing or prescribing emission standards the Council shall consider<sup>124</sup> -*

- (a) the rate of emission, concentration and nature of the pollutants emitted; and*
- (b) the best practicable technology available in controlling pollutants during the emission process.*

*(2) The emission standards prescribed by the Council under this Part shall be published in the Gazette at least ninety days before the date upon which they shall come into effect.*

*No person may emit any pollutants which cause air pollution in contravention of emission standards established or prescribed by the Council under this Part<sup>125</sup>.*

*(1) In the case of an emergency involving very hazardous pollutants, the Inspectorate shall take and advise on appropriate measures to be taken for the management of persons and the environment<sup>126</sup>.*

*(1) A person who intends to erect or install a new industrial plant or develop a new industrial process which is likely to cause air pollution shall inform the Inspectorate during the planning stages...<sup>127</sup>.*

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<sup>124</sup> Section 38

<sup>125</sup> Section 39

<sup>126</sup> Section 40

<sup>127</sup> Section 43

The EPPCA Act further addresses other environmental concerns as far as possible. Under part VI the Act regulates the disposal of waste, under part VII it regulates the use of pesticides and other toxic substances, part VIII regulates environmental noise, ionizing radiation is regulated under part IX and part X deals with natural resource conservation. The Act is further supplemented by regulations which regulate the carrying out of Environmental Impact Assessments.

### **Other legislation**

There other pieces of legislation which makes provision for conserving and protecting the environment. Among these include the Zambia Wildlife Act<sup>128</sup>, Forest Act<sup>129</sup>, Lands Act<sup>130</sup>, Agricultural Lands Act<sup>131</sup>, Water Act<sup>132</sup>, the Fisheries Act<sup>133</sup> and the Mines and Minerals Act<sup>134</sup> provides for Environmental Protection under its part IX. Zambia further subscribes to international conventions and treaties on environmental issues.

### **4.7 Judicial Pronouncements**

The legal regime for environmental protection is also to be found in a handful of cases which have been brought before the court in which environmental issues were the subject of determination. In these cases which involved the infringement of the environment, the court endeavoured to make pronouncements in an attempt to enforce the relevant environmental law which were a subject of determination.

**In Robert Kunda Chimambo versus Lusaka City Council, Environmental Council of Zambia, Director of Public Health and Florite Limited<sup>135</sup>** a judgement delivered in

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<sup>128</sup> Cap. 201 of the laws of Zambia

<sup>129</sup> Cap. 199

<sup>130</sup> Cap. 184

<sup>131</sup> Cap. 187

<sup>132</sup> Cap. 198

<sup>133</sup> Cap. 200

<sup>134</sup> Cap. 213

<sup>135</sup> 2001/HP/Unreported

June 2002, the court found that the fourth defendant contravened the law by establishing greenhouses without the prior approval of the relevant authorities and ordered Florite limited to stop forthwith all the horticultural activities on the premises and to demolish the greenhouses. On appeal by Florite Limited, the Supreme Court<sup>136</sup> ruled that the orders issued by the lower court were null and void and of no consequence on grounds of procedural flaws. Had it not been for procedural flaws this paper is of the view that the lower court's decision would have been upheld. However, the case in issue is illustrative of how judicial pronouncements can supplement the legal regime provided in statutes. In an ongoing case<sup>137</sup> the plaintiff sought the court to issue *inter alia* orders that the defendants should carry out mandatory E.I.A study in the lower Zambezi National Park and that further developments should not be authorised without an E.I.A. If the orders being sought for were to be granted by the court that would set a firm precedent on environmental concerns.

#### **4.1 Institutional framework for the legal regime implementation**

##### **Environmental Council of Zambia**

ECZ is an institution which was established specifically to deal with environmental issues in Zambia under the EPPCA. The statutory provisions regarding its establishment as outlined in the Act are:

*"6. (1) Subject to the other provisions of this Act, the functions of the Council shall be to do all such things as are necessary to conserve the environment and prevent control pollution, so as to provide for the health and welfare of persons, animals, plants and the environment.*

*(2) Without prejudice to the generality of subsection (1), the Council may-*

*(a) advise the Government on the formulation of policies relating to sustainable management of natural resources and the environment;*

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<sup>136</sup> Appeal no. 85 of 2003

<sup>137</sup> Integrity Foundation versus Zambia Wildlife Authority, Environmental Council of Zambia, Attorney General and Kafue District Council.

- (b) recommend measures aimed at preventing and controlling pollution resulting from industrial processes or otherwise;*
- (c) advise on any aspect of conservation;*
- (d) advise on the need to conduct and promote research analysis, surveys, studies, investigations and training, of personnel, in the field of environmental conservation, prevention and control of pollution ;*
- (e) receive and review reports and make recommendations to the Government on environmental matters;*
- (f) conduct studies and make recommendations on standards relating to the improvement of the environment and the maintenance of a sound ecological system;*
- (g) co-ordinate the activities of all Ministries and other bodies concerned with the management of the environment, prevention and control of pollution;*
- (h) advise on co-operation between national and international organisations on environmental matters;*
- (i) advise on the need for, and embark upon, general educational programmes for the purpose of creating an enlightened public opinion regarding the environment and an awareness of an individual and the public on their role in the management and improvement of the environment;*
- (j) identify projects or types of projects, plans and policies for which environmental impact assessment are necessary and undertake or request others to undertake such assessments for consideration by the Council;*
- (k) consider and advise, on all major development projects at an initial stage and for that purpose the Council may request information on the major development projects;*
- (l) monitor trends in the use of natural resources and their impact on the environment;*
- (m) identify, promote and advise on projects which further or are likely to further conservation for sustainable development and improvement of the environment;*

- (n) hold seminars, symposia and prepare studies on matters relating to sustainable management and use of the natural resources and the environment;*
- (o) request for information on projects proposed, planned or in progress by any person anywhere in Zambia;*
- (p) request for information on the quantity, quality and management methods of natural resources and environmental conditions from any individual or organisation anywhere in Zambia;*
- (q) provide support for environmental conservation and improvement by way of grants or loans, the provision of accommodation, equipment and the common use thereof;*
- (r) advise on the effects of any sociological or economic development on the environment;*
- (s) publicise all relevant information on any aspect of the environment;*
- (t) carry out any other activities relating to the management of the environment, prevention and the control of pollution which are necessary or conducive to the better performance of its functions under this Act.*"<sup>138</sup>

## **The Inspectorate**

Besides establishing the Council, the EPPCA empowers the Council to establish the inspectorate to administer, monitor and enforce measures for the management of the environment and the prevention and control of pollution of the environment. In order to ensure compliance with the provisions of the EPPC Act the Council has been charged with the duty to appoint such number of inspectors as it may consider necessary. The relevant provision of the EPPCA establishing the Inspectorate provides as follows:

*The Council shall establish an Environmental Inspectorate with the necessary technical staff and facilities required to administer, monitor and*

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<sup>138</sup> Section 6 Cap. 204

*enforce measures for the management of the environment and the prevention and control of pollution in the environment*<sup>139</sup>.

The Act further outlines the powers of the inspectorate under section 84 (1) and (2) as follows:

*(1) An inspector, at any reasonable time may enter any area, place or premises that is or forms part of any industry, works, undertaking or business, in which he reasonably believes there is being, or has been carried on an activity that may contribute or has contributed to pollution, and examine and take samples or materials used in or resulting from the activity carried on there and inspect any vehicle or other conveyance but there shall be no entry into a private dwelling except with the consent of the occupant or under the authority of a court warrant.*

*(2) An inspector who enters an area, place or premises or inspects a vehicle under subsection (1) may order the person in charge to produce for inspection or for the purpose of obtaining copies or extracts, any books, documents or papers concerning any matter relevant to the administration of this Act or regulations made for the purposes of this Act.*

## **Local Authorities**

Local Authorities as established by the Local Government Act have a legal obligation to ensure a clean environment<sup>140</sup>. This is a noble cause which these institutions should not relent from. It is also important for the citizenry to play their role in helping these institutions to live up to this obligation. It is a view of this paper that local authorities can play a key role in environmental protection in that at times the ECZ can even delegate the functions of the inspectorate to local authorities. To this end the EPPCA provides;

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<sup>139</sup> Section 81

<sup>140</sup> Regulation 40 of the second schedule of Cap. 281

*the Council may delegate all or any of the duties of the Inspectorate to a local authority in such area as it may designate*<sup>141</sup>.

## **The Judiciary**

Without mention of the Judiciary, the list of institutions which enforce the legal regime for environmental protection will be incomplete. There are times when other enforcing bodies have done all they could, to deter persons or entities from infringing the environment but to no avail. When any other enforcement mechanism fails to bear any fruit other enforcing bodies will usually have recourse to the courts as a final resort.

The judicature is established by article 91 of the current constitution<sup>142</sup>. Subarticles 2 and 3 of article 91 provides in part as follows;

*The judges, members, magistrates and justices.....shall be independent, impartial and subject only to this constitution and the law.....*<sup>143</sup>

*The judicature shall be autonomous.....*<sup>144</sup>

It is clear that the judiciary as an institution is independent in the conduct of its duties. It has jurisdiction to determine any matter brought before it. The EPPCA provides for recourse to the courts. In this vein the wording of section 77 of the Act is elaborative. It provides thus:

*A court, in addition to any other penalty which it may impose, may make an order requiring that person to comply with the directive within a specified reasonable time*<sup>145</sup>.

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<sup>141</sup> Section 82

<sup>142</sup> Cap. 1 of the Laws of Zambia

<sup>143</sup> subarticle 2

<sup>144</sup> subarticle 3

<sup>145</sup> section 77(b)

## **Chapter Five**

### **5.0 Conclusion and Recommendations**

#### **5.1 Conclusion**

The environment is an indispensable resource in as far as the survival of man is concerned. From time immemorial, man has always relied on the environment for meeting his survival needs. However, man's quest for advancement has not and cannot be achieved without repercussions. The environment is usually the victim of man's developmental endeavors in one way or another.

The Zambian environment has been divinely endowed with vast natural resources making it a viable resource for life's activities. However, a selfish, hostile and inconsiderate use of these resources can lead to a possible depletion of especially non renewable resources. Industrial development and use of unsustainable technologies can cause subtle impact on our environment. Therefore, developmental endeavors should not disadvantage the capabilities of our environment.

This paper in its first chapter highlighted and discussed a number of environmental problems which should be addressed by all stakeholders in order to mitigate the consequences they pose. The gist of the chapter was that there is no denying the fact that Zambia faces environmental challenges of her own. Environmental problems in Zambia are only too apparent to be ignored.

The next two chapters of this paper endeavored to discuss at length environmental issues in light of Zambia's developmental endeavors in industry. Topical issues in the industrial sector as well as the resulting environmental issues in the sector were discussed. It has been shown that developmental projects of whatever sort can affect the quality of the



environment. The fact that development of industries and the use of advanced technology can lead to environmental problems significantly, cannot be disputed. It may suffice to conclude that most environmental problems are caused by developmental activities. Finally, the fourth chapter highlighted legal framework for environmental protection, pollution control and the enforcement machinery. Conclusively, both the legal framework and the enforcement machinery are necessary for meaningful protection of the environment.

In a nutshell, it may suffice to observe that despite the need to develop industries, the environment cannot be sacrificed. We need a viable and resourceful environment in as much as we need a booming industry. Both industrial development and environment management should be promoted by all stakeholders. We benefit from the environment just like we can benefit from a flourishing industry. It therefore, remains paramount to ensure that environmental laws are enforced meaningfully.

## **5.2 Recommendations**

### **Environment**

Protection of the environment cannot be overemphasized in any developing nation like Zambia. One does not need to go so far before noticing the importance of the environment. All human endeavors, economical, developmental or any other activity, depend on the environment in one way or another. Therefore, the environment and all human industrial activities are interdependent. It follows thus that human developmental activities should not jeopardize our beautiful and resourceful environment. It is recommended here that every citizen should take up the challenge of caring for and managing our environment to enable even future generations to benefit from our vast resources. We should strive to live behind a better environment than we found it.

### **Environmental management**

In this day and age there is no need to continue perpetuating developmental acts which compromise the state of the environment given the rising environmental awareness campaigns. It is only proper that if the environment is to continue providing the life survival means for mankind it is important that the environment and its resources are managed meaningfully. It is recommended that the enforcement machinery for conserving the environment and its resources provided under the Natural Resources Conservation Act<sup>146</sup> should be provided with the necessary resources to enable it discharge the statutory obligations fully.

### **Technology as source of Developmental Change**

History is full of situations in which a technical breakthrough or invention created a new industry and brought about major changes across economies. Initially Steam engines were heavy and bulky so as to be only useful in fixed locations like factories. Metallurgical advances made it possible to produce engines which were both powerful and reasonably light. The result was the railroad industry which was critical to the development of the rest of the world<sup>147</sup>.

In recent years, the invention of the transistor and later of the large scale integrated circuit brought about a revolution in electronics. Computers, previously large, expensive, slow and subject to frequent breakdowns became small, cheap, fast and dependable. When they were large and expensive, computers were usually limited to large businesses, universities and government agencies. Now that they are small and cheap they are everywhere: small businesses, homes, elementary school classrooms and in the laps and palms of airline travelers<sup>148</sup>.

In as much as technology advancement is useful in the enhancement of industrial productivity and development generally, it cannot be meaningful if there is no viable environment in which its meaningfulness can be observed. Technology cannot exist and

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<sup>146</sup> Cap. Of the laws of Zambia

<sup>147</sup> Robert M. Dunn 'Technology and Economic Change' market economy publication p.31

<sup>148</sup> ibid

be useful in abstract. It depends on the environment for its meaningfulness. One can assert therefore that the environment is an essential resource for any technology to thrive. It would be apt to recommend that the government should put up measures aimed at deterring industries from using technologies which compromise the state of our environment. Industries should test western technology and ensure that they are appropriate for our local environment. Technologies which jeopardize the environment should not be used in industries. Industries should be encouraged to develop a culture of setting aside part of the profits realized for purposes of investing in environment protection measures.

## **Pollution Control and Protection of the Environment**

### **1. Government**

The problem of pollution is an illuminating example of how governments in a market economy can harness the marketplace mechanism of supply and demand to address a critical issue confronting the entire society. When faced with the pollution of air, water or land government has several alternatives to consider which balance the need for a cleaner environment against the economic costs of cleanup<sup>149</sup>.

Supposing a given pollutant is found to be extremely toxic and impossible to eliminate by adopting new production processes or safeguards. Under those conditions, it may be sensible for the government to issue direct regulations requiring its complete elimination or such sharp reductions in its discharge that it no longer poses a threat to human health or the environment. However, such a course assumes that the cost to the society is very high<sup>150</sup>.

For less dangerous substances, while pollution levels should be cut, complete elimination may entail unreasonably high costs in terms of lost production, consumption and employment. Under such circumstances it might be more efficient to charge a tax on

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<sup>149</sup> Ibid p. 26

<sup>150</sup> supra note 108 p.23

pollution rather than requiring a specified reduction at all production sites. The reason is simply that the costs of cleanup will vary greatly at different production sites or companies. By taxing polluters, the government causes firms that can reduce emissions at relatively low costs to do so, and thus not pay the pollution tax. Other firms will find it too expensive to reduce pollution often those with older factories and equipment and will rationally choose to continue to pollute and to pay the tax on what they release<sup>151</sup>.

The Zambian government has a major role to play in the control of pollution as well as protecting the environment. It is the government's responsibility to ensure that institutions charged with the responsibility to monitor and inspect industrial activities likely to affect the environment are well funded and adequately supervised. It is recommended that government should come up with measures such as 'pollution tax' in order to deter industrial firms from polluting the environment. Government should be stricter in ensuring that investors both foreign and local in the industrial sector comply with the law regulating pollution control. It should not condone wanton or negligent contamination of the environment such as exhibited by the Konkola Copper mine recently which polluted waters of the Kafue river endangered many lives which depend on the river for water resources.

## **2. Air and Water pollution**

The EPPCA prohibits both pollution of air and water. The relevant sections provides as follows:

*"No person may emit any pollutants which cause air pollution in contravention of emission standards established or prescribed by the Council under this Part<sup>152</sup>.*

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<sup>151</sup> Ibid

<sup>152</sup> section 39

*No person may discharge or apply any poisonous, toxic, erotoxic, obnoxious or obstructing matter, radiation or other pollutant or permit any person to dump or discharge such matter or pollutant into the aquatic environment in contravention of water pollution control standards established by the Council under this Part<sup>153</sup>. "*

Despite these provisions the mining industry, the agro industry as well as other industry continue to perpetrate the contamination of both air and water. It is recommended that institutions such as the Environmental Council of Zambia should foster the enforcement of these provisions as well as other provisions prohibiting pollution. Their enforcement will go a long way in securing a cleaner environment.

### **3. Environmental awareness**

In an endeavor to protect the environment from dangers which might severely harm it, it is important to ensure that the citizenry is informed about the current environmental problems as well as the possible conservative measures. It is on this premise that this paper recommends that government and other stakeholders should put the available resources together in opening up environmental awareness centers in districts throughout the country. The EPPCA entrust the ECZ with the duty to carry out campaigns to increase public awareness about natural resources conservation<sup>154</sup>. It is therefore recommended further that the ECZ should be provided with adequate financial resources to be able to discharge this duty.

### **4. Environmental Council Zambia (ECZ) and Local Authorities**

The ECZ which can delegate some of the functions of the inspectorate to a designated Local Authority is an institution which plays a major role in environmental issues in Zambia. It has been charged with monitoring environmental protection measures as well

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<sup>153</sup> section 24

<sup>154</sup> section 76(f)

as foster conservation of natural resources. Regarding conservation of resources the functions of the ECZ are outlined as follows;

*The Council shall-*

- (a) conduct or sponsor research on land use practices and their impact on natural resources, and such other studies which shall be the basis for better conservation and protection of natural resources;*
- (b) establish and review land use guidelines;*
- (c) with the approval of the Minister, make regulations for the conservation and protection of natural resources;*
- (d) monitor dereliction of land and where derelict land exists, assess the nature of rehabilitation works required;*
- (e) monitor land contamination and where such contamination exists, assess the nature of any rehabilitation works required;*
- (f) carry out campaigns to increase public awareness about natural resources conservation;<sup>155</sup>*

In order for the ECZ to be able to discharge the legal obligations conferred upon it, it is recommended that the ECZ should open up branches in all provinces if not all districts. To meaningfully man these branches, it is recommended that more personnel should be trained so as to increase their expertise in environmental issues. It is also recommended that personnel in departments dealing with waste management under local authorities should be trained to increase their awareness in environmental issues. It is further recommended that officers responsible for enforcing the statutory regulations on environment should be made to discharge these duties with due diligence.

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<sup>155</sup> section 76 of Cap 204 of the laws of Zambia

## **Mining Industry**

Mining has great effects on the environment. For instance the recent discharge toxic effluents by Konkola Copper mines into the Kafue River polluted its waters and endangered the lives of Chingola residents. It is recommended thus:

- Prior to issuing mining and prospecting licenses of new mines carrying out of EIAs should be a mandatory requisite. Officers responsible for issuing licenses must ensure that this requirement is complied with.
- There should be frequent inspection of mining plants by the inspectorate.
- Mines should be encouraged to establish departments to specifically look into the environmental issues of each individual mine.
- Mines should be encouraged to adopt cleaner production technologies.
- Derogations by mines from legal regulations must attract penal sanctions.

## **Other industries**

Besides the mining sector there are other industrial activities which may have a bearing impact on the environment. The development of any industry is likely to negatively impact the environment if environmental concerns are not taken into account. Therefore, the carrying out of EIAs before embarking on any developmental project, increased inspection of already existing industrial plants and ensuring compliance with environmental protection regulations is recommended in all forms of industries.

## **National Policy on Environment**

The draft policy on environment was concluded in May 2005. However, cabinet is yet to adopt the draft policy. It is recommended that cabinet should expedite the adoption process. Policy guidelines will be a useful tool in environmental protection and pollution control.

## **Legislation**

It has been observed that the regime for environmental protection is found in a number of statutes. It is recommended that there should be a review of these statutes to harmonize them as well as take care of the lacuna that might be present especially on the use, importation and disposal of radioactive materials. Constitutional provisions on environmental concerns might go a long way in safeguarding our environment. It is recommended that the said provisions must be incorporated in the substantive part of the constitution. It is hoped that provisions on environment in the Mungo'mba draft constitution will be adopted.



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