UNIT 1

INTRODUCTION TO ENVIRONMENTAL STUDIES

Objectives

By the end of the topic, learners should be able:

- Present and clarify the principles and objectives of environmental studies.
- Define and illustrate the concept of environment.
- State and define major environmental terms.
- Describe the ethical/moral issues in resource utilization/use.

1.1.1 PRINCIPLES OF ENVIRONMENTAL STUDIES

Introduction

Environmental studies aims at making individuals understand the complex nature of the natural and build environments resulting from the interactions of their biological, physical, social, economic and cultural aspects. Further it facilitates the acquisition of knowledge, values, attitudes and practical skills needed to participate in a responsible and effective way in anticipating and solving environmental problems for quality living.

To provide value, environmental studies go beyond the discussion of environmental issues, to the analysis of conditions and trends in the environment and their causes, assess and interprete the implications and impacts of these trends to human health, the economy and ecosystems; and provide an assessment of actual and potential societal responses (solutions) to environmental problems. Balanced environmental studies aims at answering fundamental questions about the interactions between the environment and socio-economic factors, which are significant to policy decision makers and the public. *UNEP/DEIA (1996) defines at least four fundamental questions for the environmental studies:*

1. What is happening? - should give a highlight of the environmental conditions and trends.
2. Why is it happening? – a description of the human and natural causes of these changes is given.

3. Are the changes significant? – discusses the health, economic, social and ecological implications (effects)
4. What is, or how could we respond? – suggest solutions and the environmental implications of societal responses.

The specific objectives of environmental studies should therefore be:

- To increase awareness and understanding of environmental trends and conditions, then causes and consequences among *all* stakeholders;
- To provide a foundation for improved decision making at all levels, from the individual to national governments and international organizations; and
- To facilitate the measurement of progress towards sustainability through the provision of credible information.

To accomplish these objectives, a set of principles can help guide the development of effective messages towards developing environmentally responsible citizens

- The need to consider the environment in totality, including the natural, man-made and social aspects – economic, political, cultural, historical, theological, technological and moral considerations.

- The need to adopt a problem-solving approach in communicating the environment from a philosophical basis of holism, sustainability, enhancement and stewardship.

- Communicating about the environment requires the adoption of interdisciplinary approach, drawing in all relevant content and ideas from each discipline (natural and social sciences) in making possible a balanced perspective of the environmental issue in consideration.

1.1.2 THE CONCEPT OF ENVIRONMENT

The Oxford advanced learners' dictionary defines environment as the natural conditions e.g. land, air and water in

which we live; while the UNESCO – UNEP describes the environment as "the aggregate of surrounding things (biotic and abiotic) and conditions that influence the life of an individual organism of population, including humans."

An elaborate definition about the environment and one commonly used is one that was given by the International Union for the Conservation of Nature and Natural Resources (IUCN) that; "*the environment is the totality of nature and natural resources, including the cultural heritage and the infrastructure essential for socio-economic activities*."

Central to this definition are the natural (physical and biological) and the socio-cultural (man-made) components.

(a) Natural (physical and biological) components

The natural component is made up of the following:

- **The physical**, comprising of the Atmosphere (air), the Hydrosphere (waters), and the Lithosphere (rocks).
- **The Biosphere** which is a thin and discontinuous narrow zone where living organisms exist. It is a little above and below the surface of the land and in water and air. It is inhabited by an immense variety of living species including human beings.
- **Ecosystems** which include all the plant and animal life that inhabit a particular area together with the physical (non-living part) environment. The living and the non-living parts interact to obtain food and water powered by energy from the sun. Ecosystems can either be natural or modified (man-made) and are categorized as either Terrestrial (forests, grasslands, deserts, tundra); Aquatic (fresh water-rivers, lakes, ponds); Marine (oceans and seas); and Estuarine (Marshes and Coastal bays).
- **Biochemical Cycles**: These are the cyclical movements of nutrients and water within the global environmental system. They express the dynamic interrelations between the living forms (bio) and the physical environment (geo-chemical) within an ecosystem. They provide a continuous circulation of the essential constituents necessary for life such as carbon, nitrogen, water vapor, phosphorus and oxygen. Types of

biochemical cycles include the water cycle, the carbon cycle, nitrogen cycle etc. These natural cycles ensure that nutrients used up in one system are not lost but are re-used again and again until the end of the world.

- **Natural Resources:** These are parts or products of the natural environment considered of *use* and *value* to the earth's inhabitants, to satisfy the *needs* of human beings and other living species. A natural resource can also be defined as a naturally occurring matter that is used to produce a desired effect or product usually for meeting human needs or improving their quality of life.

(b) Socio-cultural (man-made component)

The other component of the environment: socio-cultural, refers to *all* the physical infrastructures, built by humans including the social and institutional systems which civilization has developed such as settlements, industries and transport infrastructure. It also includes cultural, religious, political, economic, aesthetic and moral (ethical) aspects of human life.

The three levels of being are thus:

Physical Component

- Atmosphere (Air)
- Hydrosphere (Water)
- Lithosphere (Rocks)

Biological Component

- Biosphere consisting of all living things (plants, animals, bacteria and viruses).

Social Component

- *Technosphere*
- *Sociosphere* – human created world of buildings and machines, politics, cultures, arts, etc).

Thus;

(1) The environment is the complete context comprising nature and natural resources and not any specific resource sectors;

(2) The various resource sectors such as water, wildlife, forests, human beings, minerals and energy are simply components of the environment;

(3) The infrastructure constructed to facilitate socio-economic activities such as settlements; industries and transport infrastructure are all part of the environment.

Within the natural order of things, it is also important to note that:

- Each of the three levels of being (physical, biological and social) obeys the same *physical laws* and are similar in behavior, though *local* variations lead to complexities that are sometimes difficult to understand.

- Environmental components operate on *different time-scales* which makes their management difficult. A good example is the formation of soil. While it takes nearly 350 years to form three centimeters of good top soil (physical component), poor cultural practices such as overgrazing (soil component) can remove that top soil within five years; similarly, reforestation (biological component) on exhausted soil would take about 25 years while one violent storm (physical component) on overgrazed land can remove the fertile soil in a day.

- The materials necessary for life undergoes continuous *transformations* which ensure nothing is destroyed or lost. The materials pass through biochemical cycles that maintain the *purity* and the availability of these resources for life. In nature, the output of one process is continuously made the input of some other process which is well described by the concept of food webs. Everything is food for something else, and every kind of waste is an input to something else. In nature language, everything goes somewhere and there is no *away* to throw things since materially, the earth is a nearly closed system.

We need to understand the three components of the environment and the complex interrelationships in order to be sensitized into understanding their role in the creation and abating of environmental problems. To illustrate the complexity of environmental inter-relationships, consider a simple act like fuel wood use. Firewood consumption affects forests and interferes with biodiversity which influences food supply, triggering pesticide use which influences the productivity of ecosystems, affecting cultural adaptations which bring about resource use conflicts and psychological stress, lowering productivity which influences economic development. Significant changes in one single behaviour produce often unanticipated effects on other elements of human endeavor.

Since human beings are the only creatures that possess, perceive and appreciate consciousness and self awareness, on the same token, they have been given the special responsibility for environmental stewardship. To carry out that responsibility, humankind needs to be guided by morality and ethics. These elements need to be incorporated in environmental studies especially now that human being more than ever before have arrogantly interpreted the concept of stewardship.

There is need to address the interactions that cause degradation by emphasizing on simple steps within people's means that can help alleviate environmental problems. Sorting out garbage at source for instance would enhance recycling, while preparing people at the onset of rains to plant trees and harvest rain water are quite easy to adopt. *The concern should be the ability to provide information that changes behaviour towards the environment* – i.e. not stopping at awareness creation but to go through education and advocacy.

Further emphasis on the need for a universal environmental ethic lies in understanding the variety and principles of environmental cultures and ethics across the borders of time and space. *UNESCO-UNEP (1991) describes an environmental ethic as an ideal human behavior with respect to the environment currently being reinforced in the growing concern about the environment; in swelling movements to save the earth, and in the ongoing reinforcement and development of national and*

international environmental legislation and regulations. Such regulations reflect a newly acquired collective moral sensitivity to the environment which could be traced to such traditions and civilizations as in Hinduism, Jainism, Buddhism, Confucius, Judeo-Christian and Islam. All these have made a contribution to the development of a universal environmental ethic.

Written Exercises

Exercise 1.1

Q1. Draw a flow chart/diagram to show the relationships between the three components of the environment.

Q2. Give valid examples to illustrate the complexity of environmental interrelationships and their role in the creation and abating of environmental problems.

Q3. What types of ecosystems are found in your province?

- **A Classification of Resources**

Resources have been defined as features which are needed and used by people. Although the term is often taken to be synonymous with *natural resources,* this definition is often broadened to include *human resources*. Natural resources can include raw materials, climate and soils. Human resources may be subdivided into people and capital. A further distinction can be made between *non-renewable resources*, which are finite as their exploitation can lead to the exhaustion of supplies (e.g. oil), and *renewable resources*, which, being a 'flow' of nature, can be used over and over again (e.g. solar energy). As in any classification, there are 'grey' areas, e.g. forests and soils are, if left to nature, renewable; but, if used carelessly by humans, they can be destroyed (e.g. deforestation, soil erosion).

Reserves are known resources which are considered exploitable under current economic and technological conditions

e.g. North Sea oil and Gas needed a new technology and high global prices before they could be brought ashore; in contrast, tidal power still lacks the technology, and often the accessibility to markets, needed to allow it to be developed on a widespread, commercial scale.

Resources:

(i) Natural (physical) resources
(ii) Human Resources

- **Natural (physical) resources:**

(i) Non-renewable (finite)
(ii) Renewable if carefully managed (e.g. soils, forests)
(iii) Renewable

- **Human resources:**

(i) Population (e.g. politics, technology)
(ii) Capital (e.g. transport, buildings)

- **Non-renewable (finite):**

(i) Recyclable (e.g. metallic ores)
(ii) Non-recyclable (e.g. fossil fuels)

- **Renewable resources:**

(i) Flow (water, crops)
(ii) Continuous (e.g. solar power)

There is growing concern for harmonizing *two* fundamental requirements of human society – *the economy* that transforms our specialized efforts into the goods and services that feed, clothe, transport, and shelter us; and *the environment and its natural resource systems* that provide the air, clean water, raw materials, waste cycling, and other processes necessary for a healthy life. There are important aspects of the relationship between economy and environment, including the methods and policies that have been considered for making economies more compatible with a healthy and sustainable natural environment.

One of the most serious problems the world is facing today is the deterioration of the natural environment and of natural resources.

The biosphere provides mankind and other species with a place to live and with all material inputs on which livelihoods depend. It thus provides '*environmental utilization space'* for present and future generations' use. The biosphere represents our life support system and provides mechanisms for reproducing resources and restoring environmental quality. But these mechanisms are vulnerable and their 'productivity' is restricted. By generating environmental pressures, human activities adversely affect the size of their own environmental utilization space. In a dynamic sense these pressures imply the risk that future generation will have ***fewer environments*** to draw their welfare from.

Human activities generate such pressures by:

- Exhausting non-renewable resources such as mineral reserves.
- Overexploiting renewable resources such as fisheries and forests.
- Adversely influencing the rates of regeneration of renewable resources through pollution.
- Intruding into ecosystems.
- Degrading basic natural goods such as clean air and water, so that damage to human health and well-being results.

Written Exercise

Exercise 1.2

Q1. Use the above information on classification of resources, to draw a flow chart diagram.

Q2. Identify your province and list the types of resources found there.

Q3. How have human activities generated environmental pressures in your province? Give examples to illustrate.

1.2 KEY ENVIRONMENTAL TERMS

(a) The Environment

The environment is the totality of nature and natural resources, but also includes the cultural heritage and the infrastructure constructed by humans to facilitate socio-economic activities. The natural resources include land/soil, water, forests and vegetation cover, livestock, fish and other wildlife; the minerals under the land and the air which envelopes the earth's surface; and human beings. Then the artificial infrastructure includes the intrusion into that natural setting in the form of human constructions for human settlement.

(b) Environmental Management

Today, no one doubts the necessity for management and legal arrangements which ensure protection for the balance in the environment: to ensure sustainability in utilization of the natural resource components; to ensure that selected areas of environment, which are considered particularly fragile or endangered are accorded special protection; and to ensure that the interests of the present generation, are met without jeopardizing the needs of future generations.

Different management concepts are applied to ensure the foregoing objectives. First, rational management of the environment and natural resources therein require *conservation* which means to use renewable natural resources sustainably and to avoid waste of non-renewable natural resources. i.e. fisheries and forestry, for example, as renewable resources should be utilized in a manner which ensures regeneration. For non-renewable resources such as minerals, petroleum and oil the applicable meaning of conservation is to avoid waste and to ensure that usage meets the interest of the present generation without jeopardizing future interests.

The concept of conservation is to be distinguished from that of *preservation*. Although related, preservation requires that selected natural resources such as unique biological formations, endangered or threatened species, representative biomass or other natural and cultural sites of importance be set aside and left alone

so as to maintain their characteristics in a manner unaffected by human activities to the fullest extent possible.

(c) Environmental Governance

Environmental governance can be defined as a body of *values* and *norms* that guide or regulate the relationships between the state and the civil society in the use, control and management of the natural environment. These norms and values are expressed in a chain of rules, policies and institutions that constitute an organizational mechanism through which both the broad objectives and specific planning targets of environmental management must be expressed.

Environmental governance therefore provides a basis within which public and private behaviour is regulated in support of good ecological stewardship. That basis establishes reciprocal relationships between people (globally, regionally, nationally and locally) relating to access and use of environmental goods and services, and binds them, (at whatever level) to certain specific environmental ethics.

The rules, rights and responsibilities may either flow from custom and practice or be codified in such instruments as conventions, treaties or statutes and managed by different organizational forms, for example, clans, women's groups, private firms, national agencies and international organizations.

(d) Environmental Law

Environmental law refers to the whole body of various treaties and international agreements, laws made by parliament, customary rules and administrative regulations to ensure or facilitate the rational management and utilization of the natural resources so as to achieve sustainable development.

In Kenya this system consists of the Constitution and various other laws made by Parliament. These include the Environmental Management and Co-ordination Act, the Forest Act, Mining Act, Water Act, Wildlife (Conservation and Management) Act, Seeds and Plant Varieties Act, Fisheries Act, Local Government Act, Public Health Act, Traffic act, Agriculture Act among others. These laws also provide that the Ministers in charge of the aspect

of environment concerned may issue certain administrative regulations to help in the implementation of that relevant law. For instance, under the Agriculture Act, the Minister for Agriculture passed regulations, which say that one must not cultivate beyond fifty meters to the water point such as a river.

In addition, there are also some laws, which, although not specifically dealing with the environment, have a lot of bearing on the environment. For example, the Chief's Act, which is essentially an administrative law, provides in some sections that the chief may give an order requiring people not to burn grass or cut certain trees. *In sum therefore environmental law refers to those rules or regulations that have a bearing on the manner in which the natural resources and environmental context is managed*.

(e) Environmental Rights and Duties

A right includes a recognized legal entitlement, benefit, advantage, and interest that a person has and that allows him or her to require another person to do or not to do a certain thing. In terms of the environment and/or its natural resource component, *an environmental right may be described as the freedom to exploit an environment adequately but responsibly for long-term survival*. In Kenya, as in many other countries, this is embodied in the entitlement to 'a clean and healthy environment.'

With respect to environmental management, it is now widely accepted that in addition to individuals, communities, whether organized or not, and corporate entities, associations or groups defined simply by cultural and social ties, can and do enjoy rights by reason of their collective character. Thus, when the Environmental management and co-ordination Act talks of 'every person' as being entitled to a clean and healthy environment, it means more than just the individual natural human being. It refers too to such other unnatural persons such as companies, corporations, local authorities, non-governmental organizations, community based organizations and other similar associations.

However, the Act also provides that every person has a duty to ensure a clean and healthy environment is provided and maintained at all times. This is described as *'environmental duty'*.

Thus one must refrain from activities that harm the environment or any natural resources which is component of it. For instance, one must not pollute a river. The law also prescribes punishment that may be imposed on a person who harms the environment.

(f) Sustainable Development

Development is the process by which a country provides for its entire population all the basic needs of life, such as good health and nutrition, education and shelter, and also provides every one of its population with opportunities to contribute to that very process, through employment as well as scientific and technological construction. Often the raw materials are the natural resources of the country. It is important therefore that the natural resources are exploited in such a manner which avoids depletion and that they are not completely wasted and become unavailable for future generations. This means that natural resources must be used in a sustainable manner.

Sustainable development therefore means *development that meets the needs of the present generation without compromising the ability of future generations to meet their needs by maintaining the carrying capacity of the supporting ecosystems*. Sustainable development is meant to reduce the conflicts that cause environmental degradation by providing a vehicle for integrating the environment in socio-economic planning and management.

(g) Environmental Impact Assessment (EIA)

Any activity which alters the environment is expected to have a wide repercussion to people and the ecosystem. EIA is a formal study process which is used to predict social and environmental consequences of a proposed development project. EIA in environmental management serves the following roles:

- Predicting potential problems either social or environmental.
- Identification of measures to minimize potential problems.
- Outlining ways to improve the project's suitability in its proposed locality.

- Predicts options to project stake-holders who include development investors, local community, planners, environmentalists, project regulators and politicians.

1.3 ENVIRONMENTAL CONSERVATION AND ETHICS

1.3.1 ENVIRONMENTAL CONSERVATION

Attitudes towards Nature

The thinking of most people and cultures largely influences the way they treat their environment. What is an attitude? It is a set of beliefs and values organized around a specific object or situation. Attitudes towards nature involve fundamental beliefs and values that have far reaching consequences. It is important to study attitudes towards nature for two reasons:

(i) Attitudes influence thinking and eventually influence policy.
(ii) To be able to change the current phenomenon of environmental deterioration efforts must be concentrated on attitudes.

There are basically three cultural attitudes towards nature.

a) Domination over nature
b) Unity with nature
c) Stewardship of nature

Domination over Nature

This attitude is mainly associated with westerners and the Christian religion. They both believe that the earth should be subdued. It is responsible for the deteriorating environmental condition, and has been worsened by the rising level of technology that has multiplied man's capacity to work. Such work can be constructive and destructive to the environment. This attitude has foundation in the Bible when man was out at the Garden of Eden and commissioned to be fruitful – "To be fruitful, multiply and fill the earth and subdue it, have dominion over the fish of the sea and over the birds of the air and over every living thing" Genesis Chapter 1. A number of authors have recently

claimed that the Biblical idea of dominion is the main historical root of environmental destruction. The Bible also reinforces the rights of humanity over nature.

Given that ideas and attitudes are significant influences in history. One author Layn White concludes that the Biblical creation story is so Anthropocentric (man-centered) and not sufficiently protective over nature. She continues to say that Christianity bears a huge responsibility for the current environmental crisis. I suppose that this attitude influenced the hunters of the past. Such people would launch an expedition for the sole purpose of killing animals for pleasure. However, it is also notable that the Bible speaks not of unlimited domination but of stewardship, which implies restraint and responsibility. Other scholars insist that industrial capitalism is the key determinant of environmental destructive behavior.

The Greek writings of Plato, Aristotle and Cicero influenced the Western thought a lot. For example, in his writings he stated that other creatures do not think. Plants and animals therefore, exist solely for the sake of human life. Cicero similarly insisted that mankind has no obligation to respect animals because they are not rational beings. Science has been a quest to dominate nature through understanding the forces, elements and operation of nature. Throughout history man has viewed nature as an enemy to be subjugated, for example, settlements in the new lands of North America, Australia and New Zealand. In the past, nature was treated as an inexhaustible source of raw material. In the fore going man has always attempted to dominate nature much to the detriment of it. However, it is also worthwhile to note that there is another school of thought based on technological optimism. This school of thought holds – that nature is far from destroyed and that technology is the ultimate solution to healing and deterioration.

Unity with Nature

This view stresses humanities harmony with nature and participation in the world of non-human nature. In contrast to ancient Israel – the cultures of Near East (India, etc) sought integration of human life with the life of nature. They celebrated

seasons and fertility of nature. For example, Taoism in China portrays the world as an organic interdependent system in this thought the human being is part of a wider cosmic order and his well-being is integrated to the well being of nature. Buddhism holds that nature is there to be meditated upon, to be appreciated rather than to be dominated. Given that behavior is a product of social and economic forces, as well as beliefs it is not difficult to understand why one culture will respect nature and another will not. On average Eastern countries have treated nature with greater respect than West. Chinese communism shares the Marxist assumption that nature is an object of conquest for that reason Mao Tse Tung called for war against nature.

Stewardship of Nature

This outlook is Theo centric. It is neither Biocentric or anthropocentric. This outlook represents a middle ground between domination and unity. Stewardship in the Bible (Gen. 2) refers to dominion, which is responsible usage. Mankind does not have absolute and unlimited dominion but is responsible to God. A verse of the Bible says, "The earth is the Lord's for He created it." In Genesis 1, everything that God created is declared good in its own right. This was so even before the creation of man. Therefore man has the responsibility to keep creation good. Similarly in the New Testament Jesus perceived the beauty of the fields and flowers and God's care for all this. Therefore, destroying the earth is bad stewardship.

We are only trustees, caretakers or stewards responsible for the welfare of the land that is entrusted to us and we should be accountable for how we treat it. Hence the Biblical outlook is also careful by emphasizing the value of nature in itself and not just as an instrument of human satisfaction.

1.3.2 ENVIRONMENTAL ETHICS

There are three ethical grounds for environmental conservation. These grounds persuade us to take care of the environment on ethical perspectives. They include the following:

(i) The human being benefits from the environment.

(ii) We have a duty to pass on this heritage to future generations.
(iii) We have a duty and an obligation as rational human beings to the non-human beings.

1. The human being benefits from the environment

- The environment is important for us biologically, economically and aesthetically. Human welfare and fulfillment are dependent on the integrity of the biosphere. Enlightened self-interests provide strong arguments for actions to preserve the environment. Damaging the environment ends up hurting us e.g. pollution of air and land hurts us in various ways. It leads to respiratory and water borne diseases. It is also an obstacle to recreation and threat to aquatic life. Radioactive elements and toxic wastes do injure the human nervous system.

- Resources should also be used wisely to ensure a sustained supply of the same. E.g. Catchment areas should be conserved with the view to keeping us supplied in future. Wise use includes recycling, reducing wastes and lowering consumption.

(a) Human beings enjoy natural beauty in recreation
Nature is soothing and there is solitude in it. Wild life should be preserved because it symbolizes human qualities such as freedom, courage, innocence, greed which all build our character. It is also a source of inspiration to us.

(b) Spiritual significance
The wilderness experience is also source of inspiration and an opportunity to experience the divine calmness in nature. Forests are viewed as majestic and possessing natural beauty. They also evoke awe and wonder.

(c) A final reason for preserving wildlife is its use in scientific research. The wilderness is a reservoir of genetic diversity and information yet undiscovered. For that reason it is important to preserve it for none knows what holds for mankind. It might turnout to be a vital resource for us.

2. We have a duty and obligation as rational human beings to the non-human beings

Depleting resources and spoiling the environment jeopardizes the welfare of our descendants. E.g. Radioactive waste generated today will be dangerous to human and animal life even after 100,000 years. This is because such material takes a long time to decay. It is a prudent decision to rely more and more on renewable sources of energy while using less of the non-renewable. This is especially suitable where the two options are interchangeable as in the case of oil and solar energy. The present generation has a definite obligation towards the future generations for three reasons.

(i) At present, we are well endowed with the resources and the environment is still relatively well resourced. Therefore, we have a duty to maintain it and not leave it to get more polluted than when we came to the same environment. Like the old adage goes "we should leave it better than we found it."

(ii) There is also sufficient religious ground for obligations to the future generations. Among them is the fact that, Christians are transient beings and they are only a link in the long chain of the cosmos. They should be good stewards because God's plan does not end with us. It is also a fact that land is held in trust for future generation.

(iii) Though it is common for individuals to believe strongly in the ability of technology to increase capacity, we should not allow the resource base to be used more rapidly than can be safely extended by technology. Such a resource base is ours today as much as it is for all generations to come.

The following here are some measures proposed for protecting interests of the unborn

This is because it is believed that without such measures we may destroy everything for the future generations.

(a) That a punitive tax should be imposed to prevent people from abusing non-renewable resources. A tax should be imposed to prevent mineral exhaustion or forest destruction. This would contribute to intergenerational justice by slowing down resource depletion and waste production. Such a tax would also prompt or stimulate conservative usage and recycling technology.

(b) It is also proposed that we should appoint proxies for the unborn as we do for infants and mentally handicapped who cannot speak for themselves. On such a case it is not only the present considerations that would matter, the interest of the future generations would be considered too. However, this proposal is complicated by the fact that dead people or the unborn are not legal persons and hence cannot enjoy any rights.

(c) The rights of the present generations are also undermined in that urgent current needs have a priority over uncertain future ones. Our rights should prevail as long as what we do not jeopardize the possibility of future generations to satisfy the basic needs.

Political and economic institutions of our day disregard the future to such an extent that consequences of our actions that are more distant than a decade or two are virtually ignored.

3. Duties to Non-human Beings

Greek philosophers such as Aristotle, Aquinas and Emmanuel Kant and other Western philosophers wrote that we have no obligation towards animals because they cannot reason. Rationally was the main difference between man and animals and it became the reason for human beings to disregard their moral responsibility towards the rest of creation. Some philosophers of the 19th Century pursuing the philosophy of utilitarianism, (such as Bentham and J.S. Mill) believed that we have a duty to animals because they can experience pleasure. For the same reason, they have a right not to be caused to suffer. We are obliged to treat them well, not to be cruel, but also to reduce suffering where it

exists. Further, the doctrine of creation affirms the goodness of the world and all its inhabitants. Human beings are stewards of Nature as God created it. These points to the fact that all God's creatures should be treated with respect because their "goodness" is independent of the existence of man.

Among the Eastern religions such as Buddhism, Taoism and Jainism all life is sacred and should not be destroyed. Their view of the integrated cosmic order leads to better stewardship in their own environment. Such a conviction of the sacredness of the life and such gentleness towards other creatures has greater benefit than the violent abuse common with the Westerners.

Written Exercise

Exercise 1.3

Q1. Give your opinion concerning the three ethical grounds for environmental conservation.

Q2. List some of the ethical/moral issues that arise as people utilize/use resources in your province.

UNIT 2

CURRENT ENVIRONMENTAL CONCERNS / ISSUES IN KENYA

Objectives

At the end of the topic learners should be able to:

- Discuss some of the current environmental issues/concerns in Kenya and the role of stakeholders in addressing them.

- Highlight the Constitutional and Legislative framework on environment, specifically the EMCA which is Kenya's principal Legislation on matters of environment.

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2.1 ENVIRONMENTAL CONCERNS IN KENYA

Introduction

Concern for the environment in most cases occurs late after the quality of the environment has been affected. A lowered environmental quality at whatever level affects both the development of human beings, plants, animals, ecosystems and socio-economic well being.

Environmental problems arise when human activities affect the quality of the environment to the extent that it is no longer able to perform its role in the provision of:

- Clean drinking water;
- Agricultural production capacity of the soil;
- Forest products;
- Recreation;
- Survival of biodiversity; and
- Fresh air.

1. Degradation of Land Resources

This results from a combination of natural and human activities such as deforestation, soil erosion, drought and desertification, loss of biological diversity and wetland decline. The extent of land degradation is localized in some areas especially in high potential areas. Land degradation has several causes but the most important one is *poor land use practices*.

Soil erosion is a natural process, however, it is often greatly increased when human activities cause the disappearance of the protective cover of natural vegetation. Soil erosion by wind and water is the main form of soil degradation in Kenya.

2. Deforestation

There are many threats to forests in Kenya, mainly caused by human activities. These include:

- Expansion of agricultural land;
- Expansion of human and urban settlements (e.g. Karura forest);
- Mining (e.g. Ngong forest);

- Tourism development along Coast Province;
- Building of infrastructure like roads and power lines;
- Overgrazing;
- Poor harvesting of timber where young tree seedlings are destroyed and;
- A defective Forest act, which gives the Minister for Natural Resources excess powers especially in connection with degazettment and dishing out of forestland (e.g. Karura and Ngong forest).

3. Drought and Desertification

As environment problems, drought and desertification cause social and ecological problems.

Social consequences include:

- Shortage of food and malnutrition;
- Migration of people (i.e. environmental refugees);
- Lowering of human dignity, health and quality of life;
- Loss of economic livelihood due to death of livestock perpetuating poverty;
- Shortage of water for human and animal consumption; and,
- Social distress and unrest.

Ecological consequences include among others:

- Loss of biological diversity;
- Depletion of water resources; and,
- Loss of biological potential of land.

4. Wildlife and Fisheries

Wildlife and fisheries in Kenya constitute invaluable and renewable resources. Both have socio-economic, cultural, scientific and ecological values. Conflicts between wildlife and local communities occur when wild animals destroy crops or even kill people especially in areas where wildlife go beyond the park boundaries. Areas beyond the park boundaries are under pressure for other land uses like cultivation and human settlement which is making the protection of wildlife in such areas difficult because of the land tenure system already in place.

Lake Victoria, which produces 90% of Kenya's fish catch, is threatened by pollution and ecological disruption from the aquatic

weed, the water hyacinth (*Eichhornia crassipes*). The use of unauthorized fishing gear, overharvesting of fish through uncontrolled licensing of fishermen and fishing vessels exert further pressure on fish resources.

Marine ecosystems at the coast of Kenya which include mangrove forests, coral reefs, creeks and estuaries, are important for the production of marine fisheries and other life like lobsters, prawns, crabs, oysters, and the endangered dugong. Marine ecosystems further support tourism, agriculture and large-scale prawn farming. Pollutants and soil transported from up-country by rivers and run-off threaten the survival of coral fish and estuarine species. The oil spills from tankers cris-crossing the Indian Ocean destroy mangrove forests and marine organisms. Other problems facing marine species include overfishing and pollution from waste originating from coastal towns and industries.

5. Wetlands

Wetlands are areas of marsh and water, whether natural or artificial, permanent or temporary, static or flowing, fresh, blackish or salt, including areas of marine water. Kenya's wetlands perform important functions, which include:

- Groundwater recharge and discharge;
- Water purification through pollutant removal;
- Sediment trapping;
- Water storage;
- Habitats for water birds, and diverse acquatic animal life;
- Fodder for wildlife and livestock (e.g. Amboseli National park) especially in dry seasons;
- Products for making roofs, walls, thatching, mats, baskets, ropes etc. (e.g. Yala Swamp);
- Extraction of medicinal products such as herbal medicine;
- Tourism and recreation (e.g. L. Nakuru);
- Sport fishing (e.g. Coastal Zone and L. Naivasha); and,
- Cultural ceremonial values.

Threats to wetlands in Kenya include:

- Overfishing (e.g. L. Victoria, L. Naivasha);

- Pollution (e.g. L. Nakuru, L. Naivasha);
- Drainage for farming activities (e.g. Yala swamp);
- Destruction of coral reefs;
- Destruction of mangrove forests; and
- Siltation.

6. Mountain Ecosystems

The concern for mountain ecosystem is as a result of activities such as:- encroaching farming activities, over-harvesting of soft and hard wood, overgrazing, forest fires and illegal land allocations (grabbing). To improve the threatened mountain ecosystems in Kenya, it requires focus on policy reforms in areas such as:-

- Reducing the impact of livestock and creation of national conservation areas;
- Integrating mountains into projects and policies of development agenda;
- Controlled harvesting of forest products through efficient use;
- Enforcement of laws which protect forest;
- Improving knowledge about mountains through research, monitoring and public education; and
- Reducing fire incidences through fire disaster preparedness involving relevant ministries and local communities.

7. Water Resources

In Kenya, availability or lack of water is crucial to the development of agriculture, industry, human settlements and tourism. The demand for fresh water resource in Kenya is high in both rural and urban settlements.

Environmental concerns regarding water resources include:

- Use of contaminated water which has increased incidences of occurrence of water-related diseases;
- Problem of depletion of water as a result of mismanagement of water catchment areas;
- Drainage of wetlands;
- Over-extraction of ground water especially in urban centers, arid and semi-arid lands;

- Shortage of water in urban settlements;
- Pollution of surface and underground water from industrial effluents, municipal waste (solid water and sewerage), and run-off from agricultural land; and,
- Pollution of ocean water from oil spill, sewerage and dumped toxic waste.

8. Wood fuel Energy Crisis

According to Kenya's Economic Survey of 1998, 93.5% of rural households use fuel wood as source of energy, while in urban centers, 30.3% of the households use charcoal for cooking and heating. Over 70% of domestic energy is in the form of wood or charcoal. Wood is a renewable resource whose use can be sustained and ecologically sound if harvesting is balanced with replanting of trees.

This crisis is forcing people to use crop residue and dung as a substitute. The result of substitution is loss of soil fertility and decline in food production. According to Maathai (1988), the fuel wood crisis forces women to trek long distances in search of fuel. This has social and economic implications on women because other chores are left unattended. In some cases, families have been forced to change their diets and adopt foods that require little energy to cook, which may be less nutritious. This culminates in malnutrition, poor health and low productivity.

Concerns about woodfuel crisis arise because of:

- Fuel wood scarcity in many parts of the country;
- Increase in prices of fuel wood and charcoal;
- Use of agricultural residue as sources of energy;
- Rapid de-vegetation to meet energy demand in arid and semi-arid areas;
- Rapid population growth which is putting pressure on fuel wood supplies.

In order to meet the demand for fuelwood, various strategies have been adopted such as:

- Reducing demand for fuelwood through the use of energy-saving devises;

- Meeting the demand by promoting tree planting programmes; and,
- Creating awareness on the need to utilize fuelwood in a sustainable manner.

9. Urban settlements and environmental degradation

The proportion of total urban population rose from 15% in 1979 to 19% in 1989 (Economic Survey 1998). The growth is attributed to rural-urban migration, natural population growth, boundary extensions and influx of refugees. The rapid urbanization in major towns such as Nairobi, Mombasa, Kisumu and Nakuru has placed pressure on available housing, infrastructure and other services. The mismatch between urbanization and economic development has aggravated urban poverty, unemployment, underemployment, crime, drug abuse (especially in slums) and increased umber of street children.

10. Agriculture and Food Security

Agriculture, which is the practice of cultivating the land and rearing animals, depends on the quality of the environment. In order for agriculture to be sustainable, resources should be utilized in such a way that needs for present and future generations are met with minimum impact on the resource base. Food security, on the other hand, is the access to adequate food for normal life by each citizen.

Challenges facing agriculture in Kenya include:

- More and more mouths to feed due to rapid population growth while arable land and food production is declining.
- High inputs in terms of agro-chemicals, which is becoming unaffordable to farmers;
- Agro-chemicals are putting a heavy strain on the environment in terms of land degradation (e.g. eutrophication, water pollution, etc);
- Loss of topsoil to wind and rain;
- Loss of traditional varieties of crops and livestock which causes dependence on hybrid seeds whose constant supply to the farmers is not guaranteed;

- Low prices of farm crops (subsistence and cash crop) which demotivate the farmers;
- Land degradation;
- Poor quality seeds supplied to farmers by unscrupulous traders;
- Loss of arable land to other land use such as extension of urban boundaries and construction of houses, industries and infrastructure; and,
- Climate change resulting from extreme weather conditions like El Nino and drought;

Wrangles between farmers and their marketing institutions (e.g. grain growers in the Rift Valley province and the Mwea Rice farmers) have been reported. As the agriculture sector records negative growth, food security is becoming elusive. This calls for urgent action along the following strategies which are not exhaustive:

- Development of drought resistant crops (e.g. sorghum, yams, cassava, etc) and livestock;
- Monitoring and early warning systems;
- Rationalization of food import and marketing policy;
- Proper management of food reserves;
- Incentives through pricing, loan provisions etc; and,
- Provision of markets for livestock.

11. Environmental Pollution

Pollution is the presence of contaminants or pollutants in air, water or land, which cause injuries to human, plant or animal life and interferes with the comfortable enjoyment of life. The environmental impact of pollutants depends on quantities, characteristics and duration. Pollutants are generated by human activities such as industrial processes, transport, use of chemicals in agriculture, mining, food processing and in households.

Environmental pollution concerns include:

1. Industrial Pollution.
2. Urban pollution.
3. Noise Pollution.
4. Solid Wastes.

12. Disasters

Natural and man-made disasters cause damage to the environment and infrastructure and loss of life. The major disasters in Kenya include forest fires, lightening, droughty, pest invasion, industrial accidents and ethnic conflicts. Fries frequently occur in forests and national parks exposing the soil to agents of erosion. When fire breaks, vegetation is destroyed and soil is exposed to agents of erosion. The wild animals are also destroyed causing loss to biological diversity.

Floods in urban centers are common because of extensive impermeable surfaces and blocked storm sewers. While floods and droughts are predictable, there has been inadequate preparation for their cyclic occurrence. Since the introduction of multi-party politics in Kenya in 1991, some areas in the country have experienced ethnic conflicts which have resulted in massive destruction of property, loss of life and displacement of people. The bomb explosion which occurred in Nairobi on August 7, 1998 killing over 250 people, maiming thousands and extensively destroying buildings affected the social and aesthetic quality of the urban environment.

Transport accidents in Kenya are on the increase. Although some of these are attributed to technical failure and carelessness, the poor state of roads also cause accidents. Government ministries have within their portfolios responsibilities to take precautionary and remedial measures against impacts of disasters. However inspite of precautions taken, disasters still persist causing grievous harm to the environment.

Concerns in disaster management in Kenya include:

- Lack of comprehensive national policy and legislation on disaster management;
- Lack of disaster preparedness which can put in place practices that can mitigate against impacts of disasters;
- Failure to enforce building regulations which require strengthening of structures to withstand shocks;
- Inadequate coordination mechanisms for disaster management at all levels;

- Failure to enforce regulations to prevent human settlements in disaster prone areas; and,
- Lack of disaster awareness and knowledge of actions that individuals or groups could take in case of disaster.

Conclusion

The concern for the status and the quality of the environment need to be translated into appropriate action. In order to address the existing environmental problems, the government, local communities, non-governmental organizations, private sector and donor agencies have to be actively involved. The concern preceded by awareness and knowledge. In order to adopt environmental principle of living sustainably, individual and major groups such as women, youth, indigenous people, and community workers require appropriate environmental messages.

Written Exercise

Exercise 2.1

Q1. What are the major environmental concerns/issues in your province?

Q2. What remedies/solutions can the government and other stakeholders
use to address these issues?

Q3. List other environmental concerns other than those given in this topic.

2.1 KENYA'S CONSTITUTIONAL AND LEGISLATIVE FRAMEWORK ON THE ENVIRONMENT

Introduction

As already said, Kenya's laws on the environment are to be found in the constitution, other laws made by Parliament, by-laws by various authorities and other entities, customary rules and practices and international treaties and agreements. In this guide we have chosen to deal specifically with the Constitution and the Environmental Management and Co-ordination Act (EMCA). The justification for this selective treatment is that the Constitution is the supreme law of the land whereas the EMCA is the framework legislation on the environment and therefore covers what other laws deal with concerning the environment.

2.2.1 THE CONSTITUTION

The current constitution of Kenya does not expressly have any provisions dealing with the protection of the environment. However, it provides very explicitly that all have a right to life. Looking at the examples of cases from outside Kenya such as India and Pakistan, it is then clear that the right to life has environmental implications. The courts in the two countries cited, and many other countries have ruled that the word life covers all facets of human existence. It is not limited to mere vegetative and animal existence alone. It is said therefore that the slow poisoning by the polluted atmosphere caused by environmental pollution and spoliation should also be regarded as a violation of the right to life. Such courts have held that to guarantee life yet not provide a healthy environment is to guarantee one a meaningless life.

Many constitutions of countries now contain a provision guaranteeing to their citizens a right to a clean and healthy environment. Such countries include Uganda, South Africa, India, Pakistan, Philippines, and Bangladesh. And to give meaning to those provisions, the constitutions also make further provision on the right to go to court to protect the environment or to prevent a breach of one's environmental rights.

As Kenya undergoes her process of constitutional reforms, there is strong indication that it will for the first time be provided that all people in Kenya have a right to a clean and healthy environment.

2.2.2 THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT (ACT NO. 8 OF 1999)

In 1999, the Kenyan Parliament passed an environmental law known as the Environmental Management and Co-ordination Act (also known as EMCA) which is Kenya's principal legislation on matters of the environment. The development of this law took a long process involving broad consultations and consensus building between legal experts, environmental professionals and the local communities among others. Once adopted by Parliament in December 1999 it received Presidential Assent on 6th January 2000 and came into force on 14th January 2000. Its overall objective is to provide an appropriate legal and institutional framework for the management of the environment and to meet the requirements of sustainable use of natural resources.

It is worth noting that this Act does not replace hitherto existing laws which deal with specific sectors or components of the environment. It will be applied alongside the existing legislation governing the different sectors of the environment. Therefore, the Water Act, the Wildlife Management and Coordination Act, the Forestry Act, the Fisheries Act and the Physical Planning Act, to name but a few will still continue to apply and the law expects that the technical directors of the respective departments will assume a major role as Lead Agencies. However, where the previous legislation has provisions that conflict with it, the provisions of the Environmental Management and Co-ordination Act will override that other law to the extent of that conflict. For instance, where a law did not provide for the public to be consulted that is now mandatory under the EMCA. In the event that the departmental or sectoral director fails to take action then the Director-General or head of the national Environmental Management Authority will intervene to ensure that action is taken to protect the environment.

Additionally, the EMCA has revolutionized environmental management in this country in several other ways. We discuss some of these below.

- **The right to a clean and healthy environment**

The EMCA has for the first time in Kenya's legislative history provided that everyone in Kenya is entitled to a clean and healthy environment and has a duty to safeguard and enhance the environment.

The right to a clean and healthy environment means that every person is entitled to have access to and enjoy the various elements of the environment for recreational, educational, health, spiritual and cultural purposes.

In addition to giving rights, the Act also confers duties. Unlike rights, environmental duties are not entitlements. Rather they are action requirements intended to ensure that the entitlements are not only respected and protected but also in fact, achievable. For this reason, we cannot talk of a single category of duties. The literature identifies at least four sets of duties.

The first is to refrain from activities injuries to the environment or any component of it. An example is not to engage in improper waste disposal. The second is to perform specific tasks on a regular basis to ensure environmental quality at all times. An example will be to carry out garbage collection and cleaning exercises. The third is to guarantee a floor of quality enough to ensure that all survive, especially the human species. Unlike the second, there is no call to enhance environmental quality. Rather, the focus is to prevent loss of quality. For instance, by not destroying forests, we ensure that the quality of the ecosystems are guaranteed. The fourth duty is to police, supervise, monitor and evaluate the performance of individuals and all agencies on which the first three or any other duties are imposed.

These rights and duties are not just conferred and imposed on natural persons, but artificial persons as well. Such unnatural persons that are recognized by the Act include companies, Non-Governmental Organizations (NGOs), Community Based Organizations (CBOs) and such other similar associations.

- ***Locus Standi***

Locus Standi means the legal right that one has to bring a suit in a court of law. The general rule that is followed by the courts is that in order for a person to take a case to courts, they have to show that they have some direct personal interest on the matter. The strict application of this rule to environmental matters has led to a number of such suits not being heard in their merits; for quite often in such cases, the danger or harm may not be attributed to any specific individual or entity. One such case was the case that was brought by Prof. Wangari Maathai against Kenya Media Trust Corporation. In this case Prof. Wangari went to court to stop the proposed construction of a multi-storey building at Uhuru Park. The court dismissed the suit claiming that she had no legal right to be in court on the matter. The court reasoned that in cases of violations to the environment affecting the public generally then the person who has an interest and right to sue in the case is the Attorney General and not a private citizen. This position has been taken by a number of judges in other cases as well. These cases include *Wangari Maathai –vs- Nairobi City Council*, where the Plaintiff had sought a declaration that the subdivision and sale of the Council's plots was unlawful; *Lawrence Nginyo Kariuki –vs- County Council of Kiambu*, where the court rejected the plantiff's argument that because he was a shareholder of a farming company that owned land adjacent to a forest, which the respondent proposed to alienate, he had sufficient interest to maintain a suit for restraining orders; and most recently in *Law Society of Kenya –vs- Commissioner of Lands & Others*, where the judge ruled that it was only the Attorney General who could bring the suit to court.

However, this judicial position has also been met by a divergent view which is to recognize *locus standi*. This has been stated in several cases among them, *Rodgers Muema Nzioka & 2 Others –vs- Tiomin Kenya Limited*; *R –vs- Ministger for Finance & Others ex parte Kenya Bankers Association*; and *Niaz Mohamed Jan Mohamed & Others –vs- Commissioner of Lands & Others*. This divergence caused a lot of confusion on what the law actually was.

However, this confusion has been resolved with the question of *locus standi* having received specific positive mention in the EMCA. Specifically and most importantly, the Act gives any citizen, either as an individual or as a group the right to bring a case to court against any person or organization who is doing harm to the environment. Henceforth, it is not necessary to show that the right or interest has been directly violated or is likely to be violated. This provision promises to be a very useful tool in the fight for the protection of the environment.

It is important to note, however, that even as the Act widens the scope and meaning of *locus standi*, it also provides that the case must not be frivolous or vexatious. In other words the case must not be one that has no merits and which is merely meant to waste the time of the court. The intention of this provision is to guard against many cases being taken to court and taking the court's time yet they have no merit. The safeguard therefore, is to provide minimum standards that have to be met before a case is heard by the court. Furthermore, there are also some other ways and means in addition to courts, which could be utilized by ordinary citizens to the same effect.

- **Public participation in decision-making**

Public participation is where the citizens take part in the process of arriving at decisions about the activities that are proposed to be undertaken. The right of public participation can take many forms, the right to know about pending government decisions (including legislative, administrative and policy decisions), public hearings, the opportunity to present written or oral comments and evidence, the requirement that government consider citizen comments and the opportunity to present petitions, complaints, or grievances to administrative authorities.

The involvement of citizens in governmental processes enables the citizens to influence the decisions and bring their perspectives to bear on the decision-making process. A decision arrived at with the involvement of citizens also has greater legitimacy and more chances of being successfully implemented.

It has long since been recognized that if citizens are to have the requisite sense of responsibility towards the environment, then

they must be able to perceive their own involvement not merely with the environment as a retreat but in the routine activities that affect their surroundings. The public must become increasingly involved, through individual and group inputs, in the decision-making process both at the point when a development scheme is proposed and then during its formulation and implementation. In this way not only will the public become committed to the well being of the environment, but also it will understand more fully the implications of environmental quality.

One of the fundamental ways of ensuring public participation is through the process of Environmental Impact Assessment (EIA). The process of EIA basically means an analysis of the likely environmental effects of a proposed human activity. Its purpose is to ascertain the probable effects and determine explicit strategies for mitigation and amelioration. In some instances, alternatives for achieving the goals of the activity are examined.

As part of the EIA process, the EMCA puts a duty on the National Environmental Management Authority to cause to be published for two consecutive weeks and in a newspaper circulating in the area or proposed area of a project, a notice containing:

(a) A summary description of the project;
(b) The place where the project is to be carried out;
(c) The place where the environmental impact assessment study, evaluation or review report may be inspected; and
(d) A time limit not exceeding sixty days from the date on which the notice is last published in the newspaper for submission of comments.

The Act, then in the Second Schedule contains a list of projects for which an Environmental Impact Assessment must be carried out. Generally they are:

1. Any activity out of character with their surrounding;
2. Any structure of a scale not in keeping with its surrounding; and;
3. Major changes in land use.

Based on the above three general categories, the schedule then lists fourteen types of projects for which an EIA must be undertaken. These projects are:

- Urban development including establishment of industrial estates, shopping centers and designation of new townships
- Major transportation projects like construction of all major roads, railway lines and airfields
- Dams and flood control schemes
- Aerial spraying
- Mining
- Forestry related activities including timber harvesting, clearance of forests and both afforestation and reforestation activities
- Agriculture including large scale agriculture, use of pesticides, introduction of new crops and animals, use of fertilizers and irrigation
- Processing and manufacturing industries
- Electrical infrastructure
- Waste disposal
- Establishment of Natural conservation areas;
- Nuclear reactors; and
- Major development in biotechnology including introduction and testing of genetically modified organisms.

There are at least three recent instances in Kenya in which the issue of environmental impact assessment as a tool of public participation has arisen. These are the cases of titanium mining in Kwale, the forestry excisions in various places countrywide and the Sondu Miriu power project.

> In the titanium case, a Canadian company M/s Tiomin Resources Inc sought to mine titanium in Kwale district within the coast of Kenya. Several issues arose among them inadequate environmental impact assessment that was done by the company. A section of the farmers who were to be moved from the proposed mining site went to court, sought and obtained an injunction on grounds among others that the company was yet to do a proper EIA. The judge agreed with the farmers that the company was required by law to do so. Additionally, it was evident that the compensation figures offered to the farmers were arrived without consultation with the public especially those to be affected. This case stood to offer good

prospects for judicial statement on environmental impact assessment as a tool for public participation. However, the case was later compromised between the various parties.

On the other hand, there is also the very serious and recent issue of forestry excisions. The latest of this phenomenon was experienced some time last year when the then government expressed through various gazette notices its intention to excise over 167,000 acres of forests. A number of organizations and individuals opposed to this move by the government. Some of the organizations and individuals concerned therefore resorted to court action and filed a representative suit; being ***High Court of Kenya Misc. Civil Application Number 421 of 202, R Vs MINISTER FOR ENVIRONMENT AND NATAURAL RESOURCES AND OTHERS EXPARTE KENYA ALLIANCE OF RESIDENT ASSOCIATIONS AND OTHERS***(a judicial review application). The application sought various orders among which were writs of certiorari to quash those gazette notices, several orders of prohibition to stop the government from dealing with those forest areas in a manner that is detrimental to the country's health. It must be mentioned that presently, Kenya's forest cover is a meager 1.7% as opposed to the internationally accepted 10% of the country's physical area. Among the reasons cited in opposition to the excisions is that the government failed to ensure public participation in the matter by for example responding to the numerous comments and/or through the process of EIA. It is contended in the case that had the government involved the public in making decisions about the excisions, it would most certainly have arrived at a decision that the proposed excisions did not mean well for the environment and the country. The court granted orders stopping the government from proceeding with the exercise until the matter is fully heard and determined.

Then there is the issue of the Sondu Miriu power project. Located some 63 km from Kisumu city, the project is centred in Nyakach constituency, but it also cuts into neighboring Kasipul-Kabondo and Karachuonyo constituencies. It is based on the waters of Sondu Miriu River, one of the six major rivers in the

Lake Victoria basin in the Western part of Kenya. Upon completion it is expected to add an additional 60MW into the national power grid.

On one hand, Kenya needs the extra electricity that the dam would produce in order to boost its national grid electricity output that has suffered massive load shedding over the last decade. Its success is priority in the government's energy development agenda. On the other hand, the effects of the project and its dam on surrounding inhabitants could be disastrous. According to the EIA conducted. 30 km of river could dry up, cutting off or severely limiting the only water supply of more than 1,500 people. This could also affect their food supply, given that they use the river water to irrigate their plants; and in addition to lost irrigation ability, they would also lose their supply of fish. In view of these effects, it was necessary that the members of the public be involved in decision-making processes. In any event, the project also meant that a number of the inhabitants had to be resettled elsewhere. Indeed, it was through the process of public participation that the possible effects of the project were discovered.

Thus, due to the serious importance of EIA all local communities are encouraged to participate and give their views about the proposed projects in their local areas.

Conclusions and Recommendations

The legal and policy framework for the management of the environment has improved in the recent past. Citizens have a much wider space for participating in environmental management. This guide sought to sketch this space. Several conclusions can be made from the discussion thus far.

The first conclusion is with respect to an entitlement to an environment that guarantees good health and development for the people. As was noted the courts have relied heavily on constitutional provisions in making orders that have been protective of the environment. It is universally recognized that a constitution is the supreme law of any country. Expression of environmental rights and duties in any constitution places such provisions above all laws in the land. Constitutional provisions

amongst other things, underline national priorities and hence determine the direction and nature of future legislative policies and executive actions. Thus the elevation of environmental concerns to constitutional status no doubt enhances the priority likely to be conferred by Governments on sound national environmental management and sustainable development.

The Environmental Management and Co-ordination Act at Section 3 (1) provides that "Every person in Kenya is entitled to a clean and healthy environment and has the duty to safeguard and enhance the environment". However, for greater protection, it is necessary to elevate this "entitlement" to the constitution as a justifiable "right", i.e. as a direct fundamental right, which carries actionable obligations. In other words, the constitutional language must be unequivocal in granting the right for public participation to protect the environment.

The recommendation above is further based on the fact that the conferment of a right to a clean and healthy environment simultaneously comes with a widened provision on locus standi. Thus, while appreciating that the courts in Kenya are already showing their reception of a wider interpretation of the concept of locus standi, such constitutional provisions would put the matter beyond doubt or any possible challenges. Happily the draft constitution prepared by the Constitution of Kenya Review Commission already includes a provision guaranteeing the right to a clean and healthy environment. When this is passed into law, the process of environmental management will be greatly helped.

Article 62 of the Draft Constitution of Kenya

63 (1) everyone has the right –

(a) To an environment that is safe for life and health.

(b) To have the environment protected, for the benefit of present and

Future generations, through reasonable legislative and other measures that-

(i) prevent pollution and ecological degradation;

(ii) promote conservation; and

(iii) secure ecologically sustainable development and use of natural resources while promoting economic and social development

(c) to free access to information about the environmental situation

(d) to compensation for damage arising from the violation of the rights recognized in this Article.

The second conclusion is with respect to award of costs in public interest actions in general and environmental suits in particular. Environmental degradation affects to a very large extent the poor folk more than the rich. This poor lot at the same time suffers from other forms of poverty such as lack of education and general ignorance. Even where they are aware that they have rights that they can enforce, they are not able to do so due to exorbitant costs of filing court actions- both in terms of actual court fees and a possible slap of costs in the event of loss of the suit to the defendant. Costs act as a disincentive to public interest litigation generally and environmental suits in particular. It thus discourages or otherwise negatively impacts on the role of courts in environmental management. We therefore recommend that the local communities should try as much as possible to use other ways of seeking redress other than the courts. The courts may then only remain as an instrument of last resort.

Several useful avenues already exist for citizens' involvement in environmental management. Citizens need to take advantage of this to play their role in efforts to manage our environment. These include:

1. Being members of District and Provincial Environmental Committees;
2. Reporting cases of environmental degradation to the District Environmental Committees, Provincial Environmental Committees, the National Environmental Tribunal, the Public complaints Committee, Courts and other agencies;
3. Forming and participating in Community-Based organizations for environmental management;
4. Lobbying for the sound management for the environment in the locality and actually participating in efforts at proper management of the environment;

5. Networking with other citizen groups; and

Teaching other members of the community on their role in environmental management and opportunities for their participation in sound management of the environment.

Written Exercise

Exercise 2.2

Q1. In what ways have you participated in decision-making concerning environmental/resources use and management.

Q2. Give some other recent instances in Kenya, in which the issue of environmental impact assessment as a tool of public participation has arisen.

Q3. Site instances when the right to a clean and healthy environment are violated, i.e. one is denied access to and enjoyment of the various elements of the environment for recreation, education, health, spiritual and cultural purposes.

UNIT 3

ENVIRONMENTAL SUSTAINABILITY

Objectives

At the end of the topic learners should be able to:

- Assess the concept of environmental sustainability i.e. the relationship between development and environment.

- Identify some of the current environmental challenges in the 21st Century.

- Show the growing demands placed on the environment to provide resources for human activity and to absorb wastes.

3.1.1 DEVELOPMENT AND ENVIRONMENTAL SUSTAINABILITY

- **Development:**

"The challenge of development . . . is to improve the quality of life generally calls for higher incomes, - but it involves much more. It encompasses as ends in themselves better education, higher standards of health and nutrition, less poverty, a cleaner environment, more equality of opportunity, greater individual freedom, and a richer cultural life."

Development must therefore be conceived of as a multidimensional process involving major changes in social structures, popular attitudes, and national institutions, as well as the acceleration of economic growth, the reduction of inequality, and the eradication of poverty.

Three basic components or core values should serve as a conceptual basis and practical guideline for understanding the inner meaning of development. These core values – sustenance, self-esteem, and freedom – represent common goals sought by all individuals and societies.

(a) *Sustenance*: The ability to meet basic human needs – food, shelter, health, and protection.

(b) *Self-esteem*: To be a person – a sense of worth and self respect.

(c) *Freedom from servitude*: To be able to choose – human freedom. Also encompasses various components of political freedom including personal security, the rule of law, freedom of expression, political participation, and equality of opportunity.

There are International Development Targets (IDTs), which have been agreed upon by the entire United Nations membership, following a series of summit meetings held by UN and its specialized agencies. The meetings discussed progress in poverty reduction and sustainable development and set targets for measuring their progress.

1. *Economic well-being*
   - A reduction by one-half in the proportion of people living in extreme poverty by 2015.
2. *Social and Human Development*
   - Universal primary education in all countries by 2015.
   - Demonstrated progress towards gender equality and the empowerment of women by eliminating gender disparity in primary and secondary education by 2005.
   - A reduction by two-thirds in the mortality rates for infants and children under age 5 by 2015.
   - A reduction by three-fourths in maternal mortality by 2015.
   - Access through the primary health-care systems to reproductive health services for all individuals of appropriate ages as soon as possible and no later than the year 2015.
3. *Environmental Sustainability and Regeneration*
   - The implementation of national strategies for sustainable development in all countries by 2005, so as to ensure that current trends in the loss of environmental resources are effectively reversed at both global and national level by 2015.

NB: While not amenable to quantification, there is a range of qualitative elements of development that are essential to the

attainment of quantitative goals. These include democratic accountability, the protection of human rights and the rule of Law.

- **Sustainable Development**

In 1987, World Commission on Environment and Development (WCED), defined sustainable development as "development which meets the needs of the present without compromising our ability to meet those of the future."

Sustainable development requires the effective integration of the economic, social and environmental dimensions of development. It is a process of social and economic betterment that satisfies the needs and values of all interest groups, while maintaining future options and conserving natural resources and diversity. It is a complex concept, incorporating the following *principles*:

- *Ecological sustainability*, requires that development be compatible with the maintenance of ecological processes, biological diversity, and biological resources.
- *Social sustainability*, requires that development increases people's control over their lives; and maintain and strengthen community identity.
- *Cultural sustainability*, requires that development be compatible with the culture and values of the people affected by it.
- *Economic sustainability*, requires that development be economically efficient and that it be equitable within and between generations.

- ***Goals*** of sustainable development are:

1. the survival and well-being of people.
2. the survival and well-being of all other species.

- ***Symptoms*** of unsustainability:

- Ecological symptoms:

(1) Global warning. (2) Depletion of stratospheric ozone layer. (3) Acid rain and photochemical oxidants. (4) Destruction and degradation of forests. (5) Extinction of species and genepools. (6) Destination of agricultural resources.

- Social and cultural symptoms: (1) Wars and mass destruction (2) Denial of people of control over their own lives.
- Economic symptoms: (1) Economic inefficiency. (2) Inequities within generations (3) Inequities between generations.

- ***Causes*** of unsustainability

1. Human population growth
2. High per capita environmental demand (use).
3. Management of environmental demand (use).

Written Exercise

Exercise 3.1

Q1. In your own words, define development to reflect the multi-dimensional aspects of the development process.

Q2. Give valid examples from your province, of specific symptoms of unsustainable.

3.2 THE CURRENT ENVIRONMENTAL CHALLENGE

Introduction

The environment is under threat. The demands placed on it to provide resources for human activity and to absorb wastes have grown rapidly with rising population and increasing per capital consumption.

Inadequate protection and conservation of the environment has led to substantial direct and indirect impacts on the health and livelihoods of human populations throughout the world. The most pressing environmental problems experienced vary greatly from region to region, and country to country, and defy single global solutions. Many environmental problems are causing damage for beyond their local sites of origin; others, such as climate change, constitute a global threat. In addition, new environmental problems are emerging in the 21st century.

I. Environment and Health

Environmental factors are responsible for almost a quarter of all disease in developing countries.

- For urban populations the most important hazard, is faecal contamination
- of water and food due to poor or non-existent excreta disposal systems and inadequate hygiene, compounded by unreliable and unsafe domestic water supply.
- 90% of the global burden of malaria, which is estimated to kill one in twenty children under five years of age in sub-Saharan Africa, is attributable to environmental factors.
- Exposure to high levels of indoor pollution from cooking and heating with inefficient fuels in poorly ventilated areas. This contributes to acute respiratory infections.
- Inefficient collection, storage and disposal of municipal and hazardous wastes results in the spread of disease and pollution.
- Rural populations suffer from exposure to hazardous farm chemicals e.g. pesticides.

II. Environment and Livelihoods:

The environment has many implications for the livelihoods of the poor in developing countries, especially women and children.

- Soil degradation is a threat to the rural poor, which is estimated to affect some 1,900 million hectares of land globally.
- Deforestation, which deprive people of valuable forest resources such as wood products, food and medicine.
- Degradation of coastal areas is leading to the destruction of ecosystems such as mangrove and coral reefs, which are important for sustainability of fish stocks and coastal production.
- Loss of biodiversity, which affect the poor who have no alternative but to remain directly dependent on biodiverse ecosystems for food, medicines and shelter.
- Increasing water demands (for agriculture, industry, and domestic uses) threaten the quality, quantity and reliability of water supplies.
- Pollution of ground/surface waters by industrial discharges, agricultural runoff, and faecal pollution further constraints water use options, can create or exacerbate health problems,

and leads to additional degradation of river and lake ecosystems.

- Natural disasters such as floods, storms, droughts and handslides have a greater and disproportionate impact upon the poor, because a growing proportion of them often live and work in places that are more vulnerable to disasters.

III. Regional Environmental Problems

The wide range of environmental problems occurring throughout the world are testament to the complexity of the interactions taking place between human populations and their environment.

- ***Africa*:** Deforestation; soil degradation and deserti- fication; declining biodiversity and marine resources; and deteriorating water and air quality.
- ***Asia*:** High population densities; land degradation, industrialization and economic growth; and degradation of coastal habitats and unsustainable acquaculture practices.
- ***Latin America:*** Lack of effective environmental planning in urban areas, where 75% of the population live, which has led to poor environmental healths, ineffective solid waster management, disposal and air pollution, exacerbated by overcrowding and insanitary conditions. Also, the depletion and destruction of forests in the Amazon basin, and the biodiversity held within them. Also, prone to natural disasters such as flooding, earthquakes & hurricanes.
- ***Central and Eastern Europe and Asia:*** Has experienced enormously costly environmental disasters which are of national significance and affect both health and livelihoods of the poor, as well as impending future economic growth and foreign investment e.g. the Chernobyl disaster in Ukraine. Also industrial pollution, solid waste problems, air pollution, and unplanned urban settlements without proper environmental infrastructure.
- ***Small Island states:*** The economies of small Island states are highly dependent on the natural and physical environment. They are vulnerable to natural and environmental disasters and have limited capacity to respond and recover e.g. sea level rise, soil erosion, landslides, damage to infrastructure, flooding and

general degradation of water and coastal environmental resources through pollution.

- ***Western Europe and North America:*** Environmental threats associated with industrialization and unsustainable use of natural resources. pollution, decline in commercial fish stocks, exposure to pesticides and other toxic chemicals, food hygiene and the use of genetically modified organisms.

IV. Transboundary and Emerging environmental problems in the 21st Century

Environmental problems do not respect national boundaries. Conflict over access to shared water resources is growing in many regions of he world, including South Asia, the Middle East, Central Asia and North Africa. Persistent organic pollutants used in one country can have effects in countries thousands of miles away.

Examples of transboundary environmental problems include:

- The emission of substances that cause stratospheric ozone depletion.
- The emission of carbondioxide which causes climate change.
- Genetic modification technologies: There isn't much understanding of the possible environmental consequences of widespread release and use of genetically modified organisms (GMOs).
- Increased economic activity (World tradeflows) from trade liberalization can lead to environmental damage, without the implementation of appropriate environmental policies in all countries.

Written Exercise

Exercise 3.2

Q1. Citing examples from your community, illustrate the relationships (linkages) in the following:
   (i) Environment and Health

(ii) Environment and Livelihood

Q2. Suggest measures to mitigate the health problems in your community.

Q3. How has the development process affected the environment in your community? (Both positive and negative effects).

UNIT 4

THE GLOBAL ENVIRONMENT

Objectives

By the end of the topic the learner should be able to:

- Distinguish between positive and negative externalities.
- Show the relationship between property rights and externalities.
- Relate the emerging global environmental problems with the negative externalities.

4.1.1 POSITIVE AND NEGATIVE EXTERNALITIES

- **An externality** can be defined as an unintentional and thus uncompensated side effects of production and consumption that affect the levels of consumer utility and enterprise costs. Most externalities occur as a by-product of market transactions. Externalities are those gains and losses sustained by others as a result of actions initiated by producers or consumers or both, and for which no compensation is paid. Externalities are sometimes called 'third party effects', 'neighbourhood effects' or 'spillovers'.

  Positive externality: An unpaid-for benefit enjoyed by others in society.

  Example: A parent vaccinating her child for infectious disease creates a positive externality by reducing the ability of a disease epidemic to spread and affect others in society. ***Or*** A college student purchasing an education produces external benefits to society in the form of being a more informed citizen.

  Negative externality: An uncompensated, human-caused harm/cost to others in society e.g. environmental pollution.

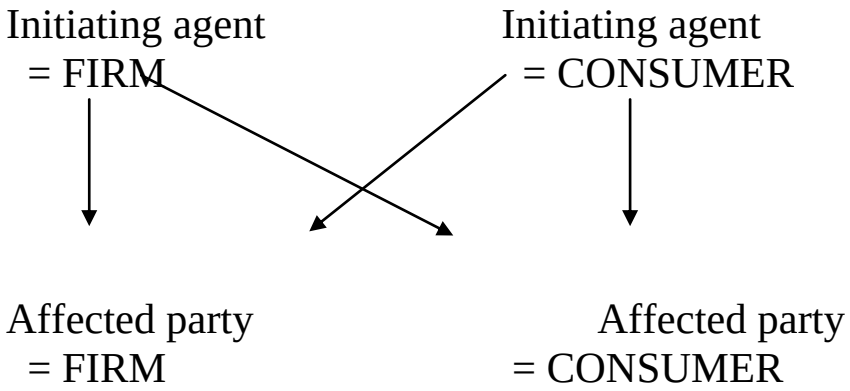
  Example: Consider a chemical firm which discharges toxic waste into a river estuary, killing all the fish and resulting in

the loss of livelihood of a fisherman: no compensation is paid for this result in the loss. Similarly, the discharge of unclean water from an industrial city into a river may result in the loss of recreational activities like swimming, boating etc, yet no compensation is claimed for the loss of these pleasures, nor are these external costs included in the cost calculations of the polluting firms and other agents.

The most important externalities are those which affect the environment within which human beings seek to satisfy their economic and biological needs.

A close examination of any economic activity is likely to reveal both positive and negative externalities and a web of initiating agents and affected parties, as illustrated in the figure below.

Firms and Consumers may generate and be affected by externalities



The arrows show the direction of the effects the initiating agents produce on firms or consumers. e.g. Consider an asbestos factory: It may provide jobs to local residents, thereby raising their living standards (a positive production externality benefiting consumers). At the same time, the emission of asbestos dust may endanger the health of the employees and local residents (a negative production externality harming consumers). Yet again, the firm/factory may provide work to local building and catering firms (a positive production externality benefiting other producers/firms). By the same token, the factory may discharge

its wastes into a river, thereby affecting the profit levels of firms downstream dependent on the supply of clean water from the river (a negative production externality harming producers).

An important problem is how to determine whether given externality-generating activity is one of *net external costs* (i.e. a negative externality) or net external benefits (i.e. a positive externality). Generally, if the externality leads to a net increase in the total of consumer and producer surplus (benefit), it can be said to be a positive externality and, in that case, state action might be called for, to encourage it. Conversely, if the externality leads to a net reduction in the total of consumer and producer surplus (benefit), government action may be called for, to curtail or even to ban it completely.

4.1.2 CAUSES OF EXTERNALITIES

1. **Interaction between the economic system and the environment**

   Every economic activity begins and ends with the environment: All initiating agents draw resources, such as air, water and raw materials, from the environment. They then transform these resources partly directly into consumption, and partly into the production of intermediate and finished goods. The resources are then returned to the environment as wastes – e.g. in the form of polluted air, unclean water, empty tins and bottles.

2. **Lack of developed markets**

   Most societies have developed markets for intermediate and finished goods and services. They also have labour markets for human resources. Markets for some environmental resources, however, are non-existent – e.g. there can be no market for fresh air. In other instances, markets do not take account of the full social cost to future generations: this may be the case in markets for non-renewable resources like oil, coal and copper. Major deficiencies exist in the markets for waste disposal; indeed, producers and consumers often regard the environment

as a free good for waste disposal (i.e. 'environment as a waste sink').

3. **Interdependence of production and consumption**
   This interdependence of production and consumption activities generates potential externalities. An illustration of such externalities has already been given above in the discussion of an asbestos factory imposing externalities on both production and consumption.

4. **Incomplete property rights**
   Since human societies have less developed private and community property rights over resources like land, air, space and water than over other goods, both positive and negative externalities can arise. It is because these resources cannot be easily owned that firms and consumers are not excluded from using them in ways which affect third parties.

   Example: Offshore fishing grounds in the oceans over which no country has jurisdiction. No property rights exists over these waters, so fishing fleets from different countries cannot be excluded. In this situation, the fishing fleets may display insufficient regard for the long-term consequences of their actions. Over-fishing may occur, with the result that fish stocks are seriously depleted. This may, in turn, threaten the livelihood of all those who depend on these fishing grounds for their living.

4.1.3 PROPERTY RIGHTS AND EXTERNALITIES

Property rights represent an enforceable authority to undertake particular actions in specific circumstances. The common-law tradition protects the integrity of property rights e.g. If someone is known to have dumped garbage on your front yard, this act is punishable (through criminal and/or civil sanction) because it impairs the value of your property.

Certain aspects of our environment – including the air, ocean, wildlife and ground water – are not privately owned, however,

and so damage to them does not directly impair the value of someone's property.

Both state and common property regimes have developed to prevent degradation of valuable resources that are not privately owned. Schlager and Ostrom (1992) identified five (5) important elements of property rights:

- **Access:** The right to enjoy benefits of the property that do not subtract from benefits that others can enjoy, such as walking along a public beach. Authorised entrants have access rights, such as those which are purchased with entry fees at national parks/reserves.
- **Withdrawal:** The right to withdraw the product of the property, such as harvesting fish from a fishery. Authorised users have both access and withdrawal rights, such as those which are acquired with the purchase of a fishing license or fuelwood-gathering permits from a national forest.
- **Management:** The right to regulate use and improvements. The term 'claimant' is used to refer to those who hold access, withdrawal and management rights, such as farmers who participate in the management of government owned irrigation systems.
- **Exclusion**: The right to determine who has access and who can be excluded from using the property. The term 'proprietor' is used to refer to those who hold access, withdrawal, management and exclusion rights.
- **Alienation/Transferability:** The right to sell or lease the property. The 'owners' possess all the rights of the proprietors along with the right of alienation. Private property falls under this category, although owners can also be governments or communities.

Property rights scholars distinguish *four different classes or regimes based on who holds property rights.*

1. ***Private property rights:*** Rights held by an identified group of proprietors.
2. ***Common property rights:*** Rights held by an identified group of proprietors.

3. ***State property rights:*** Rights held by government.
4. ***Open access:*** No ownership rights assigned; property open to all; common law of capture applies; no duties; applies to oceans and sea floor resources beyond national boundaries, as well as many elements of the world's atmosphere, among others, no recognized property rights give one group the right to limit use of others.

As Hanna S. (1996) states; "*Property rights regimes do not exist as two opposing types but rather as combinations along a spectrum from the open access to private ownership… second, no single type of property rights regime can be prescribed as a remedy for (all) problems of resource degradation and overuse…. The key attribute of an effective property rights regime is that it is context specific, reflecting environmental, economic, social and political conditions."*

At least in principle, pollution or other harms (negative externalities) on private, state or common property are punishable under traditional common law, which can provide a deterrent. Pollution or other harms (negative externalities) to open-access resources such as the world's atmosphere, however, are not punishable unless specific national or international environmental regulations are devised that impose sanctions on polluters.

Thus, if a profit-maximising firm can avoid clean-up costs by polluting an open-access resources, there is no legal sanction to deter such an action. Consequently an important step in protecting the environment is assigning a property right of some form.

The type of property rights regime that is appropriate depends on factors such as the nature of the resource, the culture and values of society, and the costs of monitoring and excluding use e.g. resources such as air, oceans, groundwater, and fisheries are ***fugitive*** resources, meaning that it is difficult to ***partition*** the stock of the resource into individually owned parcels; thus these resources are less likely to be private property and more likely to be common property or state property.

Written Exercise

Exercise 4.1

Q1. Give empirical examples of externalities arising out of the economic activities in your community.

Q2. Suggest measures to mitigate the negative externalities in part 1 above.

4.1.4 EXTERNALITIES AND THE GLOBAL ENVIRONMENT

Economic activities are undertaken to satisfy individuals' wants for goods like food, shelter, and clothing. Society also has group wants for goods like defense, clean air and water. Environmental pollution, such as unclean air and water that transcend national boundaries, is a by-product of economic activities. Environmental pollution on such large-scale is synonymous with *negative externalities in the global environment.*

Environmental pollution is an important factor that affects welfare. There is interdependence of the welfare of countries as a result of the impact of global externalities. In the global context, and in addition to consumers and producers as generators of externalities, national governments also may be important to the extent which they contribute to environmental pollution. This might be, for example, through either failure to enforce rules and regulations of minimum environmental standards, or connivance at the discharge of effluents into rivers or seas.

- **Transboundary externality**

Consider, for example, acid vain which is often attributed to the emission of sulphur oxides into the atmosphere. A *transboundary externality* occurs because sulphur oxides emitted from the burning of fossil fuels in the country may contribute to acid vain in other countries. This externality shows up in

detrimental effects on the ground and surface water, on freshwater fish in rivers and lakes, and on forests. Yet, no means exists to ascertain the precise levels of damage in the victim country, nor is there a mechanism to enable compensation to be claimed. Nevertheless, acid vain as an environmental externality is an example of *mutual damage*: The emitters of pollutants inflict damage not only on themselves and on other countries, but are themselves damaged by emissions from other countries. As a result, it is impossible to determine the precise sources of the pollution and damage sustained.

Thus there are *mutual externalities* in the world economy, however, some environmental externalities are *unidirectional*, e.g. A river that flows through several countries: it receives industrial and toxic wastes, supplies part of their water needs and also acts as a recreational amenity. With the application of sufficient resources, the polluters, the sufferers and the level of damage sustained could all be ascertained due to the unidirectional nature of the pollution.

- **The phenomenon of Global Warming**

The phenomenon is so called because of the gradual warming up of the earth's atmosphere and the possibility of associated changes in the global weather pattern as a result of emissions into the atmosphere of such gases as carbondioxide, carbon monoxide, nitrous oxide and methane. These gases are generally referred to as greenhouse gases (GHGs). The emissions of GHGs and their consequent concentration in the atmosphere are the result of production and consumption activities not of a single nation, but of all those nations which burn fossil fuels.

The burning of fossil fuels, like coal, oil and gas to generate electricity, is the major contributor to emissions which produce global warming, also referred to as the *greenhouse effect*.

|

- **The environment as a global public good**

Many environmental resources provide a flow of service to producers and consumers over time. The earth's atmosphere, for example, may be viewed as an important public good providing a vital life support system. More specifically, clean air and the

ozone layer are major contributors to the sustenance of life. Many of the resources found in the natural environment are vulnerable and also have the characteristics of public goods.

Fishing and whaling on the high seas, for example, yield direct benefits to nations which have access to these natural resources. Fish and whales, at the same time, are able to reproduce and multiply themselves in their habitats. Amongst the plant populations, the tropical rainforests do not merely yield direct benefits, like timber products and protection against soil erosion, but also provide vital ecosystem services of the biosphere to human populations. These forests are, thus, not merely repositories of biological diversity, such as animal and insect life and plant species, but they also play a significant part in the recycling of carbon dioxide and other gases.

Some environmental resources confer indirect benefits because of their 'existence value'. Today, many tend to associate their well-being with the preservation of species, which face threats of extinction, on the grounds that every species has a right to exist. On these grounds, people derive welfare when an endangered species is preserved and thus is available for the enjoyment of present and future generations.

The environment as a 'global waste sink' is another important public good shared by all nations. Because of the absence of property rights over the environment as the supplier of renewable resources and as a global waste sink, the environment is sometimes known as *global commons*). This is because there is no *exclusion* principle in operation, in the sense that, for example, fishing grounds on the high seas (as global commons) are shared freely (without any price for access) by all nations. However, many environmental resources do not belong to the category of 'pure' public goods. There are *capacity limitations* on the provisions on their benefits (i.e. positive externalities) to producers and consumers. Inspite of their capacity limitations, resources are vulnerable to excessive use.

Producers, consumers and national governments tend to regard them as 'free goods'. This is because of the absence of markets for most of these goods. The existence of zero user prices encourages their excessive consumption.

Written Exercise

Exercise 4.2

Q1. List the various resources that Kenya shares with other nations.

Q2. Give examples of the conflict that has resulted as various nations use of these resources.