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Introduction

This assignment will be composed by two parts. In part 1 I will discuss the concepts of the physical environment, the major environmental problems facing the world today and the need for environmental education. In this first part of my assignment, I will discuss particularly our natural or physical environment and take a brief look at global environmental problems that face the world and the Mozambican community today.

In part 2, I will discuss the aspects related with the value systems, legislation and global economics. In this second part I will also look more closely at the relationship between the social and physical environment.

Part 1 - What is the environment?

Simply put, the environment means our surroundings. At the most basic level, it refers to our home, our community, our workplace and our world. The term environment also refers to all the living and non-living things that affect the life of an individual organism or population. The environment includes *natural and social* surroundings and conditions.

The natural or physical environment

The natural or physical environment supports all life on earth and has four parts:

1. *atmosphere* – a mixture of gases surrounding the earth, for example oxygen (O₂) and carbon dioxide (CO₂)
2. *hydrosphere* – the water on or below the surface of the earth, for example lakes, seas, rivers and underground streams
3. *lithosphere* – the hard, rigid upper crust of the earth, for example rocks, minerals, soil, fossil fuel
4. *biosphere* – the zone where life exists, for example plants, insects, animals and of course people. The biosphere consists of the lower part of the atmosphere, the hydrosphere and the upper part of the lithosphere. It is approximately 2 kilometers thick.

An ecosystem

The natural environment operates as an *ecosystem*. An ecosystem is a usually a usually a natural, functional unit. In it, living things such as vegetation, animals, micro-organisms and, of course people co-exist and interact with the non-living things such as air, water, soil and minerals to form a stable and self-sustaining system. The interactions are based on the exchange of materials and energy.

An ecosystem is not always naturally formed. It can sometime be artificially created. An artificial ecosystem can be a village, a city or even a spaceship. A few years ago, in many countries, people could even buy a terrarium: a large glass jar with a closed ecosystem of plants, insects, soil, air and water existing inside.

The interaction of living and non-living things within an ecosystem involves the flow of energy, the cycling of matter and the regulation of populations of organisms. I will discuss these processes below.

The flow of energy

All life forms require energy to maintain their bodies and perform their activities. The primary source of energy is light from the sun. Plants capture and store light energy, and turn it into chemical energy (carbohydrates, sugars, proteins, waxes and oils) through a process called photosynthesis. Plants are eaten by animals, which are in turn eaten by other animals.

Food chain

Energy moves through an ecosystem via *food chains*. The energy is converted into living tissue and used in activity; some energy is lost from the system through heat and respiration.

There may be several levels in a food chain:

- green plants are known as *producers* because they manufacture their own food from carbon dioxide, water, minerals and sunlight through a process called photosynthesis;
- herbivores are known as *primary consumers* as they eat plants (seeds, leaves, grass, fruit, etc.)
- carnivores that eat herbivores are known as *secondary consumers* (and carnivores that eat other carnivores are known as *tertiary consumers*);
- bacteria and fungi are known as decomposers. They break down waste material, and dead plant and animal tissue into humus and minerals (which are essential for plant growth);
- small animals or detritus feeders are known as *scavengers* and they feed on decomposing materials (detritus).

Between one to twenty percent of the energy in plants is passed from plants to herbivores. Similarly, approximately one to twenty of the energy which is transferred to herbivores is passed on to carnivores.

Some energy is transferred to bacteria and fungi as they decompose the excreta and dead tissue of herbivores and carnivores, while other small animals such as worms gain energy by eating the decomposed material.

The flow of energy is not a cycle process. Energy is not returned to its source. Instead, it flows through the ecosystem in a straight line or through a linear process.

The cycling of matter

Matter consists of many elements and molecules that make up gases, vitamins, proteins, minerals and other nutrients of life. The total amount of matter in the world is constant and cycles through both living (plants and animals) and non-living materials (air, water, rock, etc.). The cycling of matter is driven by the sun and facilitated by the flow of energy.

When decomposers release minerals that returned to the soil and air, the roots of absorb the minerals from the soil. Thus, the nutrients are eventually returned to the plants, and the cycle continues. There are various forms and rates of cycling of matter.

The nitrogen cycle

An important example is the nitrogen cycle. Nitrogen is one of the major elements required for plant and animal growth. One of the main gases in air, it is transformed into a soluble form by bacteria living in soil or water. Plants use this form of nitrogen to make protein, which then re-enters the soil as the plant matter dies and decays. Animals obtain nitrogen by eating plant material or other animals, and release nitrogen in their excreta and when their bodies decay. The nitrogen is then returned to the atmosphere as a gas by the action of bacteria – thus completing the cycle. (*Earth user's to Permaculture*, by Rosemary Morrow, Kangaroo Press, Austria, 1993).

When rain falls on the land, some of it quickly evaporates back into the atmosphere. There is constant evaporation from stream, lakes, the oceans and the bodies of plants and animals. The energy for most of this evaporation comes either directly or indirectly from the sun.

On the rest, some is absorbed by plants or is drunk by animals. Some runs off the surface of the land into streams and lakes and some percolate down through the soil to accumulate as ground water. The water in streams and lakes, as well as the surface ground water, eventually find its way to the ocean.

The endless cycling of water – precipitation as rain, snow and hail, its return atmosphere through evaporation, its subsequent return to the earth as rain – maintains the various sources of fresh water necessary for life on land. The water cycle also plays a major part in modifying temperatures and in transporting many chemical nutrients through ecosystems.

This cycling process points to an important characteristic of ecosystems, that is inter-dependence. The organisms and the non-living things are also inter-dependent. Thus, when an ecosystem has become established properly, each life form is finely balanced in relation to those living and non-living forms that relate to it; those living and non-living things from which it receives sustenance or shelter.

To an extent, these relationships also exist between ecosystems, at the point where one ecosystem meets another. However, the interchanges of energy and materials between ecosystems are usually less complex than those within ecosystems.

Population regulation

Population regulation is an important aspect of a balanced ecosystem. Predators are nature's way of regulating population or controlling the number of any given organism in an ecosystem. For example, ducks eat snails. Ducks are predators of snails, or perhaps one of several predators.

It is important to note that:

- predators play an important role in controlling the rate at which organisms multiply, and in maintaining the balance of nature;
- when we destroy the predators of an organism, this can lead to the organism multiplying rapidly – a population explosion. This may result in damage to the environment and/or depletion in the numbers of the animals or plants that organism feeds on.

In a well-functioning ecosystem, numbers are in balance. For example, by feeding on producers, herbivores control the population of plants. Similar control takes place at each level of the ecosystem, with carnivores controlling populations of herbivores and detritus feeders controlling the level of organic wastes.

Without nature's system of control, populations would grow beyond the capacity of their environment to support them.

An overview of environmental problems

With Industrial Revolution, humans became capable of dramatically changing the face of the earth, the nature of its atmosphere, and the quality of its water. Today, because of rapidly increasing human populations and advancing technology, ever-growing demands on the environment are causing a continuing and accelerating decline in the quality of the environment and its ability to sustain life.

We are faced with many threats to our environment. All of these problems are of concern to young people; a degraded environment is a threat to their future survival.

The greenhouse effect

The greenhouse effect is a term used to describe the role the atmosphere plays in warming the earth's surface. Short-wave solar radiation passes through the atmosphere and is absorbed by the earth's surface. Much of this radiation is then re-emitted at infrared wavelengths, but it is reflected back by gases such as carbon dioxide, methane, nitrous oxide, halocarbons, and ozone in the atmosphere. These are often referred to as *greenhouse gases* because the atmosphere acts in a similar way to a greenhouse. In balanced quantities, these gases function to maintain the earth's relatively warm temperature.

This is why the earth is warm enough to support life on its surface. However, this heating effect is at the root of the theories concerning global warming.

Global warming

Global warming refers an increase in the earth's temperature. This increase is due to the use of fossil fuels (wood, coal, oil, petrol, etc) and other industrial processes which have led to a build-up of greenhouse *gases* (carbon dioxide, methane, nitrous oxide, and chlorofluorocarbons) in the atmosphere.

Since the late 1980s, we know that carbon dioxide (CO₂) helps to stop the sun's infrared radiation from escaping into space. However, the question today is whether the increasing levels of CO₂ in the atmosphere over the last century will lead to higher global temperatures.

A significant global warming of the atmosphere would have profound environmental effects. It would speed the melting of polar ice caps, raise sea levels, change the climate regionally and globally, alter natural vegetation, and affect crop production. These changes would, in turn, have an enormous impact on human civilization. Since 1850 there has been an average increase in global temperature of about 1°C (1.8°F). Some scientists have predicted that rising levels of CO₂ and other greenhouse gases will cause temperature to continue to rise, with estimates ranging from 2° to 6° C (4° to 11°F) by the middle of 21st century.

However, other scientists who research climate effects and trends dispute the theories of global warming, and attribute most recent rise to normal temperature fluctuations. This is one reason why legislation restricting the emission of greenhouse gases has been slow.

Acid rain

Acid rain is also associated with the burning of fossil fuels. Acid deposition is caused by the emission of sulfur dioxide and nitrous oxides into the air from power plants and motor vehicles. These chemicals interact with sunlight, moisture, and oxidants to produce sulfuric and nitric acids, which are carried with the atmospheric circulation and come to earth in rainfall and snowfall, commonly referred to as acid rain, and as dry deposits in the form of dry particles and atmospheric gases.

Acid rain is a major global problem. The acidity of some precipitation in the Northern America and Europe is equivalent to that of vinegar. Acid rain corrodes metals, weathers stone buildings and monuments, injures and kills vegetation, and acidifies lakes, streams and soils. Lake acidification has killed some fish populations and can slow forest growth.

Ozone destruction

In the 1970S and 1980S, scientists began to find that human activity was having a determinant effect on the global *ozone layer*, a region of the atmosphere that protects the earth from the sun's harmful ultraviolet (UV) rays. Without this gaseous layer, which is about 40 km (about 25 mi) thick, no life could survive on the planet.

Studies showed that ozone layer was being damaged by the increasing use of industrial chemicals called chlorofluorocarbons (CFCs) which are used in refrigeration, air conditioning, cleaning solvents, packing materials, and aerosol sprays. When CFCs are released into the atmosphere, they rise and are broken down by sunlight. The chlorine that is released reacts with and destroys ozone molecules. For this reason, the use of CFCs in aerosols has been banned in many countries.

It was initially thought that the ozone layer was being reduced gradually all over the globe. In 1985, however, further research revealed a growing ozone hole concentrated above Antarctica; 50 percent or more of the zone above this area of the earth was being depleted seasonally (beginning each October). Later, a hole was discovered above the Arctic.

A thinning of the ozone layer exposes life on earth to excessive UV radiation, which can increase skin cancer and cataracts, reduce immune system responses, interfere with the photosynthetic process of plants, and affect the growth of oceanic phytoplankton.

Because of the growing threat of these dangerous environmental effects, many nations are working toward eliminating the manufacture and use of CFCs at least by the year 2000. However, CFCs can remain in the atmosphere for more than 100 years, so ozone destruction will continue to pose a threat for decades to come.

Synthetic pesticides

Extensive use of synthetic pesticides derived from chlorinated hydrocarbons to combat insect pests has had disastrous environmental side effects. These organochlorine pesticides are highly persistent and resist biological degradation. Relatively insoluble in water, they cling to plant issues and accumulate in soils, the bottom mud of streams and ponds, and the atmosphere. Once volatilized, the pesticides are distributed worldwide, contaminating wilderness areas far removed from agricultural regions, and even the Antarctic and Arctic zones.

Although these synthetic chemicals are not found in nature, they nevertheless enter the food chain. These pesticides are either taken in by plant eaters or absorbed directly through the skin by such aquatic organisms as fish and various invertebrates. The pesticide is further concentrated as it passes from herbivores to carnivores. It becomes highly concentrated in the tissues of animals at the end of the food chain, such as the peregrine falcon, bald eagle, and osprey. Chlorinated hydrocarbons interfere in the calcium metabolism of birds, causing thinning of eggs shell and subsequent reproductive failure. As a result, some large predatory and fish-eating birds have brought close to extinction. Because of the dangers of pesticides to wildlife and to humans, and because insects have acquired resistance to them, the use of halogenated hydrocarbons such as DDT is declining rapidly in the Western World, although large quantities are still shipped to developing countries.

Radiation

Although atmospheric testing of nuclear weapons has been banned by most countries, eliminating a large source of radioactive fallout, nuclear radiation still remains an environmental problem. Power plants always release some amount of radioactive waste into the air and water, but the main danger is the possibility of nuclear accidents, in which massive amounts of radiation are released into the environment as happened at Chernobyl, Ukraine, in 1986. In fact, since the break up of the Union of the Soviet Socialist Republics (USSR), the world has learned that contamination of that region from nuclear accidents and nuclear wastes is far more extensive than had been realized.

A great problem facing the nuclear industry is the storage of nuclear wastes, which remain toxic for 700 to 1 million years, depending on the type. Safe storage for geological periods of time is problematical; meanwhile nuclear wastes accumulate, threatening the integrity of the environment.

Loss of wild lands

Loss of forests and remaining wild lands, even in those areas once considered relatively safe from exploitation, is increasing at an alarming rate. Insatiable demands for energy are forcing the development of arctic regions for oil and gas and threatening the delicate ecological balance of tundra ecosystems and their wildlife. Tropical forests, especially in Southeast Asia and the Amazon River Basin, are being destroyed for timber, conversion to crop and grazing lands, pine plantations, and settlements.

It was estimated at one point in 1980 that such forest lands were being cleared at the rate of 20 hectares (nearly 50 acres) a minute; another estimate put the rate more than 200,000 sq km (more than 78,000 sq mi) a year. In 1993, satellite data provided a rate of about 15,000 sq km (about 5800 mi) a year in the Amazon Basin area alone.

This tropical deforestation could result in the extinction of as many as 750,000 species, which would mean the loss of a multiplicity of products: food, fibres, medical drugs, dyes, gums, and resins. In addition, the expansion of croplands and grazing areas for domestic livestock in Africa, and illegal trade in wildlife and wildlife products, could mean the end of Africa's large mammals.

Soil erosion

Soil erosion is accelerating on every continent and is degrading one-fifth to one-third of the cropland of the world, posing a significant threat to the food supply. For example, erosion is undermining the productivity of approximately 34 percent of all cropland in the United States. In the developing countries, increasing needs for food and firewood have resulted in the deforestation and cultivation of steep slopes, causing severe erosion. Adding to the problem is the loss of prime cropland to industry, dams, urban sprawl, and highways; the United States

alone has lost 1.1 million hectares (2.7 million acres) of farmland to non-farm uses. Soil erosion and the loss of cropland and forests also reduce the moisture-holding capacity of soils and add sediments to streams, lakes, and reservoirs.

Demands on water and air

The erosion problems described above are aggravating a growing world water problem. Most water problems are in the semiarid and coastal regions of the world. Expanding human populations need irrigation systems and water for industry; this is so depleting underground aquifers that salt water is intruding into them along coastal areas of United States, Israel, Syria, and the Arabian Gulf states. In inland areas, porous rocks and sediments are compacting when drained of water, causing surface subsidence problems.

The world is also experiencing a steady decline in water quality and availability. About 75 percent of the world's rural population and 20 percent of its urban population have no ready access to uncontaminated water. In many regions, water supplies are contaminated with toxic chemicals and nitrates. Waterborne disease debilitates one-third of humanity and kills 10 million people a year.

During the 1980s and early 1990s, the United States improved air quality by reducing particulate matter and toxic chemicals, such as lead, but emissions of sulfur dioxide and nitrous oxides, which cause acid deposition, still remain. Massive air pollution occurs over much of Eastern Europe and the former USSR. (Microsoft Encarta 1994, Microsoft Corporation – 1994, Funk & Wagnall's Corporation).

Environmental education

If we are to use the environment wisely and protect it, we all need environmental education. This part of my assignment aims to give the background knowledge needed to understand the environment, and the environmental problems that the communities are facing in the two district of Morrumbene and Maxixe today. It also aims to provide the material that can be used to start an education program for the civil society in the above mentioned communities to raise their awareness of the environment.

A basic program in environmental awareness provides a sound foundation for communities to participate in projects that address environmental problems.

Inter-connectivity

There is a familiar saying: *No man is an island*. In fact, our earth can be viewed as a whole, where everything is connected to everything else. According to Meadows (1992) *in Beyond the Limits*, with every breath we inhale, a part of environment becomes a part of us. When we exhale, a part of us becomes part of the environment. There is a direct connection between the air we breathe and our lungs or more generally, our human health. As humans, we are connected to all the cycles – water, carbon, nitrogen, oxygen etc.

Our link to the environment can be seen as a system. Two important characteristics of a system are that:

- each part has a function to play;
- each part is connected to another one;

Therefore, thinking of our connection to the environment in systemic terms is important. It reinforces the point that each component of a system has a special function to carry out and that each component is connected to another component.

Interfering with, or disrupting, any part of the environment will seriously affect the functioning of the whole system. For example, imagine the effects of polluting the water on which all living things depend for their life, or the effects of polluting the air.

Sacredness

This concept refers to the fact that as part of our spiritual relationship with the biosphere, there are instances when **we must value nature for its own sake** or when we should not attempt to attach a commercial or materialistic value to it.

Many indigenous people, such as those from Amazon and Australian aborigines, view their relationship with nature as that of a car-taker. This belief meant that they were able to live as part of a relatively balanced ecosystem, without dominating or over-exploiting it.

For our own well being, we could learn from them to value, consider sacred, beautiful healthy and safe environment. While our survival depends on exploiting other species, we need not use them successfully. We could learn from observing how predators behave with they prey.

They do not destroy their supplies. They use only what they need. As a result, the population of animals on which they prey can replenish itself.

At the individual level, we must ask ourselves some important questions about the way we behave toward nature. Among these are:

- *Is my action morally right?*
- *Will what I do jeopardize the lives of future generation?*

Non-renewable resources

When we talk about sustainable development, we need to be aware of the concept of renewable and non-renewable resources. Continued exploitation or destruction of resources that can not be replaced is not sustainable.

For example, a 200-year-old rainforest tree that is cut down for firewood or building materials may be considered non-renewable resources because of the time it would take to replace it. However, planting timbers that are fast growing may considered renewable, because they are grown for a specific reason such as for building materials, and they are often replaced after harvest so that there is an on-going supply.

Sources of energy

The sun is a renewable energy source whereas oil and coal are non-renewable sources of energy. For this reason, people who are interested in sustainable development must look at alternative sources of energy, such as hydro, solar and wind generated electricity, for heating, domestic, agricultural and industrial power. Energy sources that are alternatives to the burning of fossil fuels not only save our non-renewable resources, but also they are much kinder to the environment. One of the biggest consumers of non-renewable energy is fuel for transport. Many of the everyday things we use or consume come from far away, even other countries.

Sustainable Development and Environmental Issues – What causes Environmental Problems?

In this part of my assignment I will discuss the relationship between the social and physical environment. I will define the social environment and examine those aspects of it that can affect the physical environment:

- Value systems
- Legislation, and
- Global economics.

I will also consider what concerns communities as I examine some of the issues that were raised at a world youth environment meeting, *Juventud (youth) '92* held in San José, Costa Rica.

The social environment

The social environment consists of systems that groups of people have organized to satisfy their needs. The social environment includes all skills, all man-made structures, all means of agricultural and industrial production, all tools, all means of transport and communication and all social activities. Therefore, when we speak of the social environment, we generally think of such things as families, religion and values, law, education, economics and politics.

Whatever happens in our social environment affects the physical environment, but this is not a one-way relationship. Without the natural environment, human beings would not exist. As I have already mentioned before, people have had a dramatic affect on the environment. Conversely, our now degraded environment can no longer support the economic development that we desire. Indeed, if we do not start to consider environment, as we plan our development activities, the survival of future generations will be threatened.

Now I will try to examine the manner in which some of our social systems affect the environment.

Value systems and environment

Because of their traditional values systems, some societies do not destroy or deplete the resources in their natural environment. The people in these societies live more or less in harmony with their environment, as a part of their ecosystem. Some indigenous societies, for example the North American and Amazonian Indians and Australian aborigines, held the belief that their did not own the land, but that they had to protect it. Some groups in India believed that the trees in the forest were gods. As a result, they protected al trees.

Other societies do not hold the same beliefs about their natural environment. People in these societies tend to see the living and non-living elements in their environment as resources to be used rather than protected. They may be unconcerned about their environment. This lack of concern, embodied in the value system of the society, will probably lead to environmental damage. Many people living in cities, for example, may simply be too far removed from nature to understand and value it. They may not even be aware that their lifestyle degrades the environment.

In extreme cases, this lack of concern may be symptomatic of deep sociological problems within a society. For example, Edwin Small, writing in the April/May, 1994 issue of *Journeys* suggests that a drug addict... *who has come to the stage where doesn't care about himself, could hardly care less about proper disposal of garbage or depleting the ozone layer.*

The value system of a society also dictates attitudes to such things as birth control, which in turn affects population growth.

Legislation and the environment

The environment is also affected by the existence or non-existence of appropriate legislation, the quality of existing laws and the extent to which they are enforced.

If there are no laws to protect the environment, degradation is likely to occur. For example, the Indian River in Dominica, a Caribbean Island was affected by pollution and erosion caused by tour boat operators and their passengers. This problem was attributed to the absence of regulations governing tourism activities along the river (OECS, 1993).

If laws exist, but they are weak or not enforced, degradation is also likely to occur. In such a situation, the physical environment is more likely to be greatly affected by large economic projects. Weak legislation and governmental emphasis on economic growth, without regard for the environment, opens the flood-gates to developers which may result in severe damage to the environment. Such damage is even more likely when the enforcement of laws and the management of the economy depend on very rich, powerful and greedy people.

Following the Kyoto Conference in December 1997, an article appeared in the *New Scientist*, January 1998 that further illustrates the difficulty in creating or enforcing laws to protect the environment when the economic interests of the rich and powerful are at stake. Even when global agreements are reached, *loopholes* can undermine their implementation.

Conversely, if laws were effective and enforced, protection of the environment is likely to result. For example, the St. Kitts Turtle Ordinance, which was established in 1948 to regulate the harvest of sea turtles, was effective only in those communities which revealed the identities of fishermen who were found catching turtles illegally. (Caribbean conservation News, Issue 1, 1995, p.14)

Global economics and the environment

In the beginning of my assignment I have discussed the main sociological theories. I also discussed a little about the nature of power, human conflict over resources and global capitalism. I am going to discuss these areas again in relation to the environment.

Capitalism

Capitalism is no longer controlled by individuals or even governments, but by global stock and bond markets, and the main concern of those markets is to increase profits. As a result, they focus only on the economic value of goods and services. Moreover, because of the rapidity with which information is transmitted by the new electronic communications, markets react to changes in global conditions with amazing speed. For example, there were a couple of occurrences which illustrate the nature of the stock and bond markets:

1. The American Wall Street stock exchange experienced its largest single one day loss over because of two developments. The first was a major crisis in the Hong Kong stock market. The second was a statement by an American financial administrator about interest rates;
2. The economies of Japan and South Korea were facing potential collapse because of a banking crisis, when their real underlying economies were very strong. This threatened financial systems globally.

The stock and bond markets have a purely financial view and exert far reaching influence. These two characteristics combine allowing them dominate global economic strategies.

However, strategies that only consider a narrow, financial focus have led to the environmental degradation we face today. The stress is on the economic value of goods and services rather than on the environmental damage which is caused in our efforts to produce those goods and services.

Third world debt

Another important fact about global economic system is that it causes a great imbalance in the distribution of wealth and has led to what is known as third world debt. Many developing countries are poor and become indebted to rich countries in an effort to improve their economies. In most cases, poor countries have found themselves in a cycle of indebtedness. Because their economies are weak, they must continue to borrow money to keep them running. However, they can only obtain new loans if they continue to pay off their existing loans. When caught in this situation, what do poor countries do? They overexploit their natural resources to meet their debt repayments. For example, in the late 1980s, Burma used over half its export earnings to pay off its debts. Its second largest export was hardwood. Thus, its trees were cut down to pay off its debts. In fact, throughout the world, one million acres of tropical forest are cut down every week. As a result, by the late 1980s, Latin America had lost 37% of its original tropical forests, Asia 42% and Africa 52%.

Imbalance of wealth within countries

Imbalance in the distribution of wealth is also evident within countries. This, too, contributes to environmental degradation. In countries where the wealth generated does not benefit a large proportion of the population, poor people may be forced to plunder their environment to survive.

What concerns the communities?

At a world youth environmental meeting, *Juventud (Youth) '92*, held in Costa Rica (in which I participated), young people from all over the world discussed their concerns about the environment. The issues raised at that meeting included:

- ✓ Poverty and environment
- ✓ External debt
- ✓ Population growth
- ✓ Natural resources degradation.

Poverty and the environment

The World Commission on Environment and Development (1987) observed that our world has more hungry people today than ever before in human history. For example, in 1980, 340 million people in 87 countries lacked enough calories to prevent stunted growth and serious health risks. Moreover, in 1984, differences in annual per capita income at the international level ranged from \$190 in low income countries (other than China and India) to 11,430 in industrialized market economies.

In developing, the majority of people have very low standards of living. This is often manifested in the form of low incomes, inadequate housing, poor health, limited or no education, high infant mortality, low life and work expectancy, and a general sense of hopelessness and despair.

In India, for example, about 30% of the population fall below the generally accepted poverty line. (The poverty line is the level of income necessities of life). This level of poverty is manifested in the state of the nation's health – for example malnutrition remains a serious problem. It has been estimated that about 40% of the population below the poverty line are landless, agricultural laborers, urban slum dwellers and remote tribal communities.

Globally, the increase in poverty has come about because of the unequal distribution of land and other assets, rapid increase in population and low living standards, among other things.

Poverty as an environmental pollutant

Poverty lessens people's capacity to use natural resources rationally. Therefore, poverty intensifies the pressure on environment. Poor people, who are unable to meet their needs, are forced to exploit natural resources for income, or for their own use. In countries with large populations of poor people, this can be devastating to the environment. For example forests are exploited for food and fuel, pastures for fodder, and ponds and rivers for water. Poverty is therefore a stumbling block to sustainable development. Most leaders of developed countries agree that developing countries need assistance in an effort to lessen the impact of poverty on environment, however, the exploitation of poor countries continues.

In India, because of poverty and population pressure, only 35% of urban households and 18% of rural households have access to tap water. This means that, all other rural residents are forced to overuse the water resources, which include wells, rivers and ponds. This practice has resulted in water contamination.

In addition, urban populations have reverted to the growing use of rivers in an effort to dispose of untreated sewage and industrial effluent. Consequently, there has been an increase in water borne diseases as well as overall health risks.

The rural poor also gather biofuel (wood, crop residue and animal dung) from the local environment and put themselves at risk of diseases associated with using such fuel for cooking activities. In this case, women and children are at the high risk.

What can young people do?

1. In the spirit of the current GATT agreement on the terms of trade, lobby international and government institutions to encourage economic growth that will, in turn, provide employment in your country. Growth can be attained if industrialized countries reduce trade barriers against goods from developing countries. The reduction of tariffs on agricultural produce would be especially beneficial;

2. Your national youth division, with support from your national government, can create special financial initiatives that will provide seed money and training for youth to become self-employed so that they can generate their own income.

The bottom line is that the poor in societies have become both the agents and victims of environmental degradation, although not the cause. The cause seems to lie with international trade agreements, the free market approach to development and external debt.

External debt

At Juventud '92, young people expressed their fears and concerns about:

1. the causes and impact of external debt;
2. their dissatisfaction with the approach of developed countries to development. That approach includes using financial institutions such as the World Bank and giving priority to transnational companies and the International Monetary Fund (IMF) which have contributed, in part, to the depletion of the resources of developing countries.

At the Juventud meeting, it was observed that the heaviest burden in international economic adjustments has been carried by the world's poorest people in Latin America, the Caribbean, Africa and Asia.

Causes of external debt

The young people at Juventud '92 felt that a combination of factors has contributed to the rapidly growing debt that confronts many developing countries:

- ✓ gaining political independence without corresponding economic independence;
- ✓ local autocrats;
- ✓ corruption;
- ✓ the poor management of developing economies;
- ✓ flawed development strategies;
- ✓ the fact that poor countries are encouraged to imitate the free market development model of industrialized nations.

How the free market model contributes to the debt problem

First, the free market model contributes to the debt problem because it forces poor countries to focus on short-term, export-oriented production for the global market. This has caused accelerated extraction of raw materials from developing countries. Ultimately, this leads to the depletion of natural resources and, in many cases, a reduction of income earning capacity of the affected countries.

Secondly, the focus on the export of raw materials has contributed to the gap between rich and poor nations. Developing countries export their raw materials at relatively cheap prices and import costly manufactured goods from the industrialized nations. Thus, there is a continuing and growing imbalance in income between developed and developing countries.

Effects of external debt on the environment

What are the main consequences of huge external debts?

1. The rapid exploitation and depletion of natural resources

This gives rise to chemical pollution, large scale mineral and forest exploitation, the establishment of hydroelectric dams and, ultimately, environmental degradation.

2. A level of exploitation which can cause irreversible environmental damage

This occurs because there is marginalization of large sectors of the population. In order to ensure their short term survival, many of these people must over-exploit their natural surroundings.

3. Disregard for conservation

Planners of development projects tend to ignore environmental planning and conservation.

4. Economic adjustments

These result in high unemployment rates among youth, budget cuts in the social sectors of education and health care and, as a result, human suffering.

Loss of control to multinational corporations

In addition to increasing the debt burden and degrading the environment, present development approaches have caused many poor countries to lose control of their natural resources to multinational corporations.

Quite often, developing countries do not possess the financial and other resources needed to exploit their own natural resources. As a result, multinational corporations, which do possess the necessary finances, purchase the right to do so. They then become owners of a large percentage of the forest and other resources in developing countries. In many cases, the accelerated extraction of natural resources, which the free market model demands, has led to increase ownership of developing countries by foreign multinational companies.

In the pursuit of sustainable development, developing countries must find alternative development models.

What can young people do?

1. lobby for debt forgiveness;
2. Begin a research and discuss among themselves the possibility of creating alternative models of development which take into consideration the cultural, social, economic and political values and nurtures the environment while delivering economic benefits to the people.

Population growth

One of the factors that add to the problem of poverty, external debt and their effect on the environment is that poor countries tend to have large, rapidly growing populations of people who are competing for limited resources. In this part of my assignment, I will take a brief look at the mechanisms of population growth, and the history of human population growth in developed and developing countries and how this affects the environment.

The factors that limit the growth of populations are referred to as *environmental resistance*. The maximum number of an organism that an environment can support is called *carrying capacity*.

Environmental resistance

If a population of animals in the wild has plenty of food, shelter, and fertile mates, its numbers will increase rapidly until overcrowding causes competition for food and space. An overcrowded population is more susceptible to a reduction in fertility and attacks by predators, as well as disease and parasites. These factors which limit population growth are referred to as environmental resistance.

Human populations are different from wild populations in that humans have learnt to protect themselves from predators, diseases, bad weather, and other factors that tend to limit the growth of wild populations.

Carrying capacity

As environmental resistance builds up, growth rate slows down because birth rate decreases and death rate increases. Animals may also migrate to other areas. As the population reaches

the maximum number that the environment can support, it is said to have reached its carrying capacity for that species.

Human population trends

Until the late eighteenth century the world's human population grew slowly because the death and birth rates were almost equal. The child mortality rate was high and adult life expectancy short because of disease and poor nutrition.

From the beginning of the nineteenth the population began to grow faster mainly due to improved agricultural methods which led to better food supplies. In many places, houses were built with piped, fresh water, and efficient sewage disposal. Advances in medicine greatly reduced death from diseases such as diphtheria and cholera. When conditions became crowded, there were still countries with ample space to which they could migrate.

From about 1940s, different trends started to evolve in developed and developing countries.

Trends in developed countries

In developed countries, such as Britain, the US and most European countries, population growth is slowing down. With greater mechanization in agriculture and industry, fewer people are needed to produce food and other goods, and large families are no longer needed to ensure survival. The average family has two children.

In some countries, due to the use of birth control, the population is almost stable, or may even be declining. People are living longer and having fewer children, with the result that there are fewer young people and more old people.

Trends in developing countries

In developing countries such as those in Africa and Asia, the death rate has dramatically declined. This is due to better health care and access to medicine for diseases such as malaria and yellow fever. However, these countries still have a very high birth rate. This is largely due to the cultural need to have children to guarantee survival as an older adult.

Approximately 80% of the world's population lives in poorer, developing countries. The growth rate in these countries is much faster than in developed countries. It is estimated that it will double in the next few years. This will put an immense strain on countries that are already finding it difficult to support their people.

The only long-term answer is population control, but family planning programs have been relatively ineffective without improved education.

Exponential growth

Populations have capacity to grow exponentially. That is, the population grows by geometric progression, for example 1:3:9:27:81. The number added to a growing population is a function of the quantity already there.

The table that I am presenting below a simple illustration of what the world faces today. The human population growth rate has been exponential, taking less and less time to double. At present the population will double every thirty-five years and is estimated to be over 6,000 million by the year 2,000. This table illustrates the exponential growth of human population.

Year	Global Population (millions)	Approximate doubling rate
6,000 BC	6-10	Every 1,700 years
1,000 BC	70	
Birth of Christ	150	Every 1,000 years
1,600 AD	500	
1,800 AD	900	Every 100 years
1,900 AD	1600	
1,970 AD	3600	Every 35 years
2,000 AD	6000	

Consumerism

Over-exploitation of resources not only occurs to satisfy the basic needs of people in countries with large populations, but also to satisfy the consumerism of the elite in richer countries.

It is estimated that 80% of the world's resources are consumed by 20% of the world's population. In fact, free market development models and multinational companies promote consumerism by the wealthy, with little concern for the rest of humanity. They contribute significantly to environmental degradation, thereby jeopardizing the future for generations to come.

Through intelligent management, human beings can live simple and balanced lives and give back to the ecosystem as much as they take from it. Subsistence farming communities have done this for centuries.

A minority of people in the upper-income countries enjoys a high standard of living and consumes a great amount of available energy, food, water, mineral and other resources. One of the recommendations for dealing with this problem is for people to lessen their consumption patterns, change their style of living and learn to do more with less.

Over-exploitation of environmental resources can come about because of, among other things, overpopulation or the desire to maintain unsustainable life-styles. People planning development activities need to be very sensitive to issues related to carrying capacity, and global, economic inequalities.

National resource degradation

One of the most devastating forms of natural resource degradation is deforestation. Combined with air and water pollution caused by industrial waste, deforestation compounds the problem of ozone depletion and global warming. It results in erosion, the loss of topsoil so necessary to agriculture, and has many other environmental harmful effects.

It is, however, an issue that young people can become involved with directly, and it can be rewarding because every tree that is planted is a positive action.

Deforestation

15% of the earth's land surface was originally covered in tropical rainforests, but at present less than half of it is left. The depletion of these forests is due to widespread destruction which has been caused by commercial logging, among other things. The best estimates based on a survey by the Food and Agricultural Organization (FAO) of United Nations suggested that some 11.4 million hectares of tropical forests are being felled each year.

Youth from various regions of the world have expressed their growing concerns about the devastating effects of deforestation.

These include:

1. loss of natural homes/habitats;
2. loss of forest species and biodiversity;
3. loss of soil;
4. a direct loss of livelihoods. This situation mainly affects the vulnerable (women, youth and children) in developing countries. Research has shown that the poor in developing countries often supplement their income with locally available natural resources. Thus, a depletion of tropical forest resources may ultimately threaten the continued survival of poor families.

Main causes of deforestation

The main causes of deforestation are:

- commercial logging;
- farming to survive;
- cattle ranching.

Commercial logging

It is thought that the timber industry is directly responsible for approximately 40% of the tropical rainforest destruction.

The worst affected areas are in West Africa and South East Asia. However, the industry is now making rapid inroads into the forests of Central Africa and Amazonia. Logging companies, such as those in Amazon region, build access roads into pristine rainforests to extract timber.

Forests of the Pacific are also affected. In fact, has been reported that, because of commercial logging operations, most countries of the Pacific region are experiencing great losses in their indigenous culture which depends on their relationship with the forests.

Farming to survive

Millions of poor people have basically no alternative but to destroy tropical rainforests in order to survive. Once the land is cleared, poor families will settle in and begin to farm according to the traditional practice of slash and burn agriculture. In slash and burn agriculture, the forests are cut and burnt, and then crops are planted. However, the burning process causes the soil to become infertile within two to three years. Thus, at the end of that period, the farmers abandon the lands and clear another patch of forest in an effort to keep producing food for their families.

Sometimes farmers are forced away from their homes by wealthy landowners, large development projects, population pressures or poverty. Eyre (1989) recorded in *The Caribbean Environment: Trends Towards Degradation and Strategies for their Reversal* that the demand for agricultural land has been so great that the steepest of mountainside plots have been titled. This has resulted in complete removal of virgin forest.

Cattle farming

A beef cattle farming is one of the main causes of deforestation, especially the rainforests in Central America and Amazonia. For example, in Amazonia, it has been estimated that approximately US\$8 million worth of timber has been destroyed to create pastures for beef cattle.

The vast herds that are grazed are not used to feed the local populations. Instead, they are regarded to provide cheap meat exports which are mainly consumed in affluent countries. Thus, this aspect of deforestation is largely linked to consumerism.

Protecting the world's forest

Protecting the world's tropical forests is **critical** since, as indicated by UNEP, the forests fulfill several vital functions. Here are a few of those functions:

1. Forests provide rural populations with many of their subsistence needs, including fuel wood, charcoal, building materials, fodder, fruit, nuts, honey medicines and dyes;
2. Forests are critically important for topsoil and water conservation. Specially, they prevent the soil from being washed away by the agents of erosion, protect the watersheds, provide shade and shelter from winds, prevent floods and landslides and retain water. Forests also increase the fertility of soil.
3. Forests harbor vast, but so far little known and documented, genetic storehouses. For example, according to the WWF Winter issue of 1994/1995, in a 2,500 acre patch of tropical forest, you could find 1,500 species of flowering plants including 750 kinds of trees. These include strains for crops, medicines and industrial chemicals;

4. Forests fix carbon dioxide. In other words, the trees in forests use and store carbon dioxide (CO₂), one of the greenhouse gases, thereby stabilizing the global climate. They also produce oxygen.
5. Forests are an important source of industrial products including poles, plywood, veneers, paper and boards, gums, resins and soils.

The causes of the upland migration

I am now going to discuss the causes of upland migration:

- A downturn in the economic environment;
- Limited access to land;
- Widespread poverty;
- Government resettlement programs;
- Timber policies:

A downturn in the economic environment

In the 1980s, the Philippines experienced a downturn in the economic environment, as did many countries. During the 1970s, the predominant flow of immigrants was towards the cities. Manila was the most popular destination because of the city's employment opportunities and the government's aggressive program against illegal forest occupants in 1976.

However, during the 1980s, the migration pattern changed. Employment opportunities in Manila reduced sharply and, as a result, migration to the upland increased. What caused the shift in the pattern of migration?

The Philippine government experienced an economic crisis which was triggered off by:

- Its domestic economic policy;
- Excessive bank lending;
- Changes in the international market which led to the collapse of the sugar industry in the Western Visaya islands.

Limited access to land

The arable lowlands were fully cultivated by the mid-1970s and growing numbers of people had their access to agricultural land limited. One of the reasons for this problem was the inequitable distribution of land. In 1980, only 3,4% of the farms occupied 26% of agricultural land, often the country's most productive.

The rapid population growth and the land distribution combined to bring about a large increase in the number of landless farm workers in the agricultural labor force grew from 40 to 56%. Over 60% of landless workers were employed on sugar and coconut farms at less than subsistence wages.

Widespread poverty

In the Philippines, particularly in the rural areas, there exists widespread poverty. In 1985, about 28% of the population had incomes below the subsistence level; about two thirds of those people lived in rural areas.

Government's resettlement programs

To deal in part, with the population growth and migration problem, the Philippines government established resettlement schemes. These efforts brought about 200,000 families into upland areas in the 1960s and 1970s. However, road building and other support programs

attracted many more resettlement migrants to the upland areas. Thus, eventually 1.3 million migrants occupied forest land that had become accessible through the resettlement programs.

Timber policies

The government's timber policies contributed to the upland migration.

Timber licenses were awarded for a period of 25 years. This was well short of the time needed for forests to regenerate. Thus, timber operators logged forests and then left to find new areas for their logging operations. The result was the establishment of a network of roads and logged land.

Timber activities contributed to upland migration because migrants provided a source of cheap labor for logging activities. Moreover, the logged land was much easier to clear for cultivation and was farmed by migrants. Because of these factors, by 195, 62% of the upland population resided in timber concession areas.

The environmental impact of the upland migration

As a result of the upland migration:

1. forest cover declined from 50% of the national territory in 1970 to less than 21% in 1987;
2. cultivated uplands increased significantly;
3. soil erosion was estimated at about 122 to 210 tons per hectare annually for newly established pasture, compared with two tons per hectare for land under forest cover;
4. many upland sites had a population density of 300 per square kilometer in the 1980s. These sites also suffered a high rate of deforestation and soil loss due, in part, to greater demand for fuel wood.

What can communities do to protect forests?

1. Support local organizations concerned with protecting forests and planting trees;
2. Plant a tree whenever an opportunity arises;
3. Lobby their government and local authorities to protect the forests in their countries;
4. Become involved in the various awareness campaigns and spread the word about the need to protect the earth's forests.

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