Lectures in

ENVIRONMENTAL STUDIES

SECOND YEAR STUDENTS
PRIMARY EDUCATION

Prepared by/

Curriculum and Instruction Department

Faculty Vision

The faculty seeks to help the university in achieving its strategic objectives throughout to be one of the distinction faculties and competition in education, community service and scientific research during achieving high level of performance, then presenting a distinction graduate faces several needs for local and external work market.

Faculty Mission

Hurghada Faculty of Education aims for distinction throughout:

- Preparing specialized teachers and leaders in different educational specialization.

- Developing scientific and professional abilities for employees' education and teaching them modern educational methods.

- Doing researches and studies in different educational specialization at faculty.

- Publishing educational thinking and its contributions to solve environment's problems and community.

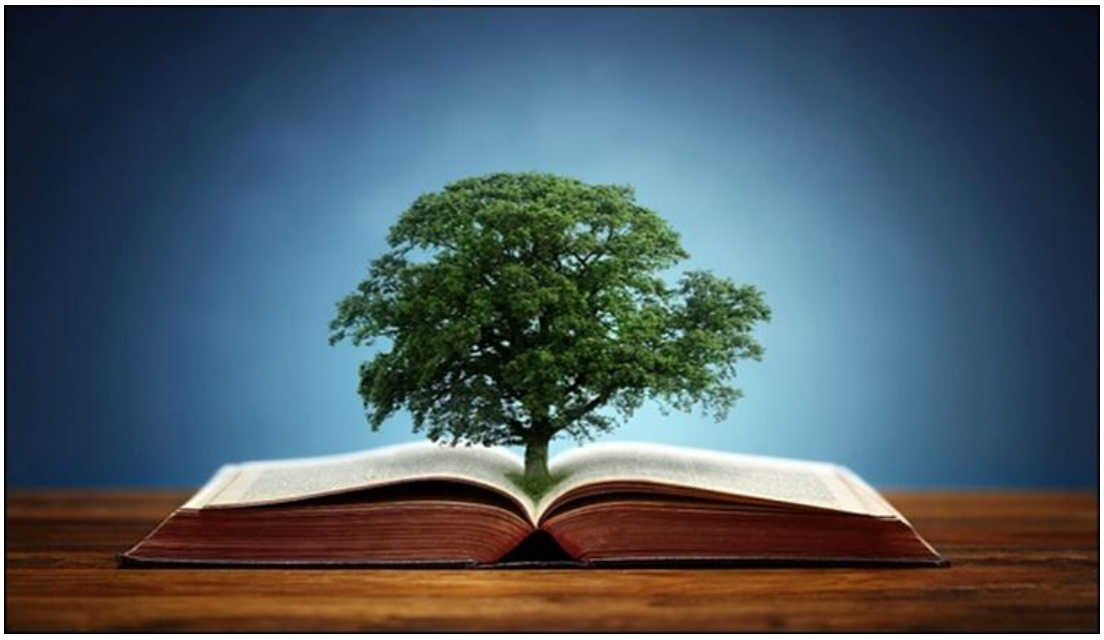
- Exchange experiences and information with authorities and educational cultural establishments.

- Developing sides of student's character and care of talented and creators.

Chapter (1)

Meaning and Definition of the Environment

The term environment has been derived from a French word "Environia" means to surround. It refers to both abiotic (physical or non-living) and biotic (living) environment. The word environment means surroundings, in which organisms live. Environment and the organisms are two dynamic and complex component of nature. Environment regulates the life of the organisms including human beings. Human beings interact with the environment more vigorously than other living beings. Ordinarily environment refers to the materials and forces that surround the living organism.



Environment is the sum total of conditions that surrounds us at a given point of time and space. It is comprised of the interacting systems of physical, biological and cultural elements which are interlinked both individually and collectively. Environment is the sum total of conditions in which an organism has to survive or maintain its life process. It influences the growth and development of living forms.

Environment includes the living and nonliving things that an organism interacts with, or has an effect on it. Living elements that an organism interacts with are known as biotic elements: animals, plants, etc., abiotic elements are non-living things which include air, water, sunlight, etc. Studying the environment means studying the relationships among these various things. An example of interactions between non-living and living things is plants getting their minerals from the soil and making food using sunlight. Predation, an organism eating another, is an example of interaction between living things.

In other words environment refers to those surroundings that surrounds living beings from all sides and affect their lives. It consists of atmosphere, hydrosphere, lithosphere and biosphere. Its main components are soil, water, air, organisms and solar energy. It has provided us all the resources for leading a comfortable life.

1. According to P. Gisbert "Environment is anything immediately surrounding an object and exerting a direct influence on it."

2. According to E. J. Ross "Environment is an external force which influences us."

Thus, environment refers to anything that is immediately surrounding an object and exerting a direct influence on it. Our environment refers to those thing or agencies which though distinct from us, affect our life or activity. The environment is surrounded and affected by factors which may be natural, artificial, social, biological and psychological.

Components of the Environment

Environment mainly consists of atmosphere, hydrosphere, lithosphere and biosphere. But it can be roughly divided into two types such as (a) Micro environment and (b) Macro environment. It can also be divided into two other types such as (c) Physical and (d) biotic environment.

(a) Micro environment refers to the immediate local surrounding of the organism.

(b) Macro environment refers to all the physical and biotic conditions that surround the organism externally.

(c) Physical environment refers to all abiotic factors or conditions like temperature, light, rainfall, soil, minerals, etc. It comprises of atmosphere, lithosphere and hydrosphere.

(d) Biotic environment includes all biotic factors or living forms like plants, animals, Micro-organisms.

Environment is everything that is around us. It can be living (biotic) or non-living (abiotic) things. It includes physical, chemical and other natural forces. Living things live in their environment. They constantly interact with it and adapt themselves to conditions in their environment. In the environment there are different interactions between animals, plants, soil, water, and other living and non-living things.

Environmental studies deals with every issue that affects an organism. It is essentially a multidisciplinary approach that brings about an appreciation of our natural world and human impacts on its integrity. It is an applied science as it seeks practical answers to make human civilization sustainable on the earth's finite resources. Its components include biology, geology, chemistry, physics, engineering, sociology, health, anthropology, economics, statistics, computers and philosophy.

Our environment provides us with a variety of goods and services necessary for our day to day lives. These **natural resources** include, air, water, soil, minerals, along with the climate and solar energy, which form the

non-living or **'abiotic'** part of nature. The **'biotic'** or living parts of nature consist of plants and animals, including microbes. Plants and animals can only survive as communities of different organisms, all closely linked to each in their own **habitat**, and requiring specific abiotic conditions.

Thus, forests, grasslands, deserts, mountains, rivers, lakes and the marine environment all form habitats for specialized communities of plants and animals to live in. Interactions between the abiotic aspects of nature and specific living organisms together form **ecosystems** of various types. Many of these living organisms are used as our food resources. Others are linked to our food less directly, such as pollinators and dispersers of plants, soil animals like worms, which recycle nutrients for plant growth, and fungi and termites that break up dead plant material so that micro-organisms can act on the detritus to reform soil nutrients.

Environmental studies bring together the principles of the physical sciences, commerce/economics and social sciences so as to solve contemporary environmental problems. It is a broad field of study that includes the natural environment, the built environment, and the sets of relationships between them. The field encompasses study in basic principles of ecology and environmental science, as well as associated subjects such as ethics, geography, anthropology, policy, politics, urban planning, law, economics, philosophy, sociology and social justice, planning, pollution control and natural resource management.

Environment represents the physical components of the earth, wherein man is an important factor affecting the environment. Environment comprises interacting systems of physical, biological, and cultural elements, which are interlinked individually as well as collectively in various ways.

Constituents of Environment

- Physical elements constitute space, landforms, water-bodies, climate, soils, rocks, and minerals. These elements determine the variable character of human habitat, and also its opportunities and limitations.
- Biological elements include plants, animals, micro-organisms, and man.
- Cultural elements include economic, social and political conditions which are largely man-made features.

Types of the Environment

Since environment is a combination of physical and biological factors, it contains both living or biotic and non-living or abiotic components. On the basis of this basic structure, environment can be divided into physical or abiotic and living or biotic environment.

- Physical or Abiotic Environment

Physical environment is made up of the following states: solid, liquid, and gas. These three elements signify lithosphere, hydrosphere, and atmosphere respectively. On the basis of spatial distribution, smaller units are termed as

coastal environment, plateau environment, mountain environment, lake environment, river environment, maritime environment, etc.

- Living or Biotic Environment

Biotic environment consists of plants (flora) and animals (fauna) including human beings as a significant factor. Thus, biotic environment can be of two types such as floral environment and faunal environment.

Apart from the above, there are social, cultural, and psychological environment.

- Social and Cultural Environment

This type of environment includes the varied aspects of socio-cultural interactions along with its outcomes such as beliefs, attitudes, stereotypes etc. The tangible and intangible aspects of environment are included in it.

- Psychological Environment

Psychological environment deals with the perception and experiences related to any environmental setting. Some environment may be stimulating and exciting for us, while others may be dull and boring. Psychological environment is more often used in the organizational context.

Natural Environment

In biology and ecology, the environment is all of the natural materials and living things, including sunlight. If those things are natural, it is a natural environment. Some people call themselves environmentalists. They think we must protect the natural environment, to keep it safe. Things in the natural environment that we value are called natural resources. For example; fish, insects, and forests. These are renewable resources because they come back naturally when we use them. Non-renewable resources are important things in the environment that are limited, for example, ores and fossil fuels. Some things in the natural environment can kill people, such as lightning.

Man-Environment Relationship

Man and environment relationship is as old as the evolution of mankind. Since the evolution of man, the physical elements of the planet earth, such as terrain, soil, water, climate, flora and fauna formed man's environment. During that time man was a typically a 'physical man' because of his limited wants, requirements, and total dependence on nature.

With the growth in social and economic activities, advancement in technologies, man expanded his own environment through design and skill to have provisions for improved and better food, shelter, access, and comfort or luxuries. Man's ability to survive in a variety of ecosystem and his unique

ability to adapt to a great variety of external conditions make man-environment relationship quite a fascinating area of study.

The environment in which man survives and to which he adapts himself and which he influences include physical, socio-cultural, and biological aspects. Man and environment has never been static and a great many factors are responsible for the shifts in man environment relationship.

Approaches to Man-Environment Relationship

The man and environment relationship can be studied under the following approaches.

- Determinism: Friedrich Ratzel, the German geographer, was responsible for the development of the concepts of determinism, which was further expanded by Ellsworth Huntington.

This approach is based on the concept of 'nature controls man' or 'earth made man'. According to this approach, man is largely influenced by nature. In fact, the determinism states that man is subordinate to natural environment because all aspects of human life such as physical (health and well-being), social, economic, political, ethical, aesthetic, etc. not only depend on but are dominantly controlled by the physical environment.

- Possibilism: Lucien Febvre, the French historian, founded the concept of Possibilism. Possibilism approach in the study of man-environment relationship is an offshoot of the criticism of environmental determinism and the impact of science and technology on such a relationship.

Possibilism indicates that the physical environment is passive and man is the active agent at liberty to choose between wide ranges of environmental possibilities. According to it, the pattern of human activity is the result of the initiative and mobility of man operating within the natural framework.

Possibilists were largely aware of the limitations of freedom of man to dictate terms to environment. It was agreed upon by the possibilists that man lacks the abilities to fully tame the nature and is not always victorious over it. As result of the above, some geographers vouched for 'cooperation with nature' or 'mutual interaction' between man and environment.

- Ecological Approach

This approach is based upon the basic principle of ecology, which is the study of mutual interaction between organisms and physical environment on the one hand, and the interaction among the organism on the other in a given ecosystem. This approach describes man as an integral part of nature or environment. Man, being most skilled and intelligent, has a unique role to play in maintaining a natural environment as healthy and productive as it should be.

This approach emphasizes on wise and restrained use of natural resources, application of appropriate environmental management programs, policies and strategies keeping in view certain basic principles of ecology so that already depleted natural resources are replenished, and health and productivity of the nature is restored.

What is Environmental Studies?

Environmental studies refer to an extensive and systematic study of nature/environment and of its physical, biological, social, and cultural factors, and the nature and characteristics of relationship between man and environment. How far man influences nature and to what extent nature delivers its bounties constitute another objective of environmental studies. It is an interdisciplinary study as subjects like ecology, biochemistry, toxicology, geography, geology, meteorology, sociology, etc. are dealt with under environmental studies.

The Need for Environmental Studies

Nature or environment sustains life. As a conscious and rational being, man needs to know the importance of environment and help keep the environment as healthy and productive as it can be. It is the environment that has made this beautiful world possible for him. Hence, there is an ever demanding need for environmental studies.

The natural environment that mankind had before the onset of industrialization, urbanization, and exponential growth in population was expectedly healthy and resilient. Nature was able to replenish the loss of its resources, which was very limited. After the onset of modern civilization, the overall health and efficiency of natural environment started deteriorating gradually and went on to such an extent that nature has virtually lost its natural ability to replenish the loss of resources caused by man.

Environmentalists, geographers, and biologists the world over are constantly endeavoring for a sustainable solution to restore a sustainable environment. There is a need for focus on environmental management, laws governing environment protection, pollution and recycling of non-bio-degradable material, etc. There is also a need for careful and cautious use of natural resources in the present time to establish sustainability in every aspect of nature. There is a need to clarify modern environmental concepts such as how to conserve biodiversity and maintain an ecological balance.

Environmental studies help us understand the importance of our environment and teach us to use natural resources more efficiently and embrace a sustainable way of living. It enables us to know the behavior of organisms under natural conditions and the interrelationship between organisms in population and communities.

Definition of Environmental Studies

As residents on Earth, our actions can impact the planet and the rest of its inhabitants. Just as major environmental catastrophes, such as hurricanes, earthquakes, and volcanic eruptions, can affect us, our actions can have major impacts on the environment. Human activities, such as pollution released into the environment, cutting down forests, and damning rivers, have all created significant impacts for environmental health and society. The environmental study is the field that examines this relationship between people and the environment.

Environmental study is an interdisciplinary subject examining the interplay between the social, legal, management, and scientific aspects of environmental issues. Interdisciplinary means that issues are examined from multiple perspectives. Unlike environmental science, which focuses mainly on the scientific component of these environmental issues, environmental studies investigate the scientific and the humanitarian aspects. Students of environmental studies learn the causes, effects, and possible solutions to address important environmental problems.

Environmental Issues

Environmental studies majors must first investigate the broad range of issues that our society is facing now and in the future. Broad issues to be addressed include population and consumption concerns, energy use, biodiversity, and global climate change. Each issue requires consideration of

the political, social, and economic concerns, in addition to a scientific understanding.

Some issues may only affect a local community, such as regional water use policies and their effects on agriculture and local businesses. Other environmental issues have global implications, such as growing industry causing carbon dioxide levels to rise in the atmosphere.

Environmental Management

To help resolve some of the environmental issues, policy makers, scientists, and government planners are looking for the most efficient ways to use our natural resources with the least negative impact possible. Environmental management strives to oversee man's impact on the environment through several management techniques. Management techniques include the development of new technologies, environmental policies, and sustainability measures.

Environmental management is where the interdisciplinary nature of environmental studies truly shines, because you must consider the scientific, economic, and social aspects of the area to be managed. Environmental managers identify the potential impact an area is facing, the goal of the management plan, and methods to achieve their goal.

Sustainability is an environmental management practice that has been gaining popularity in recent years. Sustainability addresses ways that we can use natural resources now without compromising the economic and social development of future generations. In other words, how should we behave now to ensure that our grandchildren have the clean water, air, and basic resources that they will need?

Environmental Problems

Our planet is plagued by environmental problems that deplete natural resources and strain livelihoods, many of which are exacerbated by poor industrial practices. If left unchecked, environmental problems negatively impact businesses both directly, as in supply chain disruptions, and indirectly, as in health hazards that lead to loss of man-hours and efficiency. Following are some common environmental problems that businesses need to address to ensure sustainability and long-term financial viability.

- Pollution

It is one of the world's biggest environmental problems, as it tends to be a typical byproduct of modern life. Air pollution, for instance, is the result of fossil fuel combustion, as well as various gases and toxins released by industries and factories. Below are the most common air pollutants today, as well as a discussion of their source processes and effects on health:

Ozone: A colorless, odorless gas generated when nitrogen oxides (found in motor vehicles and industrial machinery) and volatile organic compounds

(found in gasoline, paints, inks and solvents) are exposed to sunlight. Inhaling ozone can trigger health problems including chest pain, cough, throat irritation and congestion, bronchitis, asthma and emphysema.

Carbon monoxide: A poisonous gas produced by the incomplete combustion of fossil fuels. When inhaled, carbon monoxide reduces the blood's oxygen-carrying capacity. Exposure to high levels of carbon monoxide can cause death. Aside from being highly toxic, carbon monoxide is colorless, odorless and tasteless, therefore often referred to as the "silent killer".

Nitrogen dioxide: A highly reactive gas formed when fuel is burned at high temperatures (such as in motor vehicle exhaust, electric utilities and industrial boilers). Nitrogen dioxide reacts with water and oxygen to make nitric acid, one of the main components of acid rain. Nitrogen dioxide can irritate the lungs and increase susceptibility to respiratory ailments.

Particulate matter: Very small solid particles and liquid droplets suspended in the air. Short-term exposure to particulate matter can cause irritation to the eyes, nose and throat, as well as heart and lung ailments. Prolonged exposure can lead to hospital admissions and premature death due to cardiovascular and respiratory diseases.

Sulfur dioxide: A highly reactive and pungent-smelling gas formed by the incineration of fossil fuel at industrial facilities such as power plants. Other processes that generate sulfur dioxide are sea spray and the decomposition of organic matter. Inhalation of sulfur dioxide can cause wheezing, chest tightness and shortness of breath, as well as heart and lung ailments.

Lead: A common ingredient in many manufactured products. Gasoline and paint are the major sources of lead emissions. Exposure to lead can cause kidney disease, nervous system disorders, mental retardation, learning disabilities, miscarriage, stillbirth, premature birth and death.

- Waste Disposal

As populations and industries grow, so does the problem of proper waste disposal. Communities accumulate so much garbage that properly disposing of it has become increasingly difficult. Solid garbage, for example, is usually buried in landfill sites or incinerated, which is extremely harmful to the environment. Decomposing garbage may attract vermin, give off a foul smell or leach into groundwater. The smoke given off by burning garbage contributes to air pollution.

Certain byproducts of the manufacturing process amplify the need for improved waste disposal. Efficiency is sometimes pursued at the expense of environmental sustainability. To produce as much as possible in the most cost-effective manner, manufacturers may adopt practices that appear to be cheap, but are actually resource-intensive in the long run. These practices generate byproducts that cannot be reused and must be disposed of.

A good starting point towards the zero-waste ideal is the circular economy model associated with other concepts such as the “cradle to cradle” design and industrial ecology. The idea here is that instead of products eventually

being buried or burned, as in most linear models of production, their parts are designed from the beginning to be re-used and processed for re-entry into the production cycle.

- Climate Change

Climate change is a global problem with grave implications: environmental, social, economic, political, and for the distribution of goods. It represents one of the principal challenges facing humanity in our day. If present trends continue, this century may well witness extraordinary climate change and an unprecedented destruction of ecosystems, with serious consequences for all of us.

Shoreline erosion, coastal flooding and greater storm surges cause significant damage to coastal property and infrastructure. Cities, inhabited islands and tidal wetlands will be more prone to flooding. These can indirectly lead to business losses in the form of operational disruptions among suppliers, which in turn affect the rest of the supply chain and customers. In addition, floodwater can bring waterborne diseases that are harmful to people, plants and livestock.

Climate change can also trigger a higher demand for energy. As the climate gets warmer, people consume more electricity for air conditioning. Greater electricity consumption, in turn, means higher operational costs for businesses. Furthermore, a higher energy demand translates to increased

consumption of natural resources such as fossil fuel and water, resulting in a lack of resources for companies to turn into products and services.

Climate change has negative effects on agricultural productivity. Increased temperatures and carbon dioxide levels can be beneficial to some crops, but this benefit can only be realized if other conditions like nutrient levels, soil moisture and water availability are also adjusted. Otherwise, crop yields may decrease. Crops may also become more susceptible to diseases, given that some weeds, pests and fungi grow in warmer temperatures.

Wheat, for example, is an important food crop that grows in cool temperatures. Rising temperatures will stress wheat crops and lower their yields. This explains why, according to a December 2014 study that was published in Nature Climate Change, every 1°C increase in global temperatures means a 6% fall in wheat production. Falling wheat production would make it difficult for food manufacturers to produce vital foodstuffs such as cereal, bread, noodles and pasta. Plus, in order to maintain optimal yields, wheat growers would have to use chemical pesticides and fertilizers that are hazardous to both human health and the environment.

- Drought / Inadequate Access to Water

The world's water supply is becoming increasingly scarce. According to the WHO/UNICEF Joint Monitoring Program for Water Supply and Sanitation (JMP), 2.5 billion people (roughly 36% of the world's population)

still lack access to improved sanitation facilities. 748 million people continued to get their drinking water from unsafe sources in 2012. The World Wildlife Fund cautions that by 2025, water shortages will affect about two-thirds of the world's population.

Such water shortages have a detrimental effect on agriculture. Farms are dependent on water for irrigation, so a decrease in water supply will drastically affect their productivity. Farms will have smaller yields, which mean manufacturers will also have fewer raw materials to turn into products and services. Climate change-related water issues cost Unilever between $300m and $400m every year.

If the water supply in a particular area gets critically low, businesses in that area may be forced to move their operations to where water supply is still sufficient. Water is needed in almost every aspect of business operations, from running machines, to keeping the office premises clean. Relocation forces businesses to spend on new facilities and equipment, as well as on hiring and training new staff.

- Partnering for the Future

Environmental problems make it apparent that solving complex issues requires the cooperation of all sectors. Environmental issues affect every individual, organization, community and country, and by becoming

environmental stewards, it keeps the economy moving, which is necessary for growth and long-term viability.

We all know the world has its problems, particularly where the environment is concerned. But not too many of us know the details, and the stories behind those problems.

- Acid deposition
- Air pollution
- Climate change
- Development environmental movement
- Drinking water pollution
- Environmental disasters
- Environmental effects and toxicology
- Environmental impact of volcanic eruption
- Environmental effects of warfare
- Eutrophication
- Filamentous bacteria
- Floods
- Global warming and the greenhouse effect
- Groundwater pollution
- Heavy metals
- Irrigation water pollution
- Legionella
- Matter cycles and pollution

- Ozone toxicology
- Particulate matter
- Periodic table, including environmental effects
- Population growth
- Recent environmental disasters
- Water pollution

Chapter (2)

Water Pollution

What is water pollution?

Water pollution is any chemical, physical or biological change in the quality of water that has a harmful effect on any living thing that drinks or uses or lives (in) it. When humans drink polluted water it often has serious effects on their health. Water pollution can also make water unsuited for the desired use.

What are the major water pollutants?

There are several classes of water pollutants. The first are disease-causing agents. These are bacteria, viruses, protozoa and parasitic worms that enter sewage systems and untreated waste.

A second category of water pollutants is oxygen-demanding wastes; wastes that can be decomposed by oxygen-requiring bacteria. When large populations of decomposing bacteria are converting these wastes it can deplete oxygen levels in the water. This causes other organisms in the water, such as fish, to die.

A third class of water pollutants is water-soluble inorganic pollutants, such as acids, salts and toxic metals. Large quantities of these compounds will make water unfit to drink and will cause the death of aquatic life. Another class of water pollutants is nutrients; they are water-soluble nitrates and phosphates that cause excessive growth of algae and other water plants, which deplete the water's oxygen supply. This kills fish and, when found in drinking water, can kill young children.

Water can also be polluted by a number of organic compounds such as oil, plastics and pesticides, which are harmful to humans and all plants and animals in the water. A very dangerous category is suspended sediment, because it causes depletion in the water's light absorption and the particles spread dangerous compounds such as pesticides through the water. Finally,

water-soluble radioactive compounds can cause cancer, birth defects and genetic damage and are thus very dangerous water pollutants.

Where does water pollution come from?

Water pollution is usually caused by human activities. Different human sources add to the pollution of water. There are two sorts of sources, point and nonpoint sources. Point sources discharge pollutants at specific locations through pipelines or sewers into the surface water. Nonpoint sources are sources that cannot be traced to a single site of discharge.

Examples of point sources are: factories, sewage treatment plants, underground mines, oil wells, oil tankers and agriculture. Examples of nonpoint sources are: acid deposition from the air, traffic, pollutants that are spread through rivers and pollutants that enter the water through groundwater. Nonpoint pollution is hard to control because the perpetrators cannot be traced.

How do we detect water pollution?

Water pollution is detected in laboratories, where small samples of water are analyzed for different contaminants. Living organisms such as fish can also be used for the detection of water pollution. Changes in their behavior or growth show us, that the water they live in is polluted. Specific properties of these organisms can give information on the sort of pollution in their

environment. Laboratories also use computer models to determine what dangers there can be in certain waters. They import the data they own on the water into the computer, and the computer then determines if the water has any impurities.

What is heat pollution, what causes it and what are the dangers?

In most manufacturing processes a lot of heat originates that must be released into the environment, because it is waste heat. The cheapest way to do this is to withdraw nearby surface water, pass it through the plant, and return the heated water to the body of surface water. The heat that is released in the water has negative effects on all life in the receiving surface water. This is the kind of pollution that is commonly known as heat pollution or thermal pollution.

The warmer water decreases the solubility of oxygen in the water and it also causes water organisms to breathe faster. Many water organisms will then die from oxygen shortages, or they become more susceptible to diseases.

What is eutrophication, what causes it and what are the dangers?

Eutrophication means natural nutrient enrichment of streams and lakes. The enrichment is often increased by human activities, such as agriculture (manure addition). Over time, lakes then become eutrophic due to an increase in nutrients. Eutrophication is mainly caused by an increase in nitrate and phosphate levels and has a negative influence on water life. This is because,

due to the enrichment, water plants such as algae will grow extensively. As a result the water will absorb less light and certain aerobic bacteria will become more active. These bacteria deplete oxygen levels even further, so that only anaerobic bacteria can be active. This makes life in the water impossible for fish and other organisms.

What causes white deposit on showers and bathroom walls?

Water contains many compounds. A few of these compounds are calcium and carbonate. Carbonate works as a buffer in water and is thus a very important component. When calcium reacts with carbonate a solid substance is formed, that is called lime. This lime is what causes the white deposit on showers and bathroom walls and is commonly known as lime deposit. It can be removed by using a specially suited cleaning agent.

Air pollution

Air pollution means the presence of one or more unwanted substances in air. Air pollutants have a negative impact on humans, animals and plants, and on air quality. The most frequently present categories of air pollutants are sulphur oxides, nitrogen oxides, Volatile Organic Compounds (VOC) and small dust particles (aerosols).

What causes air pollution?

The main sources of air pollution are the industries, agriculture and traffic, as well as energy generation. During combustion processes and other production processes air pollutants are emitted. Some of these substances are not directly damaging to air quality, but will form harmful air pollutants by reactions with other substances that are present in air. Examples of large-scale air pollutants are VOC (Volatile Organic Compounds) and small dust

particles. When large concentrations of these substances are emitted this negatively affects ecosystems, materials and public health.

Industrial processes vary greatly and as a result there are many different chemical wastes. The industries are responsible for emissions of carbon monoxide, carbon dioxide, sulphur dioxide, nitrogen oxides, small dust particles, VOC, methane, ammonia and radioactive radiation. During energy generation chemicals such as methane are released into the air as a result of oil and natural gas extraction. The combustion of coal and natural gas for electricity production causes the release of sulphur dioxide, nitrogen oxides and carbon dioxide into the air.

Traffic is held responsible for one-third of the greenhouse gas emissions. Emissions caused by traffic are mainly those of carbon dioxide, carbon monoxide, nitrogen oxides, VOC and small dust particles.

Consumers are also partly responsible for air pollution. Firstly because the products they use have caused air pollution during their production and distribution and secondly because heating of houses and offices causes chemicals release into the air. When people use paints or cosmetics VOC is released and perspiration, pet fertilizer use and cleanser use cause ammonia emissions. Last but not least, many chemicals (carbon dioxide, carbon monooxide) are emitted during smoking.

How does air pollution form?

Air pollution can form in various ways. Chemicals are emitted during many different human activities. In the atmosphere these chemicals can react with other chemicals to more dangerous substances. Air pollutants often have properties that are harmful to the environment.

The weather plays an important role in the formation and disappearance of air pollution. This is mainly influenced by wind and temperatures. Air pollutants can be transported by wind, causing a pollution to spread widely. Rain can remove pollutants from air, causing soil and water pollution. Sunlight can aid the convention of air pollutants to different substances.

Chemicals can come from various sources, and are formed during different processes. Air pollution can be divided in categories according to the source it is derived from:

- Biological air pollution, such as pollens, small insects and microorganisms (bacteria, fungi, yeasts and algae)
- Physical air pollution, such as sound, smell, thermal pollution and radioactive radiation
- Chemical air pollution, such as ozone, aerosols and ammonia

Air pollution is caused by both human and natural sources. Human sources are traffic, agriculture or industry, as was mentioned before. Natural sources are be dust storms, volcanic eruptions and emissions from plants.

Air pollution undergoes a number of processes:

- Emission (contaminants are released into the air)
- Transport (contaminants are transported to different locations through air)
- Exchange (compounds react with other compounds in air)
- Distribution (contaminants are distributed in air)
- Immission (contaminants maintain in a certain area)
- Deposition (contaminants are deposited in a certain area, on the soil or on objects).

What types of air pollution are there?

Air pollution consists of gases and/ or particles. These have a distinct chemical or physical structure, or a distinct effect on human health.

Five of the world's biggest environmental problems:

1. Air pollution and climate change.

Problem: Overloading of the atmosphere and of ocean waters with carbon. Atmospheric CO2 absorbs and re-emits infrared-wavelength radiation, leading to warmer air, soils, and ocean surface waters - which are good: The planet would be frozen solid without this.

Unfortunately, there's now too much carbon in the air. Burning of fossil fuels, deforestation for agriculture, and industrial activities have pushed up atmospheric CO2 concentrations from 280 parts per million (ppm) 200 years ago, to about 400 ppm today. That's an unprecedented rise, in both size and speed. The result: climate disruption.

Carbon overloading is only one form of air pollution caused by burning coal, oil, gas and wood. The World Health Organization recently estimated that one in nine deaths in 2012 were attributable to diseases caused by carcinogens and other poisons in polluted air.

Solutions: Replace fossil fuels with renewable energy. Reforestation. Reduce emissions from agriculture. Change industrial processes.

The good news is that clean energy is abundant - it just needs to be harvested. Many say a 100 percent renewable-energy future is feasible with existing technology now. But the bad news is that even though renewable energy infrastructure - solar panels, wind turbines, energy storage and distribution systems - are already widespread, and getting cheaper and more efficient all the time, experts say we're not applying them quickly enough to prevent catastrophic climate disruption. Barriers in policy and finance remain to be overcome.

2. Deforestation.

Problem: Species-rich wild forests are being destroyed, especially in the tropics, often to make way for cattle ranching, soybean or palm oil plantations, or other agricultural monocultures.

Today, about 30 percent of the planet's land area is covered by forests - which is about half as much as before agriculture got started around 11,000 years ago. About 7.3 million hectares (18 million acres) of forest are destroyed each year, mostly in the tropics. Tropical forests used to cover about 15 percent of the planet's land area; they're now down to 6 or 7 percent. Much of this remainder has been degraded by logging or burning. Not only do natural forests act as biodiversity reserves, they are also carbon sinks, keeping carbon out of the atmosphere and oceans.

Solutions: Conserve of what's left of natural forests, and restore degraded areas by replanting with native tree species. This requires strong governance - but many tropical countries are still developing, with increasing populations, uneven rule-of-law, and widespread cronyism and bribery when it comes to allocating land use.

3. Species extinction.

Problem: On land, wild animals are being hunted to extinction for bushmeat, ivory, or "medicinal" products. At sea, huge industrial fishing boats equipped with bottom-trawling or purse-seine nets clean out entire fish populations. The loss and destruction of habitat are also major factors contributing to a wave of extinction - unprecedented in that it is caused by a single species: humans. The IUCN's Red List of threatened and endangered species continues to grow.

Not only do species inherently deserve to exist, they also provide products and "services" essential to human survival. Think bees and their pollinating prowess - necessary for growing food.

Solutions: Concerted efforts need to be made to prevent further loss of biodiversity. Protecting and restoring habitats is one side of this - protecting against poaching and wildlife trade is another. This should be done in partnership with locals, so that wildlife conservation is in their social and economic interest.

4. Soil degradation.

Problem: Overgrazing, monoculture planting, erosion, soil compaction, overexposure to pollutants, land-use conversion - there's a long list of ways that soils are being damaged. About 12 million hectares of farmland a year get seriously degraded, according to UN estimates.

Solutions: A wide range of soil conservation and restoration techniques exist, from no-till agriculture to crop rotation to water-retention through terrace-building. Given that food security depends on keeping soils in good condition, we're likely master this challenge in the long run. Whether this will be done in a way equitable to all people around the globe remains an open question.

5. Overpopulation.

Problem: Human population continues to grow rapidly worldwide. Humanity entered the 20th century with 1.6 billion people; right now, we're about 7.5 billion. Estimates put us at nearly 10 billion by 2050. Growing global populations, combined with growing affluence, is putting ever greater pressure on essential natural resources, like water. Most of the growth is happening on the African continent, and in southern and eastern Asia.

Solutions: Experience has shown that when women are empowered to control their own reproduction, and gain access to education and basic social services, the average number of births per woman drops precipitously.

Done right, networked aid systems could bring women out of extreme poverty, even in countries where state-level governance remains abysmal.

(15) Major Current Environmental Problems

1. Pollution: Pollution of air, water and soil require millions of years to recoup. Industry and motor vehicle exhaust are the number one pollutants. Heavy metals, nitrates and plastic are toxins responsible for pollution. While water pollution is caused by oil spill, acid rain, urban runoff; air pollution is caused by various gases and toxins released by industries and factories and combustion of fossil fuels; soil pollution is majorly caused by industrial waste that deprives soil from essential nutrients.

2. Global Warming: Climate changes like global warming is the result of human practices like emission of Greenhouse gases. Global warming leads to rising temperatures of the oceans and the earth' surface causing melting of polar ice caps, rise in sea levels and also unnatural patterns of precipitation such as flash floods, excessive snow or desertification.

3. Overpopulation: The population of the planet is reaching unsustainable levels as it faces shortage of resources like water, fuel and food. Population explosion in less developed and developing countries is straining the already scarce resources. Intensive agriculture practiced to produce food damages the environment through use of chemical fertilizer, pesticides and insecticides. Overpopulation is one of the crucial current environmental problem.

4. Natural Resource Depletion: Natural resource depletion is another crucial current environmental problems. Fossil fuel consumption results in emission of Greenhouse gases, which is responsible for global warming and climate change. Globally, people are taking efforts to shift to renewable sources of energy like solar, wind, biogas and geothermal energy. The cost of installing the infrastructure and maintaining these sources has plummeted in the recent years.

5. Waste Disposal: The over consumption of resources and creation of plastics are creating a global crisis of waste disposal. Developed countries are notorious for producing an excessive amount of waste or garbage and dumping their waste in the oceans and, less developed countries. Nuclear waste disposal has tremendous health hazards associated with it. Plastic, fast food, packaging and cheap electronic wastes threaten the well-being of humans. Waste disposal is one of urgent current environmental problem.

6. Climate Change: Climate change is yet another environmental problem that has surfaced in last couple of decades. It occurs due to rise in global warming which occurs due to increase in temperature of atmosphere by burning of fossil fuels and release of harmful gases by industries. Climate change has various harmful effects but not limited to melting of polar ice, change in seasons, occurrence of new diseases, frequent occurrence of floods and change in overall weather scenario.

7. Loss of Biodiversity: Human activity is leading to the extinction of species and habitats and loss of bio-diversity. Eco systems, which took millions of years to perfect, are in danger when any species population is decimating. Balance of natural processes like pollination is crucial to the survival of the eco-system and human activity threatens the same. Another example is the destruction of coral reefs in the various oceans, which support the rich marine life.

8. Deforestation: Our forests are natural sinks of carbon dioxide and produce fresh oxygen as well as helps in regulating temperature and rainfall. At present forests cover 30% of the land but every year tree cover is lost amounting to the country of Panama due to growing population demand for more food, shelter and cloth. Deforestation simply means clearing of green cover and make that land available for residential, industrial or commercial purpose.

9. Ocean Acidification: It is a direct impact of excessive production of CO2. 25% of CO2 produced by humans. The ocean acidity has increased by the last 250 years but by 2100, it may shoot up by 150%. The main impact is on shellfish and plankton in the same way as human osteoporosis.

10. Ozone Layer Depletion: The ozone layer is an invisible layer of protection around the planet that protects us from the sun's harmful rays. Depletion of the crucial Ozone layer of the atmosphere is attributed to pollution caused by Chlorine and Bromide found in Chloro-floro carbons (CFC's). Once these toxic gases reach the upper atmosphere, they cause a hole in the ozone layer, the biggest of which is above the Antarctic. The CFC's are banned in many industries and consumer products. Ozone layer is valuable because it prevents harmful UV radiation from reaching the earth. This is one of the most important current environmental problems.

11. Acid Rain: Acid rain occurs due to the presence of certain pollutants in the atmosphere. Acid rain can be caused due to combustion of fossil fuels or erupting volcanoes or rotting vegetation which release sulfur dioxide and nitrogen oxides into the atmosphere. Acid rain is a known environmental problem that can have serious effect on human health, wildlife and aquatic species.

12. Water Pollution: Clean drinking water is becoming a rare commodity. Water is becoming an economic and political issue as the human population fights for this resource. One of the options suggested is using the process of desalinization. Industrial development is filling our rivers seas and oceans with toxic pollutants which are a major threat to human health.

13. Urban Sprawl: Urban sprawl refers to migration of population from high density urban areas to low density rural areas which results in spreading of city over more and more rural land. Urban sprawl results in land degradation, increased traffic, environmental issues and health issues. The ever growing demand of land displaces natural environment consisting of flora and fauna instead of being replaced.

14. Public Health Issues: The current environmental problems pose a lot of risk to health of humans, and animals. Dirty water is the biggest health risk of the world and poses threat to the quality of life and public health. Run-off to rivers carries along toxins, chemicals and disease carrying organisms. Pollutants cause respiratory disease like Asthma and cardiac-vascular problems. High temperatures encourage the spread of infectious diseases like Dengue.

15. Genetic Engineering: Genetic modification of food using biotechnology is called genetic engineering. Genetic modification of food results in increased toxins and diseases as genes from an allergic plant can

transfer to target plant. Genetically modified crops can cause serious environmental problems as an engineered gene may prove toxic to wildlife. Another drawback is that increased use of toxins to make insect resistant plant can cause resultant organisms to become resistant to antibiotics.

The need for change in our daily lives and the movements of our government is growing. Because so many different factors come into play; voting, governmental issues, the desire to stick to routine, many people don't consider that what they do will affect future generations. If humans continue moving forward in such a harmful way towards the future, then there will be no future to consider. Although it's true that we cannot physically stop our ozone layer from thinning (and scientists are still having trouble figuring out what is causing it exactly,) there are still so many things we can do to try and put a dent in what we already know. By raising awareness in your local community and within your families about these issues, you can help contribute to a more environmentally conscious and friendly place for you to live.

The Simple Ways to Help the Environment

1. Use Reusable Bags

Plastic grocery-type bags that get thrown out end up in landfills or in other parts of the environment. These can suffocate animals who get stuck in them or may mistake them for food. Also, it takes a while for the bags to decompose. Whether you are shopping for food, clothes or books, use a reusable bag. This cuts down on litter and prevents animals from getting a hold of them. There are even some stores (such as Target) that offer discounts for using reusable bags! These bags are useful for things other than shopping as well. If you forget your bags at home, buy a new one. Better yet, keep a couple bags in your car so you never leave home without them (just make sure you remember you put them there)! If you are in a position where you need to use the plastic bags, reuse them the next time you go shopping, or use them for something else. Just do not be so quick to throw them out! There are some states that are outlawing or charging extra for using plastic bags.

2. Print as Little as Necessary

We have all had that teacher that wanted us to have a copy of every single reading when we come to class, or that professor who wanted a hard copy of the ten-page paper that is due next week. These are fine but it seems as if they do not understand that using so much paper is

detrimental to the environment. What can you do? Ask your teacher if you can bring a laptop or an e-reader to class so that you can download the reading onto that and read it from there. If not, print on both sides of the page to reduce the amount of paper used. If you need to turn in a long paper, ask the professor if it is okay to print on both sides of the page. Most teachers care about the environment as well and would be willing to allow you to do so.

3. Recycle

Recycling is such a simple thing to do, but so many people don't do it. Many garbage disposal companies offer recycling services, so check with the company you use to see if they can help you get started! It is as simple as getting a bin and putting it out with your trash cans for free! Also, check with your RA to see if recycling options are offered in your dorm. Another way to recycle is to look for recycling cans near trashcans. Instead of throwing recyclables in the trash with your non-recyclables, make a point to take an extra step to locate recycling cans around your campus.

4. Use Reusable Beverage Containers

Instead of buying individually-packaged drinks, consider buying a bulk container of the beverage you want and buying a reusable water bottle. Not only will this help the environment, but it will also help you save money since you are buying a bulk container. Many campuses offer

water fountains designed for drinking as well as for refilling reusable water bottles. Make use of these fountains throughout the day when you finish off the initial beverage. Along these lines, many restaurants offer reusable containers for drinks. If you go to a certain place a lot, consider buying one of these containers to help minimize waste. A lot of coffee shops even offer a discount to customers who use a reusable container for their drinks.

5. Don't Throw Your Notes Away

At the end of the semester, students are often stuck with notes they don't need anymore, especially from GenEd classes that had little, if anything, to do with their major. If you took great notes, ask your teacher to connect you with students in a future class so that you can give them your notes. These notes will help students by being able to read what they are learning in the words of another student. It is beneficial to read things that are worded differently than what the teacher said. You may need to find a student on your own, depending on the teacher's load for the semester. It will feel great to help others taking the same class! You can list your notes on online college boards.

6. Save Electricity!

Use energy-efficient light bulbs instead of regular bulbs. They last longer, which will save you a bit of money. Make you turn off lights, the TV, and other appliances when you are not using them. Lower your

air conditioning or heat when it's not necessary. This is especially true for between seasons.

7. Save Water

Water is wasted more frequently than we can see. Turn off the faucet as you are brushing your teeth. Don't turn your shower on until you're ready to get in and wash your hair. Limit your water usage as you wash dishes. Changing old habits will be good for both the environment and your wallet!

8. Avoid Taking Cars or Carpool When Possible

Cars are harmful to the environment. Taking public transportation, walking, or riding a bike to class are better options that help the environment and your budget, as well as getting some exercise in! If you do need to use your car, compare schedules and places of residency with those in your classes. You can split the cost of gas and have alternating schedules for who drives when. This is cheaper than everyone driving separately.

Chapter (3)

Human Impact on the Environment

Human impact on environment in several ways, some common effects include water quality, environmental pollution and greenhouse gas emissions, depletion of natural resources and contribution to climate change. Some of these are the direct result of human activities, whereas others are secondary effects that are part of a series of actions and reactions. Though technology is making lives of humans easier and comfortable, it poses a great threat to the environment.

The threat is due to pollution, radiation hazards, exploitation of natural resources etc. Greenhouse gases and aerosols affect climate by altering incoming solar radiation and out-going infrared (thermal) radiation that are part of Earth's energy balance. Changing the atmospheric abundance or properties of these gases and particles can lead to a warming or cooling of the climate system.

1. The population bomb

Human overpopulation has been a concern for scientists since at least 1798, when Thomas Malthus first published his finding that, without significant and ongoing technological innovation, the human population would almost certainly outstrip the planet's food supply. In

1968, this concern was again raised in Stanford professor R. Paul Ehrlich's book "The Population Bomb."

Accommodating population growth has been a root cause for much of the impact we've had on our environment. Since Malthus first noted his grave concerns, technological advances have created a new double-edged sword: health and abundance. Our food supply today can support more lives than ever, and advances in medical science have led to increasingly longer lifespans. But this reality has the profound side effect of reducing population turnover and leading to its rapid expansion. So as our quality of life and life expectancy improve, the challenges wrought by overpopulation accelerate as well.

2. Agriculture, domesticated animals and genetic modification

The demand to feed a growing human population has facilitated notable advances in agriculture, which was the first major human innovation to enable our survival as a species. Early agriculture allowed hunter-gatherer cultures to settle an area and cultivate their own food. This immediately impacted the environment by transplanting non-native species to new areas, and by prioritizing the cultivation of certain plants and animals over others. And more recently, advances in genetic modification have raised concerns about the environmental impact of newly developed crops.

In particular, the domestication of livestock and other species, including dogs and cats, by early humans altered the land in significant ways. Grazing animals contributed to environmental change by depleting native grasses and contributing to soil erosion. And we now know that the rapid expansion of cattle populations to meet human dietary demands has contributed substantially to changes in the composition of gases within the atmosphere.

The industrialization of agriculture in the last several centuries has exacerbated these effects, but it has also prompted a subsequent wave of counter-movements, which seek to undo the negative effects of human intervention. People today are increasingly aware of the impact vast factory farms have on the environment, and seek to return to smaller farms and even urban gardens. As "eating local" rises in popularity, urban land is being reclaimed for traditional agriculture and the environment is once again altered due to human labor.

3. Deforestation and reforestation

Growing populations have to be housed, which means they seek more space to build homes and cities. This often involves clearing forests to make room for urban and suburban development, as well as to provide building materials. Currently, it is estimated that 18 million acres of trees are clear-cut every year to create space for development and to be used in wood products.

Deforestation has many effects, including decreasing oxygen levels (and increasing greenhouse gases), elevated risk of soil erosion and the destruction of animal habitats. But as is the case with industrial agriculture, some groups have endeavored to create a positive counter-impact to deforestation's detrimental effects on the environment. Reforestation efforts seek to replace as much forest land as possible every year, and it is currently estimated that about 40 percent of the trees removed each year are being replaced.

4. Pollution

Human activities affect the environment by contributing to air pollution, or the emission of harmful substances into the air. While it can be difficult to understand which pollutants are associated with specific effects on the environment or public health, it is generally accepted that air pollution can indeed cause public health problems and also harm plant and animal life.

Pollution isn't just limited to the air. It can affect soil or waterways and can come from human waste, industrial chemicals and other sources. These toxins can exert tremendous effects on the natural world, leading to environmental degradation and problems like acid rain and harmful algal blooms in the ocean.

Environmental protection laws on the local and federal level have been enacted as a means to stem the ecological damage caused by pollution, and some communities have engaged in ongoing conversations aimed toward promoting sustainable, low-impact living.

5. Global warming and climate change

Among the most critically impactful ways that humans have affected the earth is our extraction and consumption of fossil fuels and their attendant CO2 emissions. Recent studies indicate that CO2 emissions contribute to the deterioration of the earth's ozone layer, which may, in turn, contribute to global climate change; this is especially true when emissions are combined with the loss of the carbon-sink effect of forest lands (due to deforestation) and existing particulate matter in the air.10 Though the scale and impact of such climate change are up for debate, the scientific community has reached a consensus that human activity does have some degree of impact on the global climate.

Human Impact on the Environment

Human impact on the environment includes impacts on biophysical environments, biodiversity, and other resources. The term is sometimes used in the context of pollution emissions that are produced as a result of human activities but applies broadly to all major human impacts on the environment.

1. Technology

Environmental impacts caused by the application of technology are often perceived as unavoidable for several reasons. First, the purpose of many technologies is to exploit, control, or otherwise "improve" upon nature for the perceived benefit of humanity. At the same time, the myriad of processes in nature have been optimized, and are continually adjusted, by evolution: any disturbance of these natural processes by technology is likely to result in negative environmental consequences.

Second, the conservation of mass principle and the first law of thermodynamics (i.e., conservation of energy) dictate that whenever material resources or energy are moved around or manipulated by technology, environmental consequences are inescapable. Third, according to the second law of thermodynamics, order can be increased within a system (such as the human economy) only by increasing disorder or entropy outside the system (i.e., the environment).

Thus, technologies can create "order" in the human economy (i.e., order as manifested in buildings, factories, transportation networks, communication systems, etc.) only at the expense of increasing "disorder" in the environment. According to a number of studies, increased entropy is likely to be correlated to negative environmental impacts.

2. Agriculture

The environmental impact of agriculture can vary widely—ultimately, environmental impact of agriculture depends on the production practices of the system used by farmers. There are two types of indicators of environmental impact: means-based, which is based on the farmer's production methods, and effect-based, which is the impact that farming methods have on the farming system or on emissions to the environment. An example of a means-based indicator would be the quality of ground water, that is effected by the amount of nitrogen applied to the soil. An indicator reflecting the loss of nitrate to groundwater would be effect-based.

The environmental impact of agriculture involves a variety of factors from the soil, to water, the air, animal and soil diversity, plants, and the food itself. Some of the environmental issues that are related to agriculture are climate change, deforestation, genetic engineering, irrigation problems, pollutants, soil degradation, and waste.

3. Irrigation

The environmental impact of irrigation includes the changes in quantity and quality of soil and water as a result of irrigation and the ensuing effects on natural and social conditions at the tail-end and downstream of the irrigation scheme. The impacts stem from the changed hydrological conditions owing to the installation and operation of the

scheme. An irrigation scheme often draws water from the river and distributes it over the irrigated area. As a hydrological result it is found that:

- the downstream river discharge is reduced
- the evaporation in the scheme is increased
- the groundwater recharge in the scheme is increased
- the level of the water table rises
- the drainage flow is increased

4. Land Loss and Soil Erosion

Lal and Stewart estimated global loss of agricultural land by degradation and abandonment at 12 million hectares per year. In contrast, according to Scherr, GLASOD (Global Assessment of Human-Induced Soil Degradation, under the UN Environment Programme) estimated that 6 million hectares of agricultural land per year had been lost to soil degradation since the mid-1940s, and she noted that this magnitude is similar to earlier estimates by Dudal and by Rozanov et al. Such losses are attributable not only to soil erosion, but also to salinization, loss of nutrients and organic matter, acidification, compaction, water logging and subsidence. Human-induced land degradation tends to be particularly serious in dry regions.

5. Energy Industry

The environmental impact of energy harvesting and consumption is diverse. In the real world, consumption of fossil fuel resources leads to global warming and climate change. However, little change is being made in many parts of the world. If the peak oil theory proves true, more explorations of viable alternative energy sources could minimize the environmental impact of human energy demands, leading to a more 'environmentally friend' resource consumption.

In recent years there has been a trend towards the increased commercialization of various renewable energy sources. Rapidly advancing technologies can achieve a transition of energy generation, water and waste management, and food production towards better environmental and energy usage practices using methods of systems ecology and industrial ecology.

6. Invasive Species

Introductions of species, particularly plants into new areas, by whatever means and for whatever reasons have brought about major and permanent changes to the environment over large areas. Examples include the introduction of Caulerpa taxifolia into the Mediterranean, the introduction of oat species into the California grasslands, and the introduction of privet, kudzu, and purple loosestrife to North America. Rats, cats, and goats have radically altered biodiversity in many islands.

Additionally, introductions have resulted in genetic changes to native fauna where interbreeding has taken place, as with buffalo with domestic cattle, and wolves with domestic dogs.

7. Transport

The environmental impact of transport is significant because it is a major user of energy, and burns most of the world's petroleum. This creates air pollution, including nitrous oxides and particulates, and is a significant contributor to global warming through emission of carbon dioxide, for which transport is the fastest-growing emission sector. By subsector, road transport is the largest contributor to global warming.

Environmental regulations in developed countries have reduced the individual vehicles emission; however, this has been offset by an increase in the number of vehicles, and more use of each vehicle. Some pathways to reduce the carbon emissions of road vehicles considerably have been studied. Energy use and emissions vary largely between modes, causing environmentalists to call for a transition from air and road to rail and human-powered transport, and increase transport electrification and energy efficiency.

Other environmental impacts of transport systems include traffic congestion and automobile-oriented urban sprawl, which can consume natural habitat and agricultural lands. By reducing transportation emissions globally, it is predicted that there will be significant positive effects on Earth's air quality, acid rain, smog and climate change.

What is Environmental Education?

Environmental education is a process that allows individuals to explore environmental issues, engage in problem solving, and take action to improve the environment. As a result, individuals develop a deeper understanding of environmental issues and have the skills to make informed and responsible decisions.

Environmental Education (EE) is a methodology in which people pick up familiarity with their surroundings and secure learning, abilities, values, experiences, and passion, all of which will empower them to act – separately and aggregately – to take care of present and future environmental issues. It is the study of relationship and interactions between natural and human systems. In short, environmental education is provided so that people can have a better understanding of the world around them and know how to take care of it properly so that the world can be a better place.

Environmental education may best be defined as a process directed at creating awareness and understanding about environmental issues that leads to responsible individual and group actions. Successful environmental education focuses on processes that promote critical thinking, problem solving, and effective decision-making skills. Environmental education utilizes processes that involve students in observing, measuring, classifying, experimenting, and other data gathering techniques. These processes assist students in discussing, inferring, predicting, and interpreting data about environmental issues.

Environmental education is not environmental information. Environmental information is providing facts about specific environmental issues or problems. This may be accomplished through news releases, informational brochures, bulletins, videos, or other media techniques. It is often geared toward the general public instead of targeting a specific group or audience. Information can be very useful to the highly motivated individual who is concerned about a specific topic or issue and can be a critical element of environmental education.

Environmental education is not environmental advocacy. Quality environmental education concentrates on the educational process. It is non-biased and science-based. Environmental educators may consider themselves environmental advocates in their personal lives. However, in their role as environmental educator they must remain neutral; there is no room for

personal beliefs to take center stage. It is important for environmental educators to remember which role they are in when working with an audience.

Environmental problems and issues are complex and there are not simple answers. Often there are many possible solutions or no obvious solution at all. It is through the processes of quality environmental education that students can sort through the frequently biased, emotional, and propagandized elements of environmental issues, weighing various sides of an issue in order to make informed, balanced, and responsible decisions.

The components of environmental education are:

- Awareness and sensitivity to the environment and environmental challenges
- Knowledge and understanding of the environment and environmental challenges
- Attitudes of concern for the environment and motivation to improve or maintain environmental quality
- Skills to identify and help resolve environmental challenges
- Participation in activities that lead to the resolution of environmental challenges.

Components of Environmental Education

There are a number of different parts to environmental education. The most common segments of environmental education that you will come across during your studies can include the following:

- Awareness and Mindfulness: Mindfulness and affectability to nature's turf and environmental difficulties that you may encounter as a result of being in the corporate sector today.
- Knowledge and Learning: Learning and understanding of nature and environmental difficulties that are holding people back and/or causing the world to change in negative ways.
- Attitudes: Disposition of sympathy toward nature's domain and inspiration to enhance or keep up environmental quality, which will spill over into any plans that you make or anything else that you do that is related to the organization that you currently are working in or developing.
- Skills: Aptitudes to recognize and help resolve environmental difficulties in a practical manner that matches up with the current trends and technologies that are out there today.
- Participation: Investment in programs and projects that help reduce the effect of environmental difficulties, this making sure that the money you're investing is going to help the environment instead of harming it.

Top 10 Benefits of Environmental Education

1. *Imagination and enthusiasm are heightened*

EE is hands-on, interactive learning that sparks the imagination and unlocks creativity. When EE is integrated into the curriculum, students are more enthusiastic and engaged in learning, which raises student achievement in core academic areas.

2. *Learning transcends the classroom*

Not only does EE offer opportunities for experiential learning outside of the classroom, it enables students to make connections and apply their learning in the real world. EE helps learners see the interconnectedness of social, ecological, economic, cultural, and political issues.

3. *Critical and creative thinking skills are enhanced*

EE encourages students to research, investigate how and why things happen, and make their own decisions about complex environmental issues. By developing and enhancing critical and creative thinking skills, EE helps foster a new generation of informed consumers, workers, as well as policy or decision makers.

4. *Tolerance and understanding are supported*

EE encourages students to investigate varying sides of issues to understand the full picture. It promotes tolerance of different points of view and different cultures.

5. *State and national learning standards are met for multiple subjects*

By incorporating EE practices into the curriculum, teachers can integrate science, math, language arts, history, and more into one rich lesson or activity, and still satisfy numerous state and national academic standards in all subject areas. Taking a class outside or bringing nature indoors provides an excellent backdrop or context for interdisciplinary learning.

6. *Bio-phobia and nature deficit disorder decline*

By exposing students to nature and allowing them to learn and play outside, EE fosters sensitivity, appreciation, and respect for the environment. It combats "nature deficit disorder" … and it's FUN!

7. *Healthy lifestyles are encouraged*

EE gets students outside and active, and helps address some of the health issues we are seeing in children today, such as obesity, attention deficit disorders, and depression. Good nutrition is often emphasized through EE and stress is reduced due to increased time spent in nature.

8. Communities are strengthened

EE promotes a sense of place and connection through community involvement. When students decide to learn more or take action to improve their environment, they reach out to community experts, donors, volunteers, and local facilities to help bring the community together to understand and address environmental issues impacting their neighborhood.

9. Responsible action is taken to better the environment

EE helps students understand how their decisions and actions affect the environment, builds knowledge and skills necessary to address complex environmental issues, as well as ways we can take action to keep our environment healthy and sustainable for the future. Service-learning programs offered by PLT and other EE organizations provide students and teachers with support through grants and other resources for action projects.

10.Students and teachers are empowered

EE promotes active learning, citizenship, and student leadership. It empowers youth to share their voice and make a difference at their school and in their communities. EE helps teachers build their own environmental knowledge and teaching skills.

Features of Environmental Education (EE)

Environmental Education:

1. Is a learning process that expands individuals' information and mindfulness about nature's domain and related difficulties, creates the vital abilities and mastery to address the difficulties, instilled confidence and stewardship and cultivates demeanor, inspirations, and responsibilities to settle on educated choices and make dependable moves in the field that they are working with.

2. Is an inter-disciplinary field that integrates fields such as biology, ecology, earth science, geography, atmospheric science and mathematics because understanding how environment works and keeping it healthy require knowledge and skills from many disciplines.

3. Includes all efforts to make general public aware of the knowledge of the environment and environmental challenges through print materials, media, brochures, bulletins, videos, or other media techniques.

4. Leads to responsible individual and group actions.

5. Provides information about specific environmental concerns or problems to the general public instead of specific group, religion or community.

6. Works to help you think critically, so that you aren't sitting there trying to fit everything into a neat little box.

7. Involves students in different data-gathering techniques that help them to discuss, analyze, predict and interpret data about environmental issues.

8. Is study centered, promotes higher level thinking skills and relevant to student's everyday lives.

9. Allows people to discuss about complex environment problems that have no simple answers.

10. Is a process in which individuals gain information environmental awareness and acquire knowledge, skills, values, experiences, and determination which can help them to solve different environmental problems.

For More Reading

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