

Portuguese

English (1)

Dutch

French

Environment and Society

Environment can be described as the natural world of land, water, air, plants and animals that exist around us. It forms the basis of our existence and

development. Environment refers to surrounding external conditions influencing development or growth of people, animals or plants, living or working conditions, etc. In the beginning, the environment of early man had consisted of only physical aspects of the planet earth (land, air, water) and biotic communities (plants and animals including man and his functions, organizations and institutions), but with the march of time and advancement of society, man extended his environment through his social, economic and political functions. Environment therefore refers to the sum total of conditions, which surround man at a given point of time.

The term environment originates from the French word 'environ' which means around, round about, to surround or to encompass.

The physical elements of environment (space, land, water bodies, climate, soils, rocks and minerals) and biological elements (plants, animals, micro organisms and man) constitute the biosphere.

The environment is both physical and biological concept, it includes both the non living

(abiotic) and living (biotic) components of the planet earth. Thus based on the basic structure the environment can be divided into 2 basic types i.e.

- ① physical or abiotic environment
- ② Biological or biotic

Based on physical characteristics and state, abiotic or physical environment is sub divided into 3 broad categories

- ③ Lethosphere (solid earth)
- ④ Hydrosphere (water component)
- ⑤ Atmosphere (gas)

The biotic components of the environment consist of plants (Flora) and animals (Fauna) including man as an important component and micro-organisms.

Relationship b/w man and environment

The relationship of man and environment has influenced the development of human society. In this context, 3 aspects of man are

- ① physical man is a component of the biological community and as such requires basic elements of physical environment such as air, water, food and habitat etc. like other biological population and release wastes in the ecosystem

- ② social man establishes the social institutions, forms the social organizations and formulates laws and policies to safeguard his

existence, interests and welfare (2)

③ Economic man derives and utilize resource from the physical and biological environment with his skills and technologies.

The changing relationship of man with the environment from pre-historic to modern times can be divided into the following 4 periods.

① period of hunting and food gathering.

This period is related to the most primitive man when he had been basically a part of natural environment and was functionally as a biological man or physical man because his basic requirements were limited to food and shelter. The natural environment satisfied all his wants. The relationship b/w man and the environment was very friendly. Man was leading a normal life. Then a stage came when he learnt to hunt animals. The discovery of fire which was accidental taught man to cook animal flesh before eating. So one can say that the discovery of fire and subsequently, invention of tools and weapons made man capable of exploiting natural resources for his benefit.

② Period of Animal domestication and pastoralism.

With the passage of time, primitive man learnt to domesticate animals for his

benefits. In the beginning, he domesticated cattle and animals for meat and slowly his herd of domesticated animals increased. Domestication of animals gave birth to group or community life among early people in order to protect their flock and themselves (No. of animals)

from wild animals. But still they have nomadic way of life as they had to move from one place to other in search of water, food for themselves and fodder for animals.

③ Period of plant domestication and agriculture.

Domestication of plants for food became a major step in the development of human skills of taming and controlling the biotic component of the natural environment system. Domestication of plants initiated primitive type of agriculture and settled life of people who were nomads. cultivation of food crops resulted in the formation of social groups and organizations. Now man started settling down on the river valley due to availability of water and fertile land which came to be known as "river valley civilization". From here started the journey of man to transform

the natural environmental resources ③ around him through improved farming practices resulting in gradual increase in human population. This led to clearing of forests to have access to more agricultural land with the passage of time, man developed his own cultural environment by building houses and creating towns and cities, constructing roads and bridges.

(d) Period of Science, technology and Industrialization.
(19th century - 1st Jan 1801 - Dec 31 1900)

The advancement of industrial revolution in late 19th century and emergence of science and technology sophisticated technologies and embittered the friendly relationship b/w man and his natural environment. The impact of modern technology on natural environment is highly complex and controversial. Highly advanced technologies and scientific techniques led to indiscriminate exploitation of natural environment which have created most of the present day environmental problems.

Biosphere and Sosiosphere

Biosphere

Biosphere is a life supporting layer which surrounds the earth and makes plant and animal life possible. It consists of all the living organisms (the biotic component), energy and physical environment.

(abiotic component). There are continuous interactions b/w living organisms and physical environment (biotic component) and also among the living organisms themselves.

The avg thickness of the biosphere or life supporting layer consists of air, water, & soil and rock is about 30 km. The upper limit of the biosphere is determined by the availability of O₂, moisture, temp, and air. pressure. The lower limit of the biosphere is determined by the availability of required amount of oxygen and light which can sustain life. Thus the depth of the biosphere over the land is upto the depth of the deepest roots of the trees. over the depth upto which burrowing organisms can live. The biosphere extends upto greater depth in oceans.

Socio-Sphere

Effects of human activity on environment

The impact of modern technology has led to series of changes in the biotic and abiotic components of natural environment. disturbance in one of the element of nature (air, water, land, flora and fauna) gives rise to an imbalance in others.

Natural Human factory sometimes aggravate natural environmental process to cause disaster for human society

- ④ like (earthquakes, volcano eruptions, floods, cyclones etc) They result in heavy loss of life and property. Environmental hazards for human health are as follows
- ① Air pollution causes respiratory diseases
 - ② water " enteric "
 - ③ solid waste pollution causes vector-borne diseases
 - ④ toxic waste causes cancer and neurological disorders.

vector - are an agent that carries and transmits an infectious pathogen onto another living organism

enteric - related to intestines.

exists

Environmental disturbances

Ozone depletion.

The ozone layer is a thin layer of gas (O_3) 15-50 kms above the earth. The ozone layer protects us from excessive levels of harmful ultraviolet radiation. Ozone depletion refers to the thinning of the ozone layer, which allows more UV radiation to reach the earth's surface. The thinning of ozone layer was discovered in 1980s and ozone holes at north and south poles.

Major cause for ozone depletion is chlorofluorocarbons (CFCs). These are the chemicals invented in 1920s, used in refrigerator and air-conditioner, coolant, foam, solvents, aerosol spray cans. CFCs are very harmful to ozone, especially at cold temperatures (north and south poles).

United Nations environmental program is working on reducing the use of ozone depleting chemicals. Montreal protocol (1987) is an agreement b/w industrialized countries to reduce and eventually to stop the use of CFCs and other ozone depleting chemicals.

(CCl_4 , Halons, methyl chloroform)

Consequences of ozone depletion

1. Effects on human health: -
High exposure to UV radiation can weaken the human immune system,

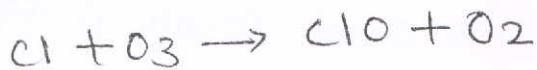
Cause skin and eye cancer, cause cataracts.
↓
lens of the eye becomes
opaque (non-transparent) resulting
in blurred ~~etc~~ vision

2. Effects on plant life

stunt growth of plants, lead to the loss
of plant species, reduce crop yield etc

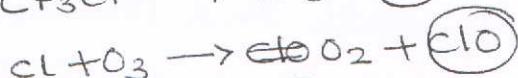
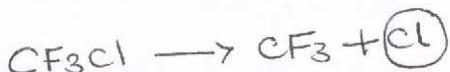
3. Effects on marine ecosystems.

reduce phytoplankton numbers, damage
the early developmental stages of fish
and other marine life



Substitute for CFCs → hydrocarbons.

Aerosol

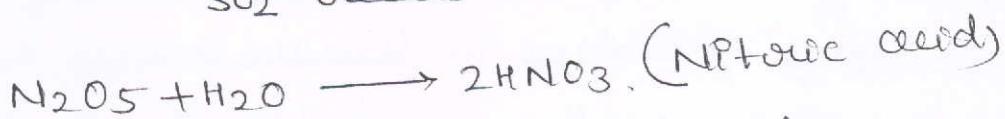
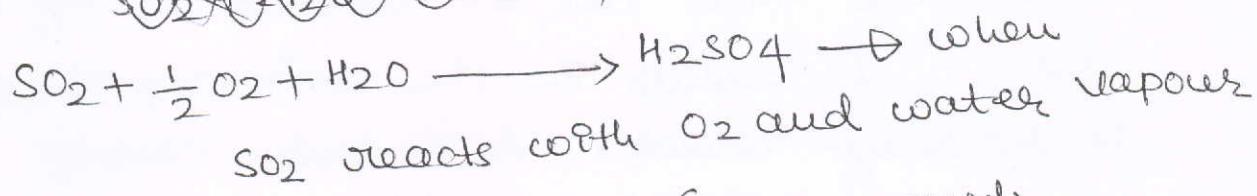
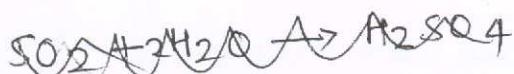


Acid Rain

Acid rain is basically rain that has a higher than normal acid level (low pH)

causes

- ① Burning coal, oil and natural gas in power stations makes electrocutes giving off Sulphur dioxide. Burning petrol and oil in vehicle engines gives off nitrogen oxides as gases. These gases mix with water vapour and rainwater in the atmosphere producing weak solutions of sulphuric acid which fall as acid rain



Acid rain can travel long distances. Often it does not fall where the gas is produced. High chimneys disperse the gases and winds blow them great distances before they dissolve and fall to earth as rain. Acid rain is an extremely destructive form of pollution and the environment suffers from its effects. Forests, trees, lakes, animals and plants suffer from acid rain.

The needles and leaves of the trees turn brown and fall off.

Trees can also suffer from stunted growth and have damaged bark and leaves, which makes them vulnerable to weather, disease & insects. Lakes are also damaged by acid rain. Fish die off and that removes the main source of food for birds. Acid rain ~~can~~ damages the eggs of fish when they are laid. At low level of acid, fish become sick, suffer stunted growth or lose their ability to reproduce and they die at high acid level. Also birds can die from eating toxic fish and insects.

Acid rain dissolves the stonework and mortar of buildings especially those made out of sandstone and limestone. It reacts with the minerals in the stone to form a powdery substance that can be washed away by rain. It results in the corrosion of railway track. Acid rain causes respiratory problems in human beings. Toxic acid may enter the body through food chain and can cause brain damage, kidney problems etc.

Remedial Measures

- ① Removal of SO₂ from power station chimneys which is an expensive process.
- ② Reducing the usage of electricity
- ③ Use of renewable energy sources like wind, solar energy etc.
- ④ Fixing catalytic converters to vehicle exhausts which removes nitrogen oxides.
- ⑤ Encouraging public transport.

Green house effect

Green house is constructed in colder regions to maintain higher temp inside than that of atmospheric temp. It has a glass roof, which allows shortwave solar radiation (short wavelength) to pass through and reflects the long wave length radiation. The solar radiation on striking the soil surface loses energy and becomes long wave radiation. This mechanism keeps the green house warmer than the outer atmosphere. In similar way, the earth's atmosphere blocks up solar energy and hence it acts like green house. where CO_2 act like glass roof. CO_2 and water vapour in the atmosphere transmit short wavelength solar radiation but reflect the long wave length heat radiation from the earth's surface. This effect is known as green house effect. Thus green house effect can be defined as the progressive warming up of the earth's surface due to release of CO_2 into the atmosphere by man activities. In other words it is a phenomenon due to which earth retains heat. excessive presence of green house gases (CO_2 , CH_4 , CFC's and N_2O) block the infrared radiation from the earth's surface in the atmosphere leading to an increase in temp which in turn makes the life difficult on earth.

Impacts of global green house effect.

- ① As a result of rise in temp of the earth due to ~~green~~ the glaciers melt and sea levels would rise flooding low-lying regions. & In this way, many world's poor/ developing nations may lose areas of rich coastal land due to the rising levels of sea
- ② plants and animals will be effected leading to ecosystem imbalance.
- ③ The crop yield will be severely effected. Cropping patterns need to be changed to suit climate conditions.
- ④ the winter will be shorter and warmer, the summer will be longer and much warmer. A warmer climate is likely to make some cities extremely hot.

Sustainable development

Development is a process that cannot be stopped and should not be stopped. But the human developmental activities along with positive benefits are causing high rate resource depletion and ecological degradation due to production of unwanted by-products of human developmental activities.

In this context, Sustainable development seems to be a solution. Sustainable development implies the following factors.

- ① Natural resources should be continuously available for man's activities for an ~~or~~ period
- ② Man's scientific and technological achievements should continue to improve the comfort and quality of life.
- ③ Social disparities and ^{Inequality} ~~disparities~~ of opportunities should not increase, as seems to be happening in the present day development.
 [For example, if a few people can afford open heart surgery while allowing millions of deaths every year due to water borne diseases, the type of development is not sustainable]
- ④ Sustainable development should ensure the preservation of ecological diversity and stability. Man's health and happiness should not be reduced by the developmental processes.
- ⑤ The damage already suffered by the present level of development should be repaired to the best possible extent.

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The primary needs of sustainable development
are

- ① Environmental awareness.
- ② Modified eco-friendly technology
- ③ Determination and will at the individual, national and international level
- ④ co-operation and co-ordination.

Measures for Sustainable development

- ① Population control: - Sustainable human population in each area should be estimated and growth should be limited to the desirable level.
- ② Reduced consumption: - People should be motivated for simple life style and lesser consumption. Mental development should gain more respect than material gain.
- ③ Integrated land use planning: - Relative priorities among the different land uses like agriculture, forestry, fodder cultivation, urban and industrial growths, traffic etc., should be planned and managed judiciously.
- ④ water resource management: - River flooding, silting up of natural and man made reservoirs, over exploitation of ground water, water logging by over irrigation and poor drainage and pollution of water bodies are some of the consequences of poor water resource management. Sustained development implies optimum management of water resources locally and globally.

(5) Renewable Resources:- Future development should be based on material resources that can be renewed or recycled or resources that cannot be depleted in the near future. For eg. wood can be consumed and can be grown, maintaining a balance b/w the two. Metals can be used recycling the scrap again and again. Solar energy will not be depleted in the near future and is an ideal energy source.

(6) Biosphere conservation:- Man's activities are resulting in the destruction of species. Thousands of plant and animal species are endangered today with threats of extinction due to pollution, destruction of habitat, commercial exploitation, etc. To ensure ecological stability, species diversity is essential. Sustained development includes biosphere conservation.

(7) Production efficiency:- The efficient production processes involve wastages, that can be reduced are avoided. Better planning and improved technology can lead to better yields from given resources. Genetic hybrids, drip irrigation, pest control, soil-crop fertility management etc are examples of improving agricultural productivity.

(8) Pollution control:- pollution of air, water and soil constitutes a major threat for future mankind. Improved pollution control technology is another major component of sustainable development.

