# B.Com Sem 2 (Foundation Course)

## ENVIRONMENTAL STUDIES

In India, Environment is known as "Mother Nature". According to our holy scriptures "All mighty God" has created this world with the help of his consort "Mother Nature". This "Mother Nature" is also known as "Divine Mother" or "The Creative Force of Nature" or, Maa Durga Or Kali Or Umiya Or Parvati Etc. In this new scientific age, this "Creative Force of Nature" has come to be known as Environment. In our country, we practice and follow so many rituals in which we worship different elements of the Environment–i.e. Sun, Moon,holy plants, trees, rivers etc. For example (1) we offer holy water to LORD SUN with chanting of mantra-japa in the early morning. As we know that without LORD SUN, no human being and any living organism can survive. (2) We light the LAMP using pure ghee during any puja or sacred religious ceremonies. This pure ghee removes the carbon-dioxide from the atmosphere and helps us to purify the environment. (3) We offer water to the holy tree " BANNYNA TREE ". According to our holy scriptures, this BANNYNA TREE is the super conductor of the DIVINE PRANIC ENERGY. The devotees who pray and worship at the feet of tree, receives this divine energy. (4) The use of Asopalav leaves for any welcome ceremony is pious. The Asopalav leaves spreads great amount of oxygen in to the environment. (5) The Rose is the excellent conductor of the spiritual pranic energy. That is why we have custom of using this sacred "Rose" at and during all types of religious & Social ceremonies. In addition we worship different kinds of plants, animals, birds, during various religious and social ceremonies. The basic idea behind all of this is to maintain, protect & purify the environment. So, this way in our country all the elements of Environment have been regarded as sacred & are being worshiped.

So we can deduce that "The Environment" is the assemblage of all the things we see on the earth. In general sense, The Environment includes the following. (1) land, (2) water, (3) air, (4) energy, (5) forest, (6) minerals, (7) food, (8) all types of animals and other living organisms, such as bacteria, worms etc. (9) all types of plants etc. So we can see that etc definition for Environment. The book on Environment published by N.C.R.T gives this definition "The Environment in which we live consists of four major elements Land, Water, Air and Living organisms". But the study of environment is quite different as we have to study only those subjects which are useful for the health and security of all living organisms. The study of environment is an urgent need in today's world. The study of environment includes all types of Natural Resources for the living being of this world. The study includes ways and means to keep these resources pure and natural without harming any living organisms.

Under environmental studies one has to keep in mind so many disciplines. The components of environment are (1) land, (2) water, (3) air, (4) energy, (5) forest, (6) minerals, (7) food, (8) all types of living organisms, such as bacteria, worms etc. (9) all types of trees.

Every individual has to be cautious to keep the surrounding atmosphere clean and healthy. At each and every step of our activity we should have to keep ourselves conscious in keeping the environment clean.

**Definition**

Environmental studies deal with every aspect that affects a living organism. It is essentially a multidisciplinary approach that brings about an appreciation of our natural world and human impact on its integrity. It is an applied science as it leads to the practical answers to the increasingly important question of making human civilization sustainable on the Earth's Finite resources. The components of environmental studies includes biology, geology, chemistry, physics, engineering, sociology, health, anthropology, economics, statistics, computers, geography, philosophy, oceanology, mining,etc.

**Importance of Environmental Studies**

Environment is an integration of several subjects that include both science and social studies. For understanding all the different aspects of our environment we need to understand Biology, Chemistry, Physics, Geography, Resource management, Economics and Population issues etc. Thus the scope of environmental studies is extremely wide and it covers some aspects of nearly every major discipline. We all know that in recent times because of the scientific progress, there has been an undisciplined, unorganized & unplanned development in different parts of the world & also of the natural resources. Because of that the natural elements of environment have been attacked and are being destroyed without proper thinking. If this kind of misuse is not stopped, then the human life can be put to danger in the long future. Due to this reason the study and knowledge of environment his very important for all of us. We all know that we misuse water which can result into its shortage in future. We need to awaken our self for proper utilization of water. Secondly, we mis-utilize lot of food products. The wastage of food products creates pollution. We need to understand the proper use of food products. In addition, we do not take care to maintain and purify the air all around us. So we need to know and understand about the pollution of air around us. This air has become the vehicle for germs of different diseases and also there is a lot of pollution of air being created by fumes coming out of lacs of vehicles running all over the world. In addition, there is a danger of chemicals being diverted into the river from different factories. So the water of the river becomes polluted. This polluted water is being used by different people resulting in to creation of various diseases. So we can see that because of all this pollution there is a direct effect on the human beings & different animals. Because of the pollution people suffer from the diseases of stomach, intestines, lungs, heart, liver & cancer etc. All of this, compel us to know, study & protect the environment. (2) In this new scientific age, the scientists of the world have found out from the research of **different resources of nature** that there are so many important beneficial elements and chemicals which are helpful for improving the health and treatment of different diseases. So scientist have started making medicine out of different kinds of plants, flowers, and species. If these plants, flowers & species are mis-utilized and destroyed without proper planning then the future of mankind will be in danger & dark. Also there is danger of complete destruction of all this invaluable natural resources. (3) The beauty of environment is also important of human life. We all get awe-struck by beauty of ice covered mountains of Himalayas. We know that lot of valuable herbs are being found in this Himalaya Mountains, which are useful for the human life. The natural beauty spots like Kashmir, Kulu Manali, Massuri, Dehradun, Almora, Pithoragarh, Rishikesh, Kannyakumari etc. are the important tourist places. They are helpful in maintaining the environmental & ecological balance. They all need to be maintained & protected.

**Objectives of Environmental Education**

Objectives of Environmental Education are as under:

**(1) Awareness:** The first and basic objective of the environmental education is to make human beings of the whole world become aware of the Environmental Education. The goal of Environment Education is to make every human being of any community and country aware of the surrounding environment and its related problems. The additional aim is to make him aware of subtle changes taking place in the surrounding environment and its related fields.

**(2) Knowledge:** The second objective of environmental education is to get knowledge of what we can do to protect and preserve environment and what are the ways and means to reduce the pollution in the environment.

**(3) Attitude**: It is the duty of every citizen to protect Environment. For that purpose, it is very important to change the attitude of the citizen about Environment and to inspire him to work for the protection of Environment. That is why education about Environment is very necessary.

**(4) Skill:** In addition to the spreading of knowledge of Environment Education, strategies are needed to recognize the problems and solve them skillfully and efficiently. For the development of this kind of skill in the people at large, education of Environment is needed.

**(5) Participation:** Every human being of the nation should be inspired to take active part in the program of Environmental protection. Dramas, Street Plays, Mono Acting, Music Concerts, other cultural and religious programs can be used to spread the message of environmental protection.

**Principles of Environmental Education**

(1) Environment is the gift of Nature or God or Divine Power so everyone should respect it. (2) To help everyone to get knowledge about surrounding Environment.(3) To get understanding about the importance of life of different species and creatures in different areas of the world. (4) To help in understanding of Biodiversity. (5) To understand the importance of Biodiversity and Ecosystem and to help in protection/care of the nature. (6) To help in development of any benefit, which can solve the problems of people and the society at large. (7) To spread love and respect for all the living creatures etc. (8) to spread love & respect for all the human beings. (9) To evaluate equality, kindness, reality, freedom.(10) To work for Environmental protection & security in different specified area.

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## NATURAL RESOURCES

The basic necessity of man is "Bread, Clothes and House" i.e. the nutrition of the body bread (food) is necessary, for the protections of the body clothes are necessary and for living a house is needed. Now for the physical and cultural development or progress, the basic wants of human beings are to be satisfied. They are based on some fundamental materials or objects. These materials or objects are called NATURAL RESOURCES. Man is considered to be the best creation of God. This creation is considered to be the unique creation. In the whole universe, man stands at the top. He not only cares or thinks of himself but also desires the progress and welfare of the society in which he lives. He also desires the progress and development of the country.

Naturally the important factor for the economic growth of any country is natural resources which are very useful to the mankind. **There are Four basic factors on which the economic development of the country depends. They are: (1) Natural resources (2) Man power and (3) capital investment (money). (4) Science.** Out of these Four factors, the most important one is **NATURAL RESOURCES**. In India the natural resources are available in abundance, but unfortunately during last 58 years, all these natural resources have not been found out, explored or used or exploited in the best possible manner and have not been utilized properly for the development of mankind. Due to this the minimum living standard of people of India has not noticeably improved. So our country needs to utilize these human natural resources and the relevant development programs associated with these NATURAL RESOURCES in the best possible manner so as to increase the living standards of the people of India.

We can enlist the natural resources as under:

1) Forest
2) Water
3) Minerals
4) Food
5) Agricultural Crops
6) Energy
7) Land
8) Climate
**9)** Solar Energy

## CHARACTERISTICS OF NATURAL RESOURCES

1) Natural Resources are the invaluable gift of nature or god. The value of Natural Resources depends on its demand and availability.
2) Controversial condition arises out of unequal distribution of Natural Resources. The average use of Natural Resources in the Developed Countries is much greater than the use in under development countries.
3) This shortage of Natural Resources in the country creates internal and inter-country disputes.
4) The distribution and use of Natural Resources is not equal at international level.
5) Natural Resources are very important from the economic view point. In addition Natural Resources are the base of any Eco-system.
6) The availability of Natural Resources depends on the technical pattern and its appropriateness.
7) The source of Natural Resources could be exhausted because of its overuse and waste. That create more environment pollution and Eco-system is adversely affected.

## Main points to be kept in mind for proper utilization of these natural resources.

1) Natural resources are to be used in such a way that there would be a least wastage and a maximum economic advantage.
2) The industrial units should be units should be instituted at the places, from where natural resources or raw material could be made available at a minimum transportation cost. That means the industrial area must be selected at such a place for which the transportation cost could be minimized. Further the natural resources are to be used as per the advice of the technical expert and the usage of the resources should be economized.
3) While using the natural resources one has to keep in view that the long term economic advantages would be achieved and further the continuity of the level of development is also be maintained e.g. For getting timber used for building purposes or fire – wood for heating purpose we usually utilize the forest – trees. This use can be planned in such a way that you have to grow new more trees against the loss of cut-down trees elsewhere. This will balance the number of forest resources. This will maintain the conservation of forest and hence wood for long-terms usage. Further it is advisable to grow trees at some other place to keep the quality of the forest resources as desired since **trees breathe in carbon-dioxide and give back oxygen.** They are helpful in reducing pollution of air also. So any proper planning of growing more trees helps in keeping the environment free from air pollution.
4) While using the natural resources for the economic development of the country the usage should be planned in such a way that it achieves multipurpose advantage. e.g. while constructing dams or irrigation projects on rivers, the natural water should be used for various purposes, that is i.e. on constructing the dams on rivers, we get the protection against the floods. We can plan an irrigation project, we can develop a fish industry and we can generate electricity also.

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# ECO-SYSTEMS

## INTRODUCTION:

Environment and its changes affect the human beings and all the creatures of the world very strongly. All the living beings and environment are interrelated right from the beginning of the creation. Any common changes in environment due to simple activity of human beings do not show any contradictory effect because of natural resisting capacity of the other species. The science of studying the factors and the effects due to the changes in the environment has come into an existence since last hundred years only. This science is called **ecology. The environment and the living creatures in the world are linked together and have very deep and close interrelationship. The frame of these living species of the world in the environment is known as Ecosystem.**

Definitions of ecology are as follows:

1. Ecology is the scientific history of nature. — Charles Elton
2. Ecology means environmental science. — Karl Fredrix.

## ECOSYSTEMS:

The environment and the living - world in it have the closed relationship with one another. The frame or formation of the living - world (or organisms) is called an ecosystem e.g.

1) Birds fly in the sky and so the air covered environment is more suitable to them and they pull on or maintain their lives as per the environment of air.
2) It is suitable for the fish and aquatic plants to stay in water and so they maintain their lives on the water.
3) Vegetations maintain their lives on the land etc.

In this way, different living species, staying in different environments maintain their lives as per the adjustment to their environment. If there be any drastic change in the environment then the corresponding living - world of the environment will be adversely affected, e.g.

I. If the water becomes dry then the fish staying in this water will die.
II. If the air becomes polluted, then human beings and other creatures are adversely affected and may become sick.
III. If it is raining, then the birds may not be able to fly in the sky.

Now if there is a radical change in the environment then the living species, which are accustomed to maintain their lives suitable to that environment, will be affected adversely or they may sometimes die also.

## Types (or classification) of ecosystems:

The ecosystems can be divided into two main types:

1) Natural ecosystem and 2) Artificial ecosystem.

**(1) Natural ecosystem:** In natural ecosystem the living species perform their activities as per the natural situations. **This natural ecosystem** can further be divided into two sub-types

(A) Terrestrial ecosystem (B) Aquatic ecosystem.

**(A) Terrestrial ecosystem:** This terrestrial ecosystem is further divided into three sub- types: 1) Ecosystem in deserts 2) Ecosystem in forests and 3) Ecosystem in grassland.

**(B) Aquatic ecosystem:** This aquatic ecosystem can be divided into the following sub-types: 1) Ecosystem in streams 2)Ecosystem in ponds 3)Ecosystem in rivers 4) Ecosystem in oceans and 5) Ecosystem in lakes.

**(2) Artificial ecosystem:** Artificial ecosystem is divided into three subtypes:

(A) Aquarium ecosystem (B) Agro - farm ecosystem and (C) Space ecosystem.

**In addition to the above there are other two types of ecosystems also.**

(1) **Energy based ecosystem:** This has two sub - types as

(A) Ecosystem directly involved with sun. (B) Ecosystem indirectly involved with sun.

(2) **Volume based ecosystem:** There are three sub – types.

(A) Micro-ecosystems (B) Medium-ecosystems and (C) Macro-ecosystems.

**COMPONENTS OF ECOSYSTEM:** There are two main components of the eco-system:

(1) Biotic components and (2) Abiotic components.

**(1) Biotic components:** The biotic components of the ecosystem can be taken as follows:

**plants, animals and bacteria.**

These biotic components can also be divided into following four types of components:

(i) Producers (ii) Consumers (iii) Decomposers and (iv) Reducers or transformers. Now we shall take the discussion of these four components one by one.

**1. Producers:** The green plants possess chlorophyll, with which they catch solar energy arid change it into chemical energy of carbohydrates, using simple inorganic compounds like $H_20$ and $C0_2$- This process is known as photosynthesis. The green plants produce their own foods, so they are known as autotrophs. The living species producing their own food similar to plants are called producers. In this class the autotroph insects, green - leaves vegetations, sea plants, moss and algae or also included.

**2. Consumers:** The animals lack chlorophyll and are unable to manufacture their food. Hence they depend on the producers for their food. Such animals are called hetrotrophs. Such hetrotrophs arc called consumers. In this group of consumers, various types of animals and carnivorous plants are included. This group of consumers can also be divided into five subgroups:

1) Vegetarian or herbivorous e.g. cow, buffalo, horse, goat, grass hopper, locust etc.
2) Non - vegetarian or carnivorous e.g. lizard, fox. kite and snake.
3) Herbivorous and carnivorous both : e.g. cat. man, bear.
4) Consumers of carnivorous only : e.g. wolf.
5) Consumers of all types of food or omnivorous e.g. lions and tigers.

**3. Decomposers:** Some living organisms expire after completion of their lives. On the dead bodies of these species, some bacteria's maintain their lives and they decompose the dead bodies. These are known as decomposers or saprotrophs (rotten feeders). These living organisms decompose the dead bodies into small particles which mix in the environment as the non-living substances.

**4. Reducers or transformers:** Bacteria and fungi belong to this type. They breakdown the dead organic materials of producers and consumers for their food and release to the environment the simple organic and inorganic substances produced as byproducts of their metabolism.

These simple substances are reused by the producers, resulting in a cyclic exchange of materials between the biotic community and the abiotic environment of the ecosystem.

Such type of incidence cycle is uniformly and regularly going on. This incidence cycle depends on the food and it goes on continuously. This incidence - cycle is known as food – chains.

**(2) Abiotic components:** The abiotic components of the ecosystem can be taken as follows :

Organic substances and inorganic substances, e.g. proteins, carbohydrates, lipid, DNA. ATP and chlorophyll are organic substances where as nitrogen, hydrogen, oxygen, carbon, water and sulphur are

inorganic substances. The following physical bodies are also included in abiotic components: Humidity, wind, temperature, tide / ebb tide, sunlight, heat etc.

## BIODIVERSITY

**INTRODUCTION:**

There exist millions of living species of different kinds on this earth. All these living species are classified as under.

(1) Animals (2) Birds (3) Insects (4) Worms (5) Aquatic species, etc. In each of this type we find different varieties or diversity and characteristics. All these living species maintain their own existence in their natural ecosystem.

**Definition**

'Biological Diversity' or biodiversity is that part of nature which includes the differences in genes among the individuals of a species; the variety and richness of all the plant and animal species at different scales in space-locally, in a region, in the country and the world; and the types of ecosystems, both terrestrial and aquatic, within a defined area.

What is biodiversity?

Biological diversity deals with the degree of nature's variety in the biosphere. This variety can be observed at three levels (1) The genetic variability within a species; (2) The variety of species within a community and (3) The organization of species in an area into distinctive plant and animal communities.

**IMPORTANCE OF BIODIVERSITY:**

**On the earth there exist so many types of living objects, things/species. Among them we find various types of diversity. Men study them by preparing the list of all these types of living species as per their diversity. Such living species are of various types and hence the list containing all possible types of living organisms is known as biodiversity. Sometimes this biodiversity is also called as species-biodiversity.**

This biodiversity is also considered as the part of the ecosystem, in which all the species of the living world or living community are included. A time may come when the wealth and health prosperity of the country will be measured only with respect to such biodiversity. This biodiversity may become the pillar or the foundation stone of future technological development but it is our sad experience that human beings are misusing or exploiting these wealth resources for their selfish motives instead of using them for the development of mankind. If these wealth resources are not properly utilized in a long term planned manner then they may be destroyed or decayed or become extinct.

It has been estimated that there are about 30 to 50 Lacs of different types of living species in the whole World. Till now the detailed information about 15 to 20 Lacs of species is available. The major part of this living species resides in the forests of the tropical zones. There is also a biodiversity of a large number of aquatic animals, varying from small cell species to very big animals, such as whale, which are living in different oceans. For manufacturing the medicines, some type of vegetations and some microbial or bacteria are used.

**VALUE OF BIODIVERSITY:** Biodiversity provides a variety of environment services from its species and ecosystem which are essential at the local, regional and global level. E.g. (1) Production of oxygen (2) Reduction of carbon dioxide (3) Maintenance of water — cycle (4) protection of soil etc.

It is accepted by all that because of industrializations and transportation of millions of vehicles oozing fumes & gases, there has been a great increase in the level of carbon dioxide and other gases in the

environment. Because of these many forests have been converted in to industrialized areas and species in the forest have to take shelter elsewhere or have been eliminated. Due to these unplanned and uneven uses of all these natural resources, we are experiencing negative changes in the atmosphere such as global warming, floods and draughts, uneven decrease or increase in the temperatures. In this way the conservation of biodiversity becomes an important tool for the survival of all the living species.

**Endangered Species:**

When the bio-diversity of the plants or animals is on the verge of destruction then it is known as an **endangered biodiversity** or an **extinctive biodiversity**. It is very necessary to protect such rare species, otherwise will be fully destroyed. Such endangered biodiversities of wild life are stated as under:

- **i) Animals:** Bear, elephant, tiger, lion, rhinoceros, leopard, gudkhars (wild asses), stags (twelve horned deer) sagar-dhenus (marine cows), hunguls, anticlopes, lad pandas etc.
- **ii) Birds:** Monals (wild - peacock), ghorads, khadmores, chilotroes.
- **iii) Reptiles:** Pythons, crocodiles, turtles.
- **iv) Others:** Some types of Ayurvedic medicines or miraculous herbal roots.

**Factors responsible for the threats to biodiversity:** Human activities are the .major threats to bio-diversity. The important factors leading to extinction of species and consequent loss of biodiversity are as follows:

1) **Destruction of habitats (Natural dwelling places of animals and plants):** The main threat of the bio-diversity is the destruction of natural habitats. The natural habitats which protect natural flora & fauna (e.g. forest trees & plants) are being converted to human settlements, harbours, dams, reservoirs, crop-lands, grazing grounds, oil wells and mining sites. Deforestation dangerously affects animal life, its shelter and food. In this condition habitats are required to be displaced to the other places, which may or may not suite them. This creates a decrease in the population of many species.

   Deforestation declines reproductively of certain wild animals as there is a sharp decline in their free movement. Migratory animals are also affected due to the disturbances in their routines. Some of the dams are creating a hindrance to biodiversity of the fishes. Sometimes human cleanliness destroys the habitat of scavengers such as vultures, kites etc.
2) **Habitats fragmentation:** Sometimes habitats are by building the roads, fields, towns, canals, power lines etc. This fragmentation affects on the biodiversity because it may limit the dispersal and colonization potential of species and also reduces the foraging ability of animals.
3) **Disturbance and pollution:** Fire, tree fall, defoliation by inserts etc. affect communities adversely. Massive use of synthetic compounds, vast release of radiations and spillover of oil in sea lead to a change in habitat quality) Pollution may reduce and eliminate populations of sensitive species. The populations of fish eating birds and falcons have declined due to excessive use of pesticides in crop fields. Lead poisoning is also a main cause of mortality of many aquatic birds such as ducks, swans and cranes. The enriched nutrient may also noticeably reduce biodiversity.

**Introduction of exotic species:** The new species entering a geographical region are called exotic species. These exotic species may cause significant loss to the biological communities. Some exotic species do not become established in new area while some may adjust themselves. Sometimes it may happen that these exotic species may kill or cat native species to the point of extinction. Sometimes it may happen that if some exotic species arc disease' causing then it will spread the epidemic in the whole area. e.g. **(A) A nile-**

**pearch** fish when introduced in the Victoria lake of South Africa threatened the whole ecosystem of the lake by eliminating several native species of chichilid fishes. **(B)** An aquatic species water **hyacinth** (the fragrant water weed which floats on water) of tropical countries (including India) threatens the survival of many aquatic species in lakes and rivers. **(C) Lantana cermera** (an exotic shrub) strongly gets attached to different trees and destroys it in the long run. The exotic shrub has invaded many forests in different parts of our country. In India following have been declared as endangered species and plants. E.g. Nilgrians plant, Chandan etc. & Lal Panda, Black deer, Rabbit etc.

## ENVIRONMENTAL POLLUTION

### 1. INTRODUCTION:

**Everything surrounding us forms an environment. Pollution is the effect of undesirable changes in our surroundings that have harmful effects on plants, animals and human beings.** In the present era of Kaliyug, there are so many problems of pollution at global, national and local levels. The main reasons for this pollution are urbanization, population explosion, and industrialization. Due to this population explosion the forest are getting destroyed and rare species of animals, birds and vegetations are also being destroyed. The increase in temperature due to green house effect and the defects in the Ozone layer are also the great problems. The environment becomes polluted because of following:

(1) Nutritive materials (2) Acids (3) Dust particles (4) Carbon dioxide (5) Alkaline substances (6) Heat (7) Noise (8) Toxic substances (9) Heavy metals (10) Organic substances (11) Microbial (12) Sulphur dioxide (13) Dispersion, etc.

Due to these pollutants different types of pollutions are evolved: **(1) Air pollution (2) Water pollutions (3) Land pollution (4) Noise pollution (5) Radiation pollution**. The evolution of this pollution is due to urbanization, dense population and industrialization. Also there are some natural disasters which adversely affect the pollution level of the environment e.g. earthquake, tsunami, floods, famine, cyclone, etc.

### (1) AIR POLLUTION

In any industrial city, various types of industries are established e.g. textile mills, chemical factories, fertilizer factories, steel and fine-steel industrial projects, pharmacy industry, dying chemicals manufacturing industries, natural gas producing units etc. Some of the materials used in these units create some gases which adversely affect the atmosphere or the fuels used in these industries create the dust particles and the smokes which pollute the surrounding environment and affect the different parts of the body. Sometimes some types of gases spread bad smell in the air. Sometimes some chemical particles get mixed with the air in the atmosphere. All these are the examples of the pollution in the air. All these types of air pollutants are most probably observed in the air of almost all the countries where the urbanization, dense population and use of more automobile vehicles have taken place. The air pollution in these countries has become the most crucial problem. **In simple common language the presence of undesired substances in air is called the air pollution**.

In1957, **Bishop** has systematically defined air pollution as follows:

**Definition**: He presence of single or more pollutants (e.g. dust particles, gases, smokes, air with bad odor, stream, fog etc), in air in such a proportion, in such a type and in such a time that creates adverse effects on men, animals, birds, vegetations and aquatic animals etc and creates the situations of adverse effects on human resources and the routine life. Such a situation is called the air pollution.

**Air pollutants:**

Before collecting the information regarding the air pollutants it is necessary to know that, which types and in how much proportions do the components should be there in the clean air. It is to be noted that fresh air contains: 78.09% of Nitrogen, 20.95% of Oxygen and 0.96% (which is approximately 1 %) of other gases.

These other gases when taken in descending order of the proportions are : argon, carbon dioxide, neon, helium, methane, cryptone, hydrogen, nitrogen oxide, carbon monoxide, xenon, ozone, ammonia, nitrogen dioxide, nitric oxide, sulphur dioxide, and hydrogen sulphide.

**Classification of air pollutants:**

The pollutants of the air can be classified as follows:

(1) Natural impurities: Mist, fog, bacteria, pollen of flower, corn, and the products from the explosion of the volcano.

2) Aerosol: Dust, smoke, mist and fumes.

3) Other impurities: Gases vapour and compounds, Sulphur dioxide, hydrogen sulphide, Nitric oxide, Carbon monoxide , Carbon dioxide , hydrogen fluoride and hydrocarbon.

**Organic pollutants**: In this type, the constituent elements arc carbon and hydrogen and in some of them nitrogen phosphorus and sulphur.

**Inorganic pollutants**: The following substances are included in this class : Carbon monoxide, carbon dioxide, carbonates. Oxide of sulphur. Oxides of nitrogen, Ozone, hydrogen fluoride, hydrogen chloride.

**Sources of air pollutants:**

About 50% of pollution in the atmosphere is created due to the nature. The sources of pollutants are as follows:

(1)Various particles such as pollen of flower mould and salt particles. (2) Wild fire (3) Explosion of the volcano. (4) Carbon Monoxide (5) Hydrocarbon obtained by the decomposition of vegetations. (6) Hydrogen sulphide obtained by the anaerobic decomposition of organic matter. (7) Methane. (8) Fuel. (9) Transportation. (10) Industrialization. (11) Solid wastes from cities and industries.

**(2) Water Pollution**

Water possesses a wonderful dissolving capacity and hence so many pollutants are dissolved in water. If there is huge quantity of water and the quantity of pollutant is not much less as compared to the quantity of water then the dissolved pollutant does not create any effect on water e.g. in a bucket full of water a drop of ink does not show any change in the color of water but a single drop of ink dropped in a small bowl of water will change the color of the water. Similarly, if the pollutants dissolved in water are in a greater proportion then the water becomes polluted, e.g. when we throw away a little quantity of used flowers (used for worship of God) in the river then it does not create any impact on the purity of water but when the tons of used flowers or rubbish or any waste are thrown in the river, the water becomes polluted.

**Main Pollutants of Water**

The list of the main pollutants of water is as shown below.

(1) Various chemical compounds. (2) Chemical elements. (3) Oil (4) Aluminum (5) Organic Matter (6) Gaseous pollutants dissolved in rain water. (7) Insecticides dissolved in the water flowing from origin to the mouth of the river (8) fertilizer (9) Dirty Water from industries (10) Disease carrier bacteria coming from urban filthy – water. (11) Hot water from thermal power plant and other industries. (12) Radio-active substances (13) Inorganic chemicals and minerals (14) Oxygen-demand-waste.

**(3) Land (soil) Pollution:**

The land pollution is created by the following factors.

(1) Population growth (2) Urbanization (3) Industrialization (4) Excessive use of Insecticides/Pesticides (5) Excessive use of Chemical Fertilizers (6) Excessive construction of Irrigation projects.

Due to population growth, millions of people excrete their own waste and they throw broken pots, vessels and other articles on the roads and other places that create pollution. Also dead bodies of human beings as well as animals which are thrown away on the land or dug in the land create a platform for land pollution. Due to excessive irrigation of land, the fruitfulness of the land can be damaged and the production of the crops can be decreased. Because of urbanization and industrialization, new flat systems, bungalows, colonies, factories, big industrial units etc. are constructed. The scraps and waste and rubbish formed during the construction work of all these, adds to the pollution of the land. When vegetations are removed from the land and the same land is utilized for construction purpose, the fertility of the land as well as the nutrients (e.g. some minerals & gases) is destructed. At so many places of constructions or otherwise there is always as obstruction of water or leakage of water on the roads, etc. which becomes the breeding place for all kinds of insects, mosquitoes, etc. In addition, there are factories which bring out their chemical waste in to the water canals or ponds or rivers resulting in the pollution all around. These results in decrease in the fertility of the land nearby.

**(4) Noise Pollution**

(1) Odum states the definition of noise as : "Unnecessary sound which has no effect on the environment, still then it is called noise"

(2) Blum states that, "Noise is unwanted, unpleasant or disagreeable sound that cause discomfort and under industrial situation noise invites deafness."

**(3)** Veetal states that, "Noise means an unpleasant voice."

**Sources of Noise Pollution :**

**(1) Noise from Vehicles:** Now a day there is gigantic use of auto mobiles at cities and villages. The voice created by the machine, emitting smoke in the environment, the voice of horn, the voice created by the doors of the vehicles, while opening and closing, the voice of the horn of trains, the voice from the aeroplanes. All these are having such a tremendous intensity that if we are talking we are unable to listen the words of our talk properly.

**(2) Noise from Machines:** The noise of the machines used in the industries is too much, e.g. In Surat, certain localities each and every house possesses the weaving power looms. These machines are of huge sizes and hence they create too much noise. Similarly other factories such as cement factory, fertilizer factory, power plants, where also machineries are of tremendous sizes are used, they create also tremendous noise pollution.

**(3) Noise from Loud-Speaker:** As and when radios, TVs, loudspeakers are being used at a high level of voice, it creates noise pollution which adversely affect. During marriage ceremonies or procession for dissolution of Lord Ganesha's statue or Moharam procession, etc. the noise created by the drums and loud speakers is so high that it affects the mind of the passer by strongly.

**(4) Noise from the Building / construction work :** The vice created by the laborers and mixer - machineries at the construction of bridges, roads, buildings etc. or their renovations are having intensities with tremendous bds. These are the unbearable noises and hence create noise pollution,

e.g. At the construction of buildings or big industries and complexes the continuous noises are created andhence they create noise pollution.

**(5) Nuclear hazards and Radiation Pollution:**

Nuclear radiation spreads in the environment affecting the human beings as and when there is a problem at the atomic reactors.

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**Human Population and Environment:**

On this earth, the population is growing and increasing day by day. Due to this increasing population many of the natural resources are being extensively used and misutilized resulting in shortage of food, fuel, residential places etc. as per e.g. **(1)** for fuel and construction work lot of food is being utilized by cutting forests. **(2)** for getting oil for transport lot of drilling is made of the bottom of the sea or on the land which reduces the quantity of resources. **(3)** for providing food several projects have been taken for increasing the agricultural products which affect the resources. **(4)** lot of dams and irrigation projects have been created to get more and more water so as to provide it to the people of the country. Out of this lot of water gets wasted at different points. This creates an imbalance in the total quantity of water available for long term use. **(5)** for production of more cloths, so many textile industries have been established **(6)** for providing better health pharmaceutical industries have been developed. **(7)** for pleasure and enjoyment cinemas, theaters and entertainment places have been developed. All of this has created artificial and additional demand for the satisfaction of desires of the people resulting into threat or danger to the environment.

Thus due to more industries and more population, there has been a great amount of pollution of water, land, air and noise. Due to this pollution there has been an adverse effect on human life in some places it is also created a danger or threat to the existence of human or animal life. In this way because of population growth and great amount of industrialization the problem of providing basic necessities to the millions of people is created. This has resulted into the over use of natural resources and disturbances in the environmental pollution. That is why it is said that, "**The greatest pollutant is the population growth**."

**Due to covetousness and temptation of the human beings with their careless attitude towards the environment following adverse effects on the environment have been created.**

(1) As lot of minerals have been dug-out from the earth at various places, that land becomes useless for any agricultural or vegetation purposes. This has resulted into reduction of land for cultivation and vegetation. In addition, during the digging of minerals some useful components of the land are thrown out resulting in reduction of fertility of that land. This adds to the pollution of land.

(2) Due to more population the use of wood for residence, fire, furniture, construction etc. has increased to a great extent resulting into cutting of forests and reduction of trees day by day. Due to this deforestation the amount of carbon-dioxide, absorbed by the trees gets reduced and the amount of oxygen being released by these trees gets reduced resulting into imbalance in the air environment and air pollution. This endangers the human life and existence of bio-species. Also due to deforestation land erosion takes place resulting into less amount of land available. This ultimately creates land pollution.

(3) Due to establishment of so many different industries in the country, the smoke, dust particles and poisonous particles are spread in the atmosphere resulting into great amount of air pollution.

Further as these industries have been established on agricultural land the quantity of agricultural land is decreased. As a definite part of the land has to be kept for residential colonies and future factory premises, that portion of land becomes useless for agricultural purposes. Due to all this, air becomes polluted resulting into the depletion on ozone layer and increase in the temperature of earth as sun's heat waves reaches the earth without much hindrances. This has created danger for the existence of bio-species.

(4) Due to increase in the temperature on the earth seasons have become irregular. Because of that, there is an increase in the possibilities of natural disaster like cyclones, snow falls, oceanic storms etc. and because of all this natural disasters there has been a great loss of human lives and properties all over the world.

(5) As for extracting oil from the earth, lot of drilling has taken place in different areas of the country. Due to this drilling, the underground layers of the earth have been affected and have started shifting slowly creating possibility of earthquakes.

(6) The dead bodies of animals which are thrown in any part of the land create pollution. The dead bodies of human beings which are cremated in the land reduces the amount of land available for better uses and may create pollution if not taken care of properly. In addition to this, lot of garbage and rubbish is thrown out from residential homes as well as factories. If not properly taken care of then it may create pollution. Dirty water from the houses and factories is being unofficially and wrongly diverted into small lakes, ponds or rivers. This pollutes the water and if this water is used by the human being at large then it may create an epidemic.

**EFFECTS OF POLLUTION ON HUMAN HEALTH CREATED BY POPULATION GROWTH**

Because of increase in the population and better opportunities for earning, thousands of rural people are tempted to migrate from villages to cities for their livelihood. This type of migration increases the population of the cities and breaks the social and economic structure of villages. Due to increase in urban population, the house rents have also increased resulting into difficulties of poor people to live properly in the cities. As some of this people cannot afford to live in rented houses, they start living in slums and poor areas around the cities. As these areas may not have proper water and drainage facilities, the pollution is created which affects the health of this people. Due to polluted water and unhygienic condition in these areas, different types of diseases are spread out among these slum dwellers. Lot of people dies because of non availability of money for the treatment of diseases. As there are no proper drainage facilities in these areas, water gets collected in the form of pits which becomes a breeding heaven for mosquitoes and other insects. This further increases the pollution level in the atmosphere. As this poor people cannot afford to purchase sufficient nutritious food, their children are also affected and they remain weak and suffer from diseases. It is noted that the children living in this slum areas suffer from such diseases. Such as T.B., Typhoid, Diphtheria, Cough and cold, Eye-Diseases and Skin-Diseases etc. due to these diseases the death rate of children has increased. As this poor people do not have proper knowledge about family planning and other methods for control of child birth, they keep on producing children as gift of god without realizing the burden created on the whole society. Because of lake of nutritious food and so many deliveries, the health of the mother and the children is affected. Because of that, children become weak and ill.

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**FUTURE ECOLOGICAL PROSPECTS OF MAN AND SUSTAINABLE DEVELOPMENT:**

The economic standard of living of an individual depends on the following Three points:

1. His surrounding environment
2. His will and prominent self - dependence of performing the task.
3. His capacity for technology.

All these three points - "environment, man and technology" are mutually interrelated. The future standard by living of a European definitely seems be bright because the environment around him abundantly contains fertile lam suitable and favorable rain, cool and pleasant atmosphere and large quantities of materials and means. Further the level of their technology is comparatively high. Where as in the dense forests of Africa, the fatal sicknesses, abundant /fain, hot deserts in some regions create hindrance in the work of the human activities. Hence Africa remains backward in its standard of living. Thus the economic development mostly depends on the environment.

Further we know that technology plays an important role in the development programs of men. Due to this only, the farmers have diverted to the use of tractors and harvesters instead of using bullocks and ploughs. A farmer is now using a crane instead of laborers for uplifting the heavy loads) He has also started sending the products or yields to the market through trucks or trailers attached to the tractors, instead of bullock carts. Thus the progress which is seen to-day is only due to the use of technology.

But due to the over usage of technology, chemical fertilizers and automobile transportations, the environment components (such as land, water and air) have become polluted, as well as the ecological balance has also been disturbed to a great extent. The over usage of technology has evolved ecological problems. Now in new thinking has evolved in the world about the "**sustainable development**" of the natural resources of the country.

## Sustainable development:

Sustainable development is such a pragmatic attempt to resolve the conflict between capitalism and environmentalism or between development and preservation or between man and nature. Sustainable development is defined as a development that meets the needs of the present without compromising the ability of future generation to meet their own needs. It also considers the equity between countries and continents, races and classes, gender and ages. It includes social development and economic opportunity on one hand and the requirement of the environment on the other. It is based on improving the quality of life for all, especially the poor and deprived within the carrying capacity of the supporting ecosystem. It is a process which leads to a better quality of life, while reducing the impact on the environment. Its strength is that it acknowledges the interdependence of human needs and environmental requirements. In the span of two decades environmentalism has become a social burning issue and a powerful political movement.

Development is a process that cannot be stopped and should not be stopped. The qualitative and quantitative development of human activity with the advent of science and technology have been giving positive benefit. But at the same time there is a over and mis-utilization of natural resources resulting into imbalance in the ecological system. This presents a threat to the future balanced development of mankind. In this situation sustainable development has become the loud slogan of the day.

**Principles of sustainable development:**

Sustainable development implies the following principles:

1) Natural resources should be utilized and maintained.
2) To take steps for protecting the environment.
3) To implement the precautionary measures and principles.
4) Pollution creators should pay.

**Objectives of sustainable development:**

The main objectives are as follows:

(**1)** It should prevent soil erosion, **(2)** It should increase forest cover, **(3)** It should reduce waste generation, **(4)** It should protect our biodiversity, **(5)** It should slow down the population growth, **(6)** It should cut off the emission of $CO_2$. $NO_v$, $SO_v$ and CFC, **(7)** It should eliminate poverty and slums **(8)** It should prove beneficial to all.

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**REMEDIAL MEASURES FOR AIR BORNE, WATER BORNE DISEASES & TO CONTROL NOISE POLLUTION**

**Everything surrounding us forms an environment. Pollution is the effect of undesirable changes in our surroundings that have harmful effects on plants, animals and human beings.** In the present era of Kaliyug, there are so many problems of pollution at global, national and local levels. The main reasons for this pollution are urbanization, population explosion, and industrialization. Due to this population explosion the forest are getting destroyed and rare species of animals, birds and vegetations are also being destroyed. The increase in temperature due to green house effect and the defects in the Ozone layer are also the great problems. The environment becomes polluted because of following:

(1) Nutritive materials (2) Acids (3) Dust particles (4) Carbon dioxide (5) Alkaline substances (6) Heat (7) Noise (8) Toxic substances (9) Heavy metals (10) Organic substances (11) Microbial (12) Sulphur dioxide (13) Dispersion, etc.

Due to these pollutants different types of pollutions are evolved: **(1) Air pollution (2) Water pollutions (3) Noise pollution**. The evolution of this pollution is due to urbanization, dense population and industrialization. Also there are some natural disasters which adversely affect the pollution level of the environment e.g. earthquake, tsunami, floods, famine, cyclone, etc. Now let us understand the steps to be taken for controlling air bone, water borne and noise borne diseases.

**1. <u>Steps to control the Air borne diseases:</u>**

Air borne diseases can only be controlled by removing or reducing or controlling air pollution. First of all we have to check whether there are pollutants in the air or not. There various methods to check the existence of pollutants in the air.

(1) By observing the physiochemical situation the proportion of the pollutant component in the air are to be recorded and a continuous analysis is to be carried out.
(2) The biotic effect and pollution effect on the human health is to be recorded and the cause of the effect is to be found out and accordingly steps are to be taken.
(3) In order to reduce the pollution in the residential area, a basic care is to be taken to keep industrial area at a considerable distance from residential area.

(4) The chimney of the factory should be kept at a sufficient height and the machines should be established in such a way that the emission of gases etc takes place in proper flow with slow speed and doesn't create any adverse effect in the surrounding environment.

(5) In the factories where there are chances of air pollution following steps are recommended. (1) The raw material which causes pollution should be replaced. (2) The process should be amended. (3) Machine or parts(causing pollution) should be replaced or removed or transformed.

In addition machines which can prevent air pollution can be utilized.

**2. Steps to control water borne diseases**

A great care is to be taken by all of us to see that water doesn't get polluted. If we can control the pollution of water then automatically there will be an effect on the diseases spread by polluted water. Following steps are recommended for controlling the water borne diseases:

(1) The dirty water used by the people of the town or city should not be diverted at any cost into any well or pond or lake or river. This dirty water should be sent to sewage purification plant and then it is to be diverted to the place where it is to be used.

(2) The rubbish and other dirt should be dispose rough at a proper place or a system should be created to take dirt or rubbish from each home in the town or city and carried away to proper place of its disposer.

(3) The industrial water should also be purified by their own sewage plant and then is to be disposed off at an appropriate place.

(4) People should be stopped to wash their cloths near a village pond or canal or a river. They also should be stopped to take bath near pond, lake or river etc.

(5) Every state must have a pollution control board which looks after all these activities regarding control of pollution.

All the people at large can be educated about water pollution and inspired to take part in any remedial measures to stop water pollution. In this new age lot of messages can be spread about control of water pollution through newspapers, cinema, T.V., Radio, Magazines and Social Media.…etc.

**3. Remedial measures to Control Noise Pollution**

In this new age it is very difficult to prevent noise pollution fully, but we can certainly make an effort to reduce its intensity for reducing the effects of noise pollution following steps can be taken:

(1) Radio, T.V., Tap recorders etc. are to be played very softly at home, so that neighbors do not get disturbed.

(2) The workers working in factories where great noise is created by the machines should be instructed to put cotton in the ear so that strong noise does not damage their ears.

(3) In industries noise reduction can be done by using rigid sealed enclosures around machinery lined with accosting absorbing material.

(4) The machines which produce least amount of noise should be utilized in the factories so as to avoid noise pollution.

(5) All kinds of helpful equipments should be used to protect ears during road, train or any kind of travel through noisy areas.

(6) A basic care is to be taken to establish factories and industries away from residential areas.

**(7)** Residential areas should be kept at least 30 feet away from main roads.

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