

SYLLABUS

B.COM IV Sem. (All)

Subject – ENVIRONMENTAL STUDIES

Unit-I	Problem of natural resources
Unit – II	<p>Bio-diversity and its protection-</p> <p>(a) Value of bio-diversity – Consumable use: Productive use, Social, alternative, moral aesthetic and values.</p> <p>(b) India as a nation of bio-diversity and multi-diversity at global, national and local levels.</p> <p>(c) Threats to bio-diversity - Loss of habitat, poaching of wildlife, man wildlife conflicts.</p>
Unit – III	<p>Human Population and Environment</p> <p>(a) Population growth, disparities between countries</p> <p>(b) Population explosion, family welfare p\Programme.</p> <p>(c) Environment and human health</p>
Unit – IV	<p>Multidisciplinary nature of environmental studies:</p> <p>(a) Natural resources</p> <p>(b) Social problems and the environment</p> <p>(c) Eco system.</p>
Unit – V	<p>Environment Wealth :</p> <p>(a) Rivers, ponds, fields and hills.</p> <p>(b) Rural, Industrial, Agricultural fields.</p> <p>(c) Study of common plants, insects and birds.</p>

Class:- B.Com. IV Semester

Subject:- Environmental Studies

Unit II

BIODIVERSITY AND ITS CONSERVATION

Biological diversity (Biodiversity) is part of our daily lives and livelihood and constitutes resources upon which humanity depends, Biodiversity is fundamental to fulfillment of human needs. An environment which is rich in biological diversity, offer the broadest array of options for sustaining human welfare and for adopting change. Loss of biodiversity has serious economic and social costs for any country. The experience of the past few decades have shown that as industrialization and economic development take place. the patterns of consumption. production and needs change. strain alert and even destroy ecosystems.

Genetic, Species and Ecosystem Diversity

Biodiversity involves three levels: diversity between the species (Species diversity), diversity within species (ie. Genetic diversity) and the diversity of the ecosystem (Ecosystem – diversity). However, apart from these specific hierarchical components of diversity e.g. genetic, species (or taxonomic) and ecological diversities. one must also consider the interaction amongst these.

Species and their population is a big library kept alive by natural ecosystem. Thus

- I. **Genetic diversity:** At finer levels of organisation, biodiversity includes the genetic variation within species, both geographically separated population and among individuals within single population.
- II. **Species diversity:** Biodiversity at its most basic level includes the full range of species on earth from microorganisms such as viruses, bacteria and protists through the multicellular kingdom of plants, animals and fungi.
- III. **Community/Ecosystem diversity:** On a wider scale, biodiversity includes variations in the biological communities in which species live, the ecosystem in which communities exist, and the interactions among these levels.

4.2 Biogeography Classification of India

India is known for its genetic and species richness with a wide variety of ecological zones. Because of its unique biogeographical realms, viz. Indo-Malayan. Eurasian and Afro-tropical. It is one of the mega-diversity centers with several bio-diversity 'hot and (eg. Eastern Himalays and Western Ghats) and is well known for species- richness and endemism (Fig. 4.1)

The diversity of the country's biological resources is yet to be fully known- Approximately, 65% of the total geographical area has been surveyed so far. Based on this over 4600 species of plants and 81000 species of animals have been described by Botanical Survey of India (Estd. 1890) and Zoological Survey of India (Estd. 1916) According to an estimate about 30% plant species are endemic to India. Area rich in endemism are also reported from Eastern Ghats. About 3000-4000 plant species are reported under different degrees of threat.

India has sufficient number of biomes. Which represent a sum total of the biological community interacting within single life zone where climate is similar. Twelve such biogeographic regions, ie. "Ecological protectorate' have been identified in the country.

1. Himalayan Highlands
2. The desert
3. Malabar Rain Forest
4. Deccan Thorn Forest
5. Coromondal Mahanandian
6. Burman Manson Forest
7. Bengalian Rain Forest

8. Laccadive Islands
9. Maldiva and Chagos Island
10. Indus-Ganges Mansson Forest
11. Andaman Islands and
12. Nicobar Islands

India has large numbers of wetlands. Mangroves and coral reefs to its credit.

4.3 Value of Bio diversity

Though conservation of biodiversity is advocated by all globally, this is very often assessed in terms of money, How much will it cost? And how much is it worth? Standard economics provides one method of assigning a value to anything, even biodiversity. One has to decide what is the economic value of a species to be conserved, and how much money may be needed in its conservation? A new developing discipline that integrates economics, environmental science and public policy, and includes valuations of biodiversity in economic analyses is known as environmental economics or ecological economics.

The economic values are divided as follows:

1. **Direct values:** These are assigned to the products harvested by people and
2. **Indirect values:** These are assigned to benefits provided by biodiversity that do not involve harvesting or destroying the resources.

Direct values (also known as use values and commodity values) can often be readily calculated by observing the activities of representative groups of people, by monitoring collection points for normal products and by examining import/export statistics. Direct values can be further divided as follows:

- (a) **Consumptive use value:** This can be assigned to goods such as fuelwood and game that are consumed locally and do not figure in national and international market.
- (b) **Productive use value:** This is assigned to products that are harvested from the wild and sold in commercial markets. Both at national and international levels.

Indirect values are assigned to biodiversity that provide economic benefits to people without consumption of the resource. Such benefits include water quality, soil protection, recreation, education, scientific research, regulation of climate and producing future option for human society. Indirect values could be further divided as follows:

- (a) **No consumptive use value:** This includes ecosystem productivity, protection of water resources, soil protection, climate regulation, waste disposal, species environmental monitoring etc.
- (b) **Option value:** This value of a species is its potential to provide an economic benefit to human society at some point in the future. The growing biotechnology industry is finding rare species to tackle pollution, and fight problems of cancer, AIDS etc.
- (c) **Existence value:** This is assigned to protect wildlife. People value charismatic animals such as lion, panda, birds etc, in a direct way to contribute money to conservation organisation. Governments also spend money on conservation.

Biodiversity at Global, National and local levels

Most of the world's biodiversity concentrations are near the equator, especially tropical rainforests and coral reefs. Of all the world's species, only 10 to 15 percent live in North America and Europe. Many of the organisms in megadiversity countries have never been studied by scientists. The Malasian Peninsula for instance, has at least 8,000 species of flowering plants, while Britain with an area twice as large, has only 1400 species. There may be more botanists in Britain than there are species of higher plants. South America, on the other hand, has fewer than 100 botanists to study perhaps 200,000 species of plants.

Area isolated by water, deserts, or mountains can also have high concentrations of unique species and biodiversity. Madagascar, New Zealand, South Africa and California. are all multitude area isolated by barriers that prevent mixing with biological communities from other regions and produce rich, unusual collections of species.

Precipitation and temperature are among the most important determinants of biodiversity. Many biomes occupy characteristic ranges of latitude, tundra occurs only in cold regions near poles while tropical forests occur only within the tropic – near the equator.

There are 8 large realms of biodiversity. On the earth which include 193 biogeographical provinces. Each biogeographical province is a definite ecosystem. in which communities of living species live in part of the ecosystem. As a matter of fact, biodiversity, in developing countries of tropical and subtropical part of the world, is much richer compared to that in the industrial countries temperate part. In addition vavilovian centres of diversity of crops and domestic animals are also localised in these countries.

India possesses a rich diversity of biological resources and indigenous knowledge related to this is well recognized.

In India, formal policies and programmes for conservation and sustainable utilisation of biodiversity resource date back to several decades. The concepts of environmental protection are enshrined in the Indian constitution in Articles 48a and 51a(g). Major central Acts relevant to biodiversity are-Forest Act 1972, Wildlife (Protection) Act 1972. Forest (Conservation) Act 1980 and Environment (Protection) Act 1986. The various central Acts are supported by a number of state laws and statues concerning forests and other natural resources. Policies and stages directly relevant to biodiversity include National Forest Policy amended in 1988, National Conservation strategy and policy statement for Environment and sustainable Development ; National Land Use policy, and Action Strategy on Biodiversity, National Wildlife Action Plan and Environmental Action plan.

India as a Mega-Diversity Nation: India possesses a rich diversity of plants, animals and microbes. This is also true for the diversity of ecosystems, species and the genetic pool within the species. Rated as one amongst the world's twelve, mega diversity, countries, India has Eastern Himalays and Western Ghats as the important hot spots of biodiversity.

India stands in between the developed and developing countries. Its biosphere, agriculture, animal husbandry, fisheries, forestry and pharmaceutical industry all are well placed. In addition, its cultural diversity which is well exemplified in its different religions, languages, traditions festivals etc, also helps in maintaining biodiversity.

Conservation and sustainable use of biological resources based on local knowledge systems and practices in ingrained in Indian ethos. Application and practices for use of biodiversity in the country have developed over the years in traditional scientific process. The country has a strong system of alternative medicine, namely, Ayurveda, Unani, Siddha and Homcopathic systems, which are predominantly based on plants raw materials in most of their preparations and formulations. Herbal preparations for various purposes, including pharmaceutical and cosmetic purposes, form part of the traditional biodiversity uses in India.

India's biodiversity is due to its changing and/or different environmental conditions. i.e. factors such as latitude, altitude, geology, climate, longitude etc. It has 629 million ha geographical area. which includes

7000 km area of coasts. It has all types of climate from hottest (Deserts) to coldest (Himalays). Rainfall varies from 100mm in Thar desert to 5000 mm in Cherapunji. Although India covers only 2% of the world's total area. But it habitats 5% species of world's animals and plants. Biodiversity is an important strength of India. Out of world's one lac species of insects, 60 thousands are found in India. Similar is the case with plants and trees (~60% species are found in India). Out of 4100 species of fishes in the world. 1693 are found in India. In addition 1200 species of birds (out of 9000 in the world) and 10% of mammals (out of 4000 in the world) are founded in India. In India 45000 species of plants and 68371 species of animals have been identified while the total sum of the species (of bacteria, fungi, and plants) identified comes to 1,08,276 (table 4.1). If we look at the number of species in table 4.1 we come to the conclusion that only insects make 50% biodiversity of India. These species are located in land, fresh water and marine habitats as symbionts or parasites.

Threats to Biodiversity

Extinction, the elimination of a species, is a normal process of the natural world. Species die out and are replaced by others. Often their own descendants. As part of evolutionary change. In undisturbed ecosystems the rate of extinction appears to be about one species lost every decade. In this country however human impacts on populations and ecosystems have accelerated that rate, possibly causing thousands of species, subspecies and varieties to become extinct every year. Ecologist E. O. Wilson estimates that we are losing 10,000 organisms a year-that makes more than 27 per day. If present trends continue, we may destroy millions of kinds of plants animals, and microbes in the next few decades. Studies of the fossil record suggest that more than 99 percent of all species that ever existed are now extinct. Most of those species were gone long before humans came on the scene. Periodically, mass extinctions have wiped out vast numbers of species and even whole families. The best studied of these events occurred at the end of the Cretaceous Period when dinosaurs disappeared, along with at least 50 percent of existing species. An even greater disaster occurred at the end of the Permian Period about 250 million years ago when ninety percent of species and half of all families and out over a period of about 10,000 year-a mere moment in geologic time. However, in the present century, human activity is the major threat to biodiversity and following are the chief causes of extinction of species caused by man to fulfill its needs.

[I] Habitat destruction : The primary cause of the loss of biodiversity is not direct human exploitation but the habitat destruction that inevitably results from the expansion of human populations and human activities. The greatest destruction of biological communities has occurred during the last 150 years during which the human population went from 1 billion in 1850 to 6.5 billion. In many cases, the factors causing habitat destruction are the large industrial and commercial activities, associated with a global economy, such as mining, cattle ranching, commercial fishing, forestry, plantation, agriculture, manufacturing, and dam construction, initiated with the goal of making profit. Huge amount of habitat are lost each year as the world's forests are cut down. Rain forests, tropical dry forests, wetlands, mangroves and grasslands are threatened habitats and leading to desertification.

[II] Habitat Fragmentation : Habitat that formerly occupied wide areas are now often divided up into pieces by roads, towns, canals, powerlines etc. Habitat fragmentation is the process where a large, continuous area of habitat is both, reduced in area and divided into two or more fragments. When habitat is destroyed there is often a patchwork of habitat fragments left behind. Habitat fragmentation limits the potential of species for dispersal and colonisation.

[III] Habitat degradation and pollution : Some activities may not affect the dominant species in the community, but other species are greatly affected by such habitat degradation. For example, physical

degradation of forest habitat by uncontrolled ground fires, might not kill the trees, but the rich perennial wild plant community and insect fauna on the forest floor would be greatly affected. Boating and diving in coral reef areas degrade the fragile species. The most subtle form of habitat degradation is environmental pollution, the most common causes of which are pesticides, industrial chemicals and wastes, emissions from factories and automobiles, and sediment deposits from eroded hill sides. Effects of pesticide pollution, water pollution and air pollution on environment are well known. Problem of acid rains and global climate change are also well known and of global concern.

[IV] Hunting and Fishing : Over harvesting is responsible for depletion or extinction of many species e.g. the American passenger pigeon. Once upon a time this was the world's most abundant bird with a population of 2-5 billion. In spite of this vast abundance, market hunting and habitat destruction caused the entire population to crash in only about 20 years (1870-1890). Similar threat is seen for whales, American bison etc. Fish stocks have been seriously depleted by over harvesting in many parts of the world. 13 of 17 principal fishing zones are now reported to be commercially exhausted or in steep decline.

Introduction of Exotic Species : The great majority of the exotic species do not become established in the introduced new places. However some of the species are able to establish in new area. Such successful exotic species may kill or eat native species to the point of extinction or may so alter the habitat that many natives are no longer able to persist. The effect of exotic species is maximum on islands. Disease causing microorganisms, if introduced to new virgin areas may cause epidemics and native species are eliminated completely. Among these species Eucalyptus, Cryptomeria, Acacia, Morlingia are important.

[VI] Disease: Human activities may increase the incidence of disease in wild species. The extent of the disease increases when animals are confined to a nature reserve rather than being able to disperse over a large area. Also animals are more prone to infection when they are under stress. Animals held in captivity are also more prone to higher level of disease.

[VII] Shifting or Jhoom Cultivation: Some rural people destroy biological communities and hunt endangered species because they are poor and have no land of their own. The local farmers often have no choice except to move to remote undeveloped areas and attempt for their livelihood through shifting cultivation. This commonly practiced agricultural system. Known also as **Swidden agriculture, slash-and-burn agriculture, and Jhoom cultivation** greatly affects forest structure and species composition by creating a mosaic of forest patches of different ages. In shifting cultivation, plots of natural tree vegetation are burnt away and the cleared patches are formed for two or three seasons after which their fertility goes down to a point where adequate crop production is no longer possible.

Unit III

Population Growth: Variation Among Nations

Ecologically, a population can be defined as a group of organisms of the same species occupying a particular space.

Populations are not static but they are instead dynamic entities which are always in a state of flux. A population has its own characteristic, such as population density, birth rate biotic potential, age distribution and population pressure, size growth and cycles etc. The issue of population explosion in the developing countries attracted wide, attention especially over last 50 years. Issues related to resources, environment; population and development have become a matter of concern for the whole world.

Every second, on an average, four or five children are born somewhere on the earth. In that same second, two other people die. This difference between births and death means a net increase of nearly 2.5 more humans per second in the world population. This means we are growing at a little less than 9,000 per hour, 214,000 per day or almost 78 million more people per year. In 1999 the world population passes six billion making us the most numerous vertebrate species on the planet

For most of our history, human have not been very numerous compared to other species. Studies of hunting and gathering societies suggest that the total world population was probably only a few million - people before the invention of agriculture and the domestication of animals around 10,000 year ago. The agricultural revolution produced a larger and more secure food supply and allowed the human population to grow, reaching perhaps fifty million people by 5000 B.C. For thousands of years, the number of humans increased very slowly. Archaeological evidence and historical descriptions suggest that only about three hundred million people at the time of Christ

Agricultural and industrial revolution innovations, development and progress were the reason for fivefold increase of population from 1650 to 1950. Population in 1987 had reached the mark of 5 billion, two-fold increase within a period of 40 years.

The present rate of increase in world population is estimated at 1.3 percent per year. The present growth rate cannot possibly last much longer without exhausting simple living space as well as the resources of the earth. A decisive factor in the people-resource ratio is the coupling of increased longevity to the marked rise in the per capita consumption of food materials and energy. A few nations only have faced the problems of restricting their rates of growth to bring about better balance between population number and resources. Very great differences in rates of population growth continue to occur among different regions of the earth. The other demographic world is made up of the richer countries of North America, Western Europe, Japan, Australia and New Zealand. This world is wealthy. Old and shrinking Italy, Germany.

Some countries in the developing world have experienced amazing growth rates and are expected to reach extraordinary population sizes by the middle of the twenty-first century. While China was the most populous country throughout the twentieth century; India is expected to pass China in the twenty-first century because India's population control programs have been less successful than China's. Nigeria which had only 33 million residents in 1950 is to have more than 300 million in 2050. Ethiopia, with about 18 million people 50 years ago, is likely to grow at least tenfold over a century. In many of these countries rapid population growth is a serious problem. Bangladesh about the size of Iowa, is already overcrowded at 128 million people. Another 83 million people by 2050 will only add to current problems.

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Population Explosion: Family Welfare Programmes

Human populations have grown at an unprecedented rate over the past three centuries. By 1999, the world population passed six billion people. If the current growth rate of 1.3 percent per year persists, the population will double in 54 years. Almost all of that growth will occur in the less-developed countries of Asia, Africa and Latin America, A serious concern is that the number of humans in the world and impact on the environment will overload the earth's life-support system

Reasons for High Birth-rate in India

Social, economic, religious all types of reasons are responsible for the high rate of birth in the country. The more important reasons may be enumerated as follows:

1. Lack of proper education
2. Traditional society
3. Joint-family system
4. Importance of Male-child
5. Rural Society
6. Religious mis-beliefs
7. Love marriage-age

In addition to the very high birth-rate in the country, the cause of explosion in the population may also be traced in lower death-rate. During past 80 years death-rate in India was 42.6/1000 person, 91% was reduced to 10.8/100 during the year 1980-81 At present the death-rate is nearly 9 per thousand person. This reduction in death-rate may be due to increase in income of person, improvement in the standard of living and health-management programme in the country.

Environment and Human Health

Nature teaches us that the world of living things. Plants and animals remain embedded in their environment as a very well knit system functioning under the dictates of the laws of nature. This integrated system is called as "Ecosystem"

In the present context the environment has to be visualized as a life-support system. Manson and Lagenheim (1957) discussing the interrelationships between the environment and organism from the ecological stand point advocated that environment has to be organism directed. Organism spaced, organism timed and organism ordered.

The environment which we are presently concerned is the "human environment".

Man is losing the benevolence and blessings of nature, which he has so far enjoyed for his very existence. The dawn of "industrial civilization" is characterized by exploitative relationship of man with nature, resulting into 3P's syndrome i.e. population, poverty and pollution. The three are interrelated. Man's basic resources-soil, water, energy, space and air interacting with the natural biota such as plants, animals, microbes, etc. generate an environment which acts as the life-supporting system of 'Man'. In addition to these natural resources man made resources are also generated by means of service based on exploitative technology inflicting deep wounds on natural environment "Pollutant" is a resource lodged at a wrong place, at wrong time and wrong concentration.

Every human beings born on this earth is now subjected to the contract of dangerous chemicals from the moment of conception to death. Explosion of scientific knowledge and its use with a view to bring comforts to human life has threatened his very survival. Introduction of new "synthetic products" incompatible to the human ecosystem is a great environmental of risk for man today. The- World Commission on Environment and Development (1987) reported that human race has today arrived at a cross-road where it has to bring a 'conceptual change from -one earth to one world". The report points out that within a span of 900 days which clasped between the first meeting and the publication of the report the world witnessed several major environmental disasters. These are:

1. The drought-triggered, environmental crises in Africa peaked, putting 35 million people at risk, killing perhaps a million.
2. A leak from a pesticide factory in Bhopal. India killed more than 2000 people and blinded and injured over 2,00,000 more
3. Liquid gas tanks exploded in Mexico city, killing 1000 and leaving thousands more homeless.
4. The Chernobyl nuclear reactor explosion sent radioactive nuclear debris fall out across Europe and Scandivian countries increasing the risk of cancers to future human generations in wide areas.
5. Agricultural chemicals solvents and mercury flowed into the Rhine River during a warehouse fire in Switzerland, killing Millions of fish and other aquatic life and Poisoning drinking water in the Federal Republic of Germany and the Netherlands.

Thus forgetting the fact that Our environment not only is providing us habitat, but also nursing us; we in greed have degraded our environment to a great extent by over exploiting natural resources; resulting in great health problems in terms of air, water, land, noise, thermal and radioactive pollutions. Whether we talk of global warming, ozone hole, acid-rain, smog or 'Alnino effect; all these in combination with soil erosion, drought, desertification and water-scarcity or flood have affected human health; giving different types of diseases and hazards.

UNIT-IV MULTIDISCIPLINARY NATURE OF E.V.S

Natural Resource

Natural resources occur naturally within environments that exist relatively undisturbed by mankind, in a natural form. A natural resource is often characterized by amounts of biodiversity existent in various ecosystems. Natural resources are derived from the environment. Many of them are essential for our survival while others are used for satisfying our wants. Natural resources may be further classified in different ways.

Classification

On the basis of origin, resources may be divided into:

- Biotic resources are obtained from the biosphere, such as forests their products, animals, birds and their products, fish and other marine organisms. Mineral fuels such as coal and petroleum are also included in this category because they are formed from decayed organic matter.
- Abiotic - Abiotic resources include non-living things. Examples include land, water, air and ores such as gold, iron, copper, silver etc.

Considering their stage of development, natural resources may be referred to in the following ways:

- Potential Resources - Potential resources are those that exist in a region and may be used in the future. For example, petroleum may exist in many parts of India, having sedimentary rocks but until the time it is actually drilled out and put into use it remains a potential resource.
- Actual Resources are those that have been surveyed, their quantity and quality determined and are being used in present times. The development of an actual resource, such as wood processing depends upon the technology available and the cost involved. That part of the actual resource that can be developed profitable with available technology is called a reserve.

On the basis of status of development, they can be classified into potential resources, developed resources, stock and reserves.

With respect to renewability, natural resources can be categorized as follows:

- Renewable resources are ones that can be replenished or reproduced easily. Some of them, like sunlight, air, wind, etc., are continuously available and their quantity is not affected by human consumption. Many renewable resources can be depleted by human use, but may also be replenished, thus maintaining a flow. Some of these, like agricultural crops, take a short time for renewal; others, like water, take a comparatively longer time, while still others, like forests; take even longer.
- Non-renewable resources are formed over very long geological periods. Minerals and fossil fuels are included in this category. Since their rate of formation is extremely slow, they cannot be replenished once they get depleted. Of these, the metallic minerals can be re-used by recycling them. But coal and petroleum cannot be recycled.

On the basis of availability, natural resources can be categorized as follows:

- ***Inexhaustible natural resources*** – Those resources which are present in unlimited quantity in nature and are not likely to be exhausted easily by human activity are inexhaustible natural resources (sunlight, air etc.)
- ***Exhaustible natural resources*** – the amount of these resources are limited. They can be exhausted by human activity in the long run (coal, petroleum, natural gas, etc.)

Some examples of natural resources include the following:

- Air, wind and atmosphere.
- Animals
- Coal, fossil fuels, rock and mineral resources.
- Forestry
- Range and pasture
- Soils
- Water, oceans, lakes, groundwater and rivers
- Solar power

Social problems & the environment: Environment problems arise both directly and indirectly from people's social institutions, social behavior, and cultural values. Conditions of population growth affluence and poverty, technological and industrial development, domestic and international economic activities, and patterns of consumption all affect the use-and abuse-of land, energy resources, and natural resources such as plants and animals, as well as the quality of soil, water, and air. Top problems of environment quality today include deforestation, global warming, biodiversity loss, and hazardous waste. The solutions to these and environmental problems involve social change.

Ecosystem:

An ecosystem is a biological environment consisting of all the organisms living in a particular area, as well as all the nonliving, physical components of the environment of the environment with which the organisms interact such as air soil, water and sunlight. It is all the organisms in a given area, along with the nonliving (abiotic) factors with which they interact; a biological community and its physical environment.

The entire array of organisms inhabiting a particular ecosystem is called a community. In a typical ecosystem plants and other photosynthetic organisms are the products that provide the food. Ecosystems can be permanent or temporary. Ecosystems usually form a number of food webs.

Ecosystems are functional units consisting of living things in a given area, non-living chemical and physical factors of their environment, linked together through nutrient cycle and energy flow.

- 1) Natural –
 - a. Terrestrial ecosystem
 - b. Aquatic ecosystem
 - i. Lentic, the ecosystem of a lake, pond or swamp.
 - ii. Lotic, the ecosystem of a river, stream or spring.
- 2) Artificial, ecosystem created by humans.

Central to the ecosystem concept is the idea that living organisms interact with every other element in their local environment. Eugene Odum, a founder of ecology, stated: "Any unit that includes all of the organism (i.e.: the "community") in a given area interacting with the physical environment so that a flow of energy leads to clearly defined trophic structure, biotic diversity, and material cycles (i.e.: exchange of materials between living and nonliving parts) within the system is an ecosystem."

Examples of Ecosystem:

- Agro-ecosystem, Agro ecosystem, Aquatic ecosystem, Chaparral, Coral reef, Desert, Forest
- Greater Yellowstone Ecosystem, Human ecosystem, Large marine ecosystem, Lotic

- Littoral Zone, Marine ecosystem, Pond ecosystem Prairie, rainforest, riparian zone
- Savanna, Steppe, Subsurface Litho autotrophic Microbial Ecosystem, Taiga
- Tundra, Urban ecosystem.

Natural Resources-

The term natural resource is a dynamic one as its meaning changes with the advancement of technology. Anything which is useful to mankind is a resources.

Important of natural resources-

- 1) Decrease flood situation by checking rain water.
- 2) Plants help to reduce temperature in summer.
- 3) Forests provide shelter to animals
- 4) Forests beatify the landscape.
- 5) A pollution free atmosphere is healthy for living.

Need for Natural Resources -

Water as a natural resource should be protected for the sake of both animals and main. Construction of dams controls floods and provides better irrigation facilities and helps in generating electricity.

Threat to Natural Resources -

- 1) Pollution
- 2) Diseases
- 3) Oil Spill, detergents, domestic waste, radioactive wastes pollute water.

Water conservation -

- 1) Keep water taps closed, when not in use
- 2) Water should be carefully used for domestic work and industrial purpose soil conservation.

Soil conservation -

- 1) By crop rotation.
- 2) Restore the fertility of the soil when plants and weeds are removed.
- 3) Maintaining a balance between air, water, land, flora and fauna.

Environment Management -

The goal is to achieve a sustainable development, environment and society.

The different natural resource are -

- | | | |
|---------------|------------------|-----------------|
| 1) Air, water | 4) Wild life | 7) Water bodies |
| 2) Flora | 5) Agro forestry | |
| 3) Fauna | 6) Soul | |

Uses of natural resources -

Natural resource	uses
Soil	grow crops
Water	Drinking, irrigation, transportation, fishing
Minerals	Absorbed by plants and passed on to human begins.
Animals	Dung used as fertilizer bides used for making bags etc carry leads and for transportation.

UNIT V

ENVIRONMENTAL WEALTH:

Important Rivers Madhya Pradesh

NARMADA: The Narmada also called Rewa is a river in central India and the fifth river in the Indian subcontinent. It forms the traditional boundary between North India and South India and flows westwards over a length of 1312 km before draining through the Gulf of Cambay into Arabian Sea. It is one of only three major rivers in peninsular India that runs from east to west along with Tapi and Mahi River. It flows through the states of Madhya Pradesh, Maharashtra border between Madhya Pradesh and border between Madhya Pradesh and Gujarat and in Gujarat.

SIGNIFICANCE: there are many fables about the origin of Narmada. According to one of them, once Lord Shiva; the destroyer of the universe, meditated so hard that he started perspiring. Shiva's sweat accumulated in a tank and started flowing in the form of a river. Important religious places and Ghats along with the course of the river, starting with its origin at Narmadakhund at Amarkantak hill for eg. The Amarkantak, Omkareshwar, Maheshwar and Mahadeo temples Nemawar Siddheshwar Mandir in the middle reach of the river-all named after Shiva, Chausath Yogini temple, Choubis Avtar temple, Bhojpur Shiva temple and Bhrgu Rishi temple in Bhruch. The Narmada Rivr is also worshiped as mother goddess by Narmadeeya Brahmins.

IMPORTANCE: te importance of the Narmada River as sacred is testified by the fact that the pilgrims perform a holy pilgrimage of a parikrama or circumambulation of the river. The Narmada parikrama, as it is called, is considered to be a meritorious act that a pilgrim can undertake. Important towns of interest in the valley are Jablpur, Barwani, Hshangabad, Harda, Narmada Nagar, Omkarshwar, Dewas, Mandala and Maheshwar in Madhya Pradesh, and Rajpipla and Bahruch in Gujarat. Some places of historical interest are Joga Ka Quilla, Chhatri of Baji Rao Peshwa and Bhimbetka and among the falls are- Dugdhdhara, Dhadi falls, Bheraghat, Dhuandhara, Kapildhara and Sahastradhara.

CHAMBAL: The Chambal River is a tributary of the Yamuna River in central India and forms part of the greater Gangaic drainage system. The River flows north-northeast through Madhya Pradesh, running for a long time through Rajasthan, then forming the boundary between Rajasthan and Madhya Pradesh before turning southeast to join the Yamuna in Uttar Pradesh state.

It is Legendry River and finds mention in ancient scriptures. The perennial Chambal originates at Manpura, south of Mhow town near Indore, on the south slope of the Vindhya Range in Madhya Pradesh. The Chambal and its tributaries drain the Malwa region of Northwestern Madhya Pradesh, while its tributary, the Banas, which rises in the Arawali Range, drains southeastern Rajasthan. It ends a confluence of five rivers, including the Chambal, Kaweri, Yamuna, Sind, Pahuj, at Pachnada near Bhareh in Uttar Pradesh state at the border of Bhind and Etawah district.

THE TAPTI RIVER: The Tapti River is a river in central India. It is one of the major rivers of peninsular India with a length of around 724 km. it is one of only three rivers in peninsular India that run from east to west-the others being the Narmada River and the Mahi River.

The River rises in the eastern Satpura Range of southern Madhya Pradesh state, and flows westward, drainage Madhya Pradesh's Nimar region, Maharashtra's Kandeh and east Vidarbha region in the northwest corner of the Deccan plateau and south Gujarat, before emptying into the Gulf of Cambay of the Arabian sea, in the Surat district of Gujarat.

THE SHIPRA RIVER: Shipra also known as the Kshipra, is a river in Madhya Pradesh state of central India. The rivers rise in kakri bardi hills vindhya range north of dhar, flows south across the malwa plateau to join the Chambal river. it is one of sacred river in Hinduism. The holy city is situated on its right back. every 12 year, the kumbha mela festival takes place on the city's elaborating riverside ghats. Shipra is perennial river. The bank of river shipra river is one of the four plces where the kumbha mela is held.

SONE – It also originates from Amarkantak. Anciently it was known as Shona. It journeys towards east.

BETWA – Originates from Kumra Village in Raisen and joints rivers Yamuna in Hamirpur. Anciently it was known as Vetrwali.

HILLS OF INDIA -

THE HIMALYA RANGE: the Himalaya range or the Himalaya mountains or the sanskriti devnagiri usually called as the Himalayas or himalaya for short, is a mountain range in asia, speadind the Indian subcontinent from the Tibetan plaeatu. The main himalay range runs west to east, form the idus river vally to brahmputra reiver vally, forming an arc of 2400 km. long, which varies in width form 400 km in the wester Kashmir xingiang region to 150 km in eastern Tibetan- arunachal Pradesh region. The range consist of three coextensive subranges, with the northern most and the highest, kown as the graet or inner Himalayas.

GREAT HIMALAYA: the highest ranges rise abruptly as much as 4000 m (13000ft.) into the realm of perpetual snow and ice. As the Himalayan system becomes wider from east to west, the number of parallel high ranges increases.

Mountain grassland and shrubland grow above treeland. The north wesretn himlaya, alpine shrub and middow are found in the high elevations of norther Pakistan, j& k, and himachal Pradesh. To east, the wester himlayay alpine shrubs and midows covers extensive areas along the Tibetan border with uttarakhand and western Nepal. The eastern Himalaya alpine shrubs nad middows grow above the aesten and northen sub alpine conifer forest, along the Tibetan border with eastern Nepal, Sikkim Bhutan and arunachal Pradesh.

LESSER HIMALAY: also called is Mahabharta range at this elevation and above the bio geography of the Himalaya is generally divided by the kali gandagi George in central nepl, one of type deepest canyons in the world. Industrialization is the process of social and economic change that transform a human group form an agrarian society into an industrial one. It is a part of modernization process, where social change abd economic developments are closely related with technological innovation, particularly with the development large scale energy and metallurgy production. It is the extensive organization of an economy for the purpose of manufacturing. Industillization also introduces a form of philosophical change where people obtain a different attitude towards the perception of nature, and sociological process of ubiquitous rationalization.

FOREST: forest is composed of overstory (or upper tree of canopy) nd the under story. The understory is further subdivided into the shrub layer , herb layer and sometimes also moss layer. In complex forest, threr is also a well-defined lower tree layer. Forests are central tpo all human life because they provide a diverse range of resources they store carbon, aid in regulating our climate, purify water and mitigate natural hazards such as floods. Forests also contain roughly 90% of the world terrestrial biodiversity.

FIELDS:

Agriculture Fields: Agricultural area is those broad areas where the types of crops and methods for cropping are similar. There are also similarities in lands and its specific properties the following factors are necessary agriculture areas:

Methods of cropping use of agriculture product association between crops and cattle labour in agriculture instruments use for agriculture and living condition of the people.

Approaches made in agriculture areas:

1. Primitive approach
2. Farming method approach
3. Multi reason analysis approach
4. Priority combinational approach
5. Technical approach

Industrial fields

Industrialization is the process of social and economic change that transform human group from a pre industrial society into an industrial one. It is a part of modernization process where social change and economic development are closely related with technology innovation, particularly with the development of large scale energy and metallurgy production. Industrial fields are those fields on which any type of industry can be established especially basic industries. Usually these are located near to any urban area so availability of resources is very high.

Characteristics of industrialization:

- ❖ Development of engineering technology
- ❖ Development of iron industry
- ❖ Development of coal industry
- ❖ Use of steam engines in textile industry
- ❖ Development of chemical industry
- ❖ Development of transportation vehicles

Common plants in India

India is a land of great variety of plants or vegetation the plants of India changes from one region to another depending the variation in the climate and the soil.

On the basis of certain common feature such as pre dominant vegetation type and climate region Indian forest can be divided into the following groups:

1 tropical evergreen and semi evergreen forest: found in north east and andaman region
Tropical deciduous forest or monsoon forest: most widespread in India. Tropical thorn forest: found in semi arid areas of south west Punjab, Haryana, Rajasthan, Gujarat, Madhya Pradesh etc.

Montane forest: found in mountain area.

Littoral and swamp forest: found in west Bengal.

BIRDS OF INDIA (FAUNA OF INDIA)

Indian Fauna consists of around 90,000 animal species of which 1200 species are of birds only. Peacock, which is found abundantly in India, is the National bird. Peasants, ducks, parakeets, cranes, pigeons are

some of every common bird species in India. Crow, ipcrow etc. are some bird species which are on the verge of extinction. Vultures and eagles are also the bird species which is in the category of rare bird species.

Migratory birds -

During winters, birds like Siberia, Cranes are seen in northern area including Rajasthan. The Kevea Deo Ghana National century of Bharatpur is very famous for such birds the Rann of Kachchh is also famous for migratory birds. Here thousands of flamingoes come to make their nest from the salty mud and lay their eggs.

Insects in India -

The word insect comes from a Latin word which means "cut into sections". More than a million species of insects are known at world level. Bees and mosquitoes are most common insects found in India and cause many diseases including malaria, dengue, chikungunya, cholera, sleeping sickness etc. Butterflies, cockroach, lice ticks, termites, ants etc. are other commonly known insects of India.

Some insects like wasps, bees, ants; termites show special type of social behavior. They live in large, well organized colonies. They have division of labour in their colonies some insects are harmful for human being as they cause diseases and are the major cause of deaths in India.

Not only the human being, they also infect other animals and cause fatal impacts. On the other hand, some insects are useful too. Some insects are helpful for pollination and thus help to maintain biodiversity.

Importance of Ponds -

The ponds conserve water & rain and waterfalls. They are very helpful for irrigation and water supply ponds are the main source of water in India since ancient time. Formation of ponds is considered as a religious and social work since the years. Moreover they add natural beauty and serve as a basic reservoir of water these days the ponds are in danger, due to urbanization, population growth, deforestation, encroachment and unbalanced monsoon timing.

Importance & benefits of rivers -

Rivers are the life times of the agriculture based countries like India. They are considered as mother in India and are venerated and worshiped. The civilizations begin and developed on the bank of rivers. They are the most primitive and cheapest means of transport right from the beginning. In this way they helped much in growth & development of trade and commerce. Most of the industrial and commercially developed cities are located on the bank of rivers only. Dams and canals are also built up out of the rivers which help in farming. They also enhance natural beauty and are developed as picnic spots.

Most of the pilgrimage places are also located on the banks of holy rivers like Ganges, Yamana Narmada, Brahmaputra, Sindhu, Godavari, Krishna etc.

The rivers are the biggest source of drinking water and domestic water.

Moreover they also provide hydro-electricity. They are also necessary for fisheries industry.