

BASIC CONCEPTS : NATURE, ECOLOGY, ENVIRONMENT

Concept

- 1.0 Objective
- 1.1 Introduction
- 1.2 Evolution of human being
- 1.3 Ecology
- 1.4 Environment
- 1.5 Types of Environment
- 1.6 Summary
- 1.7 Reference
- 1.8 Questions

1.0 OBJECTIVES

- 1) To make the students aware of the meaning of environment and its relationship with society.
- 2) To familiarize the students with basic concepts namely - ecology and environment.

1.1 INTRODUCTION

Our existence, lifestyles and growth depend entirely on the sun and the earth. The energy from the sun is called solar capital. In the same way, the planets, air, water, fertile soil, forests, grasslands, wetlands, oceans, lakes, wildlife, minerals and natural purification and recycling process are treated as Earth's capital. We use the term 'environment'¹ to describe, in the language of G.T Miller, 'The Plant's life - support system for us and for all other forms of life'. In effect, the environment is the sum-total of solar capital and earth capital. It also includes the thing created by humans. Environment now extends far beyond the bounds of the local environment, thus it is the intimate enclosure of the individual or a local human population and the global domain of the human species.

Ecology as a discipline is focused on studying the interactions between an organism of some kind and its environment. In ecology, 'niche' refers to the role an organism or species play in its ecosystem. An organism's niche includes everything affected by the organism during its lifetime. We study ecology to learn how nature works. So ecology is a study to achieve a new goal to help scientists to develop methods to protect the natural world - physical environment.

1.2 EVOLUTION OF HUMAN BEING

Man is clearly an animal. His heart, intestine, liver, lungs differ little from the corresponding organs of cat, a dog or a monkey. His respiration, digestion, reproduction muscle contraction, nerve or endocrine co-ordination fine the same general processes and same general chemical and physical relations that one finds in animals. If subjected to classification there is no difficulty in recognizing that man is a vertebrate and hence belongs to the phylum chordata. Among the vertebrates he obviously belong with the class of mammals. He is bipedal using only his hand legs for locomotion but this is also true of Kangaroos. Men, monkeys and apes are very similar to the anatomy. Ecologist concerned with the study of various eco-systems regard man chiefly as a disturbing element in it, and it is this growing attitude on the growing reality of man's disturbing tendency that has given rise to the academic interest in man-nature relations.

When Darwin published the *Descent of Man* (1871) he did not know of any human fossils. He built his case for human evolution entirely on evidence from living men and living primates, and he thought the great break in the Organic chain between apes and man might never be bridged because of the imperfect nature of the fossil record.

In late 1920s and early 1930s a series of man-like fossils were found in a cave deposit near Choukoutou in China, 42 miles from Peking (Beijing). These were the remains of what came to be called as the Peking man or *Sinanthropus*. In subsequent years a variety of hominid fossils were discovered mostly in Africa. These do not form a neat chain of links leading from ancient ape to modern man. They cannot be arranged in a single sequence and it appears that a considerable variety of man-like animals lived at different times and places in the pleistocene.

The Pleistocene was short as geological periods go, and it was also peculiar in having great four waves of glaciation around their way much across North America and Europe, and particular events are dated with reference to these glacial and interglacial periods, although absolute time range remains uncertain.

1.3 ECOLOGY

The word ecology derived from the Greek word 'Oikos meaning habitation, and logos meaning discourse or study, implies a study of the habitations of organisms. Ecology was first described as a separate field of knowledge in 1866 by the German Zoologist Ernst Haeckel, who invented the word Ecology for 'the relation of the animal to its organic as well as its inorganic environment,

particularly its friendly or hostile relations to those animals or plants with which it comes in contact.

Ecology has been variously defined by other investigators as "Scientific natural history", "the study of biotic communities, or "the science of community population", probably the most comprehensive definition is the simple one most often given 'a study of animal and plants in their relations to each other and to their environment.

Ecology may be studied with particular reference to animals or to plants, hence animal ecology and plant ecology. Animal ecology, however, cannot be adequately understood except against a considerable background of plant ecology. When animal and plants are given equal emphasis, the term bioecology is often used. Causes in plant ecology usually dismiss animals as but one of many factors in the environment. Synecology is the study of communities, and autecology the study of species. There is some confusion in these terms since Europeans commonly use 'ecology' in a broader sense - meaning the environmental relations of organisms or of communities. The broader study of communities, including species interrelations and community structure and function as well as environmental relations (Synecology), is generally termed "bioecology" or "biosociology" by Europeans.

1.5 ENVIRONMENT

Its meaning and significance

History reveals that human race was once afraid of nature and the natural forces. Human beings worshiped nature and considered nature as superior to human race. Enormous increase in human population raised the demand for development and increased the consumption of various natural resources resulting in environmental deterioration.

The term environment describes the sum total of physical and biotic conditions influencing the responses of organisms. More specifically, the sum of those portions of the hydrosphere, lithosphere, and atmosphere into which life penetrates is the biosphere. There are no characteristics of permanent inhabitants of the atmosphere, although the air is traversed by many kinds of animals and plant propagules. Of the hydrosphere, there are two major cycles, marine and fresh water, of the lithosphere there is one land.

A habitat is a specific set of physical and chemical conditions (for example, space, substratum, climate) that surrounds a single species, a group of species or a large community. The ultimate division of the biosphere is microhabitat, the most intimately local and immediately set of conditions surrounding an organism, the burrow of a rodent, for instance, or a decaying log. Other individuals

or species are considered as a part of the community to which the organisms belong and not part of its habitat. The term biotope defines a spatial or topographic unit with a characteristic set both of physical and chemical conditions and of plant and animal life.

In order for organisms to exist they must respond or adjust to the conditions of their environment. The first living organisms probably evolved in the sea and must have possessed very generalised adjustments to this relatively uniform and favourable habitat. However, these early organisms are inherent in them the potential for expansion, as they later spread into other and more rigorous habitats, particularly fresh water and land. As evolution proceeded, organisms became more and more limited in the range of their ability to respond as they became specialised in their adjustment to particular habitats. This led to the great diversification of species that we see at the present time, with each species restricted to its particular microhabitat and place in the community.

1.5 TYPES OF ENVIRONMENT

Environment can be classified into 3 broad types

a) Biotic (living) -

The word biotic refers to having to do with living organisms. Biotic elements refer to the biological component of the ecosystem, consisting of population of plants, animals and micro organisms in complex communities. The biotic factors influencing an organisms, viruses and other parasitic organisms cause diseases. There are all parts of an organisms biotic environment. The biotic component of the ecosystem consists of 3 distinct groups of organism, the producers, consumers and decomposers. The producers are those organisms capable of photosynthesis, production of organic material solely from solar light and carbondioxide. This organic material serves as a source of both energy and mineral nutrients. Both are required by all living organisms. Examples include both terrestrial and aquatic plants such as phytoplankton. The consumers are organisms whose very survival depends on the organic material manufactured by the producers. The consumer represent animals of all sizes ranging from large predators to small parasites, such as mosquitoes and flies. The nature of the consumers dependence on the producers takes various forms. Some consumers (herbivores such as rabbits) are directly dependent on primary producers of for energy. Others (carnivores such as tigers)depend indirectly on primary producers. The last group of living organisms is the decomposers. These include micro-organisms such as fungi, bacteria, yeast etc. as well as a diversity of worms, insects and many other small animals. They all rely on dead organisms for their existence and survival. In their efforts to survive and obtain energy they decompose materials released by plants and consumers to their original elements (C,O,H,N,S,P). This

is what keeps material cycling within the ecosystem. The biotic community together with the physical environment forms an interacting system called ecosystem.

b) Abiotic -

Abiotic factors* include the flow of energy necessary to maintain any organism, the physical factors that affect it and the supply of molecules required for its life functions. Other physical factors include climate, temperature, precipitation, including its types (rain, snow, hail) around and seasonal distribution, types of soil present (sandy or clay, dry or wet, fertile or infertile). All forms of life require atoms such as carbon, nitrogen and phosphorus and molecules such as water to construct and maintain themselves. The organisms constantly obtain these materials from the environment by eating food or taking them up through the process of photosynthesis.

In the ecosystem, the abiotic (non-living) components perform 3 important functions: water and oxygen for organisms. 2nd, they act as a reservoir of the 6 most important elements for life, carbon (C), hydrogen (H), Oxygen (O), nitrogen (N), Sulphur (S) and phosphorus (P). These elements constitute 95% of all living organisms. 3rd, the Earth contains only a fixed amount of these elements. Thus continual functioning of the ecosystem requires one thing at least. These elements have to be recycled because they are critical to the welfare of the ecosystem as a whole.

c) Cultural -

The stage of development that human beings have attained in the path towards progress will determine their culture as a way of life. Human interaction with the environment also influences the ecosystem. People of different cultures view their place in society from different angles. Among the factors that can shape their views are religious understandings, economic pressures and fundamental knowledge of nature. Due to this diversity of background, different cultures put different values on the natural world. But the general attitude has been one of development rather than preservation.

Technology has been the key to human progress. Technology has also increased the quantity of environmental degradation. Human interaction with the environment has increased very fast of late. For example, the green house effect is thought to result from energy consumption, agricultural practices and climatic change. It is now felt that we have entered an era characterised by global change that arises from the interdependence between human development and their environment. So self-conscious and intelligent management of the earth is one of the greatest challenges facing humanity today. Humans also cause extinction in indirect ways. The building of dams changes the character of rivers, making them less suitable for some species.

1.5 SUMMARY

Nature and environment are commonly used terms for the ecology. Man is seen as a sort of geological force reshaping landscape, favouring some kinds of organisms and destroying others, changing the very composition of the atmosphere and starting new chain of radio activity with atomic explosions.

1.6 REFERENCE

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1.7 QUESTION

- Q.1. Define environment and ecology?
Q.2. What do you know about the ecology and types of environment?



2

CHANGING HUMAN - NATURE RELATIONSHIP

Concept

- 2.0 Objective
- 2.1 Introduction
- 2.2 Dynamics of development and changing human nature relationship.
- 2.3 Factories responsible for changing human nature relationship.
- 2.4 Summary
- 2.5 Reference
- 2.6 Questions

2.0 OBJECTIVE

- 1) To familiarize the students with their natural surroundings.

- 2) To make the students aware about the basic necessities (food, water, air) required for day to day living.

2.1 INTRODUCTION

Everything which surrounds us may be collectively termed as environment. It is from the environment that we get food to eat, water to drink, air to breathe and all the basic necessities required for day to day living. The environment therefore can be said to constitute as "Life support system".

Since the environment is crucial to human wellbeing and human survival, we have a duty towards the environment i.e. a duty which is derived from human interest. This involves a duty to assure that the earth remains environmentally hospitable for supporting human life. For this there is a need to strike a balance between resource use and resource availability. To have sustainable development it is necessary that technology is used with prudence, otherwise the tool can become a weapon of destruction leading to environmental disorder.

2.2 DYNAMICS OF DEVELOPMENT AND CHANGING HUMAN - NATURE RELATIONSHIP –

Hinduism states that the natural environment is a manifestation of divine nature itself. The order of creation was Akash (space), Vayu (air), Teja (energy), Aap (water) and prithvi (earth). These are known as the 'Panchtatva¹ or the five elements. Hindu code bill or dharma strives to create harmony for the individual not only within the established societal order but also with the natural environment.

There are four basic components of natural environment :-

- 1) Atmosphere or the air.
- 2) Hydrosphere or the water.
- 3) Lithosphere or the rocks and soil.
- 4) Biosphere or the living component of the environment.

Atmosphere - this consists of a complex mixture of a number of gases, water vapour and a variety of fine particulate material. The earth's atmosphere can be roughly divided into 4 major zones based on temperature. These zones are as follows :-

- a) **The troposphere** :- this is immediately above the earth's surface and extends upto a height of 20 kms. above the equator and 8 kms. over the poles. The temperature may drop to 60°C at its upper extremity.
- b) **The Stratosphere** :- it is about 30 kms. in thickness and is an important zone of the atmosphere as it contains the 'Ozone' layer. The temperature in this zone rises from - 60°C to 0°C.

- c) **The mesosphere** - it is about 40 Kms in thickness and this zone is characterise by gradual decline in temperature to about 90°C.
- d) **The thermosphere** - in this zone the temperature increases with height & most of the constituents of this zone are in an ionized state.

Importance of atmosphere :- As a life support system the atmosphere or air is important to us.

- 1) The structure and the composition of atmosphere are responsible for creating conditions suitable for the healthy existence of the biosphere.
- 2) Atmosphere regulates the temperature of the earth. This is due to the presence of gases which are capable of absorbing long wavelength radiations, otherwise no activities could be carried out due to extreme temperatures.
- 3) The incoming solar radiations are filtered above the earth's surface. Harmful ultraviolet rays are absorbed in the stratosphere by the vital ozone layer. These ultraviolet rays can severely damage life on earth.
- 4) The temperature and pressure patterns regulates the abundance and composition of the biotic system or earth.
- 5) The atmosphere is a quick and effective media for transfer transport and dissemination of gaseous wastes.
- 6) Pollutants in the atmosphere are removed to a great extent due to snow or rain which cleans the atmosphere.

Hydrosphere :- an enormous quantity of water is present on our planet. In the total estimated water on earth 95% is locked in the lithosphere and 5% is actually available for fine circulation. Much of the available water contains a high percentage of salt and is therefore of little use to mankind. It is mainly the water received in the form of precipitation - rain dew snow which is the most important source of fresh water to life on the earth.

Importance of water :-

- 1) Without water life as it exist on our planet is impossible.
- 2) Water is an important medium in which all biochemical reaction within a living organism and the other component of the environment like rocks soil etc. occurs.
- 3) The availability of water determines the nature composition and abundance of vegetation and other forms of terrestrial life.
- 4) Water vapour can effectively absorb long wavelength radiations and therefore it acts like a greenhouse gas and plays an important role in regulating the temperature of the earth's crust.
- 5) Water can be retained in the soil due to high surface tension and the moisture retained in the soil therefore support vegetation.

- 6) The low lying region of the world, the river basins and land along seawast is much more productive and nearly 90% of the world population is concentrated in these areas.

Lithosphere or Rocks & Soil -

The lithosphere can be broadly in two categories A) Rocks B) Soil.

- a) Rocks - the rocks found on the earth's crust are of three types.
- a) **Igneous rocks** - they are formed by cooling and solidification of molten rock material called Magma e.g. Basalt.
- b) **Sedimentary rocks** - develop as a result of gradual accumulation consolidation and hardening brought about by wind and water. These rocks are characterised by distinct sedimentary layers e.g. shale sandstone.
- c) **Metamorphic rocks** - are formed as a result of metamorphosis of igneous and sedimentary rocks due to intense heat and high pressure eg. Marble Slate.

Formation of soil

The changes in the earth's crust as a result with atmosphere and the hydrosphere is called weathering. These are different agencies which cause the weathering of rocks.

- 1) **Chemical weathering** - is a relatively slow and simple process. The major agents responsible for chemical weathering are water, air, oxygen carbon dioxide and other materials.
- 2) **Physical weathering** - this is brought about by a mechanical process due to changes in temperature water and wind.
- 3) **Biological weathering** - is caused by a number of organisms which aid in the disintegration of rocks. Roots of plants growing in cracks and fissures create considerable pressure and cause the rocks to disintegrate.

Soil:- The important constituents of soil are

- a) Particles of sand silt and clay
 b) Organic material
 c) Soil water and atmosphere

Importance of soil to the Biosphere

- 1) Soil provides mechanical support to the plants.
- 2) The porosity and moisture holding capacity of the soil enables it to retain rain water or water flowing over or through it for long durations.
- 3) Soil contains organic matter such as nitrifying bacteria, some microbes fungi and protozoans to maintain its fertility for plants and Vegetation to flourish.

Biosphere :- This forms a thin crust of living beings over the surface of the earth. The biosphere includes most of the hydrosphere and parts of the lower atmosphere and upper lithosphere. This ranges from the deepest ocean floor 20 km (12 miles) below sea level to the tops of the highest mountains.

Within the ecosystems organisms interact with one another and with their physical environment in various ways. On the basis of this interaction the biotic community can be grouped into following :-

- a) **Producers** :- i.e. green plants which absorb carbon dioxide mineral nutrients and water and release oxygen required for other living things on earth.
- b) **Consumers** :- producers are consumed by herbivorous animals who in turn are consumed by carnivorous animals or the secondary consumers. This establishes a chain known as the food chain.
- c) **Decomposers** :- the organic matter excreted of animals plants humans and other dead organisms are decomposed by the activity of bacterial fungi and other small organisms which thrive on decaying organic matter. The decomposers are important because they "bring ... the constituent elements of plants and animal bodies back to the surrounding medium or soil.

However many human activities have had a negative effect on the biosphere. The illegal dumping of wastes, burning of fossil fuels mining and extraction of resource has led to the pollution of air, water and soil. It is now increasingly felt that the biosphere must be conserved. To achieve this the concept of biosphere reserves was developed by the UNESCO, which had three major objectives.

- a) First to conserve for the present and future human use the diversity and integrity of biotic communities of plants and animals and to safeguard the genetic diversity of species for continued evolution.
- b) To provide areas for ecological and environmental research.
- c) To provide facilities for education and training.

2.3 FACTORS RESPONSIBLE FOR CHANGING HUMAN-NATURE RELATIONSHIPS ARE AS FOLLOWS

1) Population - the experiences gained through successes and failures of several development have led to the greater understanding that development is a multidimensional concept which encompasses not only economic and social activities but also those related to population use of natural resources and their resulting impacts on the environment. There has been some understanding in the past about the inter relationship between people - resources environment - development. But the efforts

adopted to solve the problems were essentially sectoral. Although the relationship perse was not new, it was disregarded in the face of rapid development and technological advancement. It is common knowledge that attempts to solve seemingly environmental problems like desertification and the loss of productive soil or deforestation, emphasis should be placed not only on such physical factors like climate, soil type modes of cultivation on land use patterns, but also on many other driving forces like demographic trends, types of technology levels used and distribution of income among the population consumption patterns, cultural habits, and educational levels of the inhabitants. Without such an integral approach, action taken to solve the specific problem could give rise to several other side effects, the sum total of which would even be worse than the problems to be resolved.

Rapid population growth has serious environmental as well as developmental implications. The world population doubled from about 300 million to 600 million in more than 1500 years. The world population steadily increased from 2.5 billion in 1950 to 4.8 billion in 1984 and 6 billion in 2000, in just 50 years.

The population spread, density, socio-economic political and cultural characteristics vary from place to place and country to country. However population is subject to births and deaths. While births increase the population, the death decreases population, depending upon the rate at which addition and is taking deletion place. While the addition to the population demands developments, the very developments increases resource consumption and pollution is likely to affect the population through increased death rate. The rate at which the reduction in global population takes place will depend on the environmental deterioration, and impact on human health.

b) Development -

Development is multifaceted. The increasing population develops stress on agriculture for increased food production, establishment of employment centers to develop opportunities for gainful employment, efficient transport for mobility, shelter for better living health and educational facilities. The quantity and quality of these facilities depends on the affordability characteristics of the population. These developments utilize natural resources (land, water, air etc). Increase in population and provision of basic human necessities to each individual mean more food, energy and raw materials. Intensifying the supply of food means more land, water, energy and fertilizers. This leads to energy crises and higher oil prices, less energy available to increase food production. To alleviate fertiliser shortages, and the common denominator in virtually all responses it requires more capital, more technology and more co-operation.

The demand and supply equation attains greater meaning depending upon the economy, socio-cultural order prevailing in the country. For example, raw-materials continue to get exported from developing countries, in turn, the finished goods, which are costlier, get imported in poorer countries thus upsetting the economic balance and the environmental balance too. Thus material movements are transpounday, with long distances from origin to destination, transmedia with many processes between gases, liquids and solids and has generational transferring impacts and responsibilities from present to future.

c) Consumption of natural resources

Different parts of the globe are endowed with natural resources of varying types, quality and quantity. The degree of consumption of these natural resources are neither uniform at all places nor priced at the same level. For example, iron and steel are used world over. But some countries are the highest producers of iron and steel but they may be importing raw materials in bulk and exporting finished products to other countries. The place or country where raw material is available in plenty and exported is subjected to environmental degradation due to deforestation soil erosion and making the land less fertile. The country where the raw material is proceed may be subject to industrial pollution. Thus the pollution is also transferred from place to place. Similarly the rate of consumption and the attendant environmental problems also very from place to place.

The major environmental problem however is when the raw-materials are processed, they are subject to physical and biological change and the environmental pollution starts. The natural resources which are land, water and air get polluted to different degrees, however only when the holding capacity exceeds, it produces harmful results. While land and water pollution is confined to limited area, the air pollution finds no boundary and carried over to a longer distance. The very land which supplies raw material, receives the pollutant.

d) Health hazards

Pollution of land water and air ultimately affect the living organism. Manifestation of several diseases at varying places differs in its severity depending upon other climatic factors, including temperature, wind, humidity etc. Similarly people living in different places with varying environments are affected differently. New drug are being found everyday. The chemical industries which supply the chemicals and the pharmaceutical industry which manufactures medicine, release large quantity of chemical effluents which have severe side effects or causes diseases warranting further efforts to find new drugs. Thus each development leads to a new development which is mostly destructive in nature.

The very population for which the development activities are planned and developed has become the cause for large scale environmental deterioration through extensive utilization of natural resources affecting the same population.

2.4 SUMMARY

Interaction with fellow humans and close interaction with various aspects of nature through observation and experimentation accumulation of empirical knowledge created a base for technological development, contacts and interaction further their knowledge and overall development.

2.5 REFERENCE

- 1) V. Gordon Childe, 1956, Man Makes Himself Walts and Co. London
- 2) Thirumurthy A 2004, Principles of Environmental Science and Management. Shroff Publishers.

2.6 QUESTION

- Q.1. Explain the concept of changing human nature relationship in society.



3

ENVIRONMENT AND SOCIETY NATURE, MODERN SCIENCE AND TECHNOLOGY

Concepts

- 3.0 Objective
- 3.1 Introduction
- 3.2 Biological adaptations
- 3.3 Eco-system
- 3.4 Functions of an eco-system
- 3.5 Relationship between nature science and technology
- 3.6 Summary
- 3.7 Reference
- 3.8 Question

3.0 OBJECTIVES

- 1) To make students aware about the changing environment and modes of living in different ecological conditions.
- 2) To make students familiar with the nature, biological and physical qualities of earth.

3.1 INTRODUCTION

Man is adapted to survive in the diverse ecological conditions from arctic to equator, from mountains to ocean, from wetlands to dry lands etc. Man has to adapt himself with the changing environment in order to survive. In the struggle for existence those "well adapted" were fit to survive while the others not adopting according to changing environment were eliminated in the course of evolution.

3.2 BIOLOGICAL ADAPTATIONS

Traces of adaptations are seen in the form of biological adaptations as well as social and cultural adaptations. Pigmentation of the skin, development of the subcutaneous fatty layer in the region of chick bones-storage of fat in particular portion of the human body are common examples of biological adaptation. But it is true that today all these features are of less importance. Because of advancement of technology and inventions of artificial means of protection, man can easily combat with adverse climate conditions. We can say that man's direct dependence on the natural conditions is constantly decreasing. However social and cultural adaptation is an increasing one owing to his mobility.

Every human society has its own distinct culture with regard to food they eat, garments they wear, rites and rituals of births and deaths and marriages, modes of livelihood, means of recreation and several other activities. Not only this a variety of life styles are seen all over the world. If we think of India, we find that although the basic cultural network is same, there is a difference in lifestyles of people, living in different regions. This difference is mainly due to the geographical and climatic conditions of that particular region, availability of resources in that particular region. According to the above mentioned reasons, the mode of livelihood changes, eating habits change, means of recreation change and the life style appears changed on the whole.

People living in deserts of Rajasthan like to wear bright colorful dresses, in order to add some color to their lives, on the other hand people living in Kerala, Orissa, Assam wear white clothing, as there are enough colors in the nature there itself.

People residing in Punjab eat wheat and lot of milk products, whereas South Indians eat rice, owing to the variety of crops they get in their area. In Maharashtra, we can mark difference between Vidarbha and Konkan region. Staple food of Vidarbha is Jowar whereas Rice is the staple food in Konkan.

Dances of plains and hills differ in nature because of geographical differences in plains lot of foot work and action can be seen in dances where as hill dances are contended with hand movements. People living near forest worship tree gods, snake god and forest gods etc. because their lives depend upon nature. But urbanites do not give much importance to nature gods.

Environment includes everything that may effect an organism in many way. Thus it covers the physical aspects such as air, water land, soil as well as the social economic and political aspects is a complex factor interacting notonly with an organism but between its different aspects also. Thus environment can be understood as the surrounding in which man lives and influenced by the elements or the aspects of environment.

Environment may be divided into the following major components.

I) Natural and physical component - it can be further divided into two types namely abiotic or non-living and biotic or living component. The abiotic component is made up of the following –

1) Location - it can be understood in terms of the exact location of a place on the earth. Related to the location other factors can be understood such as climate, temperature, rainfall, forest, availability of water and other natural resources.

2) Terrain - altitude or degree of slope forms another significant aspect of physical environment.

3) Geological structure - it is the presence and composition of underline rocks and determines land forms and occurrence of mineral wealth.

4) Climate - it is the most dominant component of physical environment. It is understood through temperature, rainfall, humidity and sunlight. It affects various aspects such as plant growth, type of soil, occupation etc.

5) Energy - energy received from sun is the main source of heat and light is the environment. It is also the life giving force for the plant and animal world.

The biotic components are those which influence living organism, plants, animals and man. They are as producers or autographs, consumer or hetrotrophs, decomposers and reducers. The biotic components are interlinked and form a food chain.

II) Culture or human components - it basically includes all the man-made and ^artificial characterstics of human society. Man stays in physical or natural environment but the changes or modifies, this natural environment to suit his needs and requirements. In other words he develops a cultural environment.

The cultural environment can be further divided into the following categories

- 1) Social environment** - it can be understood in terms of the non-material aspect include the norms, values, ideas knowledge etc. whereas the material aspects are the manifest forms of the non-material aspects.
- 2) Economic environment** - it involves the different types of economic activities developed by man. Each type of economic activity has its own requirement of resources as well as technology.
- 3) Political environment** - it includes the type of environment and its ideological principles, various important factors such as production, consumption, use of resources etc. are determined by the strategies and policies advocated by the government. This in turn determines the level of development and progress of the society. Thus environment is a complex phenomena.

3.3 ECO-SYSTEM

an assemblage of species of plants and animals inhabiting a common area and having effects on one another is known as a biotic community. A combination of a biotic community with the natural or physical environment is known as an ecosystem.

The term eco-system implies to a local community of organisms inter-acting with their local non-living environment. In other words the interdependence of living and non-living aspects i.e. plants, animals, man, forest, soil etc. make an eco-system.

It is defined as an unit which include all the organisms (biological component) in a given area inter-acting with the environment (physical component) so that the flow of energy leads to a clearly defined trophic (nutrient supply) structure biotic diversity and material cycles.

It means every eco-system has a flow of energy and cycling of nutrients which bind the biological and physical components together. Every eco-system has a certain capacity to sustained - its components without deterioration this is called its carrying capacity. An ecosystem does not remain constant. Changes occur in it continuously in one form or the other. It is significant that even a small change in one part of an ecosystem is felt though out the eco-system. This establishes the importance of inter-linkages in an eco-system. However the system tries to maintain the stability of an eco-system depends on its diversity. More the diversity more is the inter dependence and more is the resistance to change.

This does not however mean that ecosystem is devoid of any change. Changes do occur. It is the drastic change in eco-system that affects the environment.

An eco-system has two important aspects namely structure and function. The structure includes the composition quantity and distribution of the biological and physical components. The function includes aspects such as rate of energy flow and nutrients, ecological regulation of environment by the organism etc.

Some of the major eco-system of the world are sea's, fresh water marshes streams, rivers, lakes, ponds, deserts grasslands and forest. Broadly speaking ecosystem can be divided into two major categories:-

- 1) Aquatic or water eco-system such as seas, rivers, ponds etc.
- 2) Terrestrial or land eco-system such as deserts, forests etc.

Eco-system constitutes a very important unit of environment. It consist of three main components namely producers, consumers, decomposers and reducers. Producers - they basically include plants which act on self-nourishing organism. These plants contain chlorophyll and with its help, they obtain solar energy and manufacture it into food, they act on a starting point in a food chain all living organisms depend on the existence of producers for their requirements of food, thus they are primary source of energy.

Consumer - they are mainly of two types namely the macro consumers and micro

Consumers.

The macro consumers can be further divided into 3 types as follows
(a) primary consumer, they include the herbivorous or grass eating animals which feed on green vegetation for ex-sheep deer etc.

b) Secondary consumers - they include the carnivorous which eat the flesh of herbivorous they are also called as herbivorous predators for ex fox, hyenc on land and fish and crabs in water.

c) Tertiary consumers - they include the animals which feed on secondary consumers and are known as higher level carnivores ex-tiger lion on land and sharks in water a part from these omnivores are also included that this organism which depend both on primary and secondary for e.g. Man.

The Micro consumer are called as detritivores such as earthworms, centipedes etc. they feed on organic matter.

3) Decomposers and reducers - they include the bacteria and fungi. These are basically micro scop organism. They break down complex compounds of dead plants and animals absorb some of

the decomposed products and release mineral nutrients into the soil. Bacteria decompose dead animal tissues and fungi decompose dead plants tissues. In this process of decomposition and reduction the nutrients which are released into the soil are used by procedures.

3.4 FUNCTIONS OF AN ECO-SYSTEM

- 1) Eco system performs the most important function of satisfying the requirements of the different aspects of the biotic component.
- 2) It is through an eco-system that the interaction as well as interdependence between the biological component and the physical component in the environment takes place, this interdependence is between biotic and biotic components. For ex:- plants depend on solar energy and soil. The interdependence is also between different aspects within the biotic components. For ex. the carnivores depend on herbivores.
- 3) Eco-system leads to transfer of food energy and nutrients from one source to another source.
- 4) The different forms of eco-system are beneficial because they lead to positive effects on the environment which in turn helps the living organisms.
- 5) Eco-systems have helped human beings by providing materials as well as services necessary for survival as well as development.

3.5 RELATIONSHIP BETWEEN NATURE SCIENCE AND TECHNOLOGY

Before you understand the relationship between nature and science and technology. It is necessary to understand the meaning of each Nature - it is understood on the qualities and characteristics related to any given thing from the view point of environment. Nature consist of the biological and physical qualities of earth. It means the physical characteristics such as air, water, soil, temperature etc. as well as the natural laws and principles which control the functioning of the natural events. Science - it is defined as the systematic body of the factual knowledge obtained by the use of scientific method there are certain important characteristics of science.

- 1) It is based on truth or facts.
- 2) The scientific methods of observation and experimentation are used.
- 3) Science puts forwards knowledge i.e. reliable, valid and verifiable in other words the knowledge has to be precise, accurate and free from vagueness and ambiguity.
- 4) It believes in ethical neutrality i.e. freedom from value judgement.

- 5) Science never accepts anything to be conclusively true. It is a continuous search for facts hence scientific knowledge is subject to revision and modification as per any new research.

Technology - it is defined as the application of knowledge for practical purposes. It is closely related to science. This is because scientific knowledge is put to practical use.

There are certain important characteristics of technology

- 1) It has a utilitarian value. It means the means of technology are of use to the human society.
- 2) Technology has created for reacting changes in the society.
- 3) It is through the creative aspects of the technology that the developments and progress have been possible. Technology used not necessarily always be beneficial. There are negative effects of technology also.

The relationship between science, nature and technology has to be understood through man. Man is the focal point and it is his interaction with nature and his use of science and technology which has laid to a relation between nature, science and technology.

During the initial years of human civilization man was in awe of nature. In other words he respected as well as feared nature. This was because the rational and logical thinking of man was inadequate. Hence, the natural event or (natural occurrences were a mystery a constant source of fascination. Man attributed immense power to nature and firmly believed that it was nature which had ultimate control over his life.

Slowly and gradually as human civilization proceeded through time a mark increased in man's intelligence, rational thinking as well as perception was noted. He started understanding the working of nature. The various natural event and occurrence could be understood in terms of a cause effect relationship and natural laws. Nature no longer remained a mystery.

All this became possible because of man's need to search for knowledge or facts. Knowledge or facts unfolded the mysteries of nature. In other words it was the development of science which put man in a better position to understand and evaluate nature. This created significant changes in man's perception towards nature.

Initially man had accepted the domination of nature passively. However with growing awareness nature no longer was considered as an all powerful force. It could now be termed, controlled, modified, manipulated as well as exploited.

With the advent of technology i.e. application of scientific knowledge for a practical purpose, the situation became still worse. Man no

longer was only taming the nature, but now he was tempering without to suit his own requirement and motives vast amount of changes were made in the natural environment under the name of development and progress of human society. These led to serious environmental degradation.

Thus it was man who has responsible for waiting a relationship between nature science and technology. This relationship can be understood from a positive view point as well as negative view point.

Positive aspects of the relationship between nature, science and technology.

As long as nature was a mystery the development and progress of human society remained as a lower level. Simple occurrences or natural events could not be deciphered by man. Man remained unaware of the causes of events such as rainfall, storms, floods, earthquakes etc. The logic and reasoning behind certain events. Such as how fire occur or how it could be ignited could never been known. This put a serious limitation on his innovativeness.

But it was through science that significant changes took place in the history of mankind. Science discovered the laws of nature acted as a torch of light to explore and discover the unknown. It provided a lay of hope to man to understand a natural occurrences in a rational and logical manner. Science determines the natural functioning. This was possible because science was based on truth or facts. These facts were discovered accidentally or consciously. Once they were to discovered and sub-sequently verify, this scientific knowledge could lbe used to modify and adopt nature for the sake of the benefit of mankind.

Application of Science and scientific.

Principles - development of technology after the advent of technology, the heights reached by human beings interms of development and progress have been unparalled. Various field were benefited from these developments.

Examples can be given in respect to important natural resources such as land, water, soil, forest etc. Science and technology have helped in man in proper utilization of land, space, planning towns and cities. Importance of water is evident through a conscious effort at water saving and water utilization schemes. Irrigation, water harvesting, dams etc. are a result of these efforts, science and technology have contributed in improving soil fertility as well minimizing soild erosion. Apart from this the uses of forest have been maximized through science and technology wood, timber and other products of forest have been utilized to the benefits of human society. However it was the selfishness and greed of man which did

not stop him at utilization of natural resources but led to exploitation of nature.

Negative aspects of the relationship between nature, science, technology.

The negative aspects are much more significant as compared to the positive aspects because of the damage they have caused to the nature. Man has exploited the natural resources in a tremendous manner. Modern scientific knowledge and technological innovations have degraded the natural environments. Examples can be given with respect to important natural resources bring misused. A lot of deforestation is carried out in order to increase landscape. This has created significant changes in rainfall. Use of chemicals as well as chemical waste have led to significant pollution levels which are evident in different forms. Water pollution, soil pollution etc. Heavy industrialization, ultranisation, modern transportation. System has caused severe air pollution. The modern science and technology had led to serious damages such as depletion of ozone layer global warming etc. Many development have taken place which had revealed that technology may not always be beneficial to mankind.

We need to consider the fact that man himself was responsible for the development of science and technology. With their help the consciously tried to modify and control the nature. But in this process he himself has become their slave. Though science and technology have created for reaching heights in mankind's development and progress, they have also resulted in far reaching serious implications.

3.6 SUMMARY

Modern science and technology brought progress but at the same time also contributed to a stressful life for human beings. Miss-use of natural resources is criminal because it reflects adversely not only on the present but more importantly the adverse effects will also affect the future of mankind and thus the price of development and progress which has been taking place due to science and technology is heavy to be paid by man.

In conclusion, can be said that the focus of the relationship between nature, science and technology can be traced to the relationship between nature and human beings. It is very necessary to accept the power of nature. Nature is above man and hence it is futile to control or dominate it. It has to be respected and limits should be put on the use of natural environment as well as the natural resources.

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3.8 QUESTION

Q.1. Write in short about the impact of modern science and technology on environment ?



4

PERSPECTIVES OF ENVIRONMENTAL ISSUES CULTURAL ECOLOGY

Contents –

- 4.0 Objective
- 4.1 Introduction
- 4.2 Cultural ecology in relation to man
- 4.3 Method of cultural ecology
- 4.4 Studies in Cultural ecology
- 4.5 Cultural ecology of India's sacred cattle
- 4.6 Gardening and other animals
- 4.7 Summary
- 4.8 References
- 4.9 Question

4.0 OBJECTIVES

1. To bring awareness among the students to understand and develop close relation with environment.
2. To develop holistic approach among students to feel man environment relationship taking into account technology and socio cultural facts.

4.1 INTRODUCTION

Cultural ecology approach evolved in the understanding man-environment relationship. It gives technology and culture a central place in understanding human adaptation to the physical environment. It proposes a feedback loop in the process of

understanding human adaptation to environment. The methodology of cultural ecology suggests holistic approach to understanding man -environment relationships taking into account technology and socio cultural factors.

The duality of ecology in relation to human beings has to be understood, ecology implies adaptation of an organism to environment. Since Darwin, environment has been conceived as the total web of life where in all plant and animal species interact with one another and within the physical features or a particular unit of territory. One can understand the human biological adaptation to the environment in evolutionary terms. But man enters the ecological scene not merely as a physical organism in relation to other organisms in terms of physical characteristics, man introduces the supra organic factor of culture. Thus two quite different objectives are suggested in understanding cultural ecology. First an understanding of organic functions and genetic variations of man as purely biological species and second a demonstration of how culture is affected by its adaptation to environment, this latter requires its own concepts and methods. Man reacts to web of life as cultural animal and that makes the study of Human Ecology unique.

Diversity of human societies cannot be understood as a simple function of environment and resource. Human interaction to the environment is mediated by culture a collection of specific objectives, values, a body of knowledge and beliefs. Thus culture itself is not static, it is adaptable and modifiable in relation to physical conditions.

4.2 CULTURAL ECOLOGY IN RELATION TO MAN

Cultural ecology as a paradigm to understand man-environment relationship was proposed by Julian Steward and has come to be recognized as Steward's Cultural Ecology paradigm-Cultural ecology differs from other ecology studies in seeking to explain the origin of particular cultural features or patterns which characterize different areas, rather than to aim for general principles applicable to any man-environment situation.

The concept of cultural ecology is less concerned with origin or diffusion of technology and the fact that technology may be used differently and entails different social arrangements in each environment. Thus societies equipped with bows, spears, bush burning, deadfall and other such hunting devices may differ among them because of the nature of fauna and flora. Other societies having about the same technological equipment may exhibit other social patterns because the perception of the environment differs to extend that the cultural adaptation must be different. For example the Eskimo use bows and arrows but owing

to the limited occurrence of fish and sea mammals their population is so sparse that communal hunt is not rewarding. So they are dispersed in family groups. The Nevada Shoshni are also fragmented into family groups. In their case scarcity of game and predominance of seeds as subsistence basis greatly restricted economic co-operation and required dispersal of society into fairly independent family groups.

A word of caution: Culturally prescribed ways may tend to perpetuate themselves in the short run and entire patterns of technology, land use, land tenure and social feature may be derived entirely from culture. But over the millennia cultures indifferent environment change tremendously, and these changes can be basically traceable to new adaptations required by changing technology and productive arrangement. Despite cultural barriers useful arts have spread extremely widely and the instances in which they have not been accepted became pre-existing cultural patterns are insignificant.

4.3 METHOD OF CULTURAL ECOLOGY

Thus steward is interested in understanding the inter-relationship between environment culture and technology as a complex inter connected feedback loop in human societies. Although environmental adaptation underlies all cultural ecology the procedures must taken into account the complexity and level of culture. He suggests three fundamental steps in the reconstruction of the cultural ecology of a human society.

First, an interrelationship between productive technology and environment must be analyzed. In primitive societies subsistence devices are basic, weapons and instruments of hunting, in more developed societies, agricultural and herding techniques and manufacturing of crucial instruments must be considered. In idential world capital and credit agreements, trade systems and the like are curcial. Socially derived needs become increasingly important in productive arrangements as culture develops. Second the behavior patterns involved in the exploitation of a particular area by means of particular technology must be analyzed. Subsistence pattern impose very narrow limits on the general mode of life of people. Gathering of wilduoifjtubess and vegetables is usually done by women alone. Nothing is gained by co-operation while it may lead to competition.

Hunting on the other hand may be collective or individual depending on the nature of game available and the techniques used, as well as on cultural history of cooperation or individualism.

4.4 STUDIES IN CULTURAL ECOLOGY, HYDRAULIC CIVILIZATIONS.

Steward studied the low energy consuming societies, their technologies and environmental factors to validate his paradigm. He demonstrated that, for the same technology different communities located in different age, geo-climatic conditions exhibited different social adaptation. Study of ancient complex hydraulic civilization in Egypt, India and China were compared by Steward to indicate the developmental and socio-political similarities in them in spite of geo-climatic variation and the crops grown in these ancient semi-arid and arid, river valley civilizations. In the irrigated areas interrelationship. The productivity of farming was limited only by the amount of water that would be used in irrigation. Metal tools and animal ploughs could not increase the yield of irrigated areas beyond the limits imposed by water supply.

The era of regional florescence is identified as an era where communities were welded into small theocratic states that were religious in nature. The relation of militarism to the enlargement of irrigation works and the expansion of states during the era are not clear. There are regions where priesthood without the backing of the military were able to create multi community states, but the extent of irrigation is not clear. In Northern Peru militarism and warfare is the manner in which the size of the state and consequently the size of irrigation works were increased. Similarly in Mesopotamia and Egypt. This happened later in China where, the empire was established first.

4.5 CULTURAL ECOLOGY OF INDIA'S SACRED CATTLE

Marvin Harris reported studies in cultural ecology about cows, pigs, wars and 1974) A Ford Foundation study in 1959 concluded that possibly half of India's cattle could be regarded as surplus in relation to food supply. Harris through his cultural ecology approach challenges this conclusion. He studies the cultural ecology of India's sacred cattle. Hindus venerate cows as a symbol of everything that is alive, so that there is no greater sacrilege Hindu than killing a cow. Cows in draught prone areas in peasant and urban economies are important in various ways as demonstrated by him. Zebu cattle have small bodies, energy storing humps on their back and greater power of recuperation. These features are adapted to specific conditions of Indian agriculture. The native breed is capable of surviving for long periods with little food or water and are highly resistant to the diseases and oxen's can work as long as they continue to breathe. It is a part of the low energy, small scale, and animal based system. They provide low energy substitutes for tractors and cow. Indian cattle annually excrete about 700 million tons of recoverable manure, half of it is used as fertilizers and the rest is burned as fuel. The peasants use cow dung for plastering floor and walls of their houses. The cow is the last desperate

defense against money lenders. The scanty milk produced by the cow is vital for food security of the poor families of the peasants.

He reported that non beef eating taboo applied only to the upper castes and twice been castes of the Hindu society in India. This taboo had persisted because it had an adaptive significance to the society as a whole. It allowed food security in the form of animal proteins to scheduled castes, especially during times of scarcity like periodic draughts and famines. Thus meat eating is finely adjusted to practical conditions. The meat-eating castes also tend to be the leather working castes since they have a right to dispose of the skin of the fallen cow. So despite cow love India manages to have a huge leather craft industry. The whole complex needs to be further understood in the light of economic and ecological significance. The cattle do not compete with humans for land or the food supply, as at best 20 percent of what the cattle eat consists of humanity inedible substances most of it is fed to oxen's and water buffaloes rather to dry and barren cattle. The observed proportion of cows to oxen's is not very different in India and Pakistan. So the theory that religion is primarily responsible for high proportion of cow is refuted. Finally contrary to expectation studies of energy costs and energy yields show that India makes more efficient use of its cattle than the United States. The ratio of total calories consumed per year to those produced is 17 percent as against 4 percent for American beef cattle raised in ranches. Thus according to him cow love is an active element in a complex, finely articulated material and cultural order. Cow love mobilizes the latent capacity of human being to preserve in a low energy ecosystem, in which there is little room for waste and indolence, cow love contributes to the adaptive resilience of the human population by preserving temporarily dry or barren but still useful animals by discouraging the growth of energy intensive beef industry, by protecting cattle that fatten in public domain or at landlords expense and by preserving the recovery potential of the cattle population during draughts and famines.

He talked of similar ecological significance of wars and associated rituals in another case study of the Marring community. The Marring make war on each other following allegations of abduction of women, rape the shooting of a pig in the garden theft of crops, poaching and death or disease induced by witch craft. But the answers to wars do not lie in the participants consciousness. The study of primitive war leads to the conclusion that war has been part of an adaptive strategy associated with particular technological, by demographic and ecological condition. This being the case when humanity stands to lose more than it can possibly gain from war, other means of resolving inter group conflicts will take its place.

Roy report studied the complex inter relationship, as resource exploitation in a gardening community that husbanded pigs. He studies the flow of energy among the Tesemba clan among the

Marrings in New Guinea, who practiced gardening with swine husbandry for a millennium. The gardening of yam, cassava and sweet potatoes provides the Tesemba with their daily energy ratio and the swine's provide them with the emergency source of protein through animal husbandry. Their way of gardening also makes the best use of a fixed volume of space. They have developed a three tiered ecosystem that exploits the micro climatic variations in the different levels of the atmosphere to grow three different varieties of tree crops. This type of gardening discourages plant specific pests and takes advantage of slight variation in the habitat to protect top soil and achieve a high level of photo synthetic efficiency. The swine husbandry is supportive activity and they are a source of animal protein during emergencies. They are slaughtered ritually once or twice in the lifetime of an individual during war.

Each local Marring subgroup or clan holds a pig festival on the average about once every twelve years. The entire festival including various preparations, small-scale sacrifices and the final massive slaughter - lasts about a year and is known in the Marring language as a Kaiko. In the first two or three months following the completion of Kaiko, the clan engages in armed combat with the enemy camp leading to many casualties and eventual loss or gain of territory. Additional pigs are sacrificed during the fighting and both the victors and the vanquished soon find themselves entirely benefit of adult pigs with which to curry favour from their respective ancestors. Fighting ceases abruptly and the belligerents repair to sacred spots to plant small trees known as rumbim. Every adult male, from every dam clans men participate in this ritual by laying hands on the rumbim sapling as it is put into the ground. The war magician addresses the ancestors explaining that they have run out of pigs, fighting is over and no resumption of hostilities will take place as long as rumbim remains in the ground and they will direct their efforts to raising pigs.

The burden of raising pigs falls mainly on the women who do the gardening. Feeding a pig is equivalent of feeding a human being in terms of food volume and type. Pigs compete with human in their dietary consumption. As the population of pigs and human grows it forces families to move their houses further a part over or wider area. This dispersion lowers the security of the group in case of renewed hostility. The women begin to complain about being overworked and ticker with their <b husbands and snap at their children. Soon the men with considerable unanimity and without counting the pigs agree that the moment has come to begin the Kaiko. The warfare begins and the cycle is complete.

Within the limits set by the basic ecological and environmental condition of the Marring all this has a practical explanation. Animal proteins compared to plant proteins they generally eat, is more concentrated and metabolically more effective. It makes good ecological sense to raise pigs given their climate. Unlimited pig

population can only lead to competition between men and pig. The role of ancestor is to encourage maximum efforts at pig raising and at the sometime to see to it that the pigs do not destroy women and the gardens. The partial taboo is thus an ecologically effective strategy is that system to maintain long term sustainability.

4.6 GARDENING AND OTHER ANIMALS

This type of gardening farms and animal complex at a symbiotic and stable equilibrium is not very uncommon in the wooded hills all over India. In the Western Ghats of India the Areca nut and coconut gardens are very good examples of a complex ecosystem very efficiently exploited by the natives. In Uttar Kannad district of Karnataka a particular community of the Havoc Brahmins practice a similar gardening and animal husbandry. The care of areca nut garden is the nucleus around which life revolves in Uttar Kannada. These gardens are located in the west evergreen forests of the Western Ghats. Great care is taken to choose a site for the garden. Red soapy soil is considered the best. The garden is ideally to be faced east, on the evening sun is believed to be doing harm. The garden needs shelter from the direct sun and leaf manure, which is procured by securing an outer belt of forest and bush wood. The gardens are fenced with live thorns bushes and bamboo. A ditch three to four feet deep surrounds the garden. Inside the garden trenches run parallel to each other in the direction of the length of the valley. The garden needs unfailing supply of water, which is commonly brought from, spring. To keep the garden productive the soil has to be manured once in two years, biological manure from cattle husbanded mainly for this purpose and dry and wet twigs branches and leaves are specially collected for this purpose. The garden's being vegetarian only drink milk from the indigenous short but sturdy breeds of cattle. The local tribe communities employed as contract labor however do consume beef and farm. They have small plots of lands to grow paddy for domestic consumption and the stalk is fed to the cattle in addition to grazing them in forest lands. The gardens make use of the micro climatic variations in the 30 to 40 feet tall Areca nut palms. The gardens are interspersed with banana trees, at the foot of the palms are planted cardamom bushes and twinning around the palm stems are pepper and battle leaf vines. Thus the gardens, animal husbanding, paddy farms and the human communities form a homeostatic ecosystem where the homeostatic is maintained by human being who act as mediators for timely intervention in this resource complex and to reap the profits from it. Their interventions are guided by their belief systems about the functioning of the eco-systems and are built into their work practices. This resource complex has existed for the part several centuries with little or no change (Bapat J 1989)

4.7 SUMMARY

Thus to conclude the cultural ecology paradigm for the fort time acknowledges that the Man-environment relationship cannot be understood using uni-linear causal paradigms. Infact the very idea of aiming at universal laws on the lines of evolutionary adaptation and natural selection is not appropriate to understand man-environment relationship. It requires unique methods and unique paradigms that would take into account the world views of human being including the role of culture and technology in human adaptation to their environment. Human being to their environment by modifying it through culture and technology. Thus there is a feedback loop a functional interconnectedness that needs to be incorporated in the theory that captures man environment relationship.

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4.9 QUESTION

- 1) What are the salient features of cultural ecology ?



5

ENVIRONMENTAL DETERMINISM AND POSSIBALISM

Contents

- 5.0 Objective
- 5.1 Introduction
- 5.2 Contribution of early anthropologists
- 5.3 Relation between anthropology archaeology

- 5.4 Ecological theory and ethnic differentiation among human population
- 5.5 Summary
- 5.6 References
- 5.7 Question

5.0 OBJECTIVE

- 1) To makes students aware about the ecological conditions and direction of human development.
- 2) To acquaint students technological conditions and its impact on social organization of society.

5.1 INTRODUCTION

Not only Prehisheria's but anthropologists too have used archeological remains and linked them to their own discipline to show the links between cultural and natural areas. The first question they asked is Did specific ecological conditions stimulate human development in a certain direction, did it have a limited force, or if once stimulated, did development proceed on its own steam.

5.2 CONTRIBUTION OF EARLY ANTHROPOLOGISTS WISSLER

Broker and Clark Wissler were inspired by Otis Mason's 'Migration and Food Quest". A study in the peopling of America" 1895. They were convinced there was correspondence between cultural and natural arras over the entire new world. Wissler indicated "there was some kind of determinist influence had to be operating from environment to culture. He was especially surprised by the fact that when a map of North American 'ecological areas was placed over a map of the cultural areas, not only did the two line up, but the centers of the representative areas were the same for both the cultural and natural features. He was baffled why it was so. Wissler was convinced that in so far the environment influenced the cultural areas, it was though the effects of food production. But he qualified, the influence of the environment appears as a passive limiting Agency rather than a casual factor in tribal life, and it became difficult and confusing when he tried to explain the uniformity of subsistence practices within a cultural area. He explained this by the alleged advantage which occurs to the tribes of a region when they all exploit the same resource. Wissler was thus unable to formulate the essential ingredients in a homothetic approach to the culture environment relationship. Wissler had no idea how, in general, the techno-environmental conditions could be nomothetically related to the social organizations and ideology.

Darylt Forde on culture and environment

Forde was convinced that environment had a strong influence in shaping a people's culture but was disinclined to express it in homothetic terms. His main contribution, say Marvin Huis, was to warn geographers that they could not hope to understand cultures as mere reflexes of environment since each culture had the power to take out of the environment or to stream those aspects of it which hysterical events inclined to it to take into consideration.

Forde goes on to say that even if he could discover determinist principles by which techno economic patterns could be related to the environment, one should still confront an impasse in trying to relate these patterns to the rest of the culture.

Julian Steward, economic and social bases of primitive bands.

The above noted work of Steward is regarded as an important achievement of anthropology; it is the first coherent statement of how the interaction between culture and environment can be studied in casual terms without reverting to the geographical determination or historical particularize. There is a double focus first on identification of cross culturally valid forms of social organization, and secondly his explanation, Bands occur among widely separated hunting and gathering people in many different part of the world. A band is type of social organization distinguished by its political autonomy, a small population made up of several nuclear families whose access to land is controlled by ownership privileges vested in the larger group. Having established the major type of several dozen recorded cases, Steward classified them into patrilineal, composite and matrilineal sub types. He took note of the low level technologies applied to various types of habitants. His contribution was to explain how despite the diversity of environment and technologies associated with band organized societies, there remained, underlying of ecological commonalties which gave rise to a general type. This formation surpassed crude environmental determinism which makes no provision for cultural variables, but it also imposed human geography known as possibilism.

There were some superfluous limitations, Steward had not in one stroke severed her ties to particularism for instance, among the many factors responsible for patrilinear Bands Steward noted that the band size is restricted not by ecological relation but rather by some social factor which nevertheless brought about the occupation of small parcels of territory by correspondingly small groups. Despite such lapses, Steward intended to produce a statement of non-mothetic causality based upon techno environmental regulaties. It is unfortunate Steward operated with a non-statistical concept of causality. The signifiante of Steward's analysis of bands is that it showed how the interaction between technology and environment could explain most of the important

structural and ideological features of low energy hunter gathers in most of the known examples without utilising historical or other ideographic modes of explanation. In his paper on Mutsib communities Steward was emphasizing that given a certain set of environmental and technologies conditions, the transition from band to sib is highly predicatable in a sufficiently large sample.

Juxtaposing the new world sequences known from northern Peru and central Mexico with available summaries of events in Mesopotamia Egypt and North China, Steward demonstrated degree of development parallelism which dwarfed all of the stupendous phenomena referred to by Sapir. In all the five regions, Steward identified a sequence which involved a roughly parallel development through the same stages. Steward's trial formulation of the developmental sequence in the five centres of ancient civilization was not intended to exhaust all the possible routes which cultures have followed towards complex, state organization. Rather the trajectories he outlined were those assumed to be characteristic sequence of a particular type viz. irrigation or hydraulic civilization Steward's ideas at this point converged with the theories of Karl Wittfogel.

Wittfogel - in 1926 Wittfogel had began to apply a cultural ecological approach to the explanations of the peculiarities of Chinese and other 'Asiatic' societies. In Wittfogel's early formulation these systems were characterised as mighty hydraulic bureaucracy, whose despotic control over the densely populated ancient states of China, India and Egypt arose from the techno-environmental exigencies of large scale irrigation, and other forms of water control in regions of scant rainfall. The realisation that the evolution of oriental societies had followed a path substantially different from those European was quite common among the scholars of enlightenment. Wittfogel's analysis of functional inter-dependence of the main features of the social organisation and techno - economic patterns of irrigation civilization led him to stress the general importance of environmental parameters in understanding of social systems.

5.3 RELATIONS BETWEEN ANTHROPOLOGY AND ARCHAEOLOGY

The links between cultural anthropology and archaeology came in late thirties and early forties with the excavations in Peru carried out by W.D. Strong and his student, Gordon Willey. In the Valley, a complex of domesticated beans, squash and cotton were identified at the base of a large mound, with an estimated date of 2500 B.C. A continuous evolutionary sequence was obtained in the mound and in the adjacent sites leading from incipient agriculture through several stages of village life upto the lowland irrigation states which were ultimately absorbed by the Inca empire. Of special interest in

this sequence was the phase identified by Steward as the formative, when maize was introduced and irrigation techniques took over the main subsistence load. The entire sequence is wholly intelligible as a product of endogenous forces, increasing productivity, increasing population density, multiplication of village sites, warfare inter village and later inter-valley co-ordination of production processes, increasing social stratification and bureaucratic control of production and distribution, centralization of power, feedback to greater productivity, and population density. If contacts with the old world had occurred during the 2500 to 3000 years which were required for the shift autonomous village to state organisation, nothing vital to the dynamics of the process seems to have resulted there from.

The only possible exception was maize, which obviously had not been domesticated on the Peruvian coast. No wild ancestors of the plant had been identified, wild ancestors of corn have been identified in Mexico, but radio carbon 14 daks have confused a period gradual experimentation with domerticated varieties extending back to 7000 B.C. in the Tehuachan valley of central Mexico. The proof that the American domesticated corn is taint amount to a proof that they were capable of achieving every either technologies innovation associated with the New world sequence independently of diffusion from the old. Given the combination Homo sapiens, a nutritive and hardy grain, semi arid valley, ample sources of water terrain. Adaptable to irrigation, it was highly probable that irrigation civilizations would evolve, not once but again and again.

5.4 ECOLOGICAL THEORY AND ETHNIC DIFFERENTIATION AMONG HUMAN POPULATION.

How relevant is ecological theory to explain human ethnic differentiation plant and animal ecologists have employed it. William Abruzzi attempts to do it (Arbuzzi 1982 current anthropology vol. 2.3 P13) Arbuzzi first premises in that ecology is not necessarily a biological science, rather ecological systems have been modelled as energy flow system determined by the their odynamic principal (Margaloff 1968 Odum 1971 pp37-85) Because ecological principles are independent of the specific biological communities and they have structural similarities that suggest the value of their being analysed from an unified ecological perspective. The fundamental units of human and non human communities alike are variables in size and comparison and respond to special and temporal variation in abundance and distribution of resources. ,

Finally both human and non human transform potential energy into social organisation, and the process that generate The division of labour (resources partioning) appears to be important to the organisation of human committees on they are to the evolution of

non human systems. Abruzzin tries to see the formation and maintenance of ethnic boundaries may be one area of social behaviour that could benefit for explicit application of ecological theory. The traditional anthropological use of ethnic unit concepts resulted in naive oversimplification and is derived from a historical approach. Traditional approaches based upon a static conception of discrete ethnic groups proved incapable of dealing with the dynamics of new concerns. A more faithful recent approach to the question of ethnic boundary formation have been those that employed ecological or material focus and have concentrated upon competition over scarce resources in conjunction with the application of labour required for efficient resources exploitation.

Ethnic groups are not different species. Species are genetic units connected by ability to exchange hereditary material, while ethnic groups are social units with much lesser degree of biological integrity or meaning. The decisive criterion is not fertility of the individuals but reproductive isolation of a population. Defining species boundaries is by no means clear, fertility is not a criterion of a species status among local population. Population biologist and ecologist have directly concerned themselves with mechanisms and processes producing changes in species boundaries among the local population and with the relation with speciation and species replacement have to the evolution of encompassing ecological communities. An ethnic unit is difficult to define. A unit defined by Norot is in terms of language, ecological adjustment and local community structure. It is difficult to use socio-cultural traits to define ethnic boundaries. Problems associated with ethnic unit boundaries arise from the contradiction of imposing a static classificatory scheme no matter how necessary upon inherently variable, evolutionary phenomena. Ethnic units in this specific communities, like local species population are prevailing ecological condition. The discreteness of species and ethnic units alike, appear greater the more complex and broadly adapted members of each class, perhaps because of greater breadth of their respective niches and the evolutionary exclusion of class competition that this involves.

Marriage assumes central importance in the definition and analysis of an ethnic population. The extent of endogamy indicates the degree of ethno differentiation within the community. Definition of an ethnic population serve principally to distinguish that unit from other less developing social groups. This suggests that the organisation of an ethnic population is more complex and encompassing than that of other social units. Neither clear species nor ethnic distinction is accepted by Aleruzzi. Rather, he says the discreteness of species and ethnic population alike must be recognized as determined by the local ecological conditions and then variable from one community to another and commonly within the same community through time, since both species and ethnic

boundaries function to regulate competing populations access to resources, the recognition that in one case the proximate cause (mechanism) of behaviour may be largely inherited while in the other they may be primarily learned should not preclude the possibility that the ultimate causes (selective pressures) in both cases may be the same.

Anbuzzi explain the implication of selection theory for the formation of ethnic population. In certain human communities it may be energetically cheaper for distinct population to exploit limited and non-overlapping sets of resources, with each population trading its surplus to neighbouring populations centred in different niches, than one undifferentiated population to exploit the total range of available resources. The distinct requirement imposed for successful exploitation for instance of a herding or a hunting (nomadic) niche contrasts sharply with those needed to occupy a farming niche. The survival of grazing animal demands the animals be mobile in their search for pastures. Human population that exploit these animals hunt like-wise be mobile. Farmers on the other hand, must remain stationary to tend their land and crops. Each adaptation demands a repertoire of supportive behaviour. An energetic advantage thus clearly exists, under certain conditions, for distinct populations concentrated in each of these two niches, rather than one uniform population exploiting both plant and animal resources.

The demand of extensive trade within pre-industrial communities are effectively overcome by the concentration of trade in one distinct population. Again for instance population agriculture involved the use of large amounts of land for the purpose of raising labour intensive cash crops. Since the demand for unskilled labour limits its annual productive value, the labour in plantation system has historically been obtained primarily through slavery, immigration, or employment of migrant workers. These three contexts are examples in anthropological literature of the evolution of distinct adaptations among potentially competing populations. They also furnish instances of pronounced ethnic distinctions within the human communities. Over competition, while not absent has been reduced through the development of more or less symbolic relations, imposed in past by the greater power of the dominant population, and through the institution of complex regulations regarding ethnic interactions, particularly intermarriage. Inequality exists in such relationships however, constant with comparative energy flows in other ecological communities ethnic interaction with human communities are asymmetrical and function to maintain, even increase, the differential organisation and control that exists. Anbuzzi goes on to argue niche diversification through competitive exclusion may result in human population achieving an equilibrium in which they exchange the products of their differentiated niches. The potential for developing symbiotic relationships is perhaps more characteristic of human competitors than of most other

population. This is illustrated by consistent development of interdependence between contiguous nomadic and sedentary population throughout much of Africa and the Middle East. As with non-human population, however competition among human population's is potentially variable.

In so much as endogamy maintains local ethnic distinction, selection would specifically favour those mechanisms that reduced the incidence of inter marriage among the ethnic populations in communities where ethnic specialisation occurs. Although the specific cluster of isolating mechanisms varies from one human community to another, understandable ecological conditions the number of independent isolating mechanisms separating two or more local ethnic population should increase with time. Reproductive isolation underlies the recurring pattern of ethnic relations associated with the expanding pioneer populations. Initial flexible interactive evolve into more rigid stereotype exchanges on the number of immigrants increase and the competition over resources intensifies Anglo-American relations in the American west is said to provide an example of this pattern.

The formation and maintenance of distinct ethnic population is viewed as function of niche diversification at the community level. The selective advantage of clear ethnic, boundaries, evolves primarily from the demands imposed upon labour. Labour demands in turn are viewed by Abruzzi as a function of the specific pattern and intensity of resources exploitation imported upon the local communities, for example by the population or colonial domination. Where the demands of a specific productive system places a selective premiums upon discrete populations, the efficiency of human information processing and group co-ordination are increased by the existence of clear and unambiguous boundaries separating these populations. Clear ethnic boundaries are said to function to improve productive efficiency by reducing the likelihood of competition between members of interacting population within the community.

Since the organisation of population within any ecological community is a function of the availability and distribution of resources, break down in the barriers to marriage between ethnic population results from a change in the conditions of resource exploitation to a situation favouring a different community organization, perhaps even one uniform population. The emergence, decline, and transformation of socially significant ethnic units have been ubiquitous and may be seen as adaptive responses to the change of material demand imposed at the community level.

5.5 SUMMARY

Inspired by the archaeological finding is North and South American, anthropologists who were probing into the life and living of the local people were inspired to investigate into the question of environmental influences on their pattern of growing, starting first with agriculture. They were by and large careful not to fall into the trap of environmental determinism and struggled hard also to avoid environmental possibilism or have an geography. These questions are looked at historically, starting with Clarke Wissler. The field of investigation has widened out only two instances a pattern of agricultural change and ethnic differentiation of a population are given as illustrative material in this section.

5.6 REFERENCES

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5.7 QUESTION

- 1) Briefly discuss ecological determination and possibilism.



6

CLASSICAL SOCIOLOGICAL THEORY

Contents

- 6.0 Objective
- 6.1 Introduction
- 6.2 Environmental changes and rapid degradation of environment
Labor in
- 6.3 Transition
- 6.4 Origin of tools
- 6.5 Anthony Giddens
- 6.6 Criticism on the view of Giddens
- 6.7 Andre Gorz and political economy
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- 6.10 Question

6.0 OBJECTIVE

- 1) To make students aware about the environmental degradation and the perception of classical sociologist on environment.
 - 2) To acquaint students with the view of contemporary thinkers and classical thinkers on environment degradation.
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6.1 INTRODUCTION

Contemporary social thinkers say a lot about environmental degradation, however this perception is not shared by the classical sociologist e.g. Comte and Spencer consider sociology to be directly dependent on biology. Weber has shown little concerned with the natural world. Durkheim did make the natural world a casual factor in human history but non-classical theorists raised casual question on structural origin of environmental degradation.

6.2 ENVIRONMENTAL CHANGES AND RAPID DEGRADATION OF ENVIRONMENT.

What have contemporary social theorists to say about environmental degradation. The theoretical legacy left by classical masters like Comte and Spencer, Durkheim and Weber have substantial limitations. Comte and Spencer consider sociology to be epistemologically and ontologically dependent on and subordinate to biology. Comte only draw on biological analogies and metaphors of form and function and the relationship between organism and organs to explore the interrelationship of individuals and institution in modern societies, Spencer would rightly be called social

Darwinist although he anticipated Darwin. Weber shows little concern with the natural world. Though Durkheim did make natural world a casual factor in human history, none of these classical theorists raise crucial questions on the structural origins of environment degradation. Classical sociological theories therefore, have substantial limitation to explain environmental changes and its rapid degradation.

Marx, a classical theorist, on the other hand made humans a part of nature, and he laid the foundation for political economy. Talcott Parsons one of the great masters and one of the foremost theorists of the present Century gives a static model of human society and has nothing to say on natural environment. In other words, classical sociological theory does not possess an adequate conceptual framework to understand complex inter relation between a society and its environment, how the societies have transferred the natural environment and the negative consequences of such

transformation on society. Marx, also a classical theorist, on the other hand made human a part of nature and how they enter into relationship with nature and with one another and the relations are not only social but simultaneously economic and political. In other worlds, he was also making room for political economy.

Labor in transition

The first operations which our ancestors gradually learned to adopt their hands during the thousands of year of transition could have been only a very simple one. Even the most primitive are for superior. Much time must have passed before the human hands fashioned flint into a Knife. This was decisive step indicating how the hands become free and would began to attain greater dexterity and flexibility and this would be inherited from generation to generation.

Engels says that the hands is not only an organ of labor but it is also a product of labor, gained by repeated effort and passed on to the progeny. It was not merely the hand that evolved but the rest of the body too e.g. The feet for the erect gait kept pace with it as a result of laws of correlation of growth, as Darwin called it. Mastery over nature began with the development of the hand, with labor, and widened man's horizon. With every advance he was continually discovering new, hitherto unknown properties in natural objects. On the other hand, the development of labor necessarily helped to bring the members of society closer together by increasing the cases of mutual support and joint activity, by making clear the advantage of joint activity to each individual. In short, they had something to say to each other. Necessity creates an organ, the undeveloped larynx developed modulations, and the organ of the mouth gradually learned to pronounce one articulate sound after another. In other words Engels tried to establish the origin of language through the process of labor. No other animal requires articulate speech. The dog and the horse through association with man have developed such a good ear that they easily learn to understand any language within their range of concepts.

First labor, then with it speech there was the two most essential stimuli under which the brain of the ape changed into that of the man. Hand in hand with the development of brain went the development of its most immediate senses and the corresponding refinement of hearing and the other senses, the eye, smell and touch. The ape hardly possess the sense of touch. The dog has a keener sense of smell than man, but it does not distinguish a hundredth part of the odors that for men are definite signs denoting different things. The reaction on labor and speech on the development of the brain and its attendant senses, of the increasing clarity of consciousness, power of abstraction and conclusion, gave labor and speech an ever-renewed impulse to further development. This development did not reach its conclusion when

man finally became distinct from the ape, but on the whole made further powerful progress, its degree and direction varying among different peoples and at different times, and here and there being interrupted by local and temporary regression. A new element emerges with the fully fledged man, namely, society.

6.3 ORIGIN OF TOOLS

Hundreds of thousand of years lapsed before human society arose. The characteristics difference between troupes of monkeys and human society is labor. The monkey as well as the other animal waste great deal of food and destroy the germ of the next generation of food, unlike the hunter, the wolf does not spare doe which would provide it with the young the next year. The goats in Greece that eat away the young bushes before they grow to maturity, have eaten bare all the mountains of that country. This predatory economy of animals plays an important part in the gradual transformation of the species facing them to adopt themselves to other than the usual food, this predatory economy constructed powerfully to the transmission from ape to man, the apes surpassed all others in intelligence and adaptability. The predatory economy must have led to a continuous increase in the number of plants used for food and to the consumption of more and more edible parts of food plants. In short food became more and more varied and these substances that entered the body were the chemical premises for the transition to man.

Labor begins only with the making of tools the most ancient tools are hunting and fishing implements, the farmer at some time served as weapons. Hunting and fishing presupposes the transition from an exclusive vegetarian diet to a concomitant use of meat and this says Engels is another important step towards transition to man. His argument is based on their assumption that meat diet (protein) contained is an almost ready state is the most essential ingredients required by the human organism. For its metabolism. It has greatly contributed towards giving bodily strength and independence to man in making Engels also insists that it also had its affect on the brain which now received a far richer flow of material necessary for nourishment and development and which therefore could develop more rapidly and perfectly from generation to generation.

The meat diet led to two new advances of decision importance - the harnessing of fire and the domestication of animals. The five shortened the digestive process, as at provided food already As if it were half digested. Demystification made meat more copious by opening up a new, more regular source of supply in addition to hunting. And more over it provided in milk and its products, a new article of food at least as valuable as meat in its composition. Both there are means for an emancipation man.

Just as man learned to consume everything edible, he also learnt to live in any climate. He spread over whole of the habitable world, the only animal being able to do so. The other animals that have become accounted to all climates - domestic animals and vermin - did not become so independently, but only in the wake of man. And the transition from the uniformity hot climate of the original home of man to colder regions, where the year was divided into summer and winter, created new requirements - shelter and clothing as protection against cold and damp, hence new spheres of labor, new farms of activity, which further and further separated man from animal. By the combined functioning of hands, speech organs and brain^ not<& only in each individual but also in society, men became capable of executing more and more complicated operations, and were able to set themselves and achieve higher and higher aims. The work of each generation itself became different, more perfect and more diversified. Agriculture was added to hunting and cattle rising, then came spinning and weaving, metal working, pottery and navigation. Along with trade and industry, art and science finally appeared. Tribes developed nations and states. Law and politics arose and with them that fantastic reflection of human things in the human mind religion. The notion that mind rather than working hand played a dominant role in the history of man. This as Engels himself explained since the mind that planned labor was able, at very early stage in the development of society, (for example, already in the primitive, family) to have labor that had been planned carried out by the other hands than its own. Thus all merits for advance of civilization was absorbed to the mind, to the development and actively of the brain, rather than on amount of felt needs the needs of course are perceived in the mind so in the course of time there emerged the idealist world outlook which holds a dominant position.

Animals merely used their environment and those artificially introduced can bring about changes by their presence, whereas, man changes the environment to serve his own ends. For instance, goats and pigs brought into the Island of St - Helena exterminated the old vegetation and prepared the ground for spreading of plants brought by later sailors and colonists. The effects of animals on the environment is unintentional and accidental, whereas those of men are predicated, planned directed towards certain ends, Animal destroy vegetation without realizing what they are doing. Man destroys it to sow field crops or plant trees which are expected to yield many times the amounts planted. The humans are not always successful - there are unforeseen effects. The people who in Mesopotamia, Greece, Asia Minor and elsewhere destroyed the forests to obtain cultivable land never dreamed that they were removing along with the forests they collecting centre and resources of moisture and laying the basis for the fortune state of

those countries. Again, when the Italians of the apes used up pine forest on the Southern slopes,

they had no inkling that by doing so they were cutting at the roots of the dairy industry of the regions they had less inkling that by doing so they were depriving their mountain spring of water for greater part of the year and making it possible for them to pour still more furious torrents on the plains during the rainy season.

6.4 ANTHONY GIDDENS

Contemporary social theorists say a lot about environmental degradation. However this perception is not shared by the classical sociologists e.g. Comte and Spencer consider sociology to be directly dependent on biology. Weber has shown little concern with the natural world, Durkheim did make the natural world a causal factor in human history.

But none of the classical theories raised crucial questions on the structural origin of environmental degradation, Anthony Giddens concerned with the issue of environmental degradation where he experienced in the second half of the (20th C). The threat of global environmental disasters and the emerging political agenda triggered his writing on the environmental questions initially. Giddens has argued that capitalism and individualisation were responsible for modern environmental degradation. Later he mentioned that whatever may be the causal origin of environmental degradation modern man is modifying and exploiting the nature for his own selfish purpose.

Giddens suggested that there is an effective close relation between capitalism and industrialisation. Capitalism is unique in its ability to create a precondition for the emergence of individualisation. According to Giddens the combination of capitalism and industrialisation produces new relations between human beings and nature whereby human beings lost the respect and fear for nature and this was replaced by a selfish tendency to dominate and exploit the nature. This created environmental degradation. Giddens has attributed to distinct impacts of capitalism and industrialisation.

According to Giddens present environmental degradation can be traced back to modern individual economy and the industrialised sector of the developed as well as the developing countries. Giddens has also made a mention of technological determinism and the overuse of it. In other words man himself created technology. However subsequently he himself has become a slave of the technology. It is his need for technological innovations which leads to a large extent of the exploitation of the nature.

6.5 CRITICISM ON THE VIEW OF GIDDENS

According to Giddens the combination of capitalism and industrialisation was responsible for environmental degradation. But he has not given any precise explanation relating to the environmental change. He fails to explain environmental transformation as well as environmental implications. Giddens also does not explain the relationship between society and environment in an adequate manner. Apart from this he overemphasizes the role of capitalism and industrialisation as the agent of environmental degradation.

6.6 ANDRE GORZ

The political ecology of capitalism. Gorz has used the idioms of political economy to address the issue of ecological degradation in the western capitalist society in his books listed in the bibliography. He is an unorthodox from France. He has shared the lineage of the radically inclined environmentalist of France.

Political economy

Gorz finds western capitalism moving in the direction of post industrialism. He raises the issue of failure of capitalism to alternate poverty, its economic rationality and the finite limits of the physical world. The dynamics of capitalist growth remains the insatiable chase for capital within a competitive market economy and its investment capital cycles. The social democratic parties within it have argued that it is only through expansion of aggregate levels of production that the problems of poverty and inequality can be resolved. This is unacceptable to Gorz, he finds the equation between more and better interable. This is because expansion in production of goods and services is in some sense morally objectionable, and the undesirable... of production can be seen in the growth of environmental damage it causes.

Gorz tries to distinguish the peculiar dynamics of consumption and production. Even with social democracy the basic human needs are not met, poverty is not eradicated but reproduced. An increase in food production and consumption does not automatically eradicate poverty, if production and consumption is concentrated in high value added products. In environmental terms, the creation of aesthetically, valuable landscape does not alleviate the poverty of those in a decaying urban environment, if that land is held in private ownership, secondly, the intrinsic character of Of some of the goods and services cannot be distributed equally or used by all simultaneously without losing their distinctive value, without losing their distinctive value, for instance a motor cannot be made available to all without losing its utility as a convenient form of transport. The weather of an affluent, consumption based life style in the west has served as a goal of development for the rest of the world. Given the expanding world population, the industrialised path

out of under development can only serve to hasten the contemporary ecological . cases without resolving the problem of endemic poverty. Gorz therefore argues, that an environmentally sustainable future depends upon transforming the nature of consumption, as well as production.

Gorz uses a combination of Marxists and post modernism on the question of mode of production. His concerns are three fold the political and social implication of technology then ecological impacts, and the conquence of computer technology and automaiton. He argues in ecology as politics that technology is the matrix in which the distribution of power the social relations of production and hierarchical division of labour are embedeed. Nuclear energy for instance, presuppose and imposes a centralised, hierahical, police dominated society. This is because it is technically complex and financially

Costly. A requier a buerauray and a high division of labour. The military significance of the nucler industry requires high level secrecy and policing trespassing on liberties and democratic discussion on energy policy.

Technologies thus have socio-political consequences.. Gorz is less specific of their impact on the ecological situation. He hold that certain technologies,

Irrespet of their relation. Of production within which they are deployed are ecologically damaging. The causal force is explored in his analysis of automation and its economic consequences and its& Role in capitalist crisis.

6.7 SUMMARY

Gdders given importance to spanal understanding... of the social processes in general and environmental degradation in particular. He also places urban sociology at the centre of social theory and has generated o(n useful concept of created environment that exists under conditions of modernity. Gorzs integration of environmental degradation into a broad political economy is very stimulating. His focus on consumption, interpretation of wealth and 7 well being, automaiton and technology have greatly contributed to technology have greatly contributed to technology have greatly contributed to our understanding the political economy of environmental degradation. He has highlighted the environmental limits of social democracy and has prented an interaction of alternative of an Utopia in his paths to paradise.

6.8 REFERENCE

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6.9 QUESTION

- 1) Critically evaluate Giddens and Gorz's economy of environment.



7

MARXIST PERSPECTIVE

Contents

- 7.0 Objectives
- 7.1 Introduction
- 7.2 Dialectics of nature
- 7.3 Ape to man
- 7.4 The laws of transformation of quantity into quality and vice-versa.
- 7.5 Law of inter penetration of the opposites
- 7.6 The law of negation of negation
- 7.7 Summary
- 7.8 Reference
- 7.9 Question

7.0 OBJECTIVE

- 1) To make students aware about the physical organisation of their individuals and their consequent relations to the rest of nature.
- 2) To acquaint students scientific technological development and related consequence with it.

7.1 INTRODUCTION

The founders of Marxism were Karl Marx and Fredrick Engels. They collaborated in their writing and in their political activity. Yet, if the major work Dialectics of nature is written by Engels, it is also equally important to remember that stressed on the role of natural sciences by pointing out, in his preparatory work for capital in 1863, that natural sciences, underlies all knowledge. In fact the methodology, Historical materialism that he worked out as early as 1845, and he himself used for social analysis begins thus, "the first premise of the history is the existing of living human individuals. Thus the first fact to be established is the physical organisation of their individuals and their consequent relations to the rest of nature. The verifying of history must always set down from these natural bases, (geological, Orohyelgraphical. climatic and so on) and their modification in the course of history through the action of "Men" themselves begin to distinguish themselves from animal as soon as they begin to produce their means of subsistence, a step which is conditioned by

their physical organisation. By producing their means of subsistence men are indirectly producing their actual material life "(Chapter German Ideology in selected works 1966 vol I pp20)

Marx and Engels were equally interested in sciences and were trained in its various branches but there existed a kind of division of labour between them. Marx was particularly interested in mathematics, history of technology and agricultural chemistry. Marx began these studies in 1851 when he resumed his research in political economy, he went into the history of technology and agricultural chemistry. He used the results of his studies in the chapter of volume I of Capital on machines, and in developing the theory of ground rent in Volume III of the same work.

7.2 DIALECTICS OF NATURE

Engels on the other hand had more intimate knowledge of physics and biology. He also studied mathematics, astronomy, chemistry, anatomy and physiology, and devoted greater attention to the theoretical natural science than Marx did. Dialectics of Nature is one of the more important works of Frederick Engels. It gives a dialectical materialist generalisation of the principal achievements of the natural sciences in the mid-nineteenth century, develops materialist dialectics, and criticizes the metaphysical and idealistic conception in natural science. The productive task of capitalism made for rapid progress in technology and in the natural sciences. New facts and natural laws were established, new theories and hypotheses conceived and new branches of science brought into being. Engels showed the three outstanding advances in that triumphant march of natural science to be the discovery of the organic cell, the laws of conservation and transformation of energy and Darwinism. In 1838 and 1839 M.J. Schleiden and T. Schwann established the identity of vegetable and animal cells, they proved that the cell is the basic structural unit of living organisms, and created an integral cell theory of the structure of the organisms. Between 1842 and 1847 J.R. Meyer, J.P. Joules, W.R. Grove, L.A. Colding and H. Helmholtz discovered and substantiated the law of conservation and transformation of energy. As a result, nature presented itself as a continuous process of one form of the universal motion of matter changing into another. In 1859 Darwin published his Origin of the Species by Means of Natural Selection which formed revolutionary ideas for biology. Marx and Engels were interested in the philosophical significance of these discoveries and revealed the dialectical character of natural development in a particularly succinct form. Engels tackled the new theoretical problem posed by scientific progress - Marx being fully absorbed in his cardinal work Capital. Their interest in scientific progress - Marx being fully absorbed in his cardinal work Capital. Their interest in scientific progress was not accidental. To create an integral world outlook, they had to generalise the main achievements of the contemporary

natural sciences too, if materialism was to be given a new dialectical form. Engels writes. Marx and I were pretty well the only people to rescue conscious dialectics from German idealist philosophy, apply it in the materialist conception of philosophy, apply it in the materialist conception of nature and history. But a knowledge of nature and history. But a knowledge of mathematics and natural science is essential for a conception of nature which is dialectical and at the same time materialist (Anti D..... Moscow 1959, PP16) It is also undertaken to show that in nature amid Other. Of innumerable changes, the same dialectical laws of motion force them ways through, as those which in history govern the apparent fortuitousness of events. To me there could be no question of building the laws of dialectics in nature but discovering them in it and evolving them from it. The task was therefore to reveal the objective dialectics of nature and thereby prove the necessity for conscious materialist dialectics in nature science and expel idealism, metaphysics, agnosticism and vulgar materialism from science and demonstrate the universal character and basic laws of materialist dialectics. Engels consistently examined the character of content of mathematics, physics, Chemistry and biology. The ideas of dialectics of nature were developed further in *Lewis Materialism and Superstition*. Engels also on the part played by labour in transition from Ape to Man. The part played by labour in the transition from Ape to Man - Engels.

7.3 APE TO MAN

Labour is the source of the all wealth, the political economist asserts. It is the source next to nature, which supplies it with material that labour converts into wealth. It is the prime basic condition for all human existence. Many hundred thousand years ago, perhaps towards the end of tertiary period a particularly highly developed race of anthropoid apes lived in the tropical zone, they lived in bands in trees. Climbing assigned different functions to hands and feet, when their mode of existence involves locomotion on level ground, they gradually got out of the habit of using their hands for working and adapted an erect posture. This was decisive step in their transition from ape to man. In general, all the transition stages for walking on all fours to walking on two legs are observed in the apes today.

It stands to reason if erect gait become the first rule and then, in time a necessity, other diverse functions must in the meantime, have devolved on the hands. First is climbing, then together and hold food in their hands, the chimpanzees for instance construct roof between branches to protect themselves against the weather with their hands they grasp sticks, and bombard their enemies with fruit and stones. In captivity they use their hands in a number of simple operations copied from human beings. But no simian hand ever fashioned even the crudest stone knife. The first operations which

our ancestors gradually leaved to adapt their hands during the thousands of year of transition could have been only a very simple one. Even the most primitive are for superior. Much time must have passed before the human hands fashioned flint into a knief. This was a decisive step indicating how the hands become free and would begin to attain greater dexterity and flexibility and this would be inherited from generation to generation.

Handred of thousands of years lapsed before human society arose. The characteristic difference between troupe of monkeys andhuman society is labour. They monkey as well as the other animals waste a great deal of food and destroy the germ of the next generation of food. Unlike The hunter, the wolf does not spare a DOEWHICH WOULD PROVIDE IT WITH THE YOUNG THE NEXT YEARS. The goats in Greece that eat away the young bushes before they grow to maturity, have eaten bare all the mountaining of the country. Thus predatory economy of animals plays an impactant part in the gradual transformation of the species by forcing them to adapt themselves to other than the usual food, thanks to which their whole physical CONSTIFATION. gradually alters, while the species that remain unaltered due out. Thispredatery economy constructed... powerfully to the <-^{erxCr} * transition from ape to man, the apes surpassed all other in intelligence in the number of plants used for food and to the consumption of more and more edible parts of food plants. Inshort food become more and more varied and there substances that entered the body were then chemical premises for the transition to man.

7.5 THE LAWS OF TRANSFORMATION OF QUANTITY INTO QUALITY AND VICE-VERSA.

The above statement can be expressed by saying that in nature, in a manner exactly fixed for each individual case, qualitative changes can only occur by quantitative addition or quantitative subtraction of matter or motion. What about changes of form of motion, or the so called energy ? Engles answers if we change heat into mechanical motion or vice-versa is not the quality altered while the quantity remain. The same ?Correct - change of form or motion is always a .process That take place between two bodies, of which one loses a definite amount of motion of one quality (e.g. heat) while the other gains a corresponding quantity of motion of another quality (mechnical motion, electricity chemical decomposition), these therefore quantity and quality mutually correspond to each other. We are concerned here in the first place with non-living bodies, the same laws holds for living bodies, but it operates under very complex condition. In chemistry it is easy to illustrate the qualitative changes of bodies as a result of changed quantitative composition. As in the cate of oxygen (O₂) if three atom unitewe get ozone (O₃) a body which is very considerably different from ordinary oxygen in its odour and reaction. And indeed in which

oxygen combines with nitrogen and sulphur each of which produces a substance quantitatively different from any of the others. How different is the Laughing gas, nitrogen monoxide (N_2O) from nature anhydride, i.e. nitrogen pentoxide (N_2O_5). The first is a gas the second at an ordinary temperature a solid crystalline substance. And yet, the whole difference in composition is that the second contains five times as much oxygen as the first and between the two of them three more oxide of nitrogen (N_2O_3 , NO_2) each of which is qualitatively differently from the first two and from one *AUTHER*

To make an uranium bomb it is necessary to have the isotope uranium. 235, the more common isotope uranium 238 will not do. The difference between the two is merely quantitative, a difference in atomic weight. Having got a quantity of uranium 235, 9 certain critical mass of it is required before it will explode.

Finally, the Hegelian law is valid not only for compound substances but even for elements. In 1869 Mendeleev achieved a scientific feat by presenting the periodic law. The physical and chemical properties of elements are a periodic function of their atomic weights. He presented a periodic table in 1871. In this table he showed various gaps occur in the series of related elements according to atomic weight indicating here new elements remaining to be discovered. He described in advance to atomic weight and the general physical and chemical properties which were lying between the properties of the neighbouring elements, some of the predictions has been confirmed later for example gallium germanium and scandium were discovered many years after Mendeleev had predicted their existence.

Engels states that in biology as in the history of human society, the same law holds good at every step, but he prefers to give examples from exact sciences since the quantities are accurately measurable. The law of transformation of quantitative into qualitative change is also met with in the society. Thus before the system of industrial capitalism comes into being there takes place a process of accumulation of wealth in form in a few private hands (largely by colonial plunder) and of the formation of a proletariat (by enclosures driving the peasant off the land) At certain point in this process, when enough money is accumulated to form capital for industrial undertakings, when enough people have been proletarianised to provide the labour required, the conditions have matured for the development of industrial capitalism. At this point the accumulation of quantitative changes gives rise to a new qualitative stage in the development of society, in general qualitative changes seem to happen with relative suddenness - by a leap something new is suddenly born, though its potentiality was already contained in the gradual evolutionary, process of continuous qualitative change which went before.

Law of inter-penetration of the opposites Dialectics prevails though out nature, it is only by the continual conflict of the opposite and their final passage in to another or into higher forms determines the life of nature attraction and Repulsion begins with magnetism, it is exhibited in one and the same body. In organic life, the formation of the cell nucleus is just to be regarded as a polarisation of the living protein material from the simple cell to the theory of evolution demonstrates how it is effected by the continual conflict between heredity and adaptation. One may conceive heredity as the positive conservative side, adaptation as a negative side that continually destroys what has been inherited, but one can just as well take adaptation as creative, active, positive activity and heredity, on the resisting, passive negative activity. Hard and fast lines are incompatible with the theory of evolution. Even the borderline between vertebrate and invertebrates is no longer liquid, just a little on there is between fishes and amphibians, while that between birds and reptiles dwindle more and more.

7.6 THE LAW OF NEGATION OF NEGATION

Negation in dialectics does not mean simply saying no whole Engels, when is the process of development, the old stage is negated by the new, in the first place, that the new stage would not have come about except as arising from and in opposition to the old. The condition for the existence of the new arose and matured within the old. The negation is a positive advance, brought about only by the development of that which is negated. The old is not simply abolished, leaving things as though it had never existed, it is abolished only after it has given rise to condition for the new stage of advance.

In the second phase, the old stage which is negated, itself constitutes a stage of advance over the forward moving process of development as a whole. It is negated, but the advance which took place is it is not negated. On the contrary, the advance is carried forward to the new stage, which takes into itself and carries forward all the past achievements.

To the liberal outlook development seems to be a smooth upward course preceding through a series of small changes. If a given stage of development is to be raised to a higher level then this must take place gradually and peacefully through harmonious unfolding of all higher potentialities latent in the original stage. But in the Marxist theory development takes place not as a harmonious unfolding but as a disclosure of contradiction in which lower stage is negated destroyed, in which the development which follows its negation is itself negated and in which the higher stage is reached only as a result of that double negation. The essence of dialectics is to study the process in all its concreteness, to look out how it actually takes place and what to improve on it on the basis of some

preconceived scheme. Engels wrote in characterising the process of negation therefore Marx does not dream of attempting to prove by this that the process was historically necessary.

Negation of negation, ... Engels is on extremely general and for this reason extremely comprehensive and important laws of development of nature, history and thought..... it is obvious that in describing any evolutionary processes negation of negation. I do not say anything conceiving the particular process of development. I bring them under one laws of motion and for this very reason I leave out of account the peculiarities of each separate process (Engels Anti-Duhrting 1 Chapter XIII).

The negation of negation as Engels also pointed out is a familiar phenomenon to a plant breeder. If he has some seeds and want to get from it some better seeds, then he has to grow the seed under definite conditions for its development which means bringing about the negation of the seeds by its growing into a plant, then controlling the condition of development of the plant until it brings about its own negation in the production of more seed. Further more the whole of geology is a series of negated negation, verong Engels, a series of arising from the successive shattering of the old depositing of new Rock formations. But the result of the process has been a very positive one; the creation of most varied chemical element, of a mixed and mechanically pulverised soil which makes possible the most abundant and diverse vegetation.

7.7 SUMMARY

Both Marx and Engels were deeply interested in nature and rigorously studied the new revolutionary development science. In their joint revolutionary endeavour there was some division of labour Engels chose to write on Dialectics of nature, while Marx worked out the methodology of investigation which he saw on Materialistic conception History or historical materialism which emphasises man's close relations with nature and man as a part of nature.

From the history of nature and human society Engels worked out the three laws of dialectics of development in both nature and society.

7.8 REFERENCE

Engels Friedrich, 1986, Dialectics of nature program publisher Moscow. Marx Karl and Engels F 1977, Theses of Feuerbach in selected ... Vol I Progress published Moscow.

7.9 QUESTION

1. Write an essay on dialectics of development.



8

RECENT CONTRIBUTION : (ANTHONY GIDDENS, U BECK)

Content

- 8.0 Objective
- 8.1 Introduction
- 8.2 Anthony Giddens
- 8.3 Giddens, capitalism, industrialism and Transformation of nature
- 8.4 Giddens on urbanisation, globalisation and the environment
- 8.5 Ulrich Back
- 8.6 Risk society
- 8.7 Ecological democracy and democratisation of science
- 8.8 Summary
- 8.9 References
- 8.10 Questions

8.0 OBJECTIVES

- 1) To make student students aware about the impact of social structure on natural process of environment.
- 2) To acquaint student with the understanding of ecological theories and the plausible reasons for and the trend of environmental degradation.

8.1 INTRODUCTION

Marx classical theorist, made human a part of nature and laid the foundation far political economy. Talcoett Parsons one of the great masters and one of the farmost theorist of the present century gives a static model of human society and has nothing to say on natural environment. In other wards, classical sociological theory does not possess an adequate conceptual framework, to understand complex inter relation between a society and its environment how the societies have transformed the natural environment, and the negative consequences of such transformation on society. Marx, also a classical theorist, olthe other hand made human a part of nature and how they enter into relationship with nature and with one another and the relations are not only social unit but simultaneously economic and political. In other words, he was also making room for political economy.

8.2 AJNTHONY GIDDENS

Two contemporary authors Antony Giddens and Andre Gorz the former falls back on classical sociology and later on political economy. A trenchant analysis of the impact of social structure on environment is possible only with a full understanding of the ecological theories. The first step would be to reconstruct the natural history of the region under study and view it vis-a-vis the social history of the same region which would yield primary clues for understanding the plausible reasons for and the trend of environmental degradation.

Both Giddens and Gorz have attempted to integrate an explanation of the origins and consequences of environmental degradation into a broader understanding of development and dynamics of modern societies. Giddens' explanation of as well as the nature of degradation focuses on the interaction between capitalism and industrialism, which he broadens further with urbanism and globalization. Gorz's work is more powerful, he draws on the work of environmental economists to bring out the dynamics of contemporary capitalist economics. He explores the mechanisms of environmental degradation through the impact of modern consumption, environmental impact of technologies and pays closer attention to environmental degradation. He asks whether socialism and the means by which cultural preferences and the demand for environmental sustainability can triumph over the dynamics of economics and political interests.

8.3 GIDDENS CAPITALISM, INDUSTRIALISM AND TRANSFORMATION OF NATURE

Giddens debates with classical theorists to consider the historical and structural origins of environmental degradation in modern societies. The concerns that were expressed in the 1980s, and the threat of global environmental disaster and the emerging political agenda no doubt triggered his writing on the environmental question.

Initially, he had argued that the conjunction of capitalism and industrialism is responsible for modern environmental degradation. But in the third phase of his work, when he shifted his focus from capitalism to modernity, he reassessed the causal origins of environmental degradation, secondly recalling the discontinuity thesis, he has argued that whatever the precise causal origins of environmental degradation, the modern world heralds a more wholesome transformation of nature than human societies have ever been capable of. Giddens' most extended discussion on capitalism and industrialisation is initially analytical, delineating the unique features of these forms of social organisations. The two are separate and irreducible, empirical, historical phenomena, there

have been capitalist societies that have not been industrial and industrialised societies that are not capitalists.

Giddens gives a five fold classification of capitalist societies, first with production of goods and services, second commodification of labour, third separation on the existence of private property as the means of production fourth separation of polity and economy and fifth capitalist state which is synonymous with a capitalist society. Although he was once a stringent critic of the notion of the concept of industrial society, nevertheless he did not wish to reduce industrialism to an epiphenomenon of capitalism. Giddens defines industrialism by four characteristics. Industrialism entails mobilization of inanimate source of power in production and circulation of commodities and mechanization of these two processes. These two processes lead to the third i.e. routinized flow of goods. All these three must be located in a centralized work place, quite separate from a domestic local to form a homogenous productive order.

Giddens is suggesting that although there is an elective affinity between capitalism and industrialism, capitalism is also historically unique in its ability to create preconditions for the emergence of industrialism. Yet in his *The Nation, State and Violence* wishes to retain a relative autonomy for industrialism this does not mean that industrialism is confined in its influence, or potential influence, to capitalist societies alone. Giddens on the other hand argues is the form of western capitalist industrialism which produces the initiative of a missively important series of alteration in relations between human being and the natural world.

Giddens resolves the dilemma through the central theoretical construction of institutional order of modernity. The orders comprise of private property, surveillance, the means of violence the transformation of nature, and the production of created environment. In describing this formulation, Giddens has argued initially that although analytically and to some extent empirically, the impact of industrialism has been separable from capitalism, the major environment impact since the last two hundred years has been in combination with capitalism. Giddens then seems to withdraw from the position, arguing for the primacy of industrialism rather than capitalism in the production of created environment the transformation of nature. The idea that industrialism has independent causal consequences for a society appears to be repeated in one of Giddens few references to the state socialist societies of the post war Europe, Goldblatt also notes the shift in Giddens work towards industrialism as a central component of modernity, quite separate from capitalism is completed in the consequences of Modernity.

8.4 GIDDENS ON URBANISM, GLOBALISATION AND THE ENVIRONMENT.

Study on urbanism and the weated environment are of importance for Gidden and he says urban in capitalism and modern social theory, and in contemporary critigues. of historical materialism. For Giddens the premodern features of the world was destroyed by the advent of modern urbanism and the created environment. In the pre capitalist societies, the city suitaned a close ecological integration with nature that almost completely suppression of natural features of modern cities in the commodificaiton of space and time. Commodification not only describes a loss of control by workers over their labour, but also the intimate and meaningful relationship of human beings with the natural world achieved through their labour are destroyed. The meaning of natural forms of time, such as seasons is overturned by imposition of commodified clock time. The natural contours of the spatial environment are dissolved in the wholly manufactured Geates space of modern cities Thus large areas of the time space organisation of everyday life in the modern cities are purely historical, routinized. Giddens argues that ^ capitalist commoditfication produced the alienated created environment and it ' was the rise of the capitalist state that eradicated the city as a distinct social form. In the consequences of Modernity, the main axis of enteraction of human beings with nature in conditions of modernity. In the industrialised societies of the globe and increasingly elsewhere the human beings live in a created environment. Not just the built environment of urban areas but most other landscapes as well become subject to human co-ordination and control.

8.5 ULIRCH BECK

Ulrich Becks two books Risk Society : Towards a New Modernity (1991) and Ecological politics in an Age of Risk, Rellexive Modernisation (1996) laid against a world in which we live constantly with a known threat of catastrophe but are unable to diminish their likelihood. Bee work is of importance for those concerned with the response of social theory to environment degradation and environment politics.

Bees earlier work in individual sociology and sociology of family and later work in insuarity and risk, economies and environmental studies. His own concerns with modernity, its pathologies and transformation have strong links with German social theory as well as with the various three stage model of post modern and post industrial and finally his concern with politics of Federal Republic of Germany. His critics against the high industrilisation of that country etc. ruthless efficiency is pursuing catastrophic ends. In ecological politics he takes on the theme of organized irresponsibility. Organized irresponsibility helps to explain how and why the

institution of modern society must unavoidably acknowledge the reality of catastrophe while simultaneously denying its existence, covering its origin and precluding compensation or control.

8.6 RISK SOCIETY

The modernisation of modernity backs arguments that threats and dangers are generated in the process of modernisation of the classical industrial society. In other words the decaying industrial society is the process of reflexive modernisation. (2) the risk and insecurity start from detraditionalization and individualisation in the spheres of work, family life and self identity. (3) the above two interconnected processes have altered the epistemological and cultural states of science and constitution of contemporary politics.

There are many types of risks and hazards in social life, it is those associated with environmental degradation that are examined by Beck. Contemporary environmental risks possess distributive characteristics that elicit and demand particular patterns of political and psychological response. They are of such magnitude and can be said to have here lead distinctive form of modernity. Production and implication of modern risk differ qualitatively from earlier form of risk and hazards first, while the risks that threatened the industrial societies were locally significant and personally devastating yet they were spatially limited in their effects. The pollution produced by the 19th and 20th century steel mill would have significant consequences for the people who worked within the mill and those who drank the local water supply it polluted with scrap and solvent, it did not threaten the entire population or the planet as a whole. Such environmental problems have not disappeared by mitigation. They have been eclipsed by new types of environmental degradation that are potentially global in their reach. First, the toxicity of contemporary form of environmental degradation, the impact of the toxins on human bodies and wider eco-systems are irreversible, cumulative across the generation. Besides transcending the spatial and social limits, they also exceed their temporal boundaries.

Alongside these threats of increasing toxicity, Beck effectively denotes a second set of environmental risks which are catastrophic in their potential, such as large scale nuclear accidents, large scale chemical release and by alteration and manipulation of the genetic make up of the flora and fauna which pose self annihilation. The third distinctive feature of modern environmental risk is invisible and according to Beck pose as a threat only when brought to the consciousness. It involves a process of scientific arguments and culture/contestation. Thus politics of risk is politics of knowledge, expertise and counter expertise. The transition from industrial society to risk society - Beck uses the model of risk to underpin, the three fold model of development from pre-industrial to industrial risk

society. In pre-industrial society, risks take the form of natural hazards -earthquakes, droughts etc. They are effectively unavoidable. The spatial range would be localised or extensive. In classical industrial societies the origins, consequences and characteristics of risk changes. The way they are understood and responded are also different given the risks are no longer attributable to external agencies, institutions and rules are developed for coping. Beck goes so far as to say that a welfare state can be seen as a collective and on institutionalised response to the nature of industrial risks. It creates compensation and insurance schemes for accidents and unemployment.

Under the impact of modern risks, the modes of perceiving and determining consultancy and allocating compensation have irreversibly broken down. Risks become unpredictable in the risk society.

8.7 ECOLOGICAL DEMOCRACY AND DEMOCRATIZATION OF SCIENCE

Leaving to live with risks in risk society. Beck sketches three broad scenarios for the future direction of politics; back to industrial society, democratization of technological development and the emergence of differential politics. These three say Goldblatt in a crude manner have then counterparts in German politics. The first option roughly equates with Christian Democratic right and according to Beck, this attempt to apply nineteenth century ideas to late twentieth century is doomed to fail. The second option which seeks to address the problem of risk corresponds to the mainstream democratic thinking and the third option which calls for new political institutes as well as new rules of political thinking to the politics of greens and environmental movements in Germany. The choices, Beck says have narrowed down authoritaring technology and ecological democracy. The former calls for the strong hand of the state that is supposed to avert ecological catastrophe, tie in the calls for the strong hand that is supported to counteract the collapse of the state power. This also leaves the definition and control of the hazard as in the hands of small groups who will decide on everybody's behalf how safe is safe enough. Ecological democracy is by contract the Utopia of a responsible modernity. It ensures a society in which the consequences technological development and economic changes are debated before key decisions are taken. Second the burden of proof regarding future risks, hazards and current environmental degradation would be with the perpetrators rather than the injured party from the polluter pays principle. Thus there would be established a new body of standard of proof collection, truth and agreement in science and law. He argues for strategies in which the limits of possibilities, safety claims and sciences own understanding of limitations ruthlessly probed, and in which every safety is superseded by baseline commitment to the preservation of life.

In Ecological Democracy the constitution would no longer be the only form establishing institutional framework, but would provide the means by which institutions and decisions could be reconciled with the absent voices of future generation and future needs. But Beck argues that laws of political conflicts has moved from nation state to international arena due to the physical characteristics of contemporary environmental risks. The globalisation of the world among the transformation patterns of finance, production and migration have all had a similar impact on the autonomy sovereignty and relevance of nation states and national power. As regards basic relevance of political economy in capitalist societies there is evidence for a shift from a positive to a negative logic of distribution. This is a part of reflexive modernisation. Rates of economic growth have been low, for the last 20 year simultaneously the rate of unemployment have climbed. True, acid rains falls on the rich and poor alike, but susceptibility of individuals to hazards, asthma in children due to air pollution is partly shaped by class position.

Almost all western societies show a clear sliding scale of poor to good health between poor and rich for children and adults alike. This does not mean children of the rich does not get asthma, the children of the poorer classes have less resistance power, if their state of health already poor. Threats of local industrial pollution and toxic waste disposal facilities do not fall evenly but continue to be located in poorer localities. Finally Beck has indeed shown that the risk society has transformed the subject matter of politics. The environmental consequences of capital expenditures, production process, design technological innovation and methods of waste disposals previously the hidden prerogatives of private corporations have now become matters of intense public debate.

8.8 SUMMARY

Giddens gives importance to spatial understanding of the social process in general and environmental degradation in particular. He also places urban sociology at the centre of social theory and has generated an useful concept 'created environment' that exists under conditions of modernity. Beck shows how modernisation and industrialisation have altered the constitution of classical industrial society. In other words the reflexive modernisation that has emerged from the corpse of a decaying industrial society has generated the Risk society threatened by global environmental hazards. Beck connects the widening risk and insecurity with deterritorialization and individualization in the spheres of work, family life and self-identity.

8.9 REFERENCES

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3. U - Beck 1991 , Risk society, towards new modernity sage, London.

8.10 QUESTIONS

- 1 What are the factors that have led to the formation of risk society.
2. Critically evaluate the major contribution of Giddens on the question of environmental degradation.



9

ENVIRONMENTAL LSSUES(GLOBAL CONTEXT) NATURE AND EXTENT OF ENVIRONMENTAL DEGRADATION

Concepts

- 9.0 Objective
- 9.1 Introduction
- 9.2 Human activities and extent of environmental, degradation^causes responsible for environmental degradation, Activities contributed significantly to environmental degradation
- 9.3 Desertification
- 9.4 Deforestation
- 9.5 Causes and consequences for desertification
- 9.6 Summary
- 9.7 References
- 9.9 Questions

9.0 OBJECTIVES

- 1 To make students aware of the progress of human race, development and civilisation.
2. To make students familiar with biological potential of land and renewable resources are threatened by accelerated desertification.

9.1 INTRODUCTION

The progress of human race since its earliest beginnings has been marked by the use of human brain. There are ample evidence to suggest that there has been innovations that led to human advancement and of civilization. The scientific and industrial revolution took place in the last century in Europe and it set the pattern for the present development. This development has been characterised by the use of energy, the use of technology to increase production and productivity. This resulted in the present industrial society. The prosperous nations of the west have reaped the fruits of industrialisation.

9.2 HUMAN ACTIVITIES AND EXTENT OF ENVIRONMENTAL DEGRADATION

One of the most serious issues in front of mankind is environmental degradation. It is serious because the damage that has been done by it is beyond repair.

Environmental degradation is defined as the deterioration in the quality and in the quantity of environment such as air, water, soil, forest, animal life etc.

It is also defined as the unfavourable change in the surroundings i.e. directly or indirectly due to human interruptions in the use of resources, energy, power and organisations. The natural environment was kept intact as long as human technology was not developed but gradually as improvement in human intelligence and innovations started taking place, they corresponded to the exploitation of the natural environment. The scientific and technological development put man in a dominating position. Subsequently the result was environmental degradation. This was because man was not just using environment as per his will, he was rather mis-using it. Several factors or causes can be taken into consideration in relation to environmental degradation –

1) Attitudinal change - this factor has contributed in a major way to environmental degradation. Initially man respected and feared the nature. This put a limitation on his tendency to misuse the nature. However with the passage of time, man started becoming powerful, this equation between man and nature changed. He now started exploiting the environment for his own selfish motives. This change in attitude led to environmental degradation to a great extent. This was mainly because man became insensitive towards environment.

Apart from this a materialistic attitude led to exploitation of the natural resources and thus led to environmental degradation.

The logarithmic growth in science and technology in the last century has continued uninterrupted. Due to the application of science, the life expectancy has increased and living conditions have become better and better. The present projections are that

the population will be 7 billion by 2010 AD. The figure of around 3 billions in 1960 and 4 billions in 1974 increased to 5 billion in 1987. At this rate every Square meter of the earth's surface will be occupied by 2000 people.

However, it is known that such a situation will never come, but due to rising standards, high aspirations and expectations, improved technology and rapid industrialisation have increased per capita demand for natural resources beyond the capacity of the ecosystem to maintain its balance. Therefore the need of water, food, energy, clothing, shelter, employment, education and health will take a heavy toll on the resources.

So our path of progress has been based on meeting our needs from the environment that sustains and which we have regarded as an infinite resource.

Population rapid growth - There has been rapid growth in population, this has automatically created a higher demand for the various natural resources, this has further led to an indiscriminate use of resources. In other words the natural resources are exploited to a great extent. This has led to depletion of natural resources. Hence it becomes necessary to replace them. However the place at which they are or they can be replaced is much more slow a compared to the place at which they are misused or exploited.

The basic concept of resource is related to human beings. All material and non-material attributes fall under three categories: resources, resistance and natural components. The materials of environment useful to men are resources. The resources by and large must satisfy three conditions i.e. it must satisfy the need of man without alteration of water. Man must have knowledge and skill to utilize the resources available to him and resource must be readily available with reasonable expenditure of energy or other resources.

Resources are either human or physical. Physical resources are neither natural nor manufactured. Natural resources are those elements of nature that have value to human beings. Any natural feature becomes a resource when man uses it, to supply his need or to serve his wants. Resources may be further classified as non-renewable resources or renewable resources. The non-renewable resources may be regarded as those resources which are diminished by one. The renewable resources may be termed as flow-resources for, with careful use they may last indefinitely.

Natural resources are life lines of any/society. The development process can continue only if it is assured of continued availability of these resources. While the threat to non-renewable resources is all too evident, the ever increasing population is a greater danger to our renewable resources e.g. food, water and agriculture.

3) Industrialisation- The process of industrialisation entailed a major use of the natural resources. A continuous and almost world-wide use, created an imbalance in the natural ecological structure. Apart from this, the industrial waste generated a lot of environmental degradation in the form of air pollution, water pollution etc.

In the past few decades human beings, either for the fulfilment of their needs or because of their greedy impulse, have exploited the environmental resources or have harmed the ecological balance. This tendency of individuals has brought about the environmental problems. The scientific and technological development which has generally been anticipated to bring about the betterment in human life, have resulted in new kind of problems related to the disturbance of nature's established order, either because of ignorance, or because of the failure on the part of people in anticipating the other side of the development which is the evil side.

However it should be made clear that the responsibility of the present crisis cannot be attributed to these developmental factors alone. The fact is that people themselves are to blame, who have gone a long way in consuming natural resources without taking into consideration its far reaching effects.

Technological programme is another important reason for many conflicts in matters pertaining to conservation. Although technology can be a boon, it can also be partly related to environmental realities. Though the use of technology great environmental changes can quickly be brought about. Although these changes are usually intended to be beneficial, they frequently occur in natural environments in which all things are ecologically related to one another. As a consequence, the changes may provide side effects that were not anticipated or that were discounted as being of little importance, thereby disrupting other human activities or the environment as a whole. Examples of such situations include the polluting effects of certain industries or the spread of water borne diseases following the destruction of major irrigation projects.

Urbanisation- it is another important cause of environmental degradation. The major scientific and technological innovation are more pre-dominantly pronounced in the urban sector. Subsequently the natural resources are used more in urban areas. As a result they generate more waste, thus they are responsible for environmental exploitation.

One of the most disturbing failures of life in a modern city is the feeling of helplessness and dependence. The longer and more complex the metropolis, the less able is the individual to help

himself. One is totally dependent on the continued function of the urban society for food, clothing, water, transportation and light etc.

In many large cities, the city heart has deteriorated with slum conditions. The metropolitan edge has deteriorated with the unplanned spread of suburbs, most of which offer minimum environmental amenities. The spread of unplanned highway strip-towns and the development of an urban fringe area - neither farm nor city but neglected land in transition has made the situation worse traffic congestion in and around cities has become extreme. In an effort to solve their problem, free ways, parking lots and other automobile oriented enterprises have cut into and often shattered the earlier city framework. Sometimes it destroys the service and historical areas as well as urban open space in the process. Pollution of air and water has become chronic. In many areas water shortage exists or is threatened.

5) Modernisation - a direct result of industrialisation and urbanisation is modernisation. Man's quest for improvement, development and progress is unending. In this process the natural environment has been misused and exploited to a great extent. This has led to environmental degradation.

6) Exploitation of the 3rd world countries

The 3rd world countries are an easy prey to the exploitation at the hands of the powerful developed countries. The developed countries have shifted their polluting industries in the 3rd world countries. Moreover they also indulge in exploitation of the natural resources under the name of development. These factors have heightened the pollution levels in the 3rd world countries and have thus caused severe environmental degradation.

7) Disturbance in the natural environmental linkage

Nature has created a definite link between the different aspects present in the environment. This creates a chain reaction, therefore change in one aspect creates further changes in the related other aspects. Since man is continuously exploiting the natural resources, this in turn has led to detrimental effects on the environment. In other words the cumulative effect is environmental degradation. It is essentially evident that environmental degradation is a consequence of human activities, there are certain major activities which contributed in a significant manner;

9.3 DESERTIFICATION

Desertification basically implies degradation, deterioration and impoverishment of world dry-land regions. It can be defined as the reduction or destruction of lands biological-potential resulting in the appearance of desert conditions. In other words, it refers to a loss of productivity of the land. This however does not mean that there is

an expansion of deserts. In this context it is necessary to focus on the fact that desertification is essentially adverse in nature.

The problem is global in scale affecting nearly one fourth of the world's land area. It can take place anywhere, however the fertile land near by the existing deserts usually becomes victims to the process of desertification in the more easier manner.

Desertification essentially is the result of human activities rather than by natural factors Causes of deserfication –

1) Over cultivation - most countries need to cultivate commercial or cash crops. This displaces traditional agriculture to marginal lands. The marginal lands which were previously not used either decline in productivity or remain stagnant at the basic production level. Natural events such as droughts, famines leds to the process of deterioration and degradation.

2) Over grazing - low livestock prices tempt producers to rear as many as possible.the cattle over graze the green land. This leds to removal of vegetation cover and its nutrients. The loosesoil particals, which basically contain the fertile characteristicSare blown away by the wind.This makes the land look like a desert. In other words over-grazing over a period* of time led to desert likeConditions.

3) Over irrigation - The irrigation schemeswhich are meant for the supply of water are important and hence they required adequate planning. Inefficienctly land irrigation schemes result in water logging of crops and consequent salination of soil. The saline soil brings up the salts and due to continued evaporation living on the surface of the ground which makes the soil unfit for cultivation subsequently, this causes desertification.

4) Deforestation - This is one of the significant causes of desertification. Forests are removed and cleaned for the variety of resources such as cultivation of cash crop, human settlement,creating space for increasing cattle etc. This process is called a&deforestation. Due to this the top quality soil or fertile soil get exposed to the force. Subsequently, it gets washed away. Apart, from this, the forest, it self make the soil to lose its fertility. Thus, deforestation results in destertification.

5) Mining operation - Mining operations results in the disposal of rejects in fertile land. These mining rejects led to total erosion of soil further resulting in the desert like conditions,

6) Growth of population - Large increase inpopulation is taking place in many parts of the world. This causes severe pressure on

land. Subsequently, causing desertification. In other words land encroachment human being it leads to desertification.

Consequences of desertification

Desertification is a severe problem as it causes exploitation of land which is one of most important natural resource. This problem is especially grave in the developing countries. Moreover, the seriousness of the problem increases because the negative consequences are irreversible.

- 1) Productivity of the land is almost eliminated or it reaches a lowest level.
- 2) Land is an important natural resource. The productivity of land is vital for the survival of mankind. If a particular area of land becomes dry land, the living conditions of the people in this affected area becomes miserable.
- 3) Once a land becomes a dry land or has desert like condition the result is loss of productivity or a loss of important means of survival. It means the drylands are incapable of producing food resources, in other words there is a failure of crops.
- 4) Desertification also levels to drying up of the water resources, it causes destruction of the natural resources of the environment.
- 5) There is also an adverse effect on the biotic and abiotic component of the environment.
- 6) The desert like conditions created due to desertification affects human being also in a serious manner. It leads to less productive or relatively infertile land. All these factors basically create miserable living conditions or poverty for the people.

Desertification is a serious problem because the consequences cannot be reverted back. It means the damage done is almost permanent hence it is extremely important to keep a check on the process.

9.4 DEFORESTATION

Deforestation is a serious form of environmental degradation. It is a global phenomenon and the global assault on forest continues to be present.

The forest occupies more than a quarter of the world land. They are not just the source of timberwood but they also performed social and ecological functions. They have wealth of lands and animals of various kind, they utilise and accumulate carbon and thus stabilise the global climate. In spite of such important functions the deforestation RATES are higher in most of the country are all on increase. Deforestation means clearance of forest by human activities which takes place in the following manner:

1. it discriminate reckless and ruthless cutting of trees on the forest areas.
2. By spreading fines set by farmer and plantation purpose in forest areas.
3. Air pollution - thus it is because of human activities that forest which are an important natural resources are exploited and damaged

Causes of deforestation - a number of facts have contributed to forest clearance of deforestation when there is an uncontrolled growth in population it causes strain on the land economic means, in other words, over population leads to poverty, unemployment, unequal land distribution. these factors force people to cut the trees. Trees

1. Increasing demand for food - Population explosion cause increasing demand for food which cannot be satisfied by intensification and diversification of the use of agricultural land presently use for cultivation. In other words there is a shortage of land. This results in deforestation of clearance of forest for new cultivation. In developing countries where agriculture is a major commercial activity the deforestation take place on continuous basis.

2. Practice of shifting cultivation - Shifting cultivation is a process where by population clear forests indiscriminately for the purpose of cultivation. They cultivate crops for a short period of time and leave the land to remain fallow. However, because of population explosion the pressure on the land cut short the fallow period of land. Hence the fallow soil becomes unproductive leading to failure of crops, in this situation the trees also cannot be grown. Thus the system of shifting cultivation is one of the main cause of deforestation.

3. Over grazing - it has been noted that the amount of grazing is very high in most of the forest areas of India. This over grazing leads destruction of forest as well as prevent forest regeneration.

4. Adverse effects of industries and mining - Industrial activity and mining activity have caused adverse effects on the forest areas. This is because the forest lands are cleared for undertaking these activities.

5. Requirement of raw-materials- Several raw materials can be extracted for certain industries as paper and paper product industries. This leads to indiscriminate deforestation on a large scale.

6. Need for fuel wood- Fuel wood is a major source of power and energy which leads to a large scale deforestation.

7. Need for progress - Certain factors which have contributed to deforestation on a large scale are river valley project, constructions of roads, establishment of industries etc.

8. One of the most significant cause of deforestation is the access to forests. Strict laws, are not enforced on trespassers and hence exploitation or clearance of forest becomes possible.

9.5 CONSEQUENCES OF DEFORESTATIONS

1. Increase in soil erosion - forest provide a natural protection to soil against rain and wind. It is because of forest the soil is protected from being washed or blown away. Deforestation therefore removes that protective cover and leads to increased soil erosion.

2. Sedimentation in dams - the soil is washed or blown away as a result of which some dams get filled with sediment more quickly than expected.

3. Reduction in rainfalls - deforestation affects human beings in major manner by affecting the amount of rainfall in a negative way, it means there is reduction in rainfall.

4. Heavy flood - tropical forest regulate the flow of rainfalls in the stream and river by retaining rainwater in the soil when forest are cleared automatically the water holding capacity is completely lost. It means the rain water is not restrained in the soil and this cause heavy flood.

5. Loss of valuable chemical product: Valuable chemical products originate and grow in the tropical forest. For e.g. many chemical products are used by pharmaceutical industries for manufacturing important medicines. Deforestation causes severe loss of those valuable chemical products.

6. Loss of valuable industrial products: Many valuable industrial products such as bamboo, rubber, certain essential oils, species etc. are found in the tropical forest, Deforestation cause a loss of these valuable industrial products.

7. Green House effect - deforestation leads to an increase in the concentration of carbon di-oxide in the atmosphere of the earth. This leads to the green house effect and global warming which are extremely serious problems for the human being.

8. struction of plant life as well as wild life - Diverse form of plantlife as well as wild life is present in the forest. In other words forest act as a wealth of a variety of plants and animals. However, deforestation leads to large scale dtstruction of plant life as well as wild life. It is due to deforestation certain species of plants as well as animals have become endangered and are on the verge of extinction.

9.6 SUMMARY

Forests play a very significant role in the benefit and welfare of mankind. However, deforestation has led to exploitation of these important natural resources. Since it is essentially a man-made activity, necessary steps should be taken in order to conserve the forest.

9.7 ADDITIONAL BOOK

1. Trivedi P., Gurdeep Raj 1992, Environmental Ecology, Akashdeep publishing Housing.
2. Vashishth V 1999, Law and practices of environmental laws in India, Bharat Law, Delhi.

9.8 QUESTIONS

1. Write an essay as the effects of human activities on environment.
2. Write short notes on : Desertification and Deforestation.
3. Discuss in detail environmental degradation due to agricultural activities.



10

GLOBAL CONTEXT) GLOBAL ENVIRONMENT POLITICS: HISTORY S MAJOR ISSUES –

Concept:-

- 10.0 Objectives
- 10.1 Introduction
- 10.2 Are there limits to growth?

- 10.3 Environmental issues the global scenario
- 10.4 Global warning
- 10.5 Loss of bio- diversity
- 10.6 Depletion of ozone - layer
- 10.7 Nuclear waste
- 10.8 Conclusion
- 10.9 References
- 10.10 Questions

10.0 OBJECTIVES

1. To introduce the students to understand how environmental threats are distributed over the globe.
2. To make students familiar with some of the major environmental risk that we face today.

10.1 INTRODUCTION

Questions about the harmful impact of human being on the natural world, such as global warming and the destruction of the world's rainforests, have come to be known as environmental ecology. Public concern about the environment has led to the formation of 'green' parties and non-governmental organizations like Friends of the Earth and Greenpeace, which campaign around environmental issues. While there are varied green philosophies, a common thread in the concern is to take action to protect the world's environment, consume rather than exhaust its resources and protect the remaining animal species.

10.2 ARE THERE LIMITS TO GROWTH?

One important influence on the use of green movements, and a public concern about environmental problems, can be traced back to a famous report first published in the early 1970s - The Limits to Growth, published by the Club of Rome (Meadows et al 1972). The Club of Rome was a group of industrial business advisers and civil servants formed in the Indian capital. It commissioned a study that used computer modeling techniques to make predictions about the consequences of continued economic growth, population growth, pollution and the depletion of natural resources.

The computer model showed what would happen if the trends that were established between 1900 and 1970 continued to the year 2100. The computer projections were altered to generate a variety of possible consequences, depending on different consequences, depending on different rates of growth of the factors considered.

The researchers found that each time they altered one variable, there would eventually be an environmental crisis. The main conclusion of the Club of Rome report was that rates of individual

growth are not compatible with the finite nature of the earth's resources and the capability of the planet to carry population growth and absorb pollution. The report pointed to the unsustainability of current levels of growth in population, industrialization, pollution, food production and resource depletion.

The Club of Rome report was widely criticized and even the original authors. Later came to accept that some of the criticisms were justified. The method used by the researchers focused on physical limits and assumed existing rates of growth and technological innovations. The report did not sufficiently take into account the capacity of human beings to respond to environmental challenges through technological advances and by political means.

Moreover, the critics pointed out, market forces can act to limit the over-exploitation of resources. As an example if a mineral like magnesium starts to become scarce, its price will rise. As its price rises, it will be used less, and producers might eventually find a way of dispensing with it altogether should costs rise too steeply. Whatever its limitation, the report made a strong impact on public awareness of the damaging consequences which industrial developments and technology can have, as well as warning about the perils of allowing different forms of pollution to develop unchecked. The report served as a catalyst for the burgeoning environmental movements.

The basic idea of the 'The limits to growth' was that there are both social and natural influences limiting how far the earth can absorb continuing economic development and population growth. The findings of the Club of Rome report were used by many groups to suggest that economic development should be severely curtailed in order to protect the environment. Yet such a view was criticized by others as implausible and unnecessary. Economic development can and should be promoted, they argued because it is the means of increasing the world's wealth. The less developed countries can never hope to catch up with the richer ones if they are somehow hindered from their own processes of industrial growth.

10.3 ENVIRONMENTAL ISSUES - THE GLOBAL SCENARIO

Global warming is considered to be one of the central environmental issues in the recent years. It may prove to be very problematic and disastrous, causing severe harm to the biotic and abiotic components of the environment. Nitrogen and oxygen are the main constituents of the atmosphere but the presence of other gases such as carbon dioxide, carbon monoxide, steadily. Because of the increasing presence of these gases there is an increase in the global temperature. In other words the earth's surface is warming.

Sunlight enters the earth's atmosphere and after hitting the earth's surface get radiated back into the atmosphere. Here it is absorbed by certain naturally present gases such as carbon di - oxide. This absorption process heats the atmosphere and thus warms the earth's surface. When the gases are present in normal proportions the warming of the earth proportions the warming of the earth surface, due to their presence is very essential and is responsible for the existence of life on earth. However when the proportion of these gases increases, these gases allow the sunlight reflect the atmosphere, but traps it resulting is heat generation. Over a period of time the temperature of the earth will increase gradually, this phenomenon is called as global warming.

Global warming is also known as the green house effect because the phenomenon is very similar to what happens in a green house. The effect of this increase in temperature is damaging the environment.

10.4 GLOBAL WARMING

Earth is atmosphere acts like the panes of glass in a green home lathing radiation in but slowing down its escape. Much of the outgoing radiation is trapped or absorbed by the green house gases. The most important green home gases are carbon di - oxide, methane, nitrous oxide ozone, chloroform carbons (CFC's) of all these gases carbon— di-oxide in responsible for 60% of the total warming effect. These green house gases trap the radiations and the net result is that the earth surface gets heated. This phenomenon is called as global warming. Since the green house gases and especially carbon-di-oxide as primarily responsible for global warming. This phenomenon is also called as the green house effect.

Implications of global warming effects -

1. Global warming can drastically reduce the moisture levels in current fertile zones and turn them subsequently into dry lands an desert means global warming or the green house effect will gradually lead to desertification.
2. Many countries in the world will suffer from droughts.
3. The agricultural production will be minimized to a significant extent.
4. Global warming will automatically lead to rise is temperature. According to the inter governmental panel on climatic change set up by the united nations environmental protection in 1998 the world is a heady 0.5 Celsius warmer than the pre-industrial period and this rise in temperature will be an on going be are going process.
5. Global warning has a more drastic effect also rise in temperatures would result in the melting office at Polar Regions. This world cultures lead to rise in the sea- levels

even 5% rise in sea - level would leads to displacement of millions of people in low tide areas and a number of Small Island nations will disappear totally.

6. Others important effects include global mean surface warming, reduction of sea -ice, polar winter surface warming etc.
7. One of the most severe effect of global warming from a human perspective is the creation of "Climate refugees" These essentially are those people who suffer from climatic conditions such as drought, floods there climatic condition leads to starvations, displacement of people. These climate refugees therefore signify the most visible symbol of global warming.

Solutions: - Global warming is one of the most serious environmental issues because if not controlled at the right time, it can lead to extinction of human life. Hence it is compulsory to take immediate and drastic steps to control global warming. The solution to global warming lies not in the hands of one country but all the countries in the world should take responsibilities and contribute in a significant manner.

Following are the solutions to control global warming -

1. The global warming is largely the product of industrialized nations an they are the world largest energy users, CFC producers and consumers. Can manufactures and uses as well as uses of nitrogen fertilizers have resulted in global warming and hence the solution is a need for a radical re-thinking of the whole western industrialized lifestyle. However this solution is almost impossible became it involves a let of sacrifice by the industrialized world. Hence show them and feasible solutions are necessary.
2. The immediate solution to reduce global warming is to reduce carbon dioxide emission, this is possible by closing down fossil, fuel, power stations and replace by nuclear power.
3. Industrialized nations will assist the developing countries in obtaining data is limiting emissions.
4. All the countries must implement national strategies to limit their toxic emissions.
5. Countries should be encouraged to recognize climatic changes in the formulation of economic, social and environmental policies.
6. It is necessary to increase public awareness related to environmental problems especially global warming through conscious efforts of education and training.
7. All the countries will Co-operate and participate in a continues international research and effort.

8. It is necessary to have global environmental ethics to protect the earth from any further exploitation in the nature of development and modernization. Hence environmental movements are necessary in all parts of the world not only to conserve the natural resources but also to share them equitably and fairly. This will sustain earth to a significant extension.

10.5 LOSS OF BIO - DIVERSITY

One of the oldest questions people have asked is how the amazing diversity of life on earth has been possible. This diversity has developed through biological evolution it is affected by the interaction among the different species and the environment Bio - diversity refers to the diverse forms of life that exist on the earth. Other words it is the variety that is found in the biotic components of the environment. Bio - diversity is important in understanding the different forms of life created by nature as well as it is a collection of different genetic codes, by having an access to these genetic codes the future generation can be maintained. Thus Bio- diversity is an issue of inter-generational responsibility.

Biological evolution is the key to understand biological diversity, Biological evolution refers to changes in the inherited characteristics of population from generation to generation. It can gradually result in a new species. There are four processes which lead to biological evolution namely mutation, natural selection, migration, genetic drift.

1. Mutation - genes contain chromosomes and these are transmitted from one generation to another. In other words the future generation inherits the characteristics of the preceding generation. The genes are made up of DNA. The DNA is the chemical block that forms a particular code when a cell divides, the DNA also gets divided so that each new cell gets a copy of the DNA. However sometimes there is an error or a failure in the reproduction of a DNA. This error can be due to environmental changes, radiation, chemical toxins etc. This results in a change in the inheriting characteristic this process is called as mutation. Mutation can result in a new species. Whether or not that species is better adapted than the parental species to the environment remains a question mark.

2. Natural selection - when there is a variation in the characteristics of species some organisms may be better suited to the environment. As a result variation may put these species at overall advantage natural selection is the process by which organisms whose biological characteristics are better as compared to their earlier generation fit to the environment in a better manner. Hence they are able to survive, thus natural selection leads to survival of the fittest.

3. Migration - The migration of one population of a species into a habitat previously occupied by another population is a process that can lead to changes in the genes frequency. Even organisms which don't move themselves may have reproductive structures that migrate. For example seeds of flowering plants can be blown by winds and moved by animals. Genetic drift — It refers to the changes in the frequency of genes in the population as a result of chance rather than mutation or natural selection as migration chance may determine which individual becomes isolated in a small group from a larger population and which genetic characteristics are most common in that isolated population. The individuals may not be better adapted to the environment in fact they may be more poorly adapted.

The term Bio - diversity thus is a complex phenomenon. It basically refers to the variety of life forms found on this planet. The number of species of plants and animals, the genetic diversity as well as different eco - system is which the species are located forms the range of bio - diversity. Climatic conditions play an important role because different types of species require different climatic conditions. The greatest bio - diversity is found on land and sea in the tropical regions.

Bio - diversity involves three concepts namely genetic diversity and species diversity, habitat biodiversity has been on an increase it means there is a decrease in the number of species this has increased the rate of extinction of species. This is called as loss of bio - diversity.

10.5 LOSS OF BIO — DIVERSITY

Can take place because of natural conditions as well as man made conditions. The natural conditions involve the interaction between species. There are three kinds of interaction namely symbiosis which benefits both participants, competition in which the outcome is negative for both the participant and parasitism in which the outcome is beneficial to one participant and detrimental to the other. Each type of interaction affects bio - diversity.

However it is the man - made conditions which have led to a severe loss of bio - diversity.

A loss of bio - diversity is created by factors such as the type of land, the type of environment and most importantly the type of human activities. It has been found that the industrialized nations have witnessed more amount of development and progress, the natural environment is exploited to a great extent, this leads to the destruction of the natural habitat of a number of species.

The over exploitation of natural resources denies the species of the opportunity to fulfill their needs of survival. This leads to endangering the species and subsequently to their extinction, Hence a large number of species are on the verge being endangered or extinction.

The man - made activities have exploited the a biotic components of the environment and have led to a deterioration both in quality and quantity of the a biotic components. This inters has affected the biotic components namely plants and animals who are dependent for their survival on the a biotic components. Hence the result is loss of bio — diversity.

Though loss of bio - diversity is a significant environmental issue not much attention has been paid to control it. It means there is a lack of policies and institutional mechanism for bio - diversity conservation apart from this adequate bio - diversity legislations are also absent. Hence loss of bio - diversity has continued it therefore is necessary to have strategies policies and actions to protect the bio — diversities.

1. Proper legal provisions should be introduce and implemented. However it has been noted that most of the legal provisions focus on the exploitation of the bio - logical resources rather than conservation. Hence a greater importance should be placed not just on protection but also on conservation.
2. It is necessary that every nation finalizes comprehensive plan or strategy for sustaining bio — diversity as well as concrete mechanism and guidelines for implementing the protective measure of bio - diversity.
3. There should be an adequate followers of the strategies implemented so as to review are analyze the results and make changes wherever necessary.

Conclusion –

Loss of bio - diversity basically needs to wiping out certain species from the face of the earth. Since this is mainly became of man - made activities it implies tampering with the nature. Hence essential steps should be taken is order to control the loss of bio - diversity.

10.6 DEPLETION OF OZONE LAYER:

Ozone (OS) is a gas present is the stratosphere which lies between 1 to 10 miles above the earth surface. It is a significant gas because it protects the earth from harmful ultra - violet radiations. It

means the ozone layer is like a protective umbrella scattered over the surface of the earth in the stratosphere.

It absorbs above 99% of the sun's damaging ultraviolet radiation which may otherwise burn life on the earth. Thus the ozone layer acts as an atmospheric blanket and keeps the earth protected from the total solar radiations.

Hence the presence as well as the maintenance of the ozone layer is extremely essential to sustain life on earth.

However it has been noted that there is a depletion in the ozone layer, ozone depletion basically means the thinning of the earth's ozone layer.

Causes -

1. The significant cause is the presence of CFC's i.e. chlorofluorocarbons. The CFC's are becoming powerful and notorious gases leading to the destruction of the ozone layer in the atmosphere. The CFC's are used in a variety of components evident in the modern life style for eg. Air conditioners, refrigeration, insulation etc.

2. Another factor which is responsible for the ozone depletion includes halogen which are important components of fire extinguishers.

3. The CFC's break down after reaching the upper atmosphere and release chlorine atoms. It is these chlorine components which destroy the ozone layer. Consequences - The depletion of the ozone layer has significant serious consequences which are as follows:-

1. The depletion of ozone would result in a greater entry of ultraviolet rays to the earth and this in turn will create adverse effects-

- a) Acceleration of the green house effects
- b) Acceleration of global warming
- c) Decrease in human immunity and the body's resistance to diseases.
- d) Increased cases of skin cancers as well as cataracts
- e) Disturbance of the eco-systems.

2. Ozone depletion will affect animal life, Marine life as well as human life.

3. A 10% decrease in the ozone layer in the upper atmosphere i.e. stratosphere would cause a 20% increase in the amount of the damaging effect of the ultraviolet radiations.

Solution - In order to control the depletions of the ozone layers certain policies were adopted. For eg :

1. In 1987, 24 countries signed Montreal protocol, it put strict limits on the use of CFC's ie this agreements called for a fifty % reduction of the CFC's production and consumption among the countries, who were the major producers of the CFC's, each of these were responsible for designing and implementing an effective control programmed in accordance with the agreed deadline ie the start of the new millennium.

2. In 1990, 59 countries developed an agreement called on the London amendments. Thus agreement aimed at eliminating ozone depleting substances between 1995 and 2005.

3. In 1992, 92 countries have joined the international efforts to control ozone depletion. Conclusion - The problem of depletion of ozone layer is a universal problem which will affect not just a few countries infect the entire earth. Hence all the nations should display co-operation and commitments which extends beyond national borders. These efforts can definitely being about positive outcome related to controlling ozone depletion.

10.7 NUCLEAR WASTES

Nuclear wastes becomes an important environmental issues namely because of the radiation factor as well as the nuclear waste disposal. This two are important issue related with the growing concern for problems such as global warming, green house effect, acid rain etc. Nuclear waste comes from five major sources namely

1. All steps involve a using of nuclear energy to produce electricity.
2. Defense activity, nuclear leaders and nuclear weapons.
3. Hospitals and research laboratories.
4. Industries.
5. Mining

Human beings have been exposed to radiation from natural source. There is the presence of small amount of radio active elements such as radium - 226. The earth is constantly receiving cosmic radiation from the outer space. The natural cause of radio active elements is necessary or harmless to the human being. The important factor is to know are determine at what points. The exposure becomes hazard, over exposure radiations leads to health problems.

Various researches has been carried out and they have verified the positive co-relation between significant disease due to exposure to significant disease due to exposure to radioactive elements for ex: many scientist believed that radiation causes cancer. It is also scientifically proved that radiation affects the chromosomes and the genetic make - up.

Problems of nuclear waste disposal -

It has been noted that there will be no nuclear renaissance unless a waste disposal programme exist every step of nuclear fuel cycle generates waste. The various types of waste are categorized into low, medium and high level of waste all of these are a threat to public safety. The storage and disposal of such high level waste is one of the most critical problems which has to be dealt with carefully.

A solution which is widely offered is deep geological disposal as converting high level waste into a stable glass substance by the process of vitrification.

There is a wide spread concern about the disposal of radioactive waste from nuclear reaction. It was estimated that by year 2010 there would be a stock pile of one million tonnes of high level of radioactive waste; apart from this the high level of radioactive waste has not been disposed. It is expected that many nuclear reactors would need decommissioning by the year 2010. All the nuclear waste is constantly on an increase.

Another major concern is that the waste disposal in rock as ground will lead to contamination of ground water. Under ground water may come in contact with the radioactive elements that have leaked out from the waste and they will contaminate the drinking water a major fear is that nuclear waste remain radioactive for thousands of years. Many countries have now established waste disposal codes, however serious concern about this problem is observed apart from problem of waste disposal is compounded by illegal dumping of nuclear waste. Since the danger of such activities is high, the penalties would be extremely severe. To make matter worse, the developed countries dump hazardous nuclear waste in the developing countries is becoming more and more hazardous.

In order to overcome this problem it is necessary that the dumping site should be carefully chosen, according to strict technical specification the site should be independently controlled & monitored & companies using them should keep a record of the types as well as the quantities of waste dumps.

Antinuclear struggle: - There is a growing realization all over the world that safe nuclear power is myth, during the last few years there have been successful campaigns that has proved that anti - nuclear groups are working effectively. Popularly known as the campaign for the nuclear disarmament (CND). The aim is to get rid of nuclear weapons as well as other weapons of mass destruction in a non violent way and to create a genuine security for the future generation CND has the following Adv.

1. To change the govt. policies & to bring about elimination of nuclear weapons.
2. To stimulate wide public debate on the need for alternatives both in the nuclear cycle as well as military attempt.
3. To improve people to engage actively in political process & to work for nuclear free & peaceful nature.
4. To cooperate with the other groups around the world & to ensure the development of greater mutual security.

CND is a part of abolition, a global network to eliminate nuclear weapons. It is a dynamic international citizen's movement that calls for elimination of nuclear weapons within a time bound framework. Many countries have actively involved themselves & are making efforts to accomplish the aim of the network.

10.8 CONCLUSIONS

it is necessary that all nation should understand the gravity of the problem of nuclear radiation as well as dumping of nuclear waste & join international efforts to overcome this problem. It has to be realized that the real security lies in a world which is free of nuclear radiation & nuclear waste.

10.9 REFERENCE

1. Anthony ciddens : 2006 sociology Simon Griffiths polity.
2. kamat kulkarni : 2000 story of science & ecological studies, manna prakashan.

10.10 QUESTIONS

1. Explain in detail the effects of global warming on human society.
2. What is the imp. Of ozone zone to human beings?
3. Write a note on loss of bio- diversity.
4. What are the consequences of dumping hazardous waste near human habitation?



11

NORTH - SOUTH DIALOGUE

Concept

- 11.0 Introduction
- 11.1 Evidence of environmental degradation
- 11.2 A case for developed countries.
- 11.3 A case for developing countries.

- 11.4 Rio - summit on Bio-diversity.
- 11.5 Climatic change in developing countries.
- 11.6 The role of nation/state for solution of environmental problems.
- 11.7 Summary
- 11.8 Reference
- 11.9 Questions

11.0 OBJECTIVE

- 1) To make students aware about the question of environment, its protection and conservation.
- 2) To familiarise students with conservation strategies which has attracted global attention.

11.1 INTRODUCTION

The question of environment, its protection and conservation has also become an issue of international debate. The South charges the North with 'eco-imperialism' arguing that because of northern colonial attitudes the problem of the degradation of environment at global and regional levels has been growing day by day. The South feels the North is responsible for most of the environmental problems as well as for the exploitation of the resources of South, but not contributing their share towards the protection of environment. On the other hand, the North is of the opinion that the responsibility of environmental protection is 'common' to both.

11.2 EVIDENCE OF ENVIRONMENTAL DEGRADATION

In the North, environmental data provide a record of environmental degradation or improvement. Such data has provided a basis for monitoring environmental change within countries and has stimulated conservation strategies. More recently it is the evidence of environmental deterioration at the global level that attracted international attention. However there are several uncertainties, which need unbiased evidence to make quick progress in formulating strategies. The evidence is problematic in several ways:

1. The problem of establishing cause and effect for example, the precise causes and effects of acid rain, are difficult to identify.

2. The problem of forecasting impacts. For example, there is broad agreement on the general range of rise in average global temperature. But there is considerable uncertainty about when it is likely to occur, how it is going to be distributed, the timing and the effect.

3. Uncertainty over the consequences of present actions and the

risks imposed on future generations. For example, if the present trend of natural resources exploitation continues, it is expected that 25% of the world's species could become extinct in the near future. Therefore even if useful scientific evidences are not available about the consequences, it is better to stop certain activities feared dangerous.

4. Inadequacy of evidence and the problem of interpretation - in general, collection of environmental data has been patchy. It is also difficult to compare over a time between places. It is also a fact that even if evidence is available the interpretation is open to manipulation due to vested interests. The South and the North differently resulting in conflicts enterpret the cause and effects of pollutants.

The different interpretations are reflected in the two different use of the term 'common'¹. The basic idea is that there are certain parts of the land or sea that are not the private property of any person, company or state. However.

1) Pro-southern perspectives tend to use the term as those areas and resources upon which the pool who own nothing rely.

2) The term has also been used by environmentalist to express the common inheritance stressed by the North at Rio and rejected by many Sourthern leaders, though not by all.Southern interests have argued that the use of the term'global common is effectively the moral hijacking of their resources, another example of eco-imperialism.

Perhaps, the real dichotomy in the use of the term 'common' is illustrated by the reluctance of the USA to sign an accord (bio-diversity) that might have constrained American based TNC's from continuing to enclose (through patents) previously those 'common'¹ on which the worlds poor depend. At UNCED the global common (and in particular, rainforests) were amongst the main problems identified by the North. The others were climatic change,the ozone layer and population. On the otherhand the countries of the south sought to emphasize a different agenda i.e. poverty, hunger and desertification.

11.3 A CASE FOR DEVELOPED COUNTRIES.

The world commission on environment and development defined sustainable development as 'development, which meets the needs of the present without compromising the ability of future generations to meet their own needs.' Sustainable development means differently to to different countries. The rich North believes in the investment of more capital and earn more profit. The level of production and consumption are rising in developed countries. The evolution of their high technology and life-styles demand a huge

quantity of raw materials. Most of the raw materials are imparted from developing countries, thus depletion of natural resources has earned greater environmental damage not only in these countries but also at global level. Green house effect is a very good example. The lifestyle and the consumption pattern in rich nations are therefore primarily responsible for greater environmental degradation in the form of green house effect, acid rain and ozone depletion. The developed countries therefore, have to adjust lifestyles to a more rational use of resources. In particular the emphasis on the present and future resource and environmental needs of the entire society should be more.

It is established that the developed nations are primarily responsible for large scale emission of toxic fumes. The result is acid rain and ozone depletion. Therefore, the developed countries should play a major role in controlling the toxic fumes and also developing renewable sources of energy. The industrialised countries must take the lead in asserting furthermore of environmental damage. This is because, they not only have the resources but also the technological capacity to take the lead role. They (the North) should undertake the principal responsibility and increase the flow of resources and technology to developing countries to avert environmental damage. The fundamental philosophy the developed countries should follow is growth, stability, equity and sustainability.

Sustainable development in developing countries is a pathway of economic development, which can help to meet the minimum needs of the people without harm to the environment the developing countries are more concerned about improvement to the standard of living and invest more to produce greater amount of food to feed their teeming millions. Contrary to the concern of developed countries, the developing countries are more concerned with the land degradation and water pollution.

Sustainable development is essentially a planning process with definite goals and priorities. The concept of Sustainable development in the case of developing countries must begin at the local and regional level. The peoples participation is absolutely required to achieve meaningful results.

Environment and development - contrasting views.

The policies and strategies to be adopted were the focal point of discussion at the Rio Summit. However, the North (developed countries) and the South (developing countries) had their own views. The North viewed the strategies for environmental protection and economic development as one. The North felt that environmental protection would promote economic growth. This is because of the fact that in the North, they have already established technically superior industries with very strict environmental regulations. In the North environmental quality is considered to be an integral part of

the quality of life.

The emphasis of the North towards formulation of strategies were on Ozone depletion, global warming, deforestation and biodiversity. The North considered the problems of the South relating to population explosion and depletion of tropical forests on local problems and that the South find solutions for them.

On the contrary, in developing countries (the South) the environmental problems are due to underdevelopment and poverty. It is emphasized that 'poverty reduced people's capacity to use resources in a Sustainable manner. It intensifies pressure on the environment. The poor are forced to forgo the needs of the future to meet the needs of today. Therefore problems of the South are food security, desertification and poverty. South emphasized that the reason for all these problems is uneven development.

The South also pointed out the linkage between the environment and development. The South further argued that the North is responsible for depletion of global assets because of overconsumption. Therefore, the South expected that the North should transfer technology and resources to the South to cope up with uneven development. Uneven development is also considered to affect the capacity of individual countries to deliver environmental strategies. This is because developing countries lack 1) Scientific information base. 2) The monitoring capacity and 3) the administrative support. When the South is suffering from poverty, internal conflicts and lack of social cohesion, formulation of environmental strategies would find last priority.

Therefore the success or failure of a sound environment policy or strategy will depend on verifiable evidence to fix responsibility on the North or the South or both.

11.4 RIO-SUMMIT ON BIODIVERSITY

Three new conventions were agreed as a result of the Rio-Summit on climate, biodiversity and desert - along with a new set of guidelines for forests. The framework Convention on climate change was signed by 155 countries. However its commitments were inadequate, especially those made (or not made) by developed nations to limit green house gas emissions. The IPCC estimated that 60 percent reductions were necessary to stabilize concentrations at their 1992 level. The word 'aim' however, was chosen, as our negotiations freely admit, so as not to be a commitment, and the deadline of the year 2000 was also dropped from the sentence at the Bush administration's request. In the event, the wording was much weaker than the Alliance of Small Island States wanted or the EU was then prepared to accept.

North South divisions focused on transfers of technology and funds that were needed if developing nations were to meet any of the convention agreements. The dependency on those transfers was included in the convention, but no commitment was made to make the transfers. The North agreed to provide financial assistance in compiling national inventories of 'sources' of carbon dioxide and the 'sinks' that remove it from the atmosphere, but did not make any arrangement to meet the cost of actually doing so. The problem is that such agreements are consensus documents and therefore tend to be minimal in terms of commitment. What was needed was consensus not just between different perceived interests within developed countries but between the rich industrialised world and the developing states, not to mention between the hugely varied interests within those developing states. The consensus was very limited, and current levels of commitments will not slow global warming.

11.5 CLIMATIC CHANGE IN DEVELOPING COUNTRIES.

Despite the weakness of Rio-Summit, however the framework convention provided evidence of what is needed (and known to be needed) to slow climatic change. It provided a framework for future discussions and an institutional structure for them, leading up to the Kyoto Conference in 1997. Since this, in turn failed to make any real progress, the entire problem was again remitted to Buenos Aires in November 1998 and this in turn agreed to put off any action until long after any of those present was likely to be in the office. But very small climatic change would produce changes that are generally seen as likely to impact particularly heavily on the developing world. For example, drought risk will produce big impacts on agriculture, leading to significant agricultural losses in Brazil, Peru, the Sahel, south East Asia, the central Asian Republic and China. Sea level rises could potentially cause massive people movements. Relatively small rises in mean sea level could displace 30 million people in Bangladesh.

Worse still, the completion of the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) resulted in the creation of the new world trade organisation, and the limited perspective already shown by it has gone far to destroy any trust that Rio might have engendered with the South. The stress on markets has intensified competition and put further pressure on the environment. It is not just globalization working against the Rio inspiration, but the nature of the fragmentations of international and national agendas. The UN is increasingly seen as unimportant by the wealthy developed nations.

11.6 THE ROLE OF THE NATION STATE FOR

SOLUTION OF ENVIRONMENTAL PROBLEMS.

The nation State is a universal form of organisation to find solution to the national and global environmental problem. The nation state will have the powers to develop policy, enforce and monitor the environmental improvement programmes. For effective and efficient functioning of the nation state, broad and binding agreements between the nation state and all countries around the world are a basic requirement. Nevertheless, there are already Intergovernmental Organisation (IGO), multinational corporations (MNC) and non governmental organisation (NGO) involved in identifying common interests on a global scale.

Inter-governmental Organisation (IGO)

United nations environmental programme (UNEP) is an IGO, which seeks to develop common environment and development at Rio. The world bank created the global Environmental facility (GEF) in 1991 to support developing countries to take appropriate actions towards environmental issues. Many IGO's affect the environment although the environment is not specifically within their domain of activities. For example, they act through food and agriculture organisation, the general agreement on Tariffs and trade or the international atomic agency. Thus IGO possess considerable power and provide a challenge to the formation of the nation state.

Multi National Corporations (MNC).

The second form of transnational organisation is the multi-national corporation. The MNC's have global reach. They have a major share in the exploitation of the earth's major economic and physical resources like energy (notably oil, minerals, timber and some commercial agricultural products). They can move investments around the globe and have a major influence on government, which are to some extent dependent on them. However, the MNC's are beyond the control of individual governments.

Non-governmental Organisations (NGO's).

They are the third form of transnational organisation. They vary in size functions and regions. Some are local, some other is national and yet some others are international in character. They cover a wide variety of issues ranging from development, human rights, women concern etc. Nevertheless all these issues have bearing on environment. These organisations draw attention to problems, mobilize opinion and lobbying for specific policies. Some of the biggest NGO's such as friends of the Earth or Green. Peace have built up global networks and displayed skillful usage of the media. In different ways the IGO's, MNC's and NGO's are the organisations which undertake environmental issues and formulate actions to solve them.

11.7 SUMMARY

The world is facing serious environmental problems, which are to be solved and/or controlled only when proper finance is available. Orderly economic growth requires broad policies and plans for land use, energy and ecology that can be developed and administered by Government only at the expense of some limitation on free enterprise, private ownership of land and industrial behaviour.

11.8 REFERENCE

- 1) Environment Geography, HM Saxena, Rawat Publications 2004
 - 2) Principles of Environmental Science, Engineering and Management, Dr. A.M. Thirumurthy Shroff pub. 2004.
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11.9 QUESTION

- 1) Write a short note on north-south debate.



12

GENDER AND ENVIRONMENT

Concept

- 12.0 Objective
 - 12.1 Introduction
 - 12.2 Gender and Environment
 - 12.3 Eco-Feminism
 - 12.4 Configuration of eco-feminism
 - 12.5 Critiques of eco-feminism
 - 12.6 Summary
 - 12.7 Reference
 - 12.8 Questions
-

12.0 OBJECTIVE

- 1) To make students aware about the women's role in the use and management of natural resources.
 - 2) To familiarise students that women's relationship with environment as distinct from that of men.
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12.1 INTRODUCTION

In recent years there has been a growing debate, about gender and environment, highlighting women's role in the use and management of natural resources. There are a number of studies that show that environmental degradation is a gendered process. They show that poor people and marginal groups who depend directly on nature for their subsistence are negatively affected by environmental degradation. In the last few years, increasingly the focus has been on a specific exploration of poor and tribal Women in the third world. In rural societies, since women are mainly responsible for providing fuel, food and water for their households, lack of access to these resources, increased both the time and energy spent on it leading to their impoverishment.

12.2 GENDER AND ENVIRONMENT

Linkage has strongly featured at the United Nations Conference on Environment and Development in Rio de Janeiro in 1992, it also figures at the conference on women in Beijing in 1995. On the years the claim that women's relationship with environment as distinct from that of men, has resulted in a *-spectrum* of perspectives. All these perspectives therefore argue for a separate policy for women in environment and sustainable development approach. However, gender environment relations are conceived in different ways.

Majority of the perspectives project women's approach as users and managers of the environment in their everyday interactions on being special. In the West women's role as homemakers and care givers within the family is seen as important contributor to the eco-feminist perspective. It focuses on 'quality of life issues' rather than 'subsistence issues'. Awareness of health impact of toxic chemicals and the action that can be taken up by the citizens, came to the forefront in the 1979-80 struggle put up by housewives of the Love Canal community. Here 900 families fought and won relocation, after they discovered that their neighbourhood was built next to 21000 tons of toxic waste. The toxic waste buried had caused high incidence of cancer and morbidity in the community. Since house makers had to bear the major burden of care giving, they became mobilised and organised a successful struggle. The movement quickly spread within US and Europe and led to the setting up of superfund of USD. 1.6 billion to clean up toxic waste sites in 1980 by United States Environmental Protection Agency (USEPA) and international efforts by the United Nations Centre for Urgent Environmental Assistance. It has identified chemical hazardous waste as an area in need of urgent attention in developing countries.

The Women in Environment and Development approach, an extension of women in development approach combines environmental policies with development. As users and managers, women collect fuel, wood, water, produce food and

guard genetic resources, to meet their daily subsistence needs. This subsistence perspective gives them a unique knowledge about and an interest in Protecting the environment. Thus there is a complementarity in the interest of women and environment. Women in 1980's are seen as 'Victims' of environmental degradation. (1988) *PORTRAYS* them as victims not only of environmental degradation and natural disasters but also of man made scientific development, as their resources bases for 'staying alive' have been undermined and eroded. Finally in the late 1980's the shift is towards looking at women as agents of change and as sufficient managers. Grass root movements like Chipko are used as example to substantiate this perspective..

The experience of women in the developed world is like with the quality of life and the experience of women in the developing world is linked within the 'subsistence'¹ issues.

12.3 ECO-FEMINISM

The term eco-feminism was coined by Francoise d'eauboune, a French writer in 1974. This concept basically can be divided into two words namely 'eco' and 'feminism'. The term eco is related to 'nature'¹ or 'environment' whereas the term 'feminism' is related to women

Eco-feminism puts forward the idea that nature and women are significantly related to each other in terms of the similarities that they displays.

The fundamental features of eco-feminism are as follows -

- 1) Women and nature share a special relationship. Hence women have an important stake in ending the domination of nature and conserving the environment.
- 2) There are important connections between the domination of women and the exploitation of nature.
- 3) These connections can be traced ideologically to patriarchal thought which sees nature as inferior to culture. Since women are identified with nature, they are considered inferior and men identified with culture, are considered superior. Given this relation, women have a special stake in ending the domination of nature and hence their own subordination.
- 4) This change can be brought about through a reconceptualisation of the relations between women, men and nature in non-hierarchical ways. Since the feminist movement and the environment movement stand for egalitarian non hierarchical system, they work together and develop a common perspective, theory and practice.

For eco-feminist the domination of women and nature is seen to be embedded in ideological terms, it is based on a system of beliefs, ideas and values and that place women and nature hierarchically

below men. Economists urge women and men to reconceptualise their relations with the another and to nature in non-hierarchical ways. Eco-feminist draw connections between the oppression of women and the destruction of nature and trace both historically, to the emergence of western patriarchal sciences in the 7th century. However, the different configurations of eco-feminism differ on the nature of the connections between women and nature.

There are certain important similarities between women on one hand and nature on the other hand. According to the eco-feminist they believe that both women and nature possess a reproductive or a regenerative capacity. In other words a co-relation is taken into consideration between the life support system of nature and women's innate inborn life support systems. Another important similarity between nature and women is nurture that they provide, women are largely responsible for the upbringing of children by providing them with love and care. In the same manner nature is also responsible for providing maintaince and survival to its different components.

Apart from these two similarities a third important source of the similarity between nature and women lies in the exploitation of both at the hands of men. It is humanbeing and especially the men who have been responsible for the degradation and exploitation of nature or enviornment. They have placed nature on an interior level. Similarly, women have also been dominated and exploited by the men and are given inferior status in the society.

It is this similarity between the nature and women which lead to the emergence of the concept of eco-feminism. Eco-feminism predominantly has western roots and it emerged out of the peace feminist and ecological movements of 1970's and 1980's. Eco-feminism was cained by Eaubone but it was further developed by Ynestra King in 1976. It became a movement in 1980 with the organisation of the first eco-feminist conference.

It was a movement of European women in a significant number in the intial stages. During this period the focus was to take into consideration a spirtual relationship between women and nature or earth. In other words the early period of eco-feminism concentrated on women's emotional connection with the nature or earth. The eco-feminist felt that the men inherently were practical, reason-dominated and hungry for power. On the otherhand the women were characterised by an emotional nature which was distinctly separate from that of men. It was this emotional nature inherent to women which led to the foundation of a special relationship with nature.

In the later period of eco-feminism the issue of exploitation of women and exploitation of nature were concentrated upon. There are certain important fundamentals of eco-feminism.

1) There is an important connection between the domination of women and exploitation of nature. The central insight of eco-feminism is that a historical, Symbolic and political relationship exist between the degradation of nature and women.

2) Because women are identified with nature, women and nature have special relationship. Hence women have an important role in ending the domination of nature and conserving the environment.

3) The subjugation of women and nature can be understood in terms of the patriarchal ideology. According to it nature is considered an inferior to culture. Women are identified with nature and hence are considered an inferior. On the other hand men are identified with culture and therefore are considered as superior even this relation women have special role in ending the domination of nature and hence their own subordination.

4) The feminist movements and the environmental movement then become co-related because both stand for egalitarian principles non-hierarchical principles they work together and develop a common perspective, theory and practices a change, can be brought about in the relationship of men with both nature and women. Since women and nature are placed below men, it is necessary to bring about a change. According to eco-feminist it is necessary for women and men to re-conceptualise their relations with one another and to nature in non-hierarchical ways.

5) Eco-feminism represents the combination of a radical ecology movement known as the deep ecology on one hand and feminism on the otherhand. It accepts the facts that have been primarily responsible for environmental degradation. deep ecology focuses on the destructive human patterns related to nature and replace it with a affirming culture. Similarly feminism also concentrates on eliminating the destructive human patterns related to nature and replacing them with a life affirming culture. Similarly feminism also concentrates on eliminating the destructive cultural norms and practices, norms related to women and replacing them with freedom, individualism and democratic right for women. It is necessary to create consciousness regarding male monopolisation of resources and power and replacing it with egalitarian approach. Thus feminism and deep ecology show inter-connectedness. Infact some consider feminism as a primary expression of deep ecology.

6) The males are associated with aspects such as rationality, assertiveness, culture autonomy etc. On the otherhand the females are associated with aspects such as emotions, connectedness,

nature, respectively all these assumptions are result of a patriarchal mentality where by the aspects associated with men are considered an superior and those associated with women are considered as inferior. The patriarchal tendency also believes that nature and women to be controlled by the males.

11.4 CONFIGURATIONS OF ECO-FEMINISM

1) Liberal eco-feminist argue that environmental problems are a result of the rapid exploitation of natural resources accompanied by the lack of regulation. This can be ' overcome by a social introduction that is environmentally sound. Thus, they propose to change human relations with nature through the passage of new laws and regulations. Radical cultural eco-feminists, on the otherhand analyse envrionmental problems from within a ...critique of patriarchy. They argue that the exploitation of women and nature is a consequences of male domination. They celebrate the relationship between women and nature through the popularisation of rituals centred around the mother goddess, the moon, animals and the female reproductive system. Women's and nature are seen as sources of female power to be celebrated.

2) Social eco-feminist, however looks upon nature and human nature as socially construct and rioted in an analysis of race, class and gender, argues that the exploitation of women and nature is due to the structure of capitalist patriarchey.

Thus for some eco-feminist, the women nature link is biological given. They point to the similarities in the experiences of the women's body and that of nature which is different from men's bodily experiences. The power to reproduce, links women with each other and other life forms and then gives them a different consciousness. This link is related to the idea of an essential female nature that is irreducible and unchangeable. For other eco-femninist, who do not believe in biological determinism, women's essential nature is considered to be a cultural construct that is universal, based on specificities of female biology but which cannot be reduced to it. Women's reproductive functions, the social roles and the psychic structure that is consequently acquired, all make them seem to be closer to nature. Men on the otherhand are forced to create through cultural and tehnolgical means, this associates them with culture. The connection between women and nature is rooted in biology although men and women also mediate between nature and culture. Since the linkage between women and nature is inevitable, these scholars for see a more environmentally sustainable future.

For still other eco-feminist, such as Ynestra King (1990) and Carolyn Merchant (1980) the dichotomy between women and nature is false, patriarchal, ideological construct through which gender hierarchy is maintained. The women nature connections are

seen as ideological constructs which have come up historically in certain societies. This view is supported by well known third world eco-feminist. Vandana Shiva (1988) whose work has gained an international presence.

Vandana Shiva powerfully argues that the violence against women and nature is intrinsic to the dominant, patriarchal model of development which is a colonial imposition on indigenous societies in Asia & Africa. This has very often replaced traditional non-hierarchical ideas which supported more balanced relations between women, men and their environment. Therefore, one needs to recover them, build on them and change the nature of development. However, though this strand of eco-feminist though has the potential to raise questions regarding the social and historical construction and conceptualisation of gender and environment, it doesn't achieve its objective.

11.5 CRITIQUES OF ECO-FEMINISM.

There are many other problems with eco-feminist concepts and categories. It is argued that it is ethnocentric, essentialist, blind to class, ethnicity and other distinguishing cleavages, a historical and neglects the material sphere.

Eco-feminist literature portray, the historical exploitation and domination of nature and women as going hand in hand. Both are seen on victims of development. Eco-feminist literature fails to establish the woman nature linkages through concrete evidence as strong argument. Eco-friendly management practices by women, like not cutting living trees but using dead wood and so on are interpreted to show women as naturally caring nurturing and selfless, with a commitment to both the future generations and the environment itself. However, the fact that deadwood is lighter and hence easier to carry is not seen as a significant reason for women not cutting living trees.

Eco-feminist, which related women and nature to biology, is characterised by essentialism and romanticism. Just because women have not been in fore front of cutting trees, mining and so on, women are seen as more caring about the environment. It probably only reflects the gender division of labour and distribution of opportunity than a special relationship between women and nature.

Eco-feminist argument that the domination of women and nature mainly on ideology thereby neglecting the inter-related material sources of domination based on economic advantage and political power. The eco-feminist images of women retain the Patriarchal Stereotypes of what men expect women to be - freeze women as merely caring and nurturing beings instead of expanding the full

range of women's human potentialities and abilities. They only reinforce gender stereotypes.

By emphasising the special relationship of women to nature they ignore the fact that men too can develop an ethic of caring for nature. It ignores the specific context of environmental practices and overlooks the facts that the concept of nature, culture and gender are 'historically and socially constructed and vary across and within cultures and time periods. It presents women as a homogeneous category both within countries and across nations. It fails to differentiate among women by class, race, ethnicity and so on.

A commonly held notion is that since women are more severely affected by environment degradation, they are naturally drawn towards conservation activities. However there are examples of women being the agents of environmental degradation, rather than conservation, due to pressure of gender class relations and poverty. By romanticising the question of women's agency, the eco-feminist discourse ignores the possibility of a gap between women's interests in environmental protection and their ability to actually take action. Women may still be victims of the larger processes and structures of dominance.

Thus eco-feminists have given a lot of importance to the concept of patriarchy. According to them the domination or subjugation of nature and women is due to the anti-life tendency of the patriarchal system. Eco-feminists such as King and Vandana Shiva argue that the violence against women and nature is intrinsic to the dominant patriarchal model of development. However this view is not supported by all the eco-feminists, as exploitation of women and nature is also due to the capitalist structure of hierarchy. Thus the internal conflict among the eco-feminists made it difficult for them to achieve their objective of bringing about egalitarian non-hierarchical relations between men, women and nature.

12.6 SUMMARY

Ecological degradation with its adverse class gender effects, has resulted in the erosion of women's system of livelihood and knowledge on which they depend. These practices therefore impact have their basis in ideology i.e. in the idea of development, scientific knowledge, the gender division of labour etc. as well as the material reality.

12.7 REFERENCE

- 1) Agarwal Bina 1992 - The Gender and environment debates - Lessons from India Feminist Studies Vol. 18

12.8 QUESTIONS

1. Explain briefly the term eco-feminism



13

SUSTAINABLE DEVELOPMENT.

Concepts

- 13.0 Objective
- 13.1 Introduction
- 13.2 Economic growth and sustainable development.
- 13.3 Appropriate technology as an alternative to sustainable development.
- 13.4 Features of appropriate technology.
- 13.5 Summary
- 13.6 Reference
- 13.7 Questions

13.0 OBJECTIVES

- 1) To make students aware about the impact of industrial revolution, and rapid exploitation of resources in the name of development.
- 2) To familiarise students that any development that is based on rapid consumption and generating pollution will lead to widespread. environmental degradation.

13.1 INTRODUCTION

The word 'sustain' comes from Latin, Sustenere, meaning to hold or keep elevated. In the context of resources and the environment, to sustain would literally mean to maintain or prolong the productive use of resources and the integrity of the resource base. This implies that there are physical and other constraints to productive resource use. Upon closer examination it is found that the concept of sustainability as yet is defined so broadly as to be open to wide interpretation.

The most widely accepted definition provided by Brundtland commission which states "sustainable development is the ability to meet the needs of the present without compromising the ability of future generations to meet their own needs". The report further states that the concept of sustainable development does imply limits, not absolute limits but limitations imposed by the present

state of technology and social organisation on environmental resources and by the ability of the biosphere to absorb the effects of human activities.

The concept sustainable development came into prominence in 1980 and in the process it has undergone numerous changes in its definition.

When the west developed, perhaps, ignored the impact of its activity on environment. Today we know that such a path is neither practicable nor desirable for the country. We need to find alternative paths to an alternative goal, an environmentally sound and sustainable quality of life which is socially just and equitable.

13.2 ECONOMIC GROWTH AND SUSTAINABLE DEVELOPMENT.

Rather than calling for economic growth to be reined in, more recent developments turn on the motion of sustainable development. The term was first introduced in a 1987 report commissioned by the United Nations, Our common future. This is also known as Brundtland Report, since the organising committee that produced the report was headed by Gro Harlem Brundtland, at that time Prime Minister of Norway. The author of the report argued that the use of the Earth's resources by the present generation was unsustainable.

Over the course of the twentieth century, the relationship between the human world and the planet that sustains it has undergone a profound change unintended changes are occurring in the atmosphere, in soils, in waters, among plants and animals, and in the relationships among all of these. The rate of change is outstripping the ability of scientific discipline and our current capabilities to assess and advise. It is frustrating the attempts of political and economic institutions which evolved in a different, more fragmented world, to adopt and cope. To keep options open for future generations the present generation must begin now, and begin together, nationally and internationally.

Sustainable development was defined as the use of renewable resources to promote economic growth, the protection of animal species and biodiversity, and the commitment to maintaining clear air, water and land. The Brundtland commission regarded sustainable development as 'meeting the needs of the present without compromising the ability of future generations to meet their own needs'. Sustainable development means that growth should, atleast ideally, be carried on in such a way as to recycle physical resources rather than deplete them, and to keep levels of pollution to a minimum.

Following the publication of 'Our common future'¹, the phrase 'sustainable development'¹ came to be widely used both by environmentalist and by Government. It was employed, at the UN Earth summit in Rio de Janeiro in 1992 and has subsequently appeared in other ecological Summit meetings organised by the UN, such as the World Summit on sustainable Development in Johannesburg in 2002.

Sustainable development is also one of the Millennium Development Goals (MDGS) which have been agreed by 191 states around the world as they aim to reduce many forms of poverty in the coming decades. The relevant MDGS include the integration of the principles of sustainable development into country policies and programmes, the reversal of the loss of environment resources, the reduction by half of the proportion of people without sustainable access to safe drinking water and achieving a significant improvement in the lives of at least 100 million slum dwellers - all by 2020.

The Brundtland Report attracted much criticism, just as the report of the club of Rome had done some quarter of a century earlier, critics see the notion of sustainable development as too vague and as neglecting the specific needs of poorer countries. According to the critics the idea of sustainable development tends to focus attention only on the needs of richer countries, it does not consider the ways in which the high levels of consumption in the more affluent countries are satisfied at the expense of other people. For instance demands on Indonesia to conserve its rainforests could be seen as unfair, because Indonesia has a greater need than the industrialised countries for the revenue, it must forgo by accepting conservation.

13.3 DEVELOPMENT AND MAINTENANCE OF NATURAL ENVIRONMENT

One of the greatest challenges that any society faces is achieving a healthy rate of economic growth without damaging or depleting the supply of natural resources. So that the productive needs of the future generation are not adversely affected finding an appropriate balance between economic growth and the preservation of natural resources is the essence of the objectives of sustainable development.

The term sustainable development is not one idea but it is a combination of many ideas, it has been defined in the following manner, the Brundtland Commission on environment and development in 1987 define sustainable development as the development that meets the needs of the present generation without compromising the ability of the future generation to meet their own needs.

Another definition for sustainable development is change for better human conditions while protecting the earth. Sustainable development is a process in which development can be sustained for generations. It focuses on intergenerational fairness in the exploitation of development opportunities. Every generation of mankind creates as well as destroys certain amount of resources for its development purpose. But the nature and the rate of present development are such that the rate of destruction of resources is greater than the rate of creation. Hence the present generation should limit the exploitation of natural resources, especially the non-renewable resources.

Sustainable development is based on 3 considerations namely environment, equity and futurity. It put forward the idea in which continued economic growth should take place in an ecological and equitable manner.

At the Earth Summit held at Rio de Janeiro, in June 1992, 27 principles were developed in the Rio Declaration for sustainable development.

- 1) Human beings are the center of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.
- 2) States have the sovereign right to exploit their resources and the responsibility to ensure that such exploitation does not cause damage to the environment of other States.
- 3) The right to development should equitably meet the needs of present and future generations.
- 4) In order to achieve sustainable development, environment protection, shall be an integral part of development process.
- 5) All states shall co-operate in eradicating poverty.
- 6) Developing countries and especially the least developed and the most environmentally vulnerable will be given special priority.
- 7) States have common but differentiated responsibilities. The developed countries acknowledge their responsibilities in view of the pressure they place on the global environment.
- 8) States should reduce and eliminate unsustainable patterns of production and consumption and promote appropriate demographic policies.

- 9) States should co-operate, to strengthen capacity for sustainable development through exchanges of scientific and technological knowledge.
- 10) State shall facilitate and encourage public awareness by making environmental information widely available.
- 11) States shall enact effective environmental legislation.
- 12) States should co-operate to promote a supportive and open international economic system.
- 13) States shall develop national law on liability and compensation for victims of pollutions and other environmental damage.
- 14) States should co-operate to discourage or prevent the relocation and transfer to other States of any activities or substances that cause severe environmental degradation or harm to human health.
- 15) The precautionary principles shall be applied by States.
- 16) National authority should promote the internationalization of environmental cause and use of economic instruments. The pollutant in principle were the cause of pollution.
- 17) Environmental Impact Assessment (EIA) shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment.
- 18) States shall notify other States of natural disasters or other emergency likely to produce sudden harmful environmental effects.
- 19) State shall notify potentially affected State of activities that may have a significant term - boundary, environmental effect.
- 20) Women had a vital role in environmental management and then participation is therefore essential to achieve sustainable development.
- 21) The creativity, ideals and courage of youth should be mobilised to forge a global partnership in order to achieve sustainable development.
- 22) Indigenous people and other local communities have vital role in environmental management and development.
- 23) The environment and natural resources of people under oppression, domination and occupation shall be protected.

- 24) Warfare is inherently destructive of sustainable development, States shall therefore respect international law, providing protection for the environment in terms of armed conflict.
- 25) Peace development and environmental protection are interdependent and indivisible.
- 26) States shall resolve all their environmental disputes peacefully and by appropriate means in accordance with the charter of the United Nations.
- 27) States and people shall co-operate in the fulfillment of the principles embodied in this Declaration and in further development of international law in the field of sustainable development.

Related to the issue of sustainable development the Rio Conference generated a lot of awareness subsequently resulted in the Kyoto Protocol (K.P.). The KP is a country agreement, the member countries have to restrict emissions to a certain level. If they are unable to do so then trading relations are not allowed.

The KP guidelines basically aim at tracking problem of dictating energy resources and deteriorating air quality. However out of 118 countries only 84 have signed protocol and only 25 have notified at sustainable development is extremely significant as it protects the rights of not just the present generation but the future generation as well.

There are 5 important principles underline sustainable development they are

- 1) Ecological harmony.
- 2) Economic efficiency.
- 3) Conservation of natural resources.
- 4) Local self-reliance.
- 5) Equity with social justice.

The concept of sustainable development is not against the process of development. It encourages economic development by any nation should not be carried out at the cost of the exploitation of natural resources. It means the environment and its components both biotics as well as abiotics should be protected from the exploitative tendencies. Development should be environmental friendly. A conscious effort should be made to protect especially the non-renewable resources. This awareness is important from a futuristic view point.

13.4 APPROPRIATE TECHNOLOGY AS AN ALTERNATIVE TO SUSTAINABLE DEVELOPMENT.

All those in the race of development disrupt the natural pace of transformation. The concept of interdependence and co-existence are becoming outdated too rapidly. The massive unsustainable exploitation of all resources to 'find' development disrupt natural processes and system with often unexpected consequences, such as Nuclear Technology, toxic agrochemical substance such as CFC (Chloro Fluorocarbon) etc. are becoming part of the routine development package even in poor 'third world nations'. The affluent countries show no signs of controlling their own technological gambling, whether it relates to nuclear explosion or biochemical warfare research. As resources decrease and demand increase as a result few people have access to their limited resources. Scarcity of natural resources has been a basic cause for conflicts between people and nations.

Steps for an alternative development model can be as follows

- 1) **Limits to growth** - we need to reassert the social and ethical responsibilities of science and technology. The material wealth we are flaunting is actually borrowed from the future with no possibility of repayment.
- 2) **Peace and development** - without peace no sustainable development is possible, the leaders should stop arm race. It must guide us to accepting our role with humility and contentment.
- 3) **Population resource and social justice** - there are physical limits to all resource development must guarantee justice, for stable and healthy cultures to evolve. It should also make people self sufficient.
- 4) **Grass roots survival knowledge** - grass roots knowledge skills have been tossed aside in the process of development. Besides bias in education, the concept of progress may collapse our contemporary civilization. Therefore the development model must have the flexibility to incorporate natural or human system changes.
- 5) **Eco-system** as unit for appropriate development, each ecologically distinct region and each distinct culture must have freedom to work out its path for development.

On understanding sustainable development the logical question that comes to mind is how it can be achieved. As far as developing countries are concerned, adoption of appropriate technology holds promise of providing sustainable development.

13.5 FEATURES OF APPROPRIATE TECHNOLOGY.

In an attempt to explain appropriate technologies Darrow and Pam provided the features of appropriate technologies. According to them appropriate technologies can be characterized by -

- low investment cost per work place.
- low capital investment per unit of output.
- organizational simplicity, adaptability.
- optimal resource consumption.
- low cost of final product and high potential for employment.

One of the features, explicitly states that appropriate technologies should involve decentralized, renewable energy sources. It is the emphasis on use of operations that combine to keep adverse environmental impacts, if any, within assimilative capacity of nature. Such technologies naturally stand a very high chance to be sustainable. It is, therefore recently argued that the appropriate technologies may as well be considered for development and would replace the technologies which are inappropriate to the long term needs.

Alternative Technology. Solar energy.

In contrast to non renewable sources of energy we have another class of energy such as the sun, wind, wave and tide which are known as renewable sources. Solar energy is energy given off by the sun. This energy is produced by atomic reactions that take place inside the sun. It is difficult to imagine the huge amount of energy given off by the sun. A major problem in harnessing these sources of energy is that the energy released by them is highly diff used as compared with the energy released by them is highly diffused as compared with the energy obtained from fossil fuel or nuclear fuel. solar energy has to be stored for us during night or on a very cloudy day. Engineers have built a number of devices to collect solar energy, these are flat plate collectors, solar furnace, solar batteries, solar boiler and solar cookers. These devices convert solar energy into different forms of energy.

Harnessing solar energy.

Solar energy can be harnessed in 3 ways.

- a) by utilizing the heat from sunlight.
- b) by converting solar energy directly into electrical energy.
- c) by using photo synthetic and biological processes.

Flat plate collector, which consists of a metal plate painted black on the side that faces the sun. The sunlight absorbed by the plate heats it one or more layer of glass cover the plate to keep it from losing the heat produced. Solar energy is utilized by circulating water through tubes which is soldered to the back of the plate, this energy can be used for central heating. Solar energy can create high temperature through the use of solar furnace that concentrates the rays of sun. It can create temperature as high as 4900F.

This way one can collect sunlight in the form of energy and use it for streetlight, tubelight, television and other electrical appliances, this energy can be used for water heater, solar cooker etc.

One of the most promising application of solar energy during the last few decades has been the heating and cooling of residential and commercial buildings. Solar cooling is usually achieved by using solar heat to operate a thermal absorptia type refrigeration system where solution of amonia is used.

Advantages.

- 1) The source of energy most readily *and* freely available to us *is* the sun.
- 2) Solar energy is inexhaustible and it is free from any pollution.
- 3) Unlike fossil fuels, transformation of solar energy does not produce any toxic byproduct.
- 4) The use of solar energy would not degrade our environment.
- 5) It would reduce our dependence on non renewable source of energy.
- 6) There is one drawback that where there is no sun, this form of energy cannot be generated, but it is stored and it can be used.

Bio-gas.

Bio-gas is a low cost appropriate energy technology with major potential in rural areas. Its main objective is the maximization of recycling of organic waste in order to provide gas for cooking, for operating water pumps, flour mills and other rural industvies. India has more than six lakh bio-gas plant while China has more than 70 lakh such plants.

Asia's biggest biogas plant is at Urli Kanchan near Pune. Biogas plant is the solution for energy[^]!* motonly for rural areas but also for towns. According to the

scientist calculation India has 25 crores of animals, from which it can gather crores of ton of excreta, in other words, from one animal one can get 10 Kgs of excreta every day. Total excreta can produced 33 thousand million cubic meter gas from bio-gas plant technology, Which is equal to energy produced by burning 64 crores litre kerosin. After the gas obtained from plan[^]slurry's left behind. It can give us manure which is very useful for agricultural of growth.

The raw material used for the production of biogas is cow dung mixed with water, wet waste from household and industries too can be used.

Use of biogas.

Biogas or gobargas is a mixtures of methane (65% by vol.) carbon dioxide (35% by vol) and moisture (unsignificance). It is produced by a consortium of an aerobic bacterial (i.e. bacteria that function in the absence of air) by degradation of organic matter. Although the biochemical process of biogas formation is complex, it does not require sophisticated plant or machinery. In a simple reactor it can be affected at atmospheric pressure and temperature provided air is not allowed to enter the reactor. A typical reactor consist of a tank constructed in bricks or cement concrete with an inlet and an outlet. A metallic dome on the tank is provided with two purposes viz. to collect the produced biogas and to prevent air contact. The organic slurry contained in the reactor seals the dome from atmosphere. A tapping from dome convey the gas to the user.

One of the important features of biogas technology which make it alternative towards sustainable development is that the process is net energy produces. As we have seen earlier, the degradation of the organic matter produces biogas. As the raw-material the organic matter, is renewable, the biogas automatically becomes a renewable source, of energy. Further, this degradation unlike chemical process does not require high ambient pressures and temperatures. Thus, not much energy is spent in the process of biogas production. As a result, energy occurred is more than energy spent in realisation of biogas making the process net energy positive. As the biogas plant doesnot involves huge structures like atomic energy, the energy spent in making plant materials and then construction is of reasonable order.

13.6 SUMMARY

The developed countries present the examples of unsustainable development where natural resources are used wastefully. In developing countries as well, we observe over utilization of resources which is due to mere survival of increasing population.

13.7 REFERENCE

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13.8 QUESTIONS

- Q.1 Define the term sustainable development. Discuss the concept of sustainable development.
- Q.2. Explain how appropriate technology can be an alternate for the sustainable development.



ENVIRONMENTAL ISSUES. THE STATE OF INDIA'S ENVIRONMENT.

Concepts

- 14.0 Objective
- 14.1 Introduction
- 14.2 Desertification
- 14.3 Defarertation
- 14.4 Summary
- 14.5 Reference
- 14.6 Question

14.0 OBJECTIVES

- 1) To make students familiar with the innovations that led to advancement of human civilisation.
- 2) To make students aware about the climatic condition which has changed significantly over the past century.

14.1 INTRODUCTION

Science and technology has grown at an exponential rate over a period of time and continues to do so. Simultaneously, a tremendous increase in world population is due to reduced death rate, increase in life expectancy and improved conditions of living resulting from application of science. The present projection is that the world population will be more than 1 billions. We know that rising standards, high aspirations and expectations improved technology and rapid industrialisation have increased the per capita demand for natural resources beyond the capacity of the eco-system to maintain its balance. Thus the basic needs of the large and rapidly growing population water, food, energy, clothing, shelter, employment, education, health etc. are too pressing, so our path of progress has been based on meeting our needs from the environment that sustains an inheritance we have continued to draw upon and which we have regarded as infinite resources.

Human activities.

The basic concept of resources is related to human being. All material and non-material attributes fall under 3 categories, resource resistance and neutral components. The materials of environment useful to men and resources. The resources by and large must satisfy three conditions i.e. it must satisfy need of man without alteration eg. water. Man must have knowledge and skill to

utilise the resource available to him and resource must be readily available.

Resources are either human or physical. Physical resources are neither natural nor manufactured. Natural resources are those elements of nature that have value to human being. Any natural feature becomes a resource when man uses it to supply his need or to serve his wants. Resources may be further classified as non-renewable resources or renewable resources. The non-renewable resources may be regarded as those resources which are diminished by use. The renewable resources may be termed as flow resources for, with careful use they may last indefinitely.

Natural resources are life lives of any society. The development process can continue only if it is assured of continued availability of these resources. While the threat to non-renewable, resources is all too evident, the ever increasing population is a greater danger to our renewable resources e.g. food, water and agriculture.

14.2 DESERTIFICATION.

The human economic activities of resource development and utilisation are not uniform is different parts of the world. Therefore, there are differences in the pattern of resource development and utilization in agriculture, manufacturing, mining, fishing, forestry and also in transport and trade. Since the nature remains stable, but man and culture are in constant change, the combination and interaction of these resources in a parituclar region may differ from time to time. This leads to a change in pattern of resource and resource development activities.

Environmental degradation due to human activities is evident allows the world. There are various heads of resource depletion facing our country. These include desertification, deforestation, agricultural erosion and industrial pollution.

Desertification is also called desertization. The desertification is a spread or encroachment of a desert environment into arid or semiarid regions caused by climatic changes, human influecne. Climatic factores include period of temporary but severe drought and long term climatic changes towards aridity. Human factors include the artificial alteration of the climate such as degradation of the biological environment in arid regions by removing vegetation which can lead to unnuaturally high erosion) excessive cultivation and the exhaustion of surface water or ground water supplies for irrigation, industry or domestic uses.

Desertification drains an arid or semiarid land of its life-supporting capabilities. The process is characterised by a decreasing ground water table, salinization of top soil and water, diminution of surface

water, increasing erosion and the disappearance of o(#wV# vegetation.

Desertification is not limited to nondesert regions and can occur in areas within desert where the delicate ecological balance is disturbed. The Sonoran and Chihuran deserts of the American South West have become absolutely more barren as the wildlife and plant population have diminished.

In arid and semiarid regions, where restoration of fragile ecosystem is very slow, mining adds significantly to other desertification pressures. Studies done by CAZRI in Jodhpur show that it takes three to five years to establish grass cover in arid areas.

The arid land in Rajasthan accounts for most of the Indian production of lead, zinc and tungsten concentrates. It is also rich in asbestos, phosphate, gypsum and steatite. Other major minerals are copper ore, kaolin and limestone. Between 1970 and 1976 there was 86 percent increase in area under mining lease for almost 50 different minerals.

Development of soil salinity due to mining has degraded land around quarries in Jodhpur, Udaipur and Jaipur districts and near the gypsum quarries in Barmer district. Mineral beneficiation and processing in the vicinity of the mines completes the denudation of vegetation. Since time immemorial land has played an important role in shaping the life of man. Early civilization were essentially riverine. Even today we depend upon land for much of the food, fibres and shelter. Land is non-renewable resources. It is finite in area.

India's agricultural land is 2% of the total area of the world. It is being depleted at an enormously rapid rate, the soil erosion alone takes thousands of land per annum. The worst and most spectacular form of land erosion is plaguing vast stretches in UP, MP, Bihar, Rajasthan and Gujarat. The increased human and cattle interference and over exploitation of marginal and submarginal lands contribute to the formation of ravines and deep gullies.

The wind erosion occurs in the arid zones and along the coastal belts, the serious consequences of wind erosion are seen in Rajasthan, Gujarat, Punjab, Haryana, Andhra Pradesh and Karnataka. In peninsular India, soil erosion is widely prevalent in the western ghats which forms the real watershed for the South. The Western ghats range, passing through Karnataka have suffered severely with the bulk of forests vanishing in the last decades. Clearing new forests for annual crops, industry, hydroelectric projects, townships, roads, bridges and other plantations are possible reasons for land slides and soil erosion.

The construction of roads on the mountain slopes generates the huge amount of debris which is the basic cause of environmental degradation. In Himalayas a huge amount of debris has been excavated during road construction, which is essential for mobility of goods and people.

14.4 DEFORESTATION.

The wild species of plants and animals that occupy it are managed to some degree. Trees are cut and planted. Fire is used deliberately to modify vegetation or wildlife is controlled. Livestock and wildlife use is monitored to keep the better forage plants productive. Some of it is intensively managed. Trees of better quality for timber are planted or forage grasses from other countries are seeded in.

The paper industry destroy the forest cover every year. The disposable Chopsticks used in Japanese Restaurants are responsible for hacking down timber every year. In India also trees are being cut every year to pack apple and other fruits.

Degradation and deforestation involves many complex issues, population poverty and policies are interlinked to pose a dilemma as far as forest protection is concerned. As long as people have no fuel, timber and fodder will continue to be burnt. Unless adequate substitutes are found for fuel wood and for the multifarious uses to which timber is put, the process of deforestation not only will continue but get accelerated.

In the Southeast Asia and the Pacific massive destruction of mangrove forest has taken place. It has been considered on the destroyable waste land. The mangroves thus denote the timber wood, poles, wood for chai coal, wood chips, fuel wood, fodder

and other products. In Gujarat and Sundaibands, the mangroves are subjected to high tidal fluctuation. In Gujarat is is grown in a high saline waters, arid conditions and in the coastal gradient. In Kerala and Tamil Nadu also mangroves are exposed to tidal fluctuations. However, there areas are witnessing the human impact and mangroves area is converted into semi-agricultural systems.

Throughout India, mangroves should be managed on high productive ecosystem. It should be regarded as life sustaining system. Except for the traditional methods of Cochin backwater System where mangroves are converted into a multiple use system and only pockets were kept for their other useful roles, interference by man has been destructive.

Because of the illegal felling of trees in UP. by villagers for fuel, fodder and to earn them livelihood by selling logs, the fear of tosing

forest cover has increased day by day. Forest fire is partly to be blamed for deforestation, besides illegal felling of trees. Once heavily wooded valley of the Kosi river has shown the signs of degradation. In Maharashtra also Mahabaleshwar, which once boasted of thick green cover has shown the signs of massive deforestation. In case of Mussoorie, and Darjeeling irresponsible felling of trees has resulted in heavy damage on environment. There is a significant fall in the existing forest cover in the State of Assam owing to massive deforestation, large scale encroachment and intense degradation. The reserves forest has depleted in the area of cover in many districts of Assam. Cherapunji once called the wettest place on the earth, now does not receive the same shinking forest over in the vicinity. The vegetation cover in this part of the country has reduced faster than could be believed.

Agricultural activities.

Now a days food problem is taking formidable dimention along with explosive growth in population. As a result, new experiments for more production in agriculture were made and new devices were adopted which are influencing our environment and ecology causing environmental deterioration and ecological imbalance. Agriculture has been a fundamental tradition under which a farmer works keeping in balance the organic and inorganic components of the farm?A form is itself is an ecological system. In the form plants, bacteria, fungi and insects are organic components and minerals, salts, fertilisers and other chemicals are inorganic components.

Under traditional farming, intensive farming, extensive farming, ultra moist farming, irrigated farming, dry farming, livelihood farming, horticulture, farming producing waste products, terrace farming and mixed farming have been adopted. Thus by traditional farming strategies of farming have been adopted to obtain more production. Among there, in extensive farming, institutional reforms are the..... services which provide big quantities and community development programmes.

However, it is not possible to get more production by the traditional farming methods and traditional agricultural strategies. Therefore, a new strategy was evolved which included quicker rotation of crops, agricultural techniques, package of inputs and the role of public institutions. For making these strategies a success, chaning the traditional methods began being adopted which included reclamation of fallow land and rotation of crop system and mixed cropping. On the one hand while the new strategies and new methods in agriculture have brought revolutionary changes in agriculture and thus increased production on the other hand it has also created various environmental and ecological problem. This problem has been created by mechanisation of agriculture, ever increasing use of chemical fertilisers, excessive use of insecticides

and pesticides, misuse of irrigation, intensive farming and use of high yielding varieties of seeds.

The mechanisation of farming has greatly increased in India, causing soil erosion and loss of productivity of soil. Due to use of machines a rapid destruction of organic components of form is taking place. The imbalance in organic component is causing a decrease in productivity and ecological imbalance in the farm system. The form of animal husbandry too has changed due to its mechanisation and has created the problems of unemployment. Mechanization has also increased energy crisis. Therefore a policy of partial mechanization should be adopted.

There has been a considerable increase in productivity due to use of chemical fertiliser however there has also been an adverse effects on cultivable land. This is due to ignorance of proper use of fertilizers. By excessive use of chemical fertilisers the fertility of soil has decreased in the long run. Faulty use of fertilisers has caused the growth of microorganism which inturn are causing various diseases. Due to excessive and wrong use of chemical fertilisers underground water is also getting polluted. The concentration of zinc, lead, manganese, nitrates have increased in the underground water. This has resulted in respiratory problems beside many other clinical diseases.

A programme to prevent rapid indiscriminate use of pesticides for eradicating harmful insects and herbicides for eradicating weeds was launched. The indiscriminate use of pesticides and herbicides has caused imbalance in the soil composition as these chemicals are not easily biodegradable. These insecticides are carcinogenic and thus have caused various diseases.

Increasing use of irrigation, too has given birth to problems of environment. Big dams, reservoirs and canals have been constructed for irrigation which have caused the problem of water logging wrong use of irrigation is causing soil erosion and land slides as well. The construction of dams like Tehari Dam may cause severe damage since it is located in an earthquake prone area.

For the production of various crops much stress is laid upon intensive farming. However, whenever this method of farming has been applied, the shortage of secondary nutritional elements like Nitrogen, Phosphorous, Potassium, Calcium, Sulfur etc. have been reported. This will have long term devastating effects. Due to high yield seeds the production has increased many folds. However, it has affected soil fertility adversely fertility is getting reduced day by day and soil is being polluted as well.

Industrialisation -

In the last few decades scientists brought to our attention, the environmental problems as unstable climate, acid rain, ozone depletion, green house effect, desertification, species loss etc. which have not only threatened our well being but our very survival. We have to address the global environmental problems, which are created due to industrial development.

On one hand, the industrial and technical development have provided individuals with the variety of ways and means for the physical comforts, on the other hand it has generated many crisis also. Processing of chemical products, atomic programme and mining are some of the projects where little ignorance and inefficiency has brought a great deal of adverse effects. After analysing the adverse effects and the valuable output of the technical and scientific development, it becomes clear whether these developmental programmes should be stopped. There are still other ways that can effectively control the adverse effects of these developmental activities.

Depletion of Ozone layer.

There is 24 km. thick Ozone shield above 15 km. from the earth's surface. It is situated in the stratosphere and this layer shields the earth from the harmful ultra violet radiations of the sun. It is known that 21 percent of the air is oxygen and 78 percent is nitrogen gas. These gases exist as diatomic molecules (O_2 and N_2). The ultra violet rays have ability to break up oxygen molecule and produce reactive oxygen atoms. Thus Ozone is a triatomic molecule (O_3). It is very reactive. Ozone is formed by combining oxygen atom with oxygen molecule. Ozone being highly reactive combines with nitrous oxide (N_2O) and thereby it is depleted in the atmosphere. However, the balance between the formation and depletion is maintained naturally. An imbalance is created when Chlorine atoms released from the earth react with Ozone molecules. These chlorine molecules are released from the man-made chemicals such as chlorofluorocarbons (CFCs) when these chemicals reach the Ozone layer, the Chlorine atoms break down the bonds holding the three atoms of oxygen in Ozone. The Chlorine is converted into Chlorine monoxide and Oxygen is released.

This loss of Ozone molecules is termed as depletion of the Ozone layer. When this happens, the capacity of the ozone layer to filter out the harmful ultra violet rays from the sun decreases. The harmful effects of the ultra violet rays have been known the major being the cancer of skin.

The earth has a history of weather and climatic change. There have been 17 ice ages in the last 10 million years. Ice ages have been global phenomenon. The Ozone 'hole' was discovered in 1965 by Cambridge Meteorologist Gordon Dobson. He considered it to be an

anomaly until the phenomenon occurred in 1975. In the early 1980's news came that there is a hole in the antarctic ozone area. The US agency had provided a satellite map of ozone levels over antarctic clearly showing the hole. In 1987 it was shown that hole had spread over 5 million square km. In 1989 the reports on ozone hole over arctic area gave clear warning.

The high solar UV levels over India are due to the proximity of South India to the Equator and not due to depletion in ozone layer. The National Physical Laboratory (NPL) has compared UV levels in India and those in the Antarctica. The people of South India are already experiencing the UV doses that are causing alarm in the Antarctica.

Indian ozone levels vary between 250 to 375 Dobson units. During the ozone hole Antarctica levels were about 130 Dobson units. An intensive research is already to find a suitable substitute for CFCs.

Green House Effect.

Due to sun rays earth surface gets heated subsequently it cools and the heat is radiated from the earth to the atmosphere. But carbon dioxide and other heat absorbing gases take a part of the radiated heat and return it to the earth. This process results in the accumulation of extra heat energy at the surface of the earth. In the last few decades, the amount of heat absorbing gases has remarkably increased and as a result the average temperature of the atmosphere has gone up. Thus phenomenon is called "Green House Effects". It is clear that gases like carbon dioxide, Chlorofluoro Carbon, Nitrous oxide and Methane make a cloud over the earth, which allows the incoming rays of the sun but obstructs the outgoing heat energy from the earth to the atmosphere.

There has been numerous warning in the recent years that the earth's climatic pattern which followed almost maintained steady course for centuries are undergone visible changes. This is being caused by changes in the composition of global atmosphere which consist of a number of natural and synthetic gases. Any increase in gases which have ability to absorb infra red radiation reflected from the earth enhanced heat - trapping capacity of the earth.

In 1961, the English Philosopher John Tyndall proposed that increased concentration of atmospheric carbon dioxide could raise surface temperature and change the climate. Since then, the concentration of this gas has increased by about 25%. This increase has been caused by various factors. An indiscriminate burning of fossil fuels like coal, oil and natural gases release huge amounts of gas into the atmosphere. There are more than half a billion vehicles on the road which spew into air carbon dioxide and other gases. The burning of a large number of oil wells continuously

after the gulf war has added tremendous amount of carbon dioxide into atmosphere.

As far as industrial revolution is concerned the main culprits are the developed countries. The industrialised countries are responsible for forcing the pace of global warming, and climatic changes. The entire international community from world leaders down to lay public is aware of global warming and its dangers. The possibilities are of a magnitude that could destabilise world food security. There may be massive disruption to agriculture and loss of ecosystem of the world wide importance.

Acid rains.

Acid precipitation has been known for century in areas such as London where sulfur discharged by the burning of coal produces toxic smogs, however, the problem did not assume scientific, economic and political prominence until the early 1980. As it transcends national boundaries, the acid rain problem has become a subject of heated controversy between otherwise friendly neighbours like the US and Canada or Germany and the Scandinavian countries.

It has been found that acid precipitation is harmful to trees and other form of vegetation, causing foliar injury and reduction in growth. The primary reason that acid rain has received attention is its economic impact. The cost to control emission of sulfur compounds from power plants, refineries and smoke generating industries is enormous.

The problem of acid rain is more apparent in the part of the world which are industrialised. The western countries and other developing countries of the world are severely facing this problem. Among Indian cities the possibility of acid rain has increased in Mumbai, Delhi, Kanpur, Bangalore, Ahmedabad and Calcutta.

Acid rain has adversely affected the entire ecosystem. Due to acid rain, the minerals balance in forest, river, fields, lakes is being disturbed. There is decrease in productivity. The resistance power of the lives at surface in water has also decreased, the microorganisms have gradually become inactive and it has affected the natural cycles of elements. It has not only affected the human life but also of thousands of species in water.

to stop acid rain the most important thing is to reduce carbon dioxide, sulfur dioxide and nitric oxide gases in the atmosphere. It should be our endeavour to limit the elements helping acid rain. We must also regulate the spread of the gases in the atmosphere.

14.4 SUMMARY

A balance between the fulfillment of human needs and environment should be maintained by taking care of the use of developmental projects. If the proper choice of technology is not made and appropriate changes are not brought about, there is a dangerous possibility of ecological and environmental imbalance.

14.5 REFERENCE

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14.6 QUESTION

Q.1. Write an essay on the effects of human activities on India's environment.



15

DEPLETION OF RESOURCES AND ITS IMPACT ON LOCAL COMMUNITIES

Concept

15.0 Objective

15.1 Introduction.

15.2 Pollution/Depletion of natural resources.

15.3 Types of pollution.

15.4 Harmful effects of pollution and industrial dumping strategies involved in conserving natural resources.

15.5 Summary

15.6 Reference

15.7 Questions

15.0 OBJECTIVE

- 1) To take a close look at natural resources of human society and its consequences on of their depletion on the society with a special reference to India.
- 2) To make students aware about the system of energy generation and maintenance among living being in a geographical area.

15.1 INTRODUCTION

The important natural resources are land, water, air, forest, human being have exploited this resources to a great extent for their own selfish purposes. This has lead to many depletion as well as pollution. The effects of there factor has serious consequences for the human society and hence conservation of there rescources or resource management is extremely essential.

In the begining of the 4th five year plan problems and issues centred around environmnet received special attention of the Government of India. This resulted in establishment of the National Council for environment planning and co-ordination in 1972 at the Department of Science and Technology. Another empowered committee was setup in 1980 for review of the existing legislative measures and administrative machinery for ensuring environmental protection and for recommending ways to strengthen them

15.2 POLLUTION / DEPLETION OF (NATURAL RESOURCES.

1) Land Pollution - it means soil pollution, soil erosion, water logging, salinity of the soil and reduction of nutrients in the soil are the main ways in which soil pollution occurs, following are its causes –

- i) Faulty agricultural practices - these includes overcropping, excessive use of chemical fertilizers and pesticides.
- ii) Deforestation - it is the most important factor in land pollution.
- iii) Excessive use of underground water - this leads to increase in the salinity of the soil.
- iv) Over - irrigation - this has led to water logging and salinity of the soil.
- v) Unlined canals - in many cases canals through which water is carried are unlined.

Water seeps through such canals and water logging takes place. Effects - Since the quality of soil deteriorates due to land pollution, the most serious effects is on the agricultural productivity, this effect is especially significant m Indian situation because majority of the people depend upon agriculture as its main occupation. Agricultural productivity suffers in a negative manner, it intensifies the problems of poverty. People are force to migrate from rural areas to urban areas. However since the urban areas also are marked by a variety of social problems. The migrants are caught of in most difficult situation.

Solution –

- a) preventing deforestation and encouraging afforestation.

- b) Rotating crops which will eliminate the need for chemical fertilizers.
- c) Using organic waste in place of chemical fertilizers.
- d) Limiting of canals which will prevent seepage of water.
- e) Using agroforestry i.e. a combination of trees and agricultural crops.
- f) Other techniques such as contour trenching terracing, gully plugging and check damming.

Land - Conservation of land is related to conserving the soil. Every year top most fertile soil is lost or soil erosion is taking place at a greater rate. This is particularly hazardous for the agricultural countries. Hence various strategies to control soil erosion and to improve the quality of soil are necessary.

1) Offering a menu of techniques - instead of promoting a single method of soil conservation it is necessary to provide a variety of techniques and allow the farmers to select as per the local circumstances.

2) Contour based cultivation - Contour is the line joining points of equal height. It is carried out where the land is uneven Hence land levelling is carried out. This not just reduces soil erosion but also increases agricultural productivity by increasing the cultivated area.

3) Agroforestry and integrated crop and livestock techniques - agroforestry involves combination of crops and of fruit trees. Integrated crop used methods such as crop rotation and multiple crop. Integrating animals into farming practices is also adopted as an important strategy.

4) Planting vetiver grass - grass has a basic capacity of improving fertility. Since its roots are strong, a type of grass namely, vetiver grass is especially used to improve the soil fertility.

5) Controlled irrigation of land - when water logging is a problem reducing irrigation. Water supply is one of the solutions. Other methods such as sprinkler irrigation systems and used.

2) Water pollution - This is serious form of pollution - Following are its sources -related to surface, water ground, water and oceans.

i) Pollution of surface water - Ponds, streams lakes and rivers get polluted through following sources –

a) Domestic sewage - it consist of sewage water from homes and business concern which pollutes water.

b) Industrial waste in fresh water - large quantities of water pollutants are released into water sources due to different types of

industrial activities.

c) Agricultural pollution - this includes sediments fertilizers, pesticides and farm animal wastes.

ii) Ground water pollution - in recent years, the pollution of ground water in some areas has increased. So greatly that the underground water may no more be fit for drinking.

3) Pollution of the oceans - petroleum (crude oil) is the main source of water pollution of the oceans. It is feared that pollution of the oceans could have global effects.

Effects-

1) Water pollution is mainly responsible for more human illnesses than any other environmental factor. Three of the common diseases:- Cholera, Jaundice and typhoid are transmitted through water.

2) Water pollution is fatal for the aquatic life, fish and sea birds, get killed because of water pollution.

3) Artificial eutrophication - a lake, canal usually support a rich variety of plant and animal life. But if it receive large quantities of phosphates and nitrates very little oxygen is available and eutrophication takes place.

Solutions

A. 1) Primary treatment - this is a mechanical process, it simply removes solid waste from polluted water.

2) Secondary treatment - this is a biological process, it consist on the removal of impurities by the digestive action of bacteria.

3) Tertiary treatment - it involves advanced biological, chemical and physical processes.

B. An innovative afforestation scheme "Smriti Van" was started by a voluntary organization 'Nisarga Sevak' at Poona. According to this scheme a new sapling was to be planted in a memory of any pleasant or painful event.

C. Afforestation of areas near the sea can be done by planting mangroves. The land near the sea will be protected from excessive salinity and crops can grow in the neighbouring regions.

Water:- The supply of water is fixed by nature. But the consumption of water has increased to a great extent. Hence this, has led to a scarcity of water which is especially felt in the poorest countries. Therefore rational use of water is essential. Various methods of

water consumption need to be adopted –

1) Traditional water harvesting system - traditional systems are usually suited to the local conditions. Hence different areas have their own systems of collecting and sharing water.

2) Watershed development - this programme depends on the commitment and participatory involvement of the entire village.

3) Pani Panchayat - it is a water coo which regulates the supply of water from the river to the fields to ensure its optimum use.

4) Johads - they helps in reducing water shortage. They are used to checks dams and tap rain water.

5) Trapping spring water - this is a new solution to conserve and harvest water.

6) Roof - tap rainwater harvesting. According to this system the rain water falling on a building roof or terrace i.e. to be collected into a well or tank below.

7) Reclamation of waste water - reclamation of waste water is used for flushing toilets in Japan and Singapore.

3) Air Pollution:- It is one of the most common kinds of pollution. Following are the sources of air pollution –

i) Indoor air pollution - In India particularly in villages, firewood, cattle dung, crop wastes and weeds are burned on fuel for cooking. These expose women to unbearably high levels of air pollution.

ii) Road transport vehicles - the exhaust pipes of these vehicles release hydrocarbons into the atmosphere, which are important air pollutants.

iii) aircraft emissions - this consist of nitrogen oxides and water vapour which are released at high attitudes. At that height, the effects of there pollutants get greatly mangnified.

iv) Industries - Manufacturing processes give rise to pollutants. The industries which are the worst air pollutants are petroleum, refineries pulp and paper mills, chemical industry etc.

v) Radiation radiation from atomic power plants as well as atomic, weapons cause significant air pollution..

Effects - The effects can be classified into two types namely specific effects and global effects.

Specific effects - air pollution affects plant life, animals humanbeing as well as materials.

Hifnan beings are more concerned about its affects on human health. Various affects are observed such as cancer, genemutations, birth defects as well as asthama.

Global effects -

a) Atmosphere invention - It is a condition when a warm layer of air lies over the cooler air below it.

b) Green house effect - Due to industrialisation and deforestation green house gas carbondioxide, methane etc. have been circulating above the earth's surface. So the earth has began to look like a big greenhouse in which heat is trap. The accumulation of excessive heat is leading to a rise in global temperature. This is also termed on global warming.

c) Depletion of ozone layer - The ozone layer protects the earth from the deadly ultner violet rays of the sun. Human activites are affecting the ozone layer and the main chemicals responsible for this are CFC's particularly CFC-ii & CFC -12.

d) Acid rain - Due to chemical reactions acidity in the atmosphere hasincreased. This has led to acid rain which kills, trees and fish, affects agriculture, metals and is indirectly harmful to the health of humanbeing and animals.

e) Nuclear winter - This will be caused due to many ground level nuclear explosion. It is lead to fall in temperature in the northern hemisphere to 25°C.

Solutions -

1) The effects of air pollution can be nullified by reducing emissions of pollutants to harmless levels.

2) It is easier to provide equipment for pollution control if industrial plants are set up in specific areas.

3) The courts have intervined to reduce pollution by automobiles by the use of purer fuels and introduction of eco-friendly car engineers.

4) Forest - Causes of environmental degradation.

i) Many natural resources are shared and the tree value is not known.

ii) The government's policies subsidize environmental pollution.

iii) The exploitation of renewable, resources occurs beyond capacity.

- iv) It Inavailability of adequate assets for people to exploit the environment.
- v) Uncertainty about environmental problems is making it difficult to deal with the issue of environmental degradation.

Various aspects od degradations.

- 1) Deforestation - the rate of depletion of forest is high, various causes are responsible for deforestation.
 - i) Overgrazing.
 - ii) Shifting cultivation.
 - iii) Commercial tree felling.
 - iv) Extracting bamboo and eucalyptus plantation.

Consequences.

- 1) Soilevosion.
- 2) Silitation in the rivers.
- 3) Forest undergrowth.

Effects -

Many rural and tribal people depend on forest products for their survival. Forest provide them with fuel, fodder etc. Therefore deforestation affects this people to a great extent.

Solution

Preventing deforestation - this is done in the following ways –

a) The government enacted the forest act, 1 980 which was amended in 1 988. A encourages the involvement of local communities in the envolevement of local communities in forest management. Subsequently the joint forest management {JFM} programme was implemented throughout the country. Under this programme village committees in collaboration in the forest department have started protection and regulating the use of nearby forest.

b) Another important act is the panchayats act 1 996..This act uses the concept of community property by transferring the ownership of minor forest produce to the gramsabha.

c) Recomendations were made to implement biodiversity legislation. However more such act has yet been passed..

2) Carrying out afforestation - it is basically done by encouraging the planting of trees. Following measures were carried out –

a) During 1 970's social forestry schemes were launched. TheseJShemes allowed villagers to enjoy the benefits of trees they plant and preserve.

b) An innovative afforestation scheme 'Smriti Van' was started by a voluntary organisation 'Nisarga Sevak' at Poona. According to this scheme a new sapling was to be planted in memory of any pleasant or painful events.

c) Afforestation of areas near the sea be done by planting mangroves. The land near the sea will be protected from excessive salinity and crops can grow in the neighbouring regions. Harmful effects of Pollution & Industrial Dumping Ozone depletion

Carbondioxide was once thought to be exclusively responsible for the green house effect. But now it is known the chlorofluro carbons CFC's are not only dangerous but destroyers of stratospheric ozone layer.

When the scientist first warned in 1970's that CFCs could attack ozone the USA responded by banning their use of spray cans. But the rest of the world continued to use CFC. The threat became far clear in 1985 when researchers reported a hole in ozone layer over Antarctica. It is an annual feature noticed in every October. The major problem to CFC substitute is its high cost of production. The proposal is not hopeful but its a small price to pay for curbing the green house effect and saving life saving ozone.

Green house effect

Green house effect is a mechanism which causes global warming without a heat trapping blanket of naturally occurring carbondioxide the earth would have had an average surface temperature of only 0°C instead of 24°C. Average temperature on Mars is -12°C because there is very little carbondioxide. Whereas the surface temperature (average) on Venus is 350°C because carbondioxide is present in large quantity on Venus.

On the earth the sun radiates energy in the form of light waves that pierce easily into the atmosphere on earth. These waves are absorbed by land, water and life forms. The upper part of the atmosphere screens out a great deal of ultraviolet portion of the sunlight and the clouds in the lower atmosphere reflect and scatter some of the incoming sunlight before it reaches the surface, although the atmosphere is still heated slightly in the process. Much of the heat absorbed during day time is radiated back towards space in the form of larger infrared waves, which are less energetic and then can not pierce through the atmosphere as easily as sunshine. As a result some of them do not pass the blanket and heat is thus trapped in the atmosphere. How much heat is retained depends upon how much carbondioxide is in the air..

Causes –

The flow of carbondioxide on earth earlier was caused by only natural processes. But with the arrival of industrialisation,

carbondioxide started releasing in large quantity when wood and other fossil fuels such as coal oil and natural gas were burnt. The release of carbondioxide is much faster than what plants and oceans can absorb or handle.

On the other hand there has been a wide spread cutting of trees, hence no trees are available to soak up this carbondioxides.

Carbondioxides is not the only green house gas, chloroflorio carbon or CFC is one of the powerful green house gases which destroys ozone layer. Other gases are Nitrogen gas and methane. Nitrogen gas is released in auto exhausts and power plant smoke stacks. Methane is generated by bacterial living in guts of cattle and termites and rotting garbage in landfills.

Industrial Waste :-

Industries are the processing units. The raw materials procured from natural resources go through these units and leave behind waste of raw material in various form like solids, semisoids and gases.

The use of fossil fuels in industries and power plants emit smoke and several gases, causing air pollution. Metallurgical industries separate impurities in all forms and dispose off on land in air and water. Spoiling their qualities. Refineries, petro chemicals corporations, ago-chemical industries, dying and bleaching units emit out harmful gases such as chlorine gas, Sulphurdioxide and Nitrogen gas etc.

Paper industry, sugar industry, leather industry dispose off liquid waste and spoil land and water.

Industries in the western countries find it easier and less expensive to ship their wastes to India where pollution control norms one weak or enforcement is non-existent. Thus dumping of waste contains zinc ash and lead acid battery scrap and adds to water, land and air pollution and poisoning the envrionment.

The developed countries not only transfer their burden to the developing nations but also transfer their old outdated technology which involves highly polluting process of manufacturing eg. leakage of methyle isocynate caused Bhopal gas tragedy.

Over use of plastic -

If we have to name today's modern world, we can call it the plastic age. Use of plastic was not as wide spread 30 years ago as it is today. We remember using glass containers, paper bags and clothhas now been substituted by plastic ones. We get milk in a plastic bag, ink, oil,shampoo, cleaner, cold drinks every thing is available in plastic bottles. Today there is no need to carry a cloth

bag to the market as even vegetable vendor, himself provides you with a polythene bag. In the rainy season, we need not worry about getting one books or other thing wet, as a sturdy plastic bag protects it from rains. We have reached to the extent of using even ornaments made of plastic.

Popularity of plastic has spread like a wild-fire and it has become indispensable to us. It carries certain plus points. Plastic is cheap and light. Moreover it looks quite attractive. It is smooth finish and pleasant colour catches our attention and we can not resist using plastic tumblers, boxes, brooms, and bankets, ornaments and toys. Plastic toys are the safest ones for children as they do not have sharp edges and are light in weight.

In the plastic age, we tend to forget that plastic makes the worst waste product. We cannot destroy it. It is not biodegradable like glass, paper, wood and cloth but remains underground for thousand of years. We often find polythene bags lying in water sources, by the road and in open drainage systems. We find these thin polythene bag, flying around the garbage dump where cattle eat them by mistake and die a terrible death. These polythene bag often block the drainage system and allow the water to

Now as we are realising the dangers in over using the plastic and it is our duty to curb the habit of using this headful gift of science. Following are the strategies involved in conserving some of the important natural re-sources.

1) Land - Conservation of land is related to conserving the soil. Every year topmost fertile soil is lost or soil erosion is taking place at a greater rate. This particularly hazardous for the agricultural countries. Hence various strategies to control soil erosion and to improve the quality of soil are necessary.

2) Offering a menu of techniques inspite of promoting a single method of soil conservation, it is necessary to provide a variety of techniques and allow the farmers to select as per the local circumstances.

3) Contour - based cultivation contour is the line joining points of equal height. It is carried out where the land is uneven, Wience land levelling is carried out. This not just reduces soil erosion but also increases agricultural productivity by increasing the cultivated areas.

4) Agro forestry and integrated crop and livestock techniques - agro forestry involves combination of crops and fruit trees. Integrated crop uses methods such as crop rotation and multiple crop. Integrating animals into farming practices is also adopted as an important strategy.

5) Planting reliver grass - grass has a basic capacity of improving fertility. Since its roots are strong. A type of grass viz. reliver grass is especially used to improve the soil fertility.

6) Controlled irrigation of land - when water logging is a problem reducing irrigation water supply is one of the solutions. Other methods such as drip and sprinkler irrigation systems are used.

Conclusion of resource management certain aspects need to be emphasised.

a) Natural resources are limited - it is necessary to respect the scarcity and limits of natural resources.

b) Shared natural resources - since natural resources such as air are shared, it is difficult to pinpoint responsibility. Hence efforts need to be co-ordinated.

c) Reducing wastage of natural resources - Proper policies, rules and regulations should be implemented to reduce the wastage.

d) Clarifying property rights - when people have open access to forests, lands of fishing grounds, they tend to over use them. Clarification of property rights helps, conservation of natural resources.

e) Contribution of all people - it is especially important to identify target groups to mobilize their efforts. For eg. in rural Indian women are responsible for collecting resources from nature. Hence mobilizing their efforts is necessary.

15.6 REFERENCE

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15.7 QUESTION

- 1) Explain in detail about the depletion of resources and its impact on local communities.
- 2) Explain various types of pollution.



TRADITIONAL SYSTEM OF RESOURCE MANAGEMENT

Concept

16.0 Objective

16.1 Introduction

16.2 Human adoption to eco-system and the concept of Panchtatva.

16.3 Modes of living in different ecological conditions.

16.4 Preservation of natural environment through culture.

16.5 Traditional system of irrigation management.

16.6 Traditional system of forest management.

16.7 Urban environmental systems.

16.8 Reference.

16.9 Questions.

16.0 OBJECTIVE

- 1) To make students aware about the biological and socio-cultural adaptations in human being.
- 2) To familiarize students with traditional knowledge about the environment.

16.1 INTRODUCTION

Man is a social animal. Yet he is peculiar and so different from all other animals. The differences when analysed turns not on anatomy and physiology but in behaviour and what he has accomplished. The difference is clear but its cause they way in which it developed and its essential nature are not easily described or analysed.

Early man was a predator, a prey and a host for parasites and also a general sort of scrounger of oddment like fruits, nuts and insect grubs. It is clear from the early cave drawing, for instance that he quite early learned to rob the bees nests of their honey. There is no general ecological word for this miscellaneous collecting activity of an organism as the term collecting is used with the development of tool making and using mans collective activities extended greatly. Stone age man must have acquired an extra ordinarily detailed knowledge of the possible utility of the animals and plants among which he lives - as a source of food. It is sufficient man learnt to domesticate grasses and animals which made possible the rise of complex societies or civilizations, and the planet to support the present number of people.

16.2 HUMAN ADAPTATION TO VARIOUS ECO-SYSTEMS AND THE CONCEPT OF PANCHATRA

Man is adapted to survive in the diverse ecological conditions from arctic to equator from mountain to oceans from wet land to dry lands etc. Man has to adapt himself with the changing environment in order to survive. In the struggle for existence those "well adapted" were fit to survive while the others not adapting according to changing environment eliminated in the course of evolution.

Hinduism states that the natural environment is a manifestation of divine nature itself. The order of creation was Akash (Space), Vayu (air), Teja (energy), Aap (Water and Prithvi) (earth). There are known as the 'panchatva'¹ or the five elements. Hindu code of conduct strives to create harmony for the individual not only within the established societal order but also with the natural environment.

a) Biological adaptations - Traces of adaptation are seen in the form of biological adaptations as well as social cultural adaptations. Pigmentations of the skin, development of the subcutaneous fatty layer in the region of shins, storage of fat in particular part of the human body are common examples of biological adaptations. But it is true that today all these features are of less importance. Because of advancement of technology and inventions of artificial means of protection, man can easily combat with adverse climate conditions. We can say that man's direct dependence on the natural conditions is constantly decreasing. However social and cultural adaptation is in an increase owing to his mobility.

b) Socio-cultural adaptation - Every human society has its own distinct culture with regard to food they eat, garments they wear, rites and rituals of births and deaths and marriages mode of livelihood, means of recreation and several other activities. Not only this a variety of life styles are seen all over the world. If we think of India all over, we find that although the basic cultural network is same, there is a difference in life styles of people, living in different regions. These differences are mainly due to geographical and climatic conditions of that particular region, availability of resources in that particular region. According to the above mentioned reasons, the mode of livelihood changes, eating habits change, means of recreation change and the lifestyle appears changed on the whole.

People living in deserts of Rajasthan like to wear bright colourful & dresses, in order to add some colour to their lives, on the other hand people living in Kerala, Orissa, Assam wear white clothing as there are enough colours in the natural area itself. People residing in Punjab eat wheat and lot of milk products, whereas South Indians eat rice, owing to the variety of crops they get in their area. In Maharashtra, we can mark difference between Vidarbha and Konkan

region. Staple food of Vidarbha is Jowar where as Rice is the staple food in Konkan.

Dances of plains and hills differ in nature because of geographical differences. In plains lot of foot work and action can be seen in dances whereas hill dances are contended with hand movements. People living near forest worship tree gods, snake god and forest god etc. because their lives depend upon nature. But urbanites give much importance to nature gods.

16.3 MODES OF LIVING IN DIFFERENT ECOLOGICAL CONDITIONS.

People living in evergreen forests of AMAZON river basin and Congo river basin depend mostly on nature. Main occupation of the people here is collecting fruits roots and bulbs in the forest, hunting animals and fishing in rivers.

Due to marshy land people build their houses on treetops, even animals prefer to live on trees. People need less clothing because of hot and humid climate.

In India people living in near forest depend on gathering jungle wealth collecting. Tender leaves for bids making, selling herbal medicines, honey, gum, rubber, wild berries etc. are the main occupations of the people. Very few of them are involved in agriculture. They celebrate their festivals only in harvest period where there is enough to eat and hard work is over.

b) Grass lands -

As grass is the main vegetation in this region, grassing animals are found in great number. Mostly they raise animals. Animals such as goats, sheep, cows, bullocks, horses, donkeys are commonly found because of extensive meadow pastures. The staple food is mostly meat, milk and milk products. In remote areas people lived in the tent, made of animal hide. In these areas animal husbandry is carried on a commercial scale. Along with the production of meat and dairy product, wool of good quality is also obtained. Making blankets of wool and preparing and selling wool is one of the occupations.

c) Deserts -

The climate in these regions is hot and dry. Due to scanty rainfall, very little vegetation is seen here. Thorny bushes are found which draw moisture from deep down the ground. Tall trees of dates are found in desert region. Camel is a desert animal who can go on without water for deep together and protects himself from dust storms by closing its nostrils. It is useful as a means of transport. In the deserts of Rajasthan camel milk is consumed by tribals. They obtain many more things from animals, such as milk, meat, wood

and leather from camel, horses, goats and sheep. The wool and leather serves them for shelter and clothings.

16.4 PRESERVATION OF NATURAL ENVIRONMENTS THROUGH CULTURE –

Cultural traditions and thoughts have provided ideological base and legitimesy to the present environmental movement in India. The cosmological view of the vedic upanishad and puranic traditions and literacy imaginations enriched by facinating symbols and idoms of the relationship of people with the nature have provided the main mode of communication. According to Vandana Shiva a renewed ecological -for the culture of Asia, the forest has always been a teacher and the message of inter connectedness and diversity, menew ability and sustainability for cultures of Asia the green movement has emerged from the forest field and rivers of Asia. India has prided herself as a forest culture - An Aranya Sanskrit!. Some of the Sanskrit Shokkas from Varaha purana¹ and 'agni purana' show that how nature was perceived with reverence and understanding for its benevolence towards the rankind.

The Sholkas says -

- 1) The man who plants shady trees, yielding fruits and flowers for the gratification of all living creatures, attain the highest bliss.
- 2) The man who plants thristy trees with shades flowers and branches, yielding fruits, never goes to hell.
- 3) Those who aspire for the highest good ought to grow plenty of trees and bring then up like sons, for trees are considered to be sons according to religious perceptions.
- 4) The trees by providing shade and shelter to by passes nests to birds, medicines to living being, through their leaves roots and bark, benefit them all. This is called the five fold sacrifice 'Panchayagna¹ of the tree.

India has received wisdom for carefully cultivating the wonderful form of nature through its ancient cultured traditions and sources. In the 'prithvi sukta', the mankind is given advice to discriminatedly use the resources of nature in order to conserve the earth. Protection of birds, animals, and vegetation is the norm of hindu religion. It naturally assumes the protection of living being. In the Hindu mythology of 14, 'Avatar¹ (Births) of the god Matsya (fish) Kurma (turtle), Varaha (pig) Narasinha (Lion) etc. signify the divine forms in such animals arid thereby making their lives secured.

16.5 TRADITIONAL SYSTEMS OF IRRIGATION MANAGEMENT.

Agriculture was the main focus of concern about productivity, and irrigation management the main aspect of environmental management for most of Indian history. As inhabitants of a powerful and sophisticated agricultural society, Indians have from the beginning constructed and used artificial irrigation systems to make their fields productive. These traditional systems included methods of controlling flood (through embankments) dams, especially diversion dams canals tanks, reservoirs and takes lift irrigation systems and wells/They existed both at the local as well as at the supra village level and were built and managed both by centralised states and kings as well as local village landholding collectivities.

In Maharashtra, there are records of Shivaji's encouragement to the people to construct dams and repair old ones, plots of..... land were granted to headman who led such activities. The Peshwa government from the middle of the 18th century encouraged dam construction by paying for the materials and the wages for skilled labour such as masons and carpenters, while villagers provided unskilled labour.

The phad system on tributaries of the Tapi in northern Maharashtra, dating at least from about from centuries, back is an example of village managed irrigation system. This included bandharas on the rivers to stop the storage reservoirs, and canal systems. Channeling water to farmers fields. The area getting water was divided into phads, usually four with sizes varying from 10 to 200 hectares. One specific crop was planted in each phad, in rotation so that an equivalent were planted. Most farmers would have land holdings in each of the phads. Decisions about cropping patterns were made collectively and the water was distributed to all the farming families. Canals were maintained by the village as a whole, while smaller diversionary channels were maintained by the individual farmers.

In North India, wells were the main sources of irrigation. Different devices for lifting water from wells into fields were used, the most sophisticated being the Persian wheel, made of wood, rope and earthen pots, with a gear wheel drawn by draught animals going around the circle. However canals are heard about from the 14th century onwards. Under the Tughluqs, especially by Firuz fughluq networks of canals were created, including some very large ones. Some in the Multan region one said to have been created and maintained by local population. The Mughal state also concerned itself with irrigation and began the construction of canals from rivers. One of the largest, built by Shahjahan near Delhi, was the Nah -1 Faiz, over 150 miles in length. Traces of other canals are

found all over the Indus plains. The Mughal state also advanced loans of cultivators for erecting dams or bunds on their own.

Thus the level at which traditional irrigation systems were built and managed varied. While the larger systems were built and controlled by the state, or Kings, smaller ones were controlled and built at the village. Usually even of the larger systems depended on links with local control and management also. This control of irrigation systems or control of water, both reflected and maintained the social structure. On the one hand the larger states gained or good deal of power from engineering and controlling irrigation.

16.6 TRADITIONAL SYSTEM OF FOREST MANAGEMENT.

In theory, the state claimed ownership over all the land in traditional India. The Arthashastra distinguishes two major types of forests "elephant forests" and "productive forests" (mainly supply timber, but including also other products. The king is urged to demarcate forest areas, to set up animal sanctuaries within them, and to establish factories for goods made from produce of the forest as well as settlements for forests. Elephant forests were those which provided the most important animals for warfare. The king is also urged to allot land in forests for ascetics for some plantations and vedic learning. Dues were levied for rights to collect forest produce, and the income from sale of forest produce and the products from factories based on there also belonged to the king. An official known as the chief superintendent of product forest was given responsibility for all of this including creating enclosures for deer and other game animals.

Besides there, recreation forests were specifically created for the leisure of the king and his nobility and for hunting. This period saw the beginning of the tradition of Indian parks with the Buddha and his monks often, put up in some very famous parks. Ashok's edicts also indicate a concern for planting and protection of trees. One edict recommends "the king - thus enjoys that medical attendance should be made available to both man and animal, the medicinal herbs the fruit trees, the roots and tubers, are to be transplanted in those places where they are presently available, after being collected from those places where they usually grow, wells should be dug and shady trees should be planted by the roadside for enjoyment both by man and animal. Up to the time of the Mughals, rulers considered the maintenance of park to be a major part of beautifying cities and providing for recreation and Indian parks became famous throughout the world.

Otherwise forests were mainly viewed as areas inhabited by wilder and perhaps dangerous tribes, travelling through them was often dangerous. Because there was always a process of clearing land

for agriculture, which was viewed as more valuable, there was always some tension regarding land - management uses between agriculture and hunting.

In practices pre-colonial India, the state did not control most of the forests as effectively as the *Anthashastra* implied (this control really came during the colonial period). Most often they were effectively controlled by the tribal groups who inhabited them. The existence of Jungly tribes seen as inimical during this period suggested such areas out of control. Once the power of the central state broke down, large forests often marked the boundaries kingdoms are areas of dispute. Tribal groups or *advasis* inhabited forest areas had their own practices and beliefs about maintaining the forest and the wildlife in them.

Forest lands near villages were another matter. These were often used and controlled locally by villagers as "common" lands. Their products escaped state taxation, though sometimes they served as forms of tribute given by local chieftains or rulers to them overloads. For villagers who lived in the hilly or mountainous areas, forests normally provided crucial resources, fodder for animals, fertilizers for fields, timber for building fuel, medicinal herbs etc. Very often specific forest groves were kept near the villages. Particular trees being planted and protected with sophisticated systems of conservation. The management of these was not 'political' by the various levels of the state on with irrigation systems, but rather 'social'¹ through customs and traditions. Very often forest lands were treated as sacred groves and respected as such, in the Himalayan foothills. For instance, deodar plantations were very often found. The use of forest products including timber and roots was often regulated and used only at culturally specified times. In many cases there were rules that prohibited lopping of leaves in hot weather, and grass cut by families was regulated. The penalty for breaking of these rules could be social boycott or exclusion from use of common forest. This practice of maintaining 'sacred groves' is an illustration of the way religion functioned in traditional society for ecological balance.

There are some famous stories of forest protection. The most well-known is that of a sect in the Rajasthan desert, the *Binnois* who protected the multi-purpose leguminous *Khejadi* tree with their lives, is well known. Some 350 years ago when the prince of Jodhpur attempted to fell a grove of *Khejadi* trees for firewood, seven *Bishnory* gave their lives to prevent the cutting of the trees. The *Kejadi* trees were used for fodder, manure and fencing material.

16.7 URBAN ENVIRONMENTAL SYSTEMS.

It is ironic that urban pollution and disposal of waste has become a major problems for Indian cities today, since India had one of the

earliest sophisticated drainage system known in the world. British rule and the destruction of traditional systems.

Finally we look at the effect of British rule on a traditional system of environmental management. By and large British neglected the local level tanks and other forms of irrigation, and though they tried to maintain the larger systems, for instance the Grand Anicut, it was often not done effectively. Too often a simple orientation to recovering investments and making the systems immediately profitable simply increased the debt burden on peasantry. Indeed, Mahatma Phule, wrote eloquently of the problems of farmers in periods of drought and of the burdens laid by British engineering.

There is no measure so that farmers can get water at the proper time to avoid their crops being scorched to ashes. Also, would not be logical for these white and black engineers who swallow salaries of thousands of rupees a month to have the capacity to measure out water from reservoirs and give just what is necessary to the Owners of the fields around? Peasants forced to give adulation to the workers who release the water? Finally, when the farmers can't get any water from them and ask recompensate to the cunning officials above them, they receive only a barrage of arrogant speech making rather than water (Phule).

The British did begin many irrigation projects they set up large scale canals dams and other projects which resulted in increased productivity. However they also saw increased problems of water logging and disease. The faults of over centralization, bureaucratization and deprivation of local communities that are seen in irrigation systems today had their origins in British period. Traditional knowledge of natural environment and its relation to science - Rabindranath Tagore say that contemporary western civilisation is built of brick, iron and wood. It is rooted in city. But Indian civilisation has been distinctive in locating the source of regeneration material and intellectual in the forest. Indian best ideas has come where man was in communication with trees, rivers and lakes away from crowds. The culture of forest has fulfilled the nature of Indian society. The unifying principle of life in diversity of democratic pluralism thus becomes the principles of Indian civilisations. Rivers have been perceived and used in the total integration of their relationship with rainfall, mountains forests lands and sea. Natural forests in catchment areas have been viewed as the best mechanisms for water control and flood control in Indian thoughts.

16.8 SUMMARY

The concept of 'Panch Mahabhuta' that is sky, air, water, fire and soil, in the Indian philosophical and mythological traditions constituting every living being has its relevance in the concept of

ecological balance and wellbeing of the earth in the modern ecological science. The concept suggests the organic relationship interdependence and continuing exchange between the five elements of the cosmology. According to these traditions the world of human being animal world the flora and the fauna is possible because of the existence of these five elements. There are the givers of life in modern terms 'the life supporting system'.

16.9 REFERENCE

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16.10 QUESTIONS

- 1) What are the different types of human adaptations ? Explain major difference between life styles of forest desert and grassland ?
- 2) Write in short about the preservation of nature in ancient time ?



17

ENVIRONMENTAL STRUGGLES/MOVEMENTS/PROTESTS

Concept

17.0 Object

17.1 Introduction

17.2 Debate about gender and environment various perspectives on women and environmental struggle efforts towards reducing environmental degradation. Major environmental movements in India Inaction of the State Governments.

17.3 Summary

17.4 Reference

17.5 Questions

17.0 OBJECTIVE

- 1) To make students aware about gender and environment highlighting women's role in the use and management of natural resources.
- 2) To familiarize students with the involvement of women as an activist for the protection of environment.

17.1 INTRODUCTION

Women as a gender were traditionally given an inferior status and hence were dominated and exploited by men. Slowly and gradually feminism as a reactionary movement developed which focused on the causes of exploitation of women. Women's problems and issues, as well as generating an awareness to emancipate women.

This movement was significant in generating strength within the women. On the other hand the movement for the saving the environment was also taking place simultaneously. Combination of the women's movement and environmental movement led to a new concept known as eco-feminism. According to eco-feminism too women and nature were similar to each other not only in terms of their life-giving and nurturing capacities but also in terms of the exploitation, both suffer at the hands of men.

Hence women share a very special relationship with nature and hence had an important role in eliminating the exploitation of nature as well as their own subordination. This was one significant factor which denoted women's movement and its important relation to environmental degradation.

17.3 DEBATE ABOUT GENDER AND ENVIRONMENT.

In the recent years there has been a growing debate about gender and environment highlighting women's role in the use and management of the natural resources. There are a number of studies which have shown that environmental degradation is a gender process, generated mainly by human exploitative activities. These studies have shown that the poor and marginal groups, especially staying in the rural areas, and who depend directly on nature for their subsistence or survival process are most affected by environmental degradation. In the last few years the focus has increasingly been on the specific suffering of the poor and marginal women, especially in the developing countries.

It is considered that environmental degradation influences women in a detrimental manner. This is because women are mainly responsible for providing fodder, fuel, water for the household. Lack of access to these resources affects women to a great extent. Women spend a lot of time in collecting these resources and hence the lack of availability of these resources leads to serious implications.

To respect to natural environment, women have an intimate connection. In the agriculture setup, rural women remain engaged throughout the day in activities such as collecting water from natural resources collecting wood and dry leaves and twigs as well as wastes which act as important sources of fuel. Hence, women shared a special relation with nature; all this factors are a part of the physical environment. Women and environment linkage has been a strong characteristic feature at the United nations conference on environment and development in Rio-de-Janeiro in Brazil in 1992. It was also was considered strongly at the conference on women in Beijing in 1995. Over the years the claim that women's relationship with environment is as distinct as that with men as resulted in various perspectives.

Various perspectives on Women & Environment Struggle

All this perspectives project women as users and managers of the environment in their everyday interaction with the nature. Women's role as homemaker as well as caretakers within the family is considered as a significant factor. Moreover, the problem of environmental degradation is also closely associated with the issue of women's health. It has been observed that the release of toxic waste material into the various aspects of environment makes woman its significant victims. Thus environmental degradation affects women's health in a more adverse manner. Thus on one hand environment degradation negatively affects the women's role as homemakers as well as make victims of ill health.

This has generated the idea that since women suffer the most due to environmental degradation, they play a special role in mobilising and organising a successful struggle against environmental degradation.

A general focus on women's current role and function has changed over a period of time. In the earlier period i.e. in 1980's women were seen predominantly as only the victims of environmental degradation. According to Vandana Shiva women are victims not only of environmental degradation and natural disasters but more importantly are also the victims of man-made scientific disaster as there resource basis for staying alive have been undermined and eroded. As a reactions to these problems women slowly and gradually have started organising themselves against there problems. Finally in the late seventies and eighties a shift took place at looking towards women. It means women were not only pictuarised as victims but more importantly as activities or agents of change as efficient managers who basically mobilised and directed their efforts towards reducing environmental degradation.

Women as Activist emerged in the Western countries eg. can be given of the struggle of housewives in USA in 1979. It was discovered that their neighbourhood was built next to 20 thousand

tones of toxic basic which led to cancer in the community as a reaction 19,000 families and especially housewives, mobilised and organised a successful struggle. Therefore fought and formed re-location. Because of their struggle the U.S. government set up 1:6 billion toxic waste gutters for environmental movements.

Significant example related to the Indian society can be given of two movements namely the Chipko movement and Narmada Bachao Andolan both these movements are important environmental movements in India and both have witnessed or significant participation and involvement of women activist. The Chipko movement for example was carried out to decrease deforestation. The main agenda of the movement was to cling the trees and thus prevent them from being cut by the exploiters. It was noticed that the rural women participated in large numbers in this movement. They hug to the trees and their organised efforts led to the success of the Chipko movement. Hence this Chipko movement has become a landmark in women's environmental movement in relation to reducing environmental degradation.

Another significant example can be given to the Narmada Bachao Andolan a movement to protest the Sardar Sarovar Dam Project. This project financed by the world bank will cause the displacement of thousands of rural and tribal people living on the banks of Narmada. Further more adequate rehabilitation of these people is not possible. Hence the Narmada Bachao Andolan was started under the able leadership of Medha Patkar her dedication and commitment towards his cause motivated the rural and tribal people especially the women. Their strength, unity and belief in their leader made the world bank have a stay order on the project to carry out a detailed analysis of the dam project.

Thus these two significant environmental movements and the success they have experienced is largely due to the contribution of women leaders, women activist as well as grass root workers.)

It has been noted that there is a difference of experience of women on environment, to this difference has led to shaping the perspectives of women environment. A comparison can be made between two district categories namely women relation with environment in the developed countries and their experience with environment in the developing countries. In the developed countries the focus is on life issues where in women have organised and mobilised their efforts to improve their life by reducing or eliminating environmental degradation. It means the struggle is not for survival on the other hand the struggle of women in the developing country is closely associated with the subsistence issue. It means women have protested against environmental degradation or it has attached their very survival.

Governments role

Controversy has surrounded several major development and infrastructure! projects in India during the last few decades, objections to there projects - whether they be dams, road, railway lines and fragile areas like wetlands and mangrove swamps -have centered on the extent of environmental degradation they will came. The absence of environmental consciousness in the decision making process has led to conflict between the project authorities and the local environment groups.

Since it was realise that environmental degradation or severe environmental crisis was a problems of a very serious nature. The environmental activists strongly believed that immediate action should be taken in order to overcome the problems in the 19th Century. U.S.A. played a key role in providing the foundation for environmental movements and green movements. There were about 3 or 4 movements in U.S.A. The first two were conservation movements from 1890 to 1915 and second in 1930 the third movement was in late in 1960's and early 1970's it became active in 1980's.

It was observed that the concern to protect the environment slowly and gradually spread to different parts of the world. Large number of policies and strategies were adopted by NGO's of different nation.

Major environmental movements in India.

The number of voluntary groups in India actively interested or involved in environmental issues, larger than in another third world country and matches with the number found in western countries. A large number of groups are concerned with protection of urban environment. Ills' the grassroots voluntary groups in rural areas, whose existence and number lends a distinct character to the voluntary movement.

Many rural voluntary group have begin to take up environmental issues in addition to their long standing concern for rural and urban poverty, social justice, inequality civil liberties and rural development. Their perspectives embrace not merely an understanding of the human impact on nature but sees this impact as arising out of the complex nature of social and political relationship between human beings. It is said that "what humans do to nature is essentially born out of what humans do to each other.

Alarmed by the destruction of the Himalaya, a group of activists led by Sundarla Bahuguna walked 4,870 km across the Himalaya range from Kashmir to Kohima in the marathon voluntary effort to educate the people. The march began in May 1981 and ended in February 1983.

The walkers had a grim story to tell Bahuguna says streams have dried up, hills are denuded and a desert is spreading fast from the middle Himalayas to its Southern foothills.

They found that there is a shortage of drinking water, and firewood. The Chenab valley of Jammu and Kashmir has become a big graveyard of fir, pine and other conifers. The hunger for wood has led to the conversion of large tracts of mixed natural forests into monoculture plantation!

The Kerala Sastra Sahitya Parishad (KSSP) started its involvement in environmental issues in the early 1970's. The activists then took part in investigating the pollution problems in and around the city of Cochin (Kochi). The Parishad has rendered significant services to the cause of environmental protection through scientific services. The number of Green NGOs have been working in the field of environmental protection from Chandigarh to Andaman - India's programmes endeavour to promote ecological security, to conserve biological diversity, to ensure sustainable use of the natural resources base, and minimize pollution and wasteful consumption. Another NGO is the Centre for Science and Environment (CSE) which is dedicated to promote the science and technology to the development needs of India.

Shrishti group is engaged in the protecting Delhi's greens with the support of citizens group resident associations, school and college students. They convened a Joint Forum for the Conservation of the Delhi Ridge. The Action for Food Production (AFPRO) conducts surveys for water resources and developmental activities in drought affected areas. The All India Women's Conference is working towards creating awareness of ecology among young women.

No doubt environmental degradation directly stems from uncontrolled emission of pollutants, release of toxic products and destructive exploitation of nonrenewable resources. Accordingly, a turning point came when a new organisation called the International Green Cross was formed in Rio de Janeiro at the time of the Earth Summit held in June 1992. The participants from 50 countries resolved to protect the environment by changing the values of humankind. They called this 20th century as warning and hailed the 21st Century as the century of human recovery and human revival.

In India Hindustan Lever Ltd. has started Zero waste programme. The company hopes to achieve zero level pollution by the end of year 2000. The Sulabh International is conducting training programmes in low cost sanitation. The Indian National Trust for Art and Cultural Heritage (INTACH) is monitoring pollution in Doon Valley and also flora and fauna in Andaman and Nicobar Islands. The Bombay Natural History Society (BNHS) studies the migration

of birds and their population in India. The society for development alternatives is engaged in designing environmentally sound and socially appropriate technologies. The environment cell of the Gandhi peace foundation is conducting studies on soil erosion, water logging and water harvesting system.

The action for welfare and awakening in Rural environment (AWARE), a Hyderabad based group has been working in activities related to environment in villages, Andhra Pradesh, Karnataka, Tamilnadu, Kerala and Uttar Pradesh. 'Kalpavriksha' is engaged in evolving a holistic environmental perspective. Bihar based Tata Steel Rural Development Society (TSRDS) has been working for the development of wastelands and social foresting in conjunction with government and other agencies. The Bhatia Agro Industries Foundation (BAIF) has been involved in studies on tress species capable of surviving in adverse conditions and irrigating them with polluted waste water.

Environment and development are mutually so intimate yet now so enimical as to compel the contemporary dialogue to take note of them. A great deal of thinking and rethinking about environment versus development in the academic circle has been articulated as existing pattern of interaction between society and environment in the name of development has turned to be pathological posing a threat to human survival.

Like other developing countries, India remained obsessed with the growth of 'everything big¹'. In free India, Nehru championed their building up of the big dam projects, big industries and big factories which he adored on the modern temples without realising its unanticipated harmful consequences, consequently in course of development, they turned to be the 'tomb stores' for our eco-system. Big dam projects such as Tehri dam, Sardar Sarovar, Bhakra Nangal, inspite of their success stories have proved ecologically disastrous. Problem such as poverty and growth of population are the great polluters in the third world countries today. The phenomena like large scale deforestation, soil degradation, and erosion, Creeping desertification and vital collapse of capacities of vast areas are attributed to poverty and unemployment.

Inaction of the State Governments -

- Kerala - Johon Jacob of Society for environmental Education in Kerala states that Government does not bother about environment. The government thrives on forest plunder.
- Pandurang Hegde of Appiko movement said that even when governments become aware of problems they prefer to sidetrack issues, for example the state government did not

ban the mechanised fishing, but offered' scholarships for students.

- Rajasthan - C. Kishore Saint from Udaipur reported that the Government in relation to deforestation in the Ariawall's did not pay heed to the urgency. A department of environment has been set up only recently. It is still in the process of defining its role. So for environmental problems of Rajasthan lack clear definition and therefore no proper policy formulation has been done.
- Madhya Pradesh - Dunu Roy of the Shahdol group wrote that the ^Environment Planning and Co-ordination Organization (EPCO) wanted to bring a report on State of the environment. However, that has yet to be published, instead government wants to bring out brochures for tourists.
- Karnataka - Appiko activists from Sirsi observed that State's forest policy is good but in actual implementation, these policies are forgotten. The Government has set up cement plants in evergreen forest of Western Ghats.
- Maharashtra - Sharad Kulkarni of Centre for Tribal conscientisation, Pune observed that the environment policies of Maharashtra Government are limited to pious statements. No efforts are made to check air and water pollution or to protect natural forests.

Legislation -

There are more than 200 Central and State Laws than can be interpreted one way or the other to protect the environment. The earliest of them, the Shore Nuisance Act, dates back to 1853. But laws enacted with specific intention of controlling environmental degradation have been slow in coming. This may be due to inadequate appreciation of environmental problem and partly became wrong notions about legislative competence. Until 1976 environment protection as such did not figure anywhere in the constitution. When the constitution was amended for the 42nd time in 1976, certain environmental provisions were incorporated.

Water act -As early as 1962, the Ministry of Health had appointed an expert committee on water pollution. The Parliament passed the bill in 1974. The water act is sweeping Pollution, sewage, effluent and trade effluent are comprehensively defined. The water (prevention and control of pollution) Act was passed in 1977 to help resources and control water pollution. The act prohibited the use of stream or wells for the disposal of polluting matter. However, the

water board does not have authority to directly deal with the erring industry and is required to approach the judiciary.

Forest conservation act - The important piece of environmental legislation has received very little attention. There are amendments to the Forest act of 1927. The mechanics of implementation are seldom made known to the public. Due to the Forest Act a lot of forest felling has been stopped.

The factories amendment act

The factories Act 1987, underwent a radical restructuring of its safety and health provisions in 1987. It placed increased responsibility on top management as well as manufacturers and suppliers. It stipulated workers involvement in safety management and disclosure of information on hazardous material.

Environmental (Protection) Act 1986

The significant provisions of the act one -

- 1) Making top management responsible for environmental protection and liable for prosecution.
- 2) Providing stringent punishment and penalties.
- 3) Empowering enforcement agencies to effect closure of polluting industries.
- 4) Giving rights to private citizens to file cases in appropriate courts against polluting industries.

17.4 SUMMARY

Both environmental movement and feminist movement went parallel to each other and influenced each other. Role of NGO's and government are equally important for the protection of environment. There is one major difference between voluntary and government agencies. Voluntary groups are non-political and therefore carry more weightage and credibility

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17.6 QUESTION

- 1) Explain briefly environmental movement in India.



18

RECENT EXPERIMENTS IN RESOURCE MANAGEMENT LOCAL INITIATIVES.

Concept

18.0 Objective

18.1 Introduction

18.2 Sustainable development

18.3 Impact of modern development projects on environment.

18.4 Recent experiment in resource management.

18.5 Summary

18.6 References

18.7 Questions

18.0 OBJECTIVES

- 1) To make students aware about the social and environmental implication of large dams.
- 2) To ensure students about the rights of future generations to their share of resources and use their new skills and knowledge for utilisation and management of resources.

18.1 INTRODUCTION

Development models were based on doctrine of modernity, the theory of growth material progress etc. Development and even human welfare was measured by economic growth. Initially till 1960s, development was measured by G.N.pq a country. Thereafter income was increased. Then the emphasis was shifted to funding for social indicators like educations, health etc. for the masses, later on general concept like basic needs, self, held minimum needs programme were accepted as development components. All this brought development closer to welfare of the people and more human. But still development was identified with physical and economic growth.

However four decades of experiences of planning and implementing great and ambitious projects_for rural development, industrial and social development brought out that without relating to people and the nature, development will not succeed. Merely providing inputs or providing for infrastructure (road, energy, communication etc.) cannot be equated with genuine development. It has to be man centred and nature centric and endogenous. That means a part from ensuring participation. Its continuous energising drive must come from within the community and ultimately development must aim at and lead to self reliance of the people.

18.2 SUSTAINABLE DEVELOPMENT

The concept of Sustainable development is accepted by all societies in the world because generations after generations have lived on this mother earth which should not be defaced. The ecology, the biosphere and the environment should remain unharmed during and after any kind of change made to any component of environment during the process of development to meet the human wants and for human welfare. Sustainable development will sustain the human race in a healthy environment with a management of environment in the best possible manner.

There is a fundamental interdependence among the world's environments. The physical biological and social surroundings and their interaction will sustain all life forms and the objectives of human development^ Human development has generally been parasitic of the environment. Sustainable development has primarily 3 objectives economic ecological and social.

The economic objectives, broadly speaking are continued human and institutional efforts for development and growth, The ecological objectives are to preserve the basic health of the ecosystem to stagger the exploitation of replenishable resources to give time for their regeneration and to make judicious use of non-renewable resources. The social objectives may vary from guaranteeing equitable access to all human communities to the earth's resources, ensuring the rights of future generations to their share of resources and use their new skills and knowledge for utilisation and management of resources.

18.3 IMPACT OF MODERN DEVELOPMENT PROJECTS ON ENVIRONMENT.

a) Industrialisation, science and technology.

The process of industrialisation started around hundred years ago, and sent through various phases. The credit for this goes to the British colonist who introduced modern methods of manufacturing in this country. The traditional methods of production which were based on traditional and inherited skills and poor technology started disappearing as industrialisation gathered momentum. The traditional form of manufacturing was confined to rural areas and the modern methods were adopted in urban industries. .

Industrialisation has brought about a great deal of improvement in the lifestyle of people. It plays a great role in the development of advanced nations to such extent that the word industrialization has become synonymous with development. But the contemporary scientific and technological development has created a threat to our environment. This threat has reached to an extent that challenges the very existence of mankind.

The greater the benefits we create the more do we realise that we cannot afford to ignore the changes brought in the biosphere by our modern productive activities. Nature takes its revenge for each of our so called victory over nature. The production of material good increasingly involves the depletion of non renewable traditional natural resources and the unconsidered disruption of important link between individual components of bio-sphere, destroying its life supporting system. Such as excessive soil erosion, transportation and disposition of soil and deforestation.

Urbanisation means the redistribution of population and a change in the demographic balance between rural and urban areas. Generally urbanisation is brought about by the following factors namely –

- 1) Reclamation of towns by which some large villages, as they grow, come under urban area.
- 2) Massive migration of rural population to urban areas due to natural disasters like floods and famines or war and partitions.
- 3) Normally migration of rural folks to urban areas taken place in search of better job opportunities, higher income, higher standard of life etc.
- 4) Many a times rural folks are simply pushed out of their villages due to absence of jobs, no means of livelihood, overburdened lands and heavy debts etc.

Impact of urbanisation are -

- 1) an increase in urban population increase the demand for firewood and oil based fuels like kerosene.
- 2) additional food requirements of urban areas create excess demand for energy.
- 3) due to shortage of housing slums are created. Slum conditions give rise to many social and environmental problems.
- 4) Provision of water and other basic necessities and providing amenities becomes a problem owing to constantly growing urban population.
- 5) Waste disposal becomes a problem which leads to several health hazards.

Due to globalisation world is becoming smaller in modern times. With the setting up of UNO, World Bank, IMF and other international organisations, the process of the world coming closer, got momentum. The process has particularly got intensified after the countries of the world experienced the

devastating effects of two world wars that affected almost all economics of the world, developed as well as developing. The countries of the world then slowly moved towards co-operation in the fields of economic social and political fields besides the issues concerning welfare of children, health, education etc.

The recent term invogue globalisation has been used mainly interns of liberalisation of world trade but which encompasses wide scale repurcassions on social, cultural, ecological lives of the people of different countries, particularly the developing countries of the world besides economic and poliitical. Globalisation aims at world trade among all the countries without any hurldes and free movement of good and services among them. Overly it seems to be a proposition which is likely to affect the developing countries in particular in various way on social, cultural and political fronts. As profit motive will be a major consideration, as markets open up the entry of MNCs in these countries is likely to lead to increase in unemployment rising social tension, consumer, leading to destruction of forest increased water and air pollution which are the side effect of industrialisation and urbanisation.

b) Industrial disaster -

Bhopal gas tragedy - causes and consequences.

The union carbide corporation, a U.S. based multinational chemical corporation was operating a giant pesticide plant on the outskirts of Bhopal city. On December 3rd, 1984 an accident occurred which was probably caused by the introduction of water into toxic Methyl isocynate storage tank. This resulted in a powerful and uncontrollable reaction generated by liberation of heat. As a result the deadly Methyl isocynate escaped in the form of a gas. This gas killed thousands of human beings blinded many more and also harmed the people living nearby in different ways.

The human rights activists the environmentalists and humanitarian groups arose against the callousness of MNC authorities who tried to play down the extent of tragedies. But their negligence was exposed by the non-governmental organisations and supported by national and international media. The Bhopal tragedy is considered as perhaps the tragic episode of the poisoning of the environment in human history with international dimension.

Love canal tragedy

Often industries do not care much about the disposal of industrial waste. Their policy is out of right out of mind. But this policy sometimes creates disasters. In 1977, resident of a suburb near Niagara falls New York discovered chemical smells and chemical burn in children playing in Love canal. Their complaints were ignored. Afterwards they observed the leakage of chemicals into sewers, gardens and basements of the homes next to the canals.

The whole story was as follows - during 1940s and 50s an American chemical company - the Hooker chemicals and plastics corporation disposed of its industrial waste properly according to the standards of that time. They sealed the waste in metal drums and buried them in a place called Love canal near Niagara falls New York. After many years a housing complex was built in that area. And in 1977, the resident found out the leakage of hazardous chemicals from badly corroded metal drum. The chemicals bubbled to the surface, found its way into ground water and ended up in backyards and basement. Informal health surveys conducted by the resident, revealed an unusually high incidence birth defects, miscarriages, assorted cancers, severe respiratory and kidney disorders among people who lived near the canal.

Global warming is the increase in the heat seriously threatens the global climatic equilibrium that determines the pattern of winds, rainfall, surface temperatures, ocean currents and sea level. The earth's temperature is increasing by 0.7°C per two decades. According to Prof. Willum Mevell of USA, the rising thermal level of Earth will result in melting ice-caps and glaciers which in turn will increase the water level by as much as 9.3 cm. This level is likely to increase further when other peaks begin melting. All the coastal cities and parts thus will be flooded and a major disaster will occur. When atmospheric pollutants like sulphurdioxide and nitrogen oxide combine with water vapour, sunlight and oxygen in the atmosphere they create a dilute soup of sulphuric and nitric acids which comes down to earth in the form of rain, moist snow crystals or dry depositions. Acid water contains increased concentration of toxic heavy metals such as mercury, aluminium, manganese, lead and zinc. Aluminium toxicly clogs to fish gills and suffocate them to death. Acid rain leaches crucial nutrients such as potassium magnesium and calcium from soil, depriving trees and other plants of those life supporting elements, Acidic deposition poses a threat to various resources on earth eg. lakes and aquatic life, forest and vegetation, agriculture and wildlife and also to various buildings and monuments.

A very high nuclear contamination of wastes in the Pacific waste of Russia is noticed because of disposal of liquid nuclear waste by Russian's, Korean's and Japanese. Besides a dumping yard of decommissioned and wrecked nuclear submarines and naval ships of Russia have spoiled water and marine life, affecting human life. The problem with radioactive waste is that they cannot be burnt because the smoke would also be radio active. It does not get destroyed for thousand of years. The most dangerous by product nuclear power production is plutonium which is considered to be the most toxic substance on earth. Each nuclear reactor produces around 200 kgs of plutonium every year, enough to inflict cancer on every single person on earth.

18.4 RECENT EXPERIMENT IN RESOURCE MANAGEMENT -

I) Waste recycle - reduce, reuse and recycle are the three 'R's' which are going to play a crucial role in resource management in the near future. The first two 'R's' reduce and reuse are in a way quite obvious as they relate to resource conservation in a visible way. Recycle however comprises of use of resources in a modified form and mostly at place different than the one where resources in earlier from were used. To the society recycle offers a great potential of increasing resource consumption without increasing resource exploitation from nature. The resources here are generate from the waste. The term waste is called as 'misplaced resources'. Garbage has a wealth of these misplaced resources. Garbage contains plastics, glass, metals, papers and host of such resources. Selected recovery of these misplaced resources reduces burden of degrading them in environment.

There has been a significant increase in Municipal Solid Waste (MSW) in India in last few decades. This is largely because of rapid increase in populations growth and economic developments in country. Hence solid waste management has become a major environmental issues in India. It has been indicated that the growth in MSW in urban centre's has been move as compared to the population growth in recent years this trend can be related to changing lifestyles food habits and change in living standards. The MSW's in cities is collected by respective municipalities and transported to designated disposal sites. The municipalities however have limited resources or ill equipped on compared to the high cost involved in the collection, storage, treatment and proper disposal of MSW, as a result a substantial port of the MSW remains un-attended and increase in volumes at poorly maintained collection centres. The choice of a disposal site is also improper because the focus is on what is available and met on what is suitable.

Proposed intervention of waste management -

Waste management is a significant issue taking into consideration the negative consequences, arising out of the different types of waste. In order to have a satisfactory efficient and sustainable system of waste management the following aspects need consideration.

- 1) Targeting waste reduction at source.
- 2) Technological interventions.
- 3) Institutional and regulatory reforms –

Targeting waste reduction at source - Waste reduction at source can be accomplished in three ways as fees and tax incentives to promote market mechanisms to effect source reduction, by

changing for the environmental and economic cost of production and disposal of waste, market forces can be employed to improve the efficiency of waste management. The basic idea is to include the cost of disposal in the production cost. Technological interventions - India has lack behind in terms of adopting technologies for solid waste management. There are two aspects which require urgent consideration a) collection of waste and b) treatment and disposal of waste c) collection of waste.

Certain factors needed to be given importance as regards collection of waste 1) to modify the existing collection service structure 2) to provide community with waste bins, placed for the people to deposit domestic waste 3) to improve the facilities of door to door collection of waste 4) segregation of waste at source into bio-degradable and non-biodegradable components. This segregation would reduce the cost of transportation for the final disposal apart from this it would facilitate the conversion of waste into recycled products.

Institutional and regulatory reforms -

Proper and efficient waste management is important however it cannot be implemented due to variety of problems - a) financial constraints b) Institutional problems c) inadequate links with other concerned agencies, d) lack of suitable staff e) training and financial support to rag pickers.

II) Watershed management

A watershed is a land area where water is collected and then channelized to a lake, river or stream. "The watershed areas in agricultural areas may vary in size from 400 to 2000 ha. This may cover a part of a village or a couple of village. Watershed planning involves development and use of the water, soil and other resources in a watershed.

Best practices in watershed management -

a) Pani Panchayat – drought is the unpleasant reality in many villages, but in some villages things have changed. Fifty km from Pune is the village Mahur situated in the rain shadow of Sahyadris. Due to high run off, this hilly region leaves little water for cultivation. The scheme had unique aspect in that water was not distributed randomly and the largest landowner did not get the lion's share. Instead, each land owner was allowed to irrigate only two access of land and the water was distributed equally. One trained person in the village check the distribution of water and ensure that no one was denied of his share.

b) Recharging of Shamashttra Walls

drought in some parts of the country notable Rajasthan Gujarat made big news in the months preceding the monsoon. Grass root and community level efforts made to fight the drought without any government help. Several innovative, traditional methods of water

harvesting saved the day for a number of villages in the two worst affected States. Deepening villages ponds recharging dried wells and construction of simple watersheds success fully, enabled villagers to face the acute water shortage.

c) Plant a tree and get rain ' the worst hit Saurashtra region of Gujarat, with the help of Crusaders like Premji Bhatta who spread the message plant a tree and get a rain, and also engaged in making people of the region realise the importance of preserving ground water. He has been educating villagers how to recharge open wells.

d) Bhenkra village story - Bhagwanbhai from Amereli district was the first to try watershed management, blocked the village water by putting mud and stones to prevent water from flowing out to open areas. Using this experience of conserving water, villagers have benefited through the years.

18.5 SUMMARY

We learnt the problems and techniques of modern technology, watershed and waste management. We have also gone through the success stories of different states showing path to other villagers in the area of watershed management.

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18.7 QUESTIONS

- Q1. Define the term water shed management?
Q2. Write short note on waste management?



SOCIAL IMPACT ASSESSMENT DAMS

Contents

- 19.0 Objective
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19.0 OBJECTIVE

1. To make statements aware about the tremors due to construction of dams leading to widespread destruction.
2. To acquaint students with the loss of biodiversity and a construction of dams.

19.1 INTRODUCTION

Large dams are no more reversed unthinkingly on the temples of India's progress. They are not, of course, white sepulchers but their destructive consequences are now being increasingly reorganised. Even so, bigger and bigger investments are being made in them. All major rivers today are dammed or are in the process of being so. Only a fraction of the country's hydropower potential has been realised. This indicates that in next two or three decades, dam construction is going to be a major development project.

India has been one of the most enthusiastic dam building countries in the world. After independence, multi-purpose river valley projects and other kinds of dams large, medium and small became an important part of the country's strategy of infrastructure development. They were deemed necessary for the production of electricity for industry and domestic consumption, irrigation for agriculture and flood control. So central were dams to the dream of India's leaders of self reliant and planned economic development that they were famously termed by Nehru the temples of modern India^ But after five decades of constructing dam, canals and

hydroelectric projects, the environmental and human costs of this strategy have become all too apparent.

In the light of recent experience, questions are now being raised about the viability of large dams which have often proved to be ecologically disasters. There is no question that big irrigation and power schemes have since the original temple or today. Bhakra Nangal, been an integral part of the agricultural and industrial growth of the country. At the same time, there is no getting away from the fact that for all the euphoria over the green revolution, the present annual output of cereals, a total of 170 million tonnes, is on the planning commissions own norm of 4 tonnes a hectare from irrigated land above. As much as 70 percent of arable today is rain fed and even when the total irrigation potential is exhausted half will always depend on the monsoon. If the present productivity of farming is tremendously low, it is due to poor land and water management.

19.2 TWO FOLD BENEFITS OF DAMS

The two fold benefits of big dams can be subject to scrutiny. Take power which may have helped the country figure among the dozen largest producers of goods in the world. But this does camouflage the that electricity is not quite the general good that it is made out to be given its present use. Two thirds of it is consumed by industry while none can deny the massive strikes made by industry since independence on one count employment its reward is abysmal. Five year plan have allowed one fifth of the resources to the power sector alone and this is considered a progress. Unfortunately, planners mistake electricity for energy. For that matter only commercial energy is accounted for, the rest being generated at no money cost. Half the total energy consumed in the country is by way of fuel wood for cooking, the most of it is collected free. That is, at great expense of human labour. If one looks at the needs of the neediest, therefore it is futile pointing to electricity. It is the health at home that is cold.

Only Luddites would argue against the need to generate power. As energy experts like Dr. Amulya Reddy have observed, peoples homes should be the first to be electrified, in practice, rural electrification in the bane of all state electricity boards. The social and economic spin off extending the working day would be for greater than those of lopsided industrial growth. Even though the country has been able to electrify nearly eight out of every 10 villages, only 14% of the households in a typical village on the grid can afford to install connection to their homes.

The opponents of big dams are after barking up the wrong tree. It is the entire development process that is being debated, not just a big versus small slanging march, if the policies followed in the last

20 years of encouraging capital and resource intensive experts in agriculture are to continue, together with a highly selective pattern of industrialisation, there is no way of reducing the nations dependence on such projects.

19.3 ANTI DAM CAMPAIGNS.

Meanwhile chipko movement leader Chandi Prasad Bhatt has stated a campaign against the Vishnuprag Hydro electric project because of the dangers it poses to the unique ecosystem of the valley of flowers and the general geological havoc it could create. Bhatt as he has shown with the chipko Movements, is capable of mobilising strong support among the local population though a section of the workers who have found jobs on the projects oppose the campaign.

Another instance of intervention at the highest levels resulting of a large dam is Lalpur in Gujarat. Gandhian soyrat worker. Harivallabh Parikh, an ardent supporter of Mrs. Gandhi and close associate of Jinabhai Darji, and influential congress (I) leader in the state {Wan ashram at Rangapur, which would have been submerged if the project had materialised. He raised two issues destruction of forest and displacement of tribals in a letter to Mrs. Gandhi. The very issues are cited by Baba Amte, while mobilising protest rallies against the Sardar Sarovar. Bhopalpatnam and Inchampalli Dams. He also questioned about the development of big dams by asking whose development do these dams represent ? Amtes strategy is to mobilise people through mass rallies and public opinion by getting in touch with environmentalist political leaders, planners, journalists and even the discussions and personal letters.

The protest against the Tehu dam in Garhwal is another where along with rehabilitation environmental issues relating to large dams have also been highlighted. The Bandh Virodhi Sangharsh Samiti led by advocate V.D. Saklani has underlined the threat to the ecological balance of their sensitive mountain region through rallies, seminars and even wall writing. The movement has gained momentum and local support because of the student protests by citizens of Tehu town, which will be submerged by the hydro project.

19.4 ORGANISED TRIBALS

Tribal populations who are affected by a large dam are fully aware that they will lose their trees, land and houses. The Munda tribals of Chhota Nagpur, who celebrate their festivals by planting saplings, are today fighting against the massive Koel Karo Project. As one tribal from the area, questioned about the compensation, he will get, replied. 'Can you give back our trees planted by our forefathers? The tribals of Chhota Nagpur likely to be affected by

the Koel Karo Project are well organised, with a co-ordination committee and a representative from each village. Local leaders of various political parties are also part of the organisation making it probably the strongest popular movement in India against a dam.

The movement has a single demand : Comprehensive rehabilitation social, cultural and economic. The Koel Karo Jaaa Sangathan is involved in negotiations with the government for getting as much compensation as possible. In Koel karo people succeeded in stopping work by their Kam Roko (stop work) movement in 1978 and want the authorities ^involve the affected people in fixing rehabilitation terms. In mid 1984 the new Chief Minister of the state had ordered armed police into the area to put down the tribals. By contrast, in the absence of organised protests as support from any voluntary groups, peoples houses were bulldozed for the srisalaim project in A.P. and the villagers were hounded out by demolition squads

As far as rehabilitation is concerned the movement in the villages affected by the Sardar Sarovar dam on the Narmada is setting an example. The Narmada Tribunal Award spelt out terms for villagers displaced from MP and Maharashtra and under pressure from various voluntary groups, the Gujarat government had to agree to similar terms. To ensure that the rehabilitation programmes is carried out properly volunteers of the Gujarat Chhatra Yuva Sangarsh Vahini have gone into the village and are both educating and organising the villagers. Researchers from the centre for social studies at Surat have conducted a detailed reports on their needs. At the state level, there are other voluntary groups which have been instrumental in bringing pressure to bear on the government.

19.5 FUTURE ISSUES

Large dams are generally being constructed in areas which have so far not been touched by modern development. Many people in there areas look at such projects as symbols of hope. They even accept the argument that someone has pay the cost for the benefits to society, even if they are the one who have to pay. As things are today, people are not likely to oppose dams. But they are definitely getting ready to agitate/or better rehabilitation terms. But also as more and more dam's are chosen on environmentally sensitive sites, as in the Himalayas, or in heavily forest areas, protest against dams are likely to grow. Meanwhile a number of experts have even began to question the very usefulness of the large surface irrigation systems that dams provided, which means that through analysis of India's current water management plans and especially of dams is urgently needed.

In most cases, as in Koel Kara, there groups are fighting mainly for better terms of rehabilitation. But in a few cases, citizens groups

have even began to demand that a dam or a hydroelectric project not be built at all either because of the numbers of people it would displace, as with Bedthi or with Bhopal Patnam and Inchampalli, or because of the unique ecosystem it would destroy, as in the case of silent valley or the Vishnuprayag Hydroelectric Project. Some of the antidam campaigns have even been successful in stopping these massive projects : silent valley and Behave already been given by the Kerala and Karnataka governments respectively. And government committees are investigating the environmental impact of Lalpur dam, the Vishnuprayag Hydroelectric project and the Bhopalpatnam and Inchampalli dams.

19.6 DAMS AND FOREST

A large dam invariably alters the course of nature and because of the play of complex and largely unknown forces, the ecological consequences are usually much more serious than were bargained silent valley has been dropped but the government has decided to go ahead with Tehu vishnuprayag and many other projects. Also being proposed is the Manibhadha dam in Orissa, in one of the prime forest areas remaining in the country?The forest cover bears the brut of dam construction in more than one way. In the Himalayan valleys contractors who come to clear the forest which is going to be submerged greedily cut trees even in unaffected areas. People who are being displaced from Tehu town in Garhwal to make way for the dam will be rehabilitated on forest land that has been acquired and cleared near Hardwar and Rishikesh. The forest is also being cleared for approach roads, offices, residential quarters and for storage of construction material. With the reduction in forest cover and the entry of people, the pressure on the remaining forest increases. Their needs for firewood leads to further danudahas. The construction of a dam therefore has a multiplier effect.

The main problems regarding rehabilitation have been well evolved by the remarkable studies on the gigantic Sardar Sarovar (Narmada) Project in Gujarat educated by Centre of Social Studies (CSS) in Surat and Lokayan study on Srisailam. The issues can be summarised as follows : rehabilitation has always been considered on obstacle in implementing a project and an extra financial burden, the authorities always try and get away with minimum, no guidelines exist to include even the barest arrangements for rehabilitation in project plans, and facilities provided differ from project to project.

19.7 RESISTANCE AND PROTEST IN THE NARMADA VALLEY

The Narmada valley project is probably the best known and most contentions large resource development project of recent decades.

The Narmada project envisaged the construction of major dams on the Narmada and its tributaries as well as 135 medium sized and 3,000 minor dams. The focus of opposition has been on the Sardar Sarovar reservoir, which if completed would submerge 243 villages and displace one lakh people. Protests by local people affected by the project started in the 1970s but the movement, spear headed by the Narmada Bachao Andolan under Medha Patkar has taken off only since 1988. Since 1988 the inhabitants of the submergence areas have been part of a determined resistance not to move from their land. They have mobbed project authority offices, surveyors and world Bank officials. The demonstrators have faced immense hardship, been beaten and arrested for their actions and have faced severe state repression. The NBA has demanded a comprehensive review of the projects and has found world attention on the question of big dams, to the extent that the world bank withdrew from the project leaving the state governments to foot the bill. The dam work has continued in spite of reviews and many concerns about its feasibility and questions about its projected promises. Violence against the activists has continued unabated. Strategies for action have been non-violence resistance. There have included fasts as well as attempts to launch satyagrahs where activists have pledged to draw rather than leave the villages being flooded. There is a constant debate among activists about the merits of Satyagraha versus militant action. As the struggle against the Narmada dam continues it has brought into critical questioning the much longer issue of state search for alternatives.

19.8 ENVIRONMENTAL IMPACT OF LARGE DAMS

Large dams have, led to extensive decimation of forest due to submergence by reservoirs and the dereservation and, clearance of forest lands for the resettlement of people. Both forest and good farmland have been appropriated by reservoirs, canals, and other infrastructure connected with river valley projects. According to one estimate, big river valley projects have swallowed about 0.5 mha of forest land between 1951 and 1976 about one tenth of the area that has benefited from large irrigation works. River and the ecosystems they support are unique Irreparable environmental damage is caused by the construction of large scale dams. Some of these are considered here-

1) Change in downstream morphology and water quality.

a) Rivers provide energy for a number of vital processes in downstream entries, deltas, coastal areas, upon which health of the fisheries are dependent. These processes include transport of nitrogen, organic matter and nutrient rich silt, oxygen enrichment, and entertainment of nutrients in bottom sediments. Any water management scheme that reduces runoff by more than 25% will

result in negative effects on coastal and estuarine, fisheries and subsequent depletion of fish catches. The effect is stronger with higher reducers of run off.

b) Dam trap the sediment eroded from soils and rocks by the river. Clear water below the dam then seeks to recapture its lost sediment and erodes the soil on the bed and banks downstream from the dam. Loss of sediment is particularly important on the delta of the river as it leads to further eroding of the coast. Increased sediment flow also adversely affects the dams capacity for hydro power generation.

c) Flowing water undergoes rapid thermal chemical and physical changes. Deterioration of water quality is said to increase with retention time due to loss of dissolved oxygen.

2. Loss of forest and biodiversity

The most dramatic ecological effect of a dam project is the flooding of vast areas of forest wetlands, cultivated land and wildlife. It is estimated that world, wide approximately 40,000 sq.km. have been flooded by such dams. Dam along the Indus also killed off almost all the deltas mangrove forests Innumerable plants and animals one now extinct became their habitat was flooded by a dam. Dams fragment the reveline ecosystem isolate different species and cut off migrations and other patterns necessary for species survival. The natural ecosystem in the area of reservoirs is disturbed. Submergence may lead to extinction of plant and animal species unique to those ecosystem as in the case of Sieul Valley hydroelectric project to Kerala (one project that was successfully derailed by environmentalised) and thus to loss of biodiversity or biological resources, the value of which cannot be estimated in advance.

Good forest coyer is essential for curbing soil erosion, yet catchment areas of reservoirs usually experience rapid deforestation, leading to landslides, heavier water flow into the reservoirs, and eventual, situation processes which ironically threatens the ciability of river valley projects themselves. High siltation rates have dramatically reduced the life expectancy to be unsuitable for agriculture.

3. Salinity and pollution.

5. Dams cause massive evaporation loss, after resulting in increasing salinity to dangerous levels. Reduction in the flow of water and silt caused by dams has a negative impact on downstream ecosystems and also adversely affects the fertility of agricultural land. Delta areas suffer from ingress of sea water.

Reduced flow of water in many rivers also has increased the level of pollution making river water unusable for humans and animals.

4. Earthquakes

Large dams built along fault lines or in geologically unstable regions can trigger earthquakes due to the pressure exerted by the weight of water in reservoir and the dam itself, which in turn can destroy the dam leading to widespread flooding. This danger was evidenced by devastating earthquake at Koyanagar near the Koyna dam reservoir in Maharashtra in 1967. Although India has already experienced dam induced earthquakes, the government is pushing a head with its plans to build the Tehu dam in a seismically sensitive region, the Garhwal Himalayas in the face of opposition by experts and local people and despite the warning sign of a major earthquake in the region in 1992.

5. Design / Construction problems

Dams may bust even in the absence of tremors due to poor construction, as in the case of the Machu dam (Gujarat) which bust in 1979 leading to widespread destruction and death caused by flooding. A study by the World Bank, which has been a major financier of large dams in India, found that at least 70 percent of the dams funded by them have serious design, construction or other safety related faults. Large dams and their reservoir disrupt local ecosystem in multiple ways those effects cannot be easily measured in terms of economic costs and benefits, but as in the case of forest loss of biodiversity is not factored into cost benefit analyses.

6. Impact on society.

People who loose their homes and lands because of large scale development projects are called environmental refugee. Displacement takes place so easily because it involves largely tribals. These tribals are mostly uneducated and are unaware of their right. They are joint moved around without considering the economic and psychological impact of such action on them. Hence displacement takes place without the knowledge of affected population, who do not have any sense of participation in the project nor do they get any share of the benefit. This problem of displacement is compounded by the fact that even land records of the displaced population are not up to date and hence there is no guarantee that the benefits will reach the right person.

19.9 SUMMARY

Environmentalists activists and social scientists are after accrued of being anti development. They would argue however that they are

not anti-development and that development as a process cannot be seen isolated from the issue of social justice. The seriousness and extent of the problem of displacement has only recently come into public view, in spite of the work of activists over the years to bring this issue to the attention of the society and the state. The Nalicta Bacho Andolan in particular has succeeded in bringing this problem into the consciousness of the urban middle classes.

19.10 REFERENCE

1. H.M. Saxena : Environment Geography, Rawal Publication 2004.
2. Trivedi and G. Raj Environmental Ecology, Akashdeep publishing 1992

19.1 QUESTION :

1. What are the consequences of building large dams ?



20

PARKS AND SANCTUARIES

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- 20.0 Objectives
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20.0 OBJECTIVES

- 1 To make students aware about the monopoly of man over natural resources which in reality endanger his own survival.
2. To acquaint students with the consequences of technological development provide man only a short lived relief.

20.1 INTRODUCTION

The civilization of man is built around two of his greatest inventions - the plough and the wheel. The plough gave man freedom from hunger and the wheel, a means of quick transport. These two inventions have been refined so much that within a few thousand years, man had come to monopolize the management of all natural resources. This managerial monopoly has brought him to the brink, he realised the danger confronting him. A new holistic approach to management of all natural resources is being vigorously advocated. There is mountainous evidence to show that huge projects, irrigational and industrial provide to man only a very short lived relief. In the long run, each project disturbs the ecology of the area it serves so much that clean water, clean air and healthy food cannot be taken for granted, the bioresources as also other natural resources suffer irreparably. So much so, human progress at what cost has become the central theme of the debate raging through the whole infarmed world.

We in India are in an uneviable position. Our population is fast out stripping the country's carrying capacity. And we don't have the technology to improving the carrying capacity of our land without determent to our ecology. No government dare impose restrictions of a compulsory nature on the family size, neither can it deny itself plans to press into service every available resource to meet the demands of the immediate present. In fact, we see a variety of contradiction rocking the government and people of our land, each one of them exemplifies this dilemma. The creation of several wild life reserves though every conceivable ecosystem, the vociferous opposition to and the planning of a good many multipurpose projects, the creation of the Development of Environment and forest at the centre and in the states, the acquisition of legislative powers to regulate human intrusion into nature arrangements reflect the growing concern of the government and the people of India over the likely damage to environment. On the other hand politician whose visions is necessarily for here and now are equilly vociferous in demanding projects that benefit their vote banks through the next quarter country.

20.2 THE ENVIRONMENT AND ENVIRONMENTALIST-

Inamdar N. R. looks upon environmentalism as a social activity aimed at distinguishing between the factors impinging on the social system from outside and those inherent in the system itself. The quality of life in a local context engages the attention of every environmentalist. This is not altogether a modern idea. In maharashtra, we come across passages in which the pandavas, while they lived in the forest, were advised not to stay in one forest area for too long, Dharmaraja was briefed on the ecological degradation, his party was causing and was advised to move to another forest. He was told in no unmistakable terms that a forest lives on the basis of a network of devoures-devoured relationship

and too much of human presence would unsettle this relationship. And the pandavas respected this advice.

In the totality of environment, the biological component goes through cyclical changes but the non-living component does not. And the all important fact is that the living world sustain itself at the expense of the non-living. A portion of the non-living finds its way into the making of a living object but eventually whatever had thus moved from the non-living state of existence into the fabric of a living object has got to go back to its original state. Otherwise, ecological imbalance sets in. In such a situation, the threat posed to the ecology of an areas comes mainly from man, for while then on human segments of the living world donot play any planned role to be but manellvered by nature. 15fuhe other hand, he began to reorganize natures order of things to suit his own ends. Environmentalism is not against, projects aimed at improving the standard of life a term usually understood in terms of human consumption. Environment's ALISM advocates development geared to improving quality of life for man. The quality of life which the school of environmentalistespouse is. attended by a demand that man merge with nature, is an unnoticeable way. We should not understand this as a call for going back to a primitive style of life. It is a call for promoting human welfare in a manner that would not endanger other life forms.

20.3 MEANING OF DEVELOPMENT

The industrial revolution that was in through the last quarter of 18th century and progressed at an ever increasing pace though 19th and 20th centuries proved to be a vital factor in the upgradation of consumerism and consequent degradation of environment. The two process moved along a collision course, with almost identical speed. The economic and political fall out of that revolution unleashed forces that could grapple with those problems, somewhat successfully. But it took a very long time, almost not until into the 7th decade of this century, to understand the harm the industrial revolution did to the environment. In his hunt for processing to the new rich articles of fancy, the new breed of industrial marketer began to exploit the bioresources. This exploitation reached limits, when it led to killing bird and bent, not to improve living standards but to satisfy the ego and fancy of man. When one learns of the extermination of a bird species for the only reason that it had attractive plumage, attractive enough to make a wealthy woman want to adorn her hat with it or when one learns that the rhino populations suffered heavily just because it was believed that its horn had aphrodisiac properties, one feels at once sad and ashamed of for being born a man. Added to there, the knowledge gained in regard to greenhouse effect, acid rain, ozone hole etc. have made man realise the danger that he is bringing upon himself. But above all, the science of genetic engineering has

opened up new possibilities of transplanting non native genes into microorganisms so as to induce them to synthesize chemicals of great significance to human welfare.

20.4 DIVERSITY OF FLORA AND FAUNA

With a wide range of climatic conditions from the torrid to the arctic, India has a rich and varied vegetation, which only a few countries of comparable size possess. India can be divided into eight floristic regions namely the western Himalayas, the eastern Himalayas, Assam, the Indian plain, the Ganga plain, the Deccan, Malabar and the Andamans.

The western Himalayan region extends from Kashmir to Kumaon, its temperate zone is rich in forest of chir, pine, other conifers and broad leaved temperate trees, Higher forest of deodar, blue pine, spruce and silver fir occur. The alpine zone extends from the upper limit of the temperate zone of about 4750 metres or even higher. The characteristic trees of this zone are high level silver fir, silver birch and junipers. The eastern Himalayan region extends from Sikkim eastwards and embraces Darjiling, Kurseong and the adjacent tract. The temperate zone has forests of oaks, lawers, maples, rhododendrons, alder and birch. Many conifers, junipers and dwarf willows also occur here. The Assam region comprises the Brahmaputra and the Surma Valleys with evergreen forests, occasional thick clumps of bamboos and tall grasses. The Indus plain region comprises the plains of Punjab, Western Rajasthan and Northern Gujarat. It is dry and hot and supports natural vegetation the Ganga plain region covers the area which is alluvial plain and is under cultivation for wheat, sugarcane and rice. Only small areas support forests of widely differing types. The Deccan region comprises the entire table land of Indian Peninsula and supports vegetation of various kinds from scrub jungles to mixed deciduous forests the Malabar region covers the excessively humid belt of mountain country parallel to the west coast of the peninsula. Besides being rich in forest vegetation, this region produces important commercial crops such as coconut, betel nut, pepper, coffee and tea, rubber and cashew nut. The Andaman region abounds in evergreen mangroves, beach and diluvial forests. The Himalayan region extending from Kashmir to Arunachal Pradesh through Nepal, Sikkim, Bhutan, Meghalaya and Nagaland and the Deccan Peninsula is rich in endemic flora, with a large number of plants which are not found elsewhere.

India is rich in flora. Available data place India in the tenth position in the world and fourth in Asia in plant diversity. From about 70 percent geographical area surveyed so far, 47,000 species of plants have been described by the Botanical Survey of India (BSI) Kolkata. The vascular flora, which forms the conspicuous vegetation cover comprises 15000 species. Of these more than 35

percent is endemic and has so far not been reported anywhere in the world. The flora of the country is being studied by BSI and its nine circle/field offices, located throughout the country along with certain universities and research institutions owing to destruction of forests for agricultural, industrial and urban development several Indian plants are facing extinction. About 13336 plant species are considered vulnerable and endangered. About 20 species of higher plants are categorized as possibly extinct as these have not been sighted during the last 6-10 decades.

The zoological survey of India (ZSI) with its headquarters in Kolkata and 16 regional stations is responsible for surveying the faunal resources of India. Possessing a tremendous diversity of climate and physical conditions, India has great variety of fauna numbering 89,451 species of the protista number 2,577 mollusca, 5,070, arthropoda 68,389 amphibia 209 mammalia 309, reptilian 456, numbers of proto chordata 19, pisces 2546, aves 1232 and other invertebrates 8,329.

The mammals include the majestic elephant the gaur or Indian bison the largest existing bovine, the great Indian rhinoceros, the giant Himalayan, the swamp deer, the thaurin spotted deer, nilgai the four horned antelope the Indian antelope or black buck. the only representatives of these genera. Among the cats, the tiger and lion are the most magnificent of all other splendid mammals such as the clouded leopard, the snow leopard, the marbled cat etc. are also found. Many other species of mammals are remarkable for their beauty colouring, grace and uniqueness. Several birds like pheasants geese, ducks parakeets, pigeons, cranes, hornbills and sunbirds inhabit forests and wet lands Rivers and lakes harbour crocodiles and gharials, the latter being the only representative of crocodylian order in the world. The salt water crocodile is found along the eastern coast and in the Andaman and Nicobar islands. A project for breeding crocodiles started in 1974 has been instrumental in saving the crocodile from extinction. The great Himalayan large has a very interesting variety of fauna that includes the wild sheep and goats, markhor, ibex, shrew and tapir, The Panda and the snow leopard are found in the upper reaches of the mountain. Depletion of vegetative cover due to expansion of agriculture, habitat destruction, over exploitation, pollution, introduction of toxic imbalance in community structure, epidemics, floods, droughts cyclones, contribute to the loss of flora and fauna. More than 39 species of mammals, 72 species of birds, 17 species of reptiles, three species of amphibians, two species of fish and a large number of butterflies, moth and beetles are considered vulnerable and endangered.

20.5 ENVIRONMENTAL MOVEMENT IN INDIA

There had always been a concern for every form of life in the Indian mind. This Indian concern is projected through the doctrine of non

violence, preached by every religious school that flowered in our land. Indeed, it is enjoined on every Hindu to spend his last years of life in a forest, meditating upon the meaning of life (vanaprasthan mama) violation of life for the sheer of joy of it marked the early years of colonial rule. An Englishman who was here-during those years wrote to his friend at home - thus, wild pig, porcupine, wild fowl game fowl and other animals are met with incredible numbers. The demand for railway sleepers led to a huge scale felling of trees. Even after the advent of independence, the government of India went ahead with large irrigation and industrial projects, costing hundreds of crores of rupees, netting into ancient the disastrous consequences to the ecology of the area there was no ecology consciousness at that time in fact the absence of any environmental awareness is expressed by a local farmer as the occasion of the commissioning Nagarjuna Sagar Project in A.P.)

The dangers to which all forms of wild life got exposed were realised long before Shri Sunderlal Bahuguna launched his non famous Chipko movement. Several wild life sanctuaries have been carved out and poaching in these areas was made cognizable offence. Indeed, laws which prohibited killing endangered species of animals and birds were passed through mid sixty's. The Gir lion, the Bengal tiger, the great Indian Bustard and a few other species benefited a great deal through such laws. For some species, they came to late, for example, the Indian Cheetah and the mink deer. But the questions raised by environmentalists are far more basic and it is in questions so raised that the maintenance of environment movement lies. A close scrutiny of the demands made by the Narmada Bachaw Andolan spotlights this development vs ecology debate. The Sardar Sarovar project and the Narmada Sagar Project on the project underway on Narmada are Christened, are designed to take water to the parched area of kutch in Gujarat.

20.6 ACTION TAKEN

Wildlife - National wildlife action plan was adopted in 1983. The Indian board for wildlife is the apex statutory body, with Prime Minister as chairman. Sixty three national parks and 358 sanctuaries in the country covering an area of 1,33,000 sq.km. about 4 percent of the country area. Sixteen tiger reserves in the country in which project Tiger launched in 1974 has had great success. The wildlife, Institute of India at Dehradun established in 1982.

EIA (Environment Impact Assessment) and approval of all projects which require approval by the Government of India and which require diversion of forest land, made obligatory. Guidelines for EIA issued by the ministry for mining projects, industrial sitting, river

valley projects, development of ports and harbours, and development of beaches.

During the sixth plan period, the forest (conservation) act 1980 was., enacted with the main objective of checking the diversion of forest land for non forestry purposes. As a result the rate of diversion has been considerably brought down. The scheme of social forestry was initiated as a centrally sponsored scheme during the sixth plan in 101 fuelwood districts of the country. later in 1982-83 it was extended to cover 157 districts when social forestry was included in the New 20 point Programme. The scheme envisaged the raising of 0.26 million hectares of fuelwood plantation and supply of about 580 million seedlings free of cost to the public and also included under A tree for every child Programme. As regards the production, forestry programme emphasis was laid on the conversion of low value mixed forest areas into high value mixed plantation of commercially important species like teak and bamboo. It was noteworthy that the social forestry and production forestry programme put together created plantations over an area of 2.25 million hectares during the sixth plan period as against 3.55 million hectares during all the earlier five years plans together. ^^

With regard to wildlife there are 52 National parks and 223 sanctuaries constituted under wildlife (Protection) Act 1972. These include 15 tiger reserves covered by the Project Tiger. In order to meet the needs of trained manpower and research support for the vast conservation areas in the country the wild life institute of India was established in 1982.

In order to protect the eco-system and supply various forest products as well as to bring one third of the geographical area under tree cover, all possible efforts are being made to achieve the target by the end of the century. As a result the Government of India has created a separate department of forest and wildlife at the centre. The demand for fuelwood has grown faster than supply. The report of the fuelwood supply committee 1982 has estimated that in order to meet the demand for fuelwood, it would be necessary to raise fuelwood plantation at the rate of 1.5 million hectares annually and to distribute 800 million seedlings per year to the public. The centrally sponsored scheme of social forestry including rural fuelwood plantations was to be extended to cover all fuelwood deficit areas during the seventh plan period. So far heavy reliance was placed on the plantation of seedlings of exotic species. Efforts were now to be made to identify some suitable indigenous species for specific climatic and edaphic conditions.

The central Ganga Authority was set up in 1985 to oversee the implementation of the Ganga Action Plan in view of the magnitude of pollution of the river Ganga. A national forest Policy 1988 was formulated in December 1988 with the principal aim of ensuring environmental stability and maintenance of ecological balance. The

forest conservation Act 1980 was amended in 1988 to facilitate stricts implementation and to plug certain 100pholes. The National Forest Policy (1988) stipulates that a minimum of one-third of the fotal area of the country should be brought under forest or tree cover. It is envisaged that this will be achieved by involving local stakeholders like the farmers, the tribals, the women, the NGO's and the Panchayat Raj Institutions (PRI) Amendments in 1991 to the wildlife (Protection) Act, hunting of all species of wildlife for commerce or for pleasure has been banned due to genetic strains of flora and fauna.

The schemes of Ninth plan were generally similar to those taken up during the earlier plan period. These include Integrated Afforestation and Eco-Development Project, fuelwood, and fodder project scheme, non-timber forest produce scheme, grant in aid scheme, seed development scheme etc. with greater focus and improved implementation on the basis of experience gained during the eighth plan.

20.7 SUMMARY

The process of commercialising the forest resources base that has led to widespread Deforestation In tne country is today the motive force behind the governments affiliation programmes being carried out with the full support of foreign and agencies. Rural women for instance, whose lives revolve around the collection of fuel and fodder, have almost nowhere been involve in there programme. All activities to protect the environment require considerable scientific inputs in the areas, such as land, soil and water conservation, pollution, control environmental impact assessment, preparation of environment management plans, ecological restoration of degraded areas, for estrs wildlife protection, assessing the impact and finding solutions for global warming and ozone depletion

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20.9 QUESTION:

1. Write a note on preservation of Parks and Sancutries.



INFRASTRUCTURE

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- 20.1 Introduction
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21.0 OBJECTIVES

1. To bring awareness among students regarding the present growth of population and strain on environmental resources.
2. To acquaint students with infrastructural development meaning shift to more economic and modern agricultural production.

21.1 INTRODUCTION

India is predominantly an agricultural country. Development of agriculture therefore assumes great importance in the overall development of economy. Since the time of independence government of India took various land reforms measures to improve agricultural production which was essential to feed the teeming millions as also to accelerate the pace of industrial development. After 1960 government adopted an agricultural policy based on modern technology in the hope of increasing agricultural production at a greater pace which came to be known as 'green Revolution'. This broad and comprehensive philosophy of reconstruction included increased use of modern tools, machinery high yielding varieties of seeds electrically operated water pumps chemical fertilizers pesticides etc in development the present world is facing multi facious problems of environmental degradation due to technological and industrial development as well as an explosive growth of population which has caused enormous strain on environmental resources. Thus there is an urgent need for maintaining a balance between the capacity of environment and the quantum of sustainable utilization it is only possible by understanding environment in its totality and the principles of its

scientific management there is now a growing concern about E/A all over the world specially after the US National Environmental Policy Act of 1969 in which emphasis has been given that all federal agencies should prefer an E/A on all major development projects before approved would be given to developers

21.2 INFRASTRUCTURE AND ENVIRONMENT:-

People every where and in all times have depended upon the environment for their survival. whether by farming fishing or collecting natural products from the forests. In the broadest sense of the Term then natural resources include all those parts of the environment that human groups draw upon to sustain themselves include the air, water, land, plants and animals. But when we speak of natural resources development, the meaning shift to a narrower, mefe economic one natural resources as inputs mainly for industrial and modern agricultural production. The central question of development versus the environment is best encapsulated in the debate about large scale development projects. The environmental and social consequences of dominant pattern of development in India is most clearly illustrated by big such as large dams Power projects and industrial development in backward regions. It is such project that have also generated the most intense and widespread resistance movement due to their requirement of land and the consequence displacement of people and appropriation of their subsistence bases.

Newly independent India adopted a policy of mixed economy with socialist goals, conceived by Indian nationalist as the path best suited to Indian national interests. The Nehurvian model of development economics that was adopted mean that state such enterprises would run and control among other industries, the production of power as well as the running of railways and airlines. Private enterprise was allowed to operate under state direction and was assisted through numerous state subsidies. In post independent India the need for economic growth, increased food production and the establishment of core industry supurred the state towards large scale infrastructure developmenLprojects were focussed on irrigation and Power generation. The development emphasis was on rapid industrilisation, the use of natural resources and the promotion of infrastructure project namely those associated with power generation. As a bulk of the population depended on agriculture the dominant planning model emphasised intensification of agriculture though modern method and the irrigation of large areas of land. Haring river water and the generation of hydroelectric power become and continues to be the central tenet of state development policy.

21.3 IMPACTS OF GREEN REVOLUTION ON AGRICULTURAL SOCIETY –

Though green revolution has many positive aspects it has also negative concepts as well. The use of new technology in agriculture was expected to incre agricultural production and it was expected that the benefits would gradually percolate down to the layer of social strata resulting in reduction of rural poverty. However this policy caused lasting imbalances between regions, where water is available on account of irrigation facilities and the ones which are dependent on seasonal rains only. The green revolution was primarily meant to cover region where there were permanent irrigation facilities such on Punjab, part of U.P. and part of A.P. this therefore resulted in disparity of income between those from the areas with irrigation facilities and those areas which are dependent on,seasonal rains. This therefore led to the emergence of different classes banned on economic disparity.

Sales of Punjab and Haryana are considered to be models of wheat based green revolution. However disparity of income was in the ratio of 20:1 between the big landlords, cultivating land exceed 25 acres, (and a marginal farmer holding 2.5 acres of land) of land. Also majority of beneficiaries of green revolution were found to be rich agriculturists who only could afford to bear expense of getting power connection. New technology and mechanisation on a large scale resorted to extensively in agriculture led to the use of electric pumps, fertilisers, and crushes in large numbers. While benefits were reaped by rich farmers, the landless labourers was exposed to grave dangers such as physical injuries, loss of limbs and at times deaths due to accidents.

Exposure of agriculture workers to health hazards from acute and chronic poisoning due to spraying of insecticides. Green revolution led to increase income of rich and wealthy farmers while pushing the marginal farmer is the category of landless labourers, thereby pushing them below the poverty line affecting of their minimum calery intake adversely. Liberalisation of Indian economy.

After 1984 there was a distiinct change in ideology, and liberalisation of the Indian economy became a top economic priority of the state under this policy large infrastructure projects opened up by the private sector. This has not yet happened in a major way but some power generation projects have now been given to private sector companies, including foreign companies - India's structural Adjustment Programme (SAP) has also encouraged building of roads and highways both to increase tourism and to improve commercial transportation for trade. Most of the government infrastructure development projects have caused the displacement of large number of people whose land (individual and community)

has been acquired by the government for a project. The only legal power which enables the government to evict people for development projects and to provide rehabilitation or resettlements is the Land Acquisition Act of 1894.

Throughout the colonial period the British acquired huge tracts of land for building railways, expansion of trade routes, conversion of forests and pasture lands to plantations for tea, coffee, rubber, indigo establishment of army cantonments and ordinance factories, construction of dams and canals, building ports and administrative institutions. Most persons displaced by these projects were either agriculturists or forest dwellers and there is very little documentation of what happened during these early processes. It was only in 1894 that the British government formulated an Act with the state provision to provide some protection to those whose land was being acquired for development. However, the Land Acquisition Act of 1894 ended up being an important legal policy that extended the British government's arm of economic control, oppression and exploitation. The Act exploited the concept of the public domain and used it as a normal justification for acquiring land owned by Indians for a public purpose and stipulated that individuals displaced from their land would be compensated. Since the enactment of this law millions of people have continued to be displaced and have become economically and socially impoverished as a result of it.

The British government's legacy of displacing persons without adequate compensation continued to be purchased by the government of independent India. Since the Act recognises very few rights of those who are to be deprived of their land it has been a mechanism by which the government has claimed absolute rights with little regard for social justice. Though the government has planned to amend the Act to give itself even more sweeping powers in the acquisition of land.

Another major legal instrument of displacement has been the forest policy, established by the British and continued -largely unchanged today. Communities dependent on various forest products upon which they depend for their livelihoods, and have also displayed such communities for the purpose of establishing National Parks and Wildlife reserves. Under the British, all forest land, which was traditionally community property to which people had many access for fulfilling their various needs was declared to be the property of the state and allowing the state to use forests as it saw fit for monopoly over land was first established in relation to forest through the British forest policy of 1894 and continues to be used even after fifty years of independence.

21.4 INFRASTRUCTURAL DEVELOPMENT IN THE NAME OF TOURISM.

Maharashtra was the first state to encourage private investment in the tourism sector eg. beach front land given to the well known hotel companies like Taj and Oberoi for infrastructural development. To promote tourism in Mumbai every year fair is conducted in the most traditional manner.

From positive aspect tourism provides employment to large number unemployed young generation. Due to development of infrastructure facilities like development in the modes of transport, electricity, water supply, drainage, sewage etc. regions develops both economically and socially. International tourism gives an opportunity to earn foreign exchange which is important for developing countries. Negative impact of tourism is that it brings a lot of changes in the natural environment of the given region. Infrastructural facilities generated for tourism have resulted in a lot of environmental damage. Twenty years before Mahabaleshware (Maharashtra) was considered as one of the best hill station. But today there is acute shortage of water in this region basically due to over emphasis on tourism. Because of this industry air, land, water suffer from pollution. The other environmental damage is deformation which leads to top soil erosion.

In the recent years international tourism is blamed for disrespecting local culture. A recent publication based on a seminar jointly sponsored by the world bank and UNESCO deals with the special social, cultural effects of tourism in developing countries. It is time that man tourism has adverse environmental and social impact. One of the social effects over a long period is influence on the local population to adopt a way of life beyond their means incidence of drugs, human abuse and importation of negative aspects of tourist culture. One of the obvious signs of cultural determination is to be found in the state of traditional art forms in the third world society. To make quick money the artisans have done away with traditional designs and skill and have substituted man producing method. Infrastructural development and its impact on environment

Ground water depletion, increase in salinity In green revolution the need to irrigate land for agriculture has resulted in hastily constructed canals. The excessive irrigation has resulted in the ground water levels falling up to a metre per year in parts of the North China, an important wheat growing region. In Tamil Nadu the bore wells here caused water to fall as much as 25-30 metres in a decade. In Gujarat over pumping by irrigates in the coastal district has caused salt water to invade the aquifers, contaminating the village water supply. In dry climates, evaporation of water near the soil, surface leaves behind a layer of salt which also reduces crop

yield. If this layer of salt is build up in excess the crops get destroyed and ultimately the land gets abandoned as salty waste land. Scientist link this danger of salinization to alarming events such as grotesque deformities and reproductive failure in the fish, bird and wildlife of contamination of land and water by salts and toxic chemical is one indication that over irrigation is not sustainable. In much of the world falling water tables signal that ground water withdrawal exceed the rate of replenishment. As water tables decline, over pumping can make irrigation too costly to continue and can even drain some acquirers dry.

Pesticides are undoubtedly designed to kill pests synthetic chemical kill pests of weeds and it was claimed that are of chemicals will bring about a new age in agriculture but it is now found that in spite of increased use of chemical pesticides and herbicides crop loss is high. Besides air, water and soil are put to grave danger. Such chemicals kill indiscriminately and the effects often lead to devastating conditions. Pesticides take years to break down in the environment make mere toxic compounds. They enter even into food chain. Research has shown that the direct application of these poisons has a disruptive effect on the field. It not only kills the target pest but other animals and insects needed to maintain ecological integrity. There is growing recognition that the long term exposure to pesticides includes the danger of cancer, liver and kidney disease, reproductive problems and mutations. Massive use of chemical fertiliser involves the risk of interfering with the quality of an ecosystem. Its most important side effect is promotion of excessive growth of algae and other water plants. This results in a deterioration of the quality of water and threat to aquatic organisms. Although fertilisers are sometimes indispensable in restoring a minimum level of fertility of land, its excessive use can cause permanent damage to the cultivable land. Chemical products are increasingly being used for controlling adventitious growth of insects in forest plantations. These products are very toxic and are dangerous to any eco system.

21.5 ENVIRONMENT IMPACT ASSESSMENT

EIA is the prior assessment of the future impact of the consequences of any decision on the quality of the total human environment on which man largely depends for his well being. EIA means a simple explanation an approach which seeks to improve development by a prior assessment. By improving understanding of the relationships between development and environment, EIA can lead to better environmental management formulation of Environmental Management Plan to ensure that resources are used with maximum efficiency and that each of the adverse impacts identified and evaluated as significant be prevented, alternated or when required, compensated.

21.8 SUMMARY

The biggest impact of infrastructural development is the resettlement of people. The history of the governments resettlement plans has been dismal. It is perhaps this inability of the government to honestly actually carry out its resettlement projections that has carried such widespread unpopularity of these massive infrastructural projects.

Critical problems are associated with controlling and directing new technologies maintaining resource bases and democratic decentralised system of decision making. Involving people who are to be affected needs to be considered an important component of any development policy.

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21.10 QUESTIONS:

1. The biggest social impact of infrastructural projects is the health of rural people displacement of people. Discuss.
2. Write a short note on impact of infrastructural development on society.



PREFACE

The paper Environment and society paper of the earlier one. Some new topics have been added and some of the old topic have been discarded. This paper is therefore compulsory for all students of Sociology. Those who have done Sociology at the B.A. level will be familiar with some of the concept discussed here. However, we must again stress that the student is expected to learn more and read more at the M.A. level. Hence please do not be under the illusion that your B.A. notes will suffice. It will suffice to ensure that you fail!

We must stress once again that at the post-graduate (M.A.) level, you as a student, are expected to have must more knowledge that at the graduation level. The study material presented in this book has been prepared by a group of scholars having vast knowledge of the subject. We have left no stone unturned to ensure that you get the best quality for your studies. Hence we advise you that you should avoid reading guides on the subject. As post-graduate teachers we know about some of the material in circulation. We find these are very elementary and in most cases they give wrong facts. One of the surest way of failing the examination is by referring to guides. In most cases a good student will find that she actually knows more than the guide writer. Hence by following these guides one is likely to unlearn Sociology rather than learn anything.

Finally we want to stress/that there is no shortcut to success. The study material presented in this book is of good quality but it is not sufficient. We have followed the M.A. lectures pattern. Lectures in the University Departments serve mainly to get the student interested in the subject. The student has to do further reading on the topics in accordance with the suggestions made by the teacher. Similarly, the course materials are like lectures. If a student wants to do well she .must do further reading form the suggested reading given at the end of each chapter.

We wish you best of luck and hope that you will go through the readings and the suggested readings. Finally, you practice to write in a clear and coherent manner. You can do this if you practice to write clearly as this will give you confidence.

Dr. Shashi. A Mishra
Course Co-ordinator

MA II
Sociology Paper VII
Environment and Society

1. Introduction

- Basic concepts: Nature, Ecology, Environment
- Changing Human-Nature Relationship
- Nature, Modern Science and Technology

2. Perspectives of Environmental Issues

- Cultural ecology
- Environmental Determinism and Possibalism
- Classical Sociological theory
- Marxist perspectives
- Recent contributions

3. Environmental Issues (Global Context)

- Nature and extent of environmental degradation
- Global environment politics: history, major issues
- North-South dialogue
- Gender and environment
- Sustainable development

4. Environmental Issues

- The state of India's environment
- Depletion of resources and its impact on local communities
- Traditional systems of resource management
- Environmental struggles / movements / protests
- Recent experiments in resource management : local and state initiatives

5. Socisil Impact Assessment

- Dams
- Parks and Sanctuaries ,
- Infrastructure

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