

Chapter 2 – Natural Resources

Forest Resources

Resources obtained from nature, i.e. from the earth are called **natural resources**. These resources occur naturally, and humans cannot make them. The raw materials used in artificial or man-made resources are natural resources.

Classification of Natural Resources

Classification of natural resources can be done in several ways based on their origin, level of development and uses, stock or deposits, and their distribution.

On the basis of their origin, natural resources can be classified into living or biotic and non-living or abiotic resources.

Living or Biotic Resources

If natural resources come from living things or organic materials, they are termed as living or biotic resources. Biotic resources include plants, animals and fossil fuels. Fossil fuels such as coal, oil and natural gas are classified as biotic resources as they are formed from the decay of organic matter over millions of years.

Non-living or Abiotic Resources

On the other hand, if the resources are derived from nonliving or inorganic materials, they are termed as abiotic resources. For instance, air, sunlight, and water are abiotic natural resources. Minerals are also considered abiotic.

On the basis of deposit or stock, natural resources can be classified as renewable and non-renewable.

Renewable Natural Resources

Resources that can be used without any risk of its ending up are called renewable resources. They exist in unlimited quantity. Sun, water, wind, biomass, tides, geothermal energy, etc. are renewable resources. These are infinite sources of energy.

Non-renewable Natural Resources

Those natural resources, on the other hand, that cannot be replenished after their depletion is called non-renewable resources. Most fossil fuels, such as coal, petroleum and natural gas are considered nonrenewable resources. Nonrenewable resources take billions of years for their formation; hence, their cautious and economic use is the only option left for mankind.

Natural Resources and Associated Problems

- The main problem associated with natural resources is unequal consumption.
- A major part of natural resources are consumed in the 'developed' world. The 'developing nations' also over use many resources because of their greater human population. However, the consumption of resources per capita (per individual) of the developed countries is up to 50 times greater than in most developing countries.
- Advanced countries produce over 75% of global industrial waste and greenhouse gases.
- Energy from fossil fuels consumed in relatively much greater quantities in developed countries. Their per capita consumption of food too is much greater as well as their waste.

Forest Resources

A forest can be defined as a biotic community predominant of trees, shrubs or any other woody vegetation usually in a closed canopy. It is derived from latin word 'foris' means 'outside'. India's Forest Cover is 6,76,000 sq.km (20.55% of geographic area). Scientists estimate that India should ideally have 33% of its land under forests. Today we only have about 12% thus we need not only to protect our existing forests but also to increase our forest cover.

Functions of Forest

- It performs very important function both to human and to nature.
- They are habitats to millions of plants, animals and wild life.

- They recycle rain water.
- They remove pollutant from air.
- They control water quality.
- They moderate temperature and weather.
- They influence soil condition and prevent soil erosion.

Uses of Forest

- Commercial uses
- Ecological uses

Commercial uses:

- ✓ Wood – used as a fuel
- ✓ Supply wood for various industries – Raw materials as pulp, paper, furniture timber etc.
- ✓ Minor forest products – gum, dyes, resins
- ✓ Many plants – Medicines
- ✓ Supply variety of animal products – honey, Ivory, horns etc.
- ✓ Many forest lands are used for - Mining, grazing, for dams and recreation.

Ecological uses: Forest provides number of environmental services.

Production of oxygen: Photosynthesis produces large amount of oxygen which is essential for life.

Reducing global warming: Carbon dioxide is one of the main greenhouse gasses. It is absorbed by plants for photosynthesis. Therefore, the problem of global warming caused by CO₂ is reduced.

Soil conservation: Roots of trees bind the soil tightly and prevent soil erosion. They also act as wind breaks.

Regulation of hydrological cycle: Watershed in forest act like giant sponges and slowly release the water for recharge of spring.

Pollution moderators: Forest can absorb many toxic gases and noises and help in preventing air and noise pollution.

Wild life habitat: Forest is the home of millions of wild animals and plants

The Direct Benefits from Forests are:

- (a) Fuel Wood: Wood is used as a source of energy for cooking purpose and for keeping warm.
- (b) Timber: Wood is used for making furniture, tool-handles, railway sleep-ers, matches, ploughs, bridges, boats etc.
- (c) Bamboos: These are used for matting, flooring, baskets, ropes, rafts, cots etc.
- (d) Food: Fruits, leaves, roots and tubers of plants and meat of forest animals form the food of forest tribes.
- (e) Shelter: Mosses, ferns, insects, birds, reptiles, mammals and micro-organ-isms are provided shelter by forests.
- (f) Paper: Wood and Bamboo pulp are used for manufacturing paper (News-print, stationery, packing paper, sanitary paper)
- (g) Rayon: Bamboo and wood are used in the manufacture of rayon (yarns, artificial silk-fibres)
- (h) Forest Products: Tannins, gums, drugs, spices, insecticides, waxes, honey, horns, musk, ivory, hides etc. are all provided by the flora and fauna of for-ests.

The Indirect Benefits from Forests are:

- (a) Conservation of Soil: Forests prevent soil erosion by binding the soil with the network of roots of the different plants and reduce the velocity of wind and rain — which are the chief agents causing erosion.
- (b) Soil-improvement: The fertility of the soil increases due to the humus which is formed by the decay of forest litter.
- (c) Reduction of Atmospheric Pollution: By using up carbon dioxide and giving off oxygen during the process of photosynthesis, forests reduce pollu-tion and purify the environment.
- (d) Control of Climate: Transpiration of plants increases the atmospheric humidity which affects rainfall and cools the atmosphere.

(e) Control of Water flow:

In the forests, the thick layer of humus acts like a big sponge and soaks rain water preventing run-off, thereby preventing flash-floods. Humus prevents quick evaporation of water, thereby ensuring a perennial supply of water to streams, springs and wells.

Reason for Deficiency of Forest

In India the minimum area of forest required to maintain good ecological balance is about 33% of total area. But at present it is only about 12%. So over exploitation of forest material occurs.

Over Exploitation of Forest: Due to over population, there is an increased demand for medicine, shelter, wood and fuel. Hence exploitation of forest materials is going on increasing.

Cause of over exploitation:

1. Increasing agricultural production.
2. Increasing agricultural activities.
3. Increase in demand of wood resources.

Deforestation: It is process of removal of forest resources due to natural or manmade activities (i.e.) destruction of forests.

Causes of Deforestation:

1. Developmental projects: Developmental projects causes deforestation through two ways.

- Through submergence of forest area.
- Destruction of forest area.

Ex: big dams, hydroelectric projects, road construction etc.

2. Mining operations: It reduces forest areas. Ex: Mica, coal, Manganese and lime stone.

3. Raw materials for industries: Wood is an important raw material for various purposes.

Ex: Making boxes, furniture and paper etc.

4. Fuel requirement: Wood is the important fuel for rural and tribal population.

5. Shifting cultivation: Replacement of natural forest ecosystem for mono specific tree plantation.

Ex: Teak

6. Forest fires: Forest fire destructs thousands of acres of forest.

7. Over grazing: Over grazing by cattle reduces the cultivation land

Consequences of Deforestation (or) Impacts of Deforestation:

1. Economic loss

2. Loss of biodiversity

3. Destructs the habitats of various species

4. Reduction in stream flow

5. Increases the rate of global warming

6. Disruption of weather patterns and global climate

7. Degradation of soil and acceleration of the rate of soil erosion.

8. Induces and accelerates mass movement / landslides.

9. Increases flood frequency, magnitude / severity. 10. Breaks the water cycle

11. Breaks the nutrient cycle

Timber Extraction

Wood used for engineering purposes like building houses, making furniture is called timber. The products derived from timber have been important to many civilizations, and thus it has acquired value within these civilizations. Timber extraction results in deforestation and in the fragmentation of the last remaining forests. It harms valuable species of trees, birds and wild animals. In spite of this, it is sometimes necessary to extract timber, so as to meet the needs of a developing country. During the extraction of timber, cutting, felling and handling should be done selectively, carefully and in a planned manner, in order to save the remaining forests and biodiversity.

Effects of Timber Extraction

The major effects of timber extraction on forest and tribal people include:

1. Poor logging results in a degraded forest.
2. Floods may be intensified by cutting of trees or upstream watersheds.
3. Loss of biodiversity.
4. Climatic changes such as less rains.
5. New logging roads permit shifting cultivators to gain access to logged areas and cut the remaining trees.
6. It results in forest fragmentation which promotes loss of biodiversity because some species of plants and animals require large continuous areas of similar habitat to survive.
7. Exploitation of tribal people by the contractors.
8. Soil erosion especially on slopes occurs extensively.
9. Sedimentation of irrigation systems, floods may be intensified by cutting of trees on upstream.

Dams

Today there are more than 45,000 large dams around the world, which play an important role in communities and economies that harness these water resources for their economic development. Current estimates suggest some 30-40% of irrigated land worldwide relies on dams. Hydropower, another important use of stored water, currently supplies 19% of the world's total electric power supply and is used in over 150 countries. The world's two most populous countries – China and India – have built around 57% of the world's large dams.

Effects of Dams on Forest:

1. Thousands of hectares of forest will be cleared.
2. Killing of wild animals and destruction of aquatic life.

3. Spreading of water borne diseases.

4. Water logging increases the salinity of the soil.

Ex: Narmada Sagar project it has submerged 3.5 lakhs hectares of forest.

Effects of Dam on Tribal People

1. Construction of big dams lead to the displacement of tribal people.

2. Displacement and cultural change affects the tribal people both mentally and physically.

3. They do not accommodate the modern food habits and life style.

4. Tribal people are ill-treated by the modern society.

5. Many of the displaced people were not recognized and resettled or compensated.

6. Body condition of tribal people will not suit with new areas and hence they will be affected by many diseases.

Preventive Measures (or) Avoid of Deforestation (or) Methods of Conservation of Forests

1. New plants of more or less of the same variety should be planted to replace the trees cut down for timber

2. Use of wood for fuel should be discouraged.

3. Forest pests can be controlled by spraying pesticides by using aero planes

4. Forest fire must be controlled by modern techniques.

5. Over grazing by cattle must be controlled.

6. Steps should be taken by the government to discourage the migration of people into the islands from mainland.

7. Education and awareness programmes must be conducted.

8. Strict implementation of law of Forest conservation Act.

References:

- ERACH BHARUCHA. (2004). *Textbook for Environmental Studies*. Pune: University Grant Commission.
- R. Rajagopalan. (2016). *Environmental Studies From Crisis to Cure* (Third ed.). New Delhi: Oxford University Press.
- https://www.tutorialspoint.com/environmental_studies/environmental_studies_mineral_resources.htm
- <https://www.yourarticlelibrary.com/environment/forest/forest-resources-in-india-use-over-exploitation-causes-and-effects/28196>
- http://www.brainkart.com/article/Forest-Resources_986/
- https://aits-tpt.edu.in/wp-content/uploads/2018/08/Environmental-Studies-Lecture-notes.doc-I_Betech_-ECE-CSE-EEE-CEME_III-Sem_BR.pdf

Complied By:

Dr. Prerna N. Bhautik

Assistant Professor

AISSMS CHMCT

Pune