FOREST RESOURCES

1.Introduction

Natural resources (economically referred to as land or raw materials) occur naturally within environments that exist relatively undisturbed by mankind, in a natural form. 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. 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.

The USA for example with just 4% of the world's population consumes about 25% of the world's resources. Producing animal food for human consumption requires more land than growing crops. Thus countries that are highly dependent on non-vegetarian diets need much larger areas for pastureland than those where the people are mainly vegetarian.

Our natural resources can be compared with money in bank. If we use it rapidly the capital will be reduced to zero. On the other hand if we use only the interest, it can sustain us over the longer term. This is called sustainable utilization or development. The quality of human life and the quality of ecosystems on earth are indicators of the sustainable use of resources. There are clear indicators of sustainable lifestyles in human life. These are: Increased longevity, an increase in knowledge and an enhancement of income. These three together are known as the **'human development index'**.

1.1 Definition :

A natural resource may be defined as "any material given to us by nature which is valuable, useful and necessary for our day-to-day life'. Eg: Plants, animals and microbes (living or biotic part), Air, water, soil, minerals, climate and solar energy (non- living or abiotic part). For human being, Resources are defined as those substances which are required for survival, comfort and prosperity. They are directly coming from environment.

On the basis of availability, the resources are classified as two categories.

A. Renewable Resources

B. Non-renewable Resources.

Renewable (Inexhaustible) Resources:

Inexhaustible resources have the inherent ability to reappear or replenish themselves by recycling, reproduction or replacement. Fresh water, fertile soil, plants and animals are its examples. Some resources such as plants and animals are replaced from time to time because they have a life-cycle and continuous harvest is possible. Hence, they are called renewable resources.

Non-renewable (Exhaustible) Resources:

These resources are available in finite quantities, the rate of renewal or formation is so slow that, it may take thousand years. Once they are used in unlimited way, they cannot be easily

replaced. Thus, their exploitation at large scale will result in their fast depletion. Some such resources are called non-renewable resources or exhaustible. Examples of such resources are metal ores, fossil fuels (coal and petroleum), mineral oil etc.

Forest Resources

The word "*forest"* is derived from the Latin word "*foris*" means 'outside'. A forest is a natural community characterized by rich biodiversity dominated by trees, shrubs, herbs, climbers and creepers usually with a closed canopy. Trees are large, generally single-stemmed woody plants. Forest can exist in many parts in different environmental conditions. No forest is static in time. That is, because forest communities respond to outside influences. The factors like rainfall, fire, wind, glaciations, seismic activity, flooding, animal activity etc are constantly disturbing the forest resources.

Man depends heavily on a larger number of plant and animal products from forests for his daily needs.

The chief product that forests supply is wood, which is used as fuel, raw material for various industries as pulp, paper, newsprint, board, timber for furniture items, other uses as in packing articles, matches, sports goods etc.

Indian forests also supply minor products like gums, resins, dyes, tannins, fibers, etc.

Many of the plants are utilized in preparing medicines and drugs;

Total worth of which is estimated to be more than $300 billion per year.

Many forests lands are used for mining, agriculture, grazing, and recreation and for development of dams.

Classification of forest:

1.Tropical Rain Forests: They are evergreen broadleaf forests found near the equator. They are characterized by high temperature, high humidity and high rainfall, all of which favor the growth of trees.

2.Tropical Deciduous Forests: They are found a little away from the equator and are characterized by a warm climate the year round. Rain occurs only during monsoon.

3.Tropical Scrub Forests: They are found in areas where the day season is even longer.

4.Temperate Rain Forests: They are found in temperate areas with adequate rainfall. These are dominated by trees like pines, firs, redwoods etc.

5.Temperate Deciduous Forests: They are found in areas with moderate temperatures.

6.Evergreen Coniferous Forests (Boreal Forests): They are found just south of arctic tundra. Here winters are long, cold and dry. Sunlight is available for a few hours only.

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. The total forest coverage in India shown in Table-1.

Table-1:Forest coverage in India

Class	Area (Sq Km)	Percentage of Geographical area
Forest Cover		
a) Very dense Forest	83,502	2.54
b) Moderate Dense Forest	318,745	9.7
c) Open Forest	295,651	8.99
Total Forest Cover*	**697,898**	**21.23**
Scrub	41,383	1.26
Non Forest	2,547,982	77.51
Total Geographical Area	3,287,263	100

Forest Functions:

- Protective
- Productive
- Regulatory
- Recreational ,cultural and Educational
- Development Functions

Protective

- **Shelter:** Forest is a safe shelter for wide variety of flora and fauna , such as mosses, ferns, insects, birds, reptiles, mammals and microorganisms etc.
- **Watershed protection**
- Reducing the rate of surface run-off of water
- **Flood control:** In the forest, the thick layer of humus acts like a big sponge and soaks rain water preventing run off, thereby preventing flash –floods. Soil floor with thick litter deposits prevent quick evaporation of water and enhance the infiltration of water to ground water which finally increases in ground water table.
- Producing prolonged gradual run-off and thus safeguarding against drought.
- **Erosion control**
- Holding soil tightly (by preventing rain from directly washing soil away)
- **Land bank**
- Maintaining soil nutrients and structure. Forest soil is very rich in inorganic and organic nutrients.

Productive

- Local use : Consumption of forest produce by local people who collect it for Sustenance
- Food: (consumptive use) gathering plants, fishing, hunting from the forest.
- Fodder for cattle
- Fuel wood and charcoal for cooking and heating
- Poles for building homes in rural and wilderness areas
- Timber for house hold articles and construction
- Fiber for weaving baskets, ropes, nets, strings, etc.,
- Sericulture for silk
- Apiculture for rearing bees for honey (bees as pollinators)
- Medicinal plants for traditional medicines, investigating them as potential source for new modern drugs
- Market use (productive use) Most of the products used for consumptive purposes and good source of income for supporting their livelihood of forest dwelling people.
- Minor forest products (NTFPs): Fuel wood, fruits, gum, fiber, etc which are collected and solid in local markets as a source of income for forest dwellers
- Major timber extraction for construction, industrial uses, paper pulp etc. Timber extraction is done in India by the forest department, but illegal logging continues in many of the forests of India and the world

Regulatory Function

- **Safeguard against Pollution:** Absorption of carbon dioxide and release of oxygen in the process of photosynthesis, reduce the concentration of green house gases in atmosphere. Tree also reduces dust pollution and noise pollution.
- **Control desertification:** The forest checks strong gales and keeps the soil intact beneath the roots of trees and thus checks extension of desert.
- **Maintains Ecological Balance:** Forest control rainfall, nutrient cycling, and temperature balance of earth, which perfectly balanced the world ecosystem.
- Climate Control by maintain the earth temperature
- Regulating Water & Nutrient Cycle
- Reduction of Atmospheric Pollution

Recreational, Cultural and Educational Functions:

- Eco Tourism: Forest are good destination for spending leisure time with family and friends,
- Forests are linked with our cultural and civilization. Many plants are highly essential in our cultural and traditional rituals.
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Developmental Functions :

- **Economic Development:** Forest contributes to the economic development of the country because they provide goods and services to the people and industry.
- **Employment opportunities:** About eight crore people are employed in wood based industries like paper and match and small and cottage industries. Besides, those who are employed in the forest department in various states.
- **Revenue Receipts:** The forests provide Rs. 400 crores per year as revenue to the government.

Importance of forest Resources:

- **Ecological Balance:** Forests and wildlife are essential to maintain ecological balance of an area.
- **Renewable Natural Resources:** Forests are an important renewable natural resources.
- **Eco-system:** Trees dominate forest ecosystem; their species content varities in different parts of the world.
- **Economic Development:** Forest contributes to the economic development of the country because they provide goods and services to the people and industry.
- **Environment Quality:** The forest enchance the quality of environment by influencing the life supporting system.
- **Safeguard against Pollution:** Forest check air pollution and soil erosion. Thus, they exercise safety and against pollution.
- **Soil Conservation:** Forest save the hill-slopes from landslides.
- **Wind Erosion:** In deserts, trees reduce wind erosion by checking wind velocity.
- **Check the Extension Balance:** The forest checks strong gales and keeps the soil intact beneath the roots of trees and thus checks extension of desert.
- **Maintains Ecological Balance:** The forest check pollution of air through increasing oxygen content of the air.
- **Attract Rainfall:** By causing condensation of water vapour in clouds, forests attract rains.
- **Control Floods:** The floods are controlled because forests dry up rainwater like sponge.
- **Linked with Cultural and Civilization:** Forests are linked with our cultural and Civilization.
- **Supply of Raw Material:** Forest supply wood, which is used as under:
- Fuel,
- Raw material for various industries as pulp, paper, newsprint, board;
- Timber for furniture items;
- To be used in packing articles like fruits, tea etc.

- For preparing matches, sport goods etc.
- **Minor forest products:** Some examples of minor forest products, are canes, gums, resins, dyes, flocks, medicines, tannins, lac, fibres, katha etc.
- For tribal people are provided with food like tuber, roots, leaves, fruits, meat from birds and other animals etc.
- **Employment opportunities:** About eight crore people are employed in wood based industries like paper and match and small and cottage industries. Besides, those who are employed in the forest department in various states.
- **Revenue Receipts:** The forest provide Rs. 400 crores per year as revenue to the government.
- **Fodder for Cattle:** Forest provide fodder to cattle.
- **Foreign Exchange Earners:** Forest produce a great number of articles like essential oils, resins and dyes. Which find market in foreign countries. Nearly Rs. 50 crores are earned in foreign exchange through selling lac, terpentine oil and sandal wood oil to abroad.
- The ecological services provided by our forests may be summed up as follows:
- **Balances CO_2 and O_2 levels in atmosphere.**
- The main green house gas carbon dioxide is absorbed by the forests as a raw material for photo synthesis. Thus forest canopy acts as a sink for carbon dioxide thereby reducing the problem of global warming caused by green house gas CO_2
- **Regulates earth temperature and hydrological cycle (Regulation of hydrological Cycle)**
- Forested watersheds act like giant sponges, absorbing the rainfall, slowing down the runoff. They control climate through transpiration of water and seed clouding.
- **Encourage seepage and reduces runoff losses, prevents drought**
- Reduces soil erosion (roots binding), prevents siltation and landslides thereby floods (Soil Conservation)
- Forests bind the soil particles tightly in their roots and prevent soil erosion. They also act as wind breakers.
- **Litter helps in maintaining soil fertility**
- **Pollution Moderators**
- Forests can absorb many toxic gases and can help in keeping the air pure and in preventing noise pollution.
- **Safe habitat for birds, wild animals and organisms against wind, solar radiation and rain**

Over Exploitation of Forests

- Man depends heavily on forests for food, medicine, shelter, wood and fuel. With growing civilization the demands for raw material like timber, pulp, minerals, fuel wood etc. shot up resulting in large scale logging, mining, road-building and clearing of forests.
- Our forests contribute substantially to the national economy. The devasting effects of deforestation in India include soil, water and wind erosion, estimated to cost over 16,400 cores every year.

Deforestation

- Deforestation is the process of felling trees indiscriminately resulting in nude or seminude surface of the hill hitherto covered by thick forests.

The main causes of Deforestation:

- **Population Explosion**
- **Forest Fire**
- **Mining Operation**
- **Over grazing of animals**
- **Pest Attack**
- **Natural Forces**

a. Population growth

Ever increasing population poses serious threat to the environment. Due to population increase the demand for timber, firewood, pulpwood and synthetic fibers increases and forests have been exploited to meet the demands. Vast areas of forest land are cleared of trees to reclaim land for human settlements, factories, agriculture, housing, roads, railway tracts etc.

b. Forest Fires

Fires in the forests may due to natural calamities or human activities. In densely populated forests, tree tops may catch fire by heat produced by constant rubbing against each other. Dried twigs and leaves may catch fire. Human activities like clearing forest for habitation, agriculture, firewood, construction of railway tracks , construction of roads and others may catch fire during careless working.

c. Mining Operation

In open cast mining and deep tunneling the over burden is removed and this involves forest clearance. Mining is done to extract metal ores (iron ore, lime stone, manganese, coal, mica and copper)from earth.

d. Over grazing

Overgrazing by livestock has poses serious effect on forest, loss of porosity of soil, soil erosion and leads to desertification of fertile forest area.

e. Pest attack

Pests attack is a serious problem in forest ecosystem. It destroy huge amount of forest land by destroying leaves, shoots and spreading diseases.

f. Natural Forces

Every year India is losing million hectares of forest land due to natural calamities like floods, cyclone, snow, lightening, land slide etc .

Consequences of Deforestation:

A) Effects on productivity

Deforestation leads to soil erosion by the natural forces like wind and water, which ultimately washed away the top soil of the crop field and finally resulted in loss in productivity of soil.
It is noticed that the devasting effects of deforestation in India include soil, water and wind erosions, estimated to cost over 16,400 crores every year.

A) Habitat destruction
Due to indiscriminate falling of trees , the forest density going on thinning, which effect the wild animal habitat significantly. The tree using and tree depending animals adversely affected by loosing their shelter.

B) Reduction in oxygen liberation by plants through photosynthesis and which leads the reduction in productivity of the plant.
C) Increase in pollution due to burning of wood and reduction in carbon dioxide fixation by plants.
D) Reduction in forest products availability.
E) Biodiversity loss due to extinction of variety of species of plant.
F) Loss of cultural diversity.
G) Loss of livelihood for the tribal people residing near the forest area.
H) Decrease in ground water table, due to increased in runoff, which ultimately result in frequent flood .
I) Deforestation leads to desertification of fertile land.
J) Global warming due to increase in carbon dioxide level in the atmosphere. Which leads to melting of glaciers and rising of sea level.

Conservation of Forest:

Generally, conservation is defined as wise use of natural resources. A widely favored definition is that ***"conservation is the use of natural resources for the greatest good of the greatest number for the longest time."*** Conservation thus implies both the development and the protection of resources.

Here conservation of forest resources implies optimum development of the forest products and retaining their perennial supply as well. Therefore, it includes the plan for highest productivity as well as the highest restoration of the products.

- Timber and fuel wood should be used economically by minimizing wastage
- Alternate source of energy such as Biogas, Solar Energy etc. should be developed to supplement fuel wood.
- Over grazing and deforestation should be prohibited.
- Reforestation of degraded forest land should be encouraged
- Pest and fire control by modern techniques should be adopted
- Forestry should be improved by modern research technique

Forest conservation Act 1952:

- **Agro Forestry**
- Same piece of land used for farming and forestry.
- **Social Forestry**
- Plantation for fuel wood, fodder, fruits , agricultural implements and construction purpose for rural population
- **Urban Forestry**
- - Plantation of Ornamental Plants, fruit bearing trees in house compounds, common parks and along the roads.
- Observation of Van Mohotsava twice a Year during Feb and July.
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