



UNIT-I

Forest Resources :Indian Scenario





Chief Natural Resources



Forests Resources

Water Resources

Land Resources

Mineral Resources

Energy Resources

Food Resources



Forest Resources



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Introduction



- A biotic community with predominance of trees. Most important gift of nature.

OR

- A forest is usually an **area filled with trees** but any tall densely packed area of vegetation may be considered a forest, even **underwater vegetation** such as kelp forests, or **non-vegetation** such as **fungi and bacteria**.

OR

- It is highly complex, changing environment **made up of a living and non living things. Living things include trees, shrubs, wildlife etc. and non-living things include water, nutrients, rocks, sunlight and air.**
- Forest are important to humans and the natural world. For humans, they have many aesthetics, recreational, economic, historical, cultural and religious values.
- **Forest provide fuel, wood, timber, wildlife, habitat, industrial, forest products, climate regulations, medicinal etc.**



Forest refers to a complex ecosystem that predominantly consists of trees, shrubs, and generally, a closed canopy. They act as the storehouse of a diverse variety of flora and fauna.

- They also home an abundance of microorganisms and fungi, which are crucial for the decomposition cycle which enrich the soil.
- Nearly, **30% of the total Earth's land surface is covered by forests. The percentage refers to around 4 billion hectares of forest cover.**
- Another implication of the word 'forest' is natural vegetation of an area which has existed for thousands of years and supports a variety of biodiversity. This eventually forms a complex ecosystem.
- Forests are crucial for the planet, global climate, animals and humans beings as well. They provide various natural services and products. Moreover, they have a crucial role in maintaining the ecological balance and have its contribution to the economy also.



Forest Resources



- The word forest is derived from a Latin word
- “ Foris” means Outside
- Forest are one of the most important natural resources of the earth.
- Tree forests cover approximately 9.4 percent of the Earth's surface (or 30 percent of total land area i.e., Approximately $1/3^{\text{rd}}$ of the earth's total land area).
- India is one of the ten most forest-rich countries of the world along with the Russian Federation, Brazil, Canada, United States of America, China, Democratic Republic of the Congo, Australia, Indonesia and Sudan.
- Together, India and these countries account for 67 percent of total forest area of the world



Table 18.1

Extent of forest and wooded land, 2005

Country/area	Forest	Other wooded land	Other land with tree cover	Total forest and wooded land area
	1000 ha	1000 ha	1000 ha	1000 ha
Total Eastern and Southern Africa	226,534	167,023	10,345	403,902
Total Northern Africa	131,048	94,609	10,207	235,864
Total Western and Central Africa	277,829	144,468	788	423,085
Total Africa	635,412	406,100	21,339	1,062,851
Total East Asia	244,862	90,003	0	334,865
Total South and Southeast Asia	283,127	29,842	10,806	323,775
Total Western and Central Asia	43,588	71,446	1,145	116,179
Total Asia	571,577	191,291	11,951	774,819
Total Europe	1,001,394	100,925	8,044	1,110,363
Total Caribbean	5,974	1,310	339	7,623
Total Central America	22,411	5,018	449	27,878
Total North America	677,464	111,866	32,899	822,229
Total North and Central America	705,849	118,194	33,687	857,730
Total Oceania	206,254	429,908	145	636,307
Total South America	831,540	129,410	613	961,563
WORLD	3,952,025	1,375,829	75,779	5,403,633

1 hectare (ha) = 10 000 square meters (m²) = 0.01 square kilometres (km²)

Source: Global Forest Resources Assessment 2005.



Table 18.2 Forest cover by subregion 2005 and distribution

Table 18.2				
Forest cover by subregion 2005 and distribution				
Region/subregion	Land area (1 000 ha)	Forest area, 2005 (1 000 ha)	Forest area as % of region's land area	Forest area as % of global forest area
Eastern and Southern Africa	814581	226 534	27.8	5.73
Northern Africa	1517682	131 048	8.6	3.32
Western and Central Africa	630393	277 829	44.1	7.03
Total Africa	2962656	635 412	21.4	16.08
East Asia	1147756	244 862	21.3	6.2
South and Southeast Asia	848952	283 127	33.4	7.16
Western and Central Asia	1101205	43 588	4	1.1
Total Asia	3097913	571 577	18.5	14.46
Total Europe	2260180	1 001 394	44.3	25.34
Caribbean	22907	5 974	26.1	0.15
Central America	51073	22 411	43.9	0.57
North America	2069930	677 464	32.7	17.14
Total North and Central America	2143910	705 849	32.9	17.86
Total Oceania	849116	206 254	24.3	5.22
Total South America	1753646	831 540	47.7	21.04
WORLD	13067421	3 952 025	30.3	100
1 hectare (ha) = 10 000 square meters (m ²) = 0.01 square kilometres (km ²)				
Source: Global Forest Resources Assessment 2005.				



A conifer forest in the Swiss Alps



Mixed deciduous forest in Stara Planina, Serbia



Temperate rainforest in Tasmania's Hellyer Gorge



Amazon Rainforest in Brazil



Indian Scenario

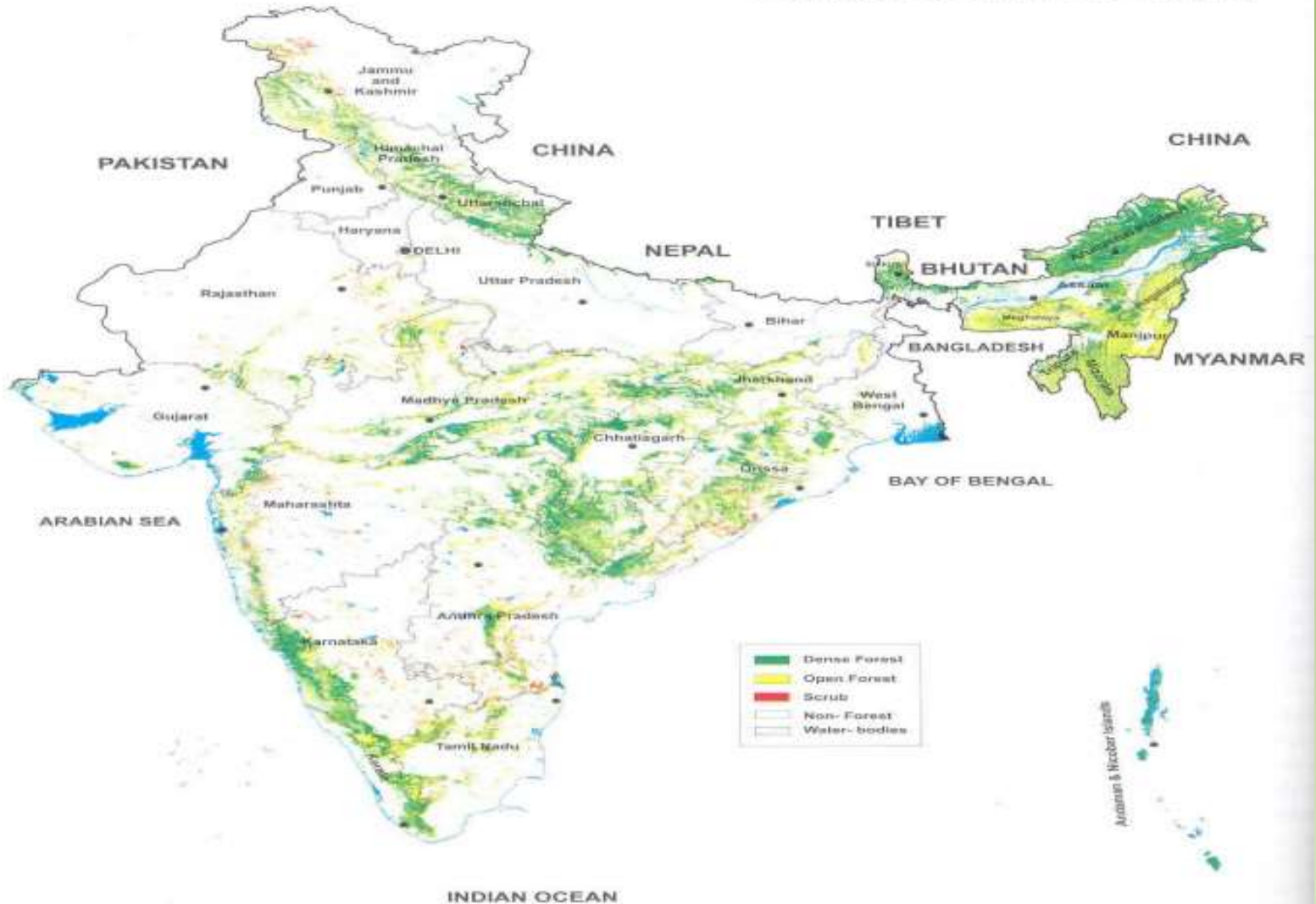


- As of 2010, the Food and Agriculture Organisation of the United Nations estimates India's forest cover to be **about 68 million hectares, or 24% of the country's area.**
- **The 2013 Forest Survey of India states its forest cover increased to 69.8 million hectares by 2012.**
- Forest cover in India is defined as all lands, more than one hectare in area with a tree canopy density of more than 10%.
- India's forest cover grew at **0.22% annually over 1990-2000**, and has grown at the rate of **0.46% per year over 2000-2010.**

Very Dense Forest	All lands with tree cover of canopy density of 70% and above
Moderately Dense Forest	All lands with tree cover of canopy density between 40% and 70%
Open Forest	All lands with tree cover of canopy density between 10% and 40%.
Scrub	Degraded forest lands with canopy density less than 10 %.
Non-forest	Any area not included in the above classes.



FOREST COVER OF INDIA





Indian top five states with largest area under forest cover

❖ According to India's 2013 forest survey report, thus obtained and published by the Government of India suggests the **top five states with largest area under forest cover**:

→ Madhya Pradesh: 7.75 million hectares

→ Arunachal Pradesh: 6.73 million hectares

→ Chhattisgarh: 5.6 million hectares

→ Maharashtra: 5.06 million hectares

→ Odisha: 5.03 million hectares

The seven north-eastern States of India have nearly 1/4 th of the country's forest cover.

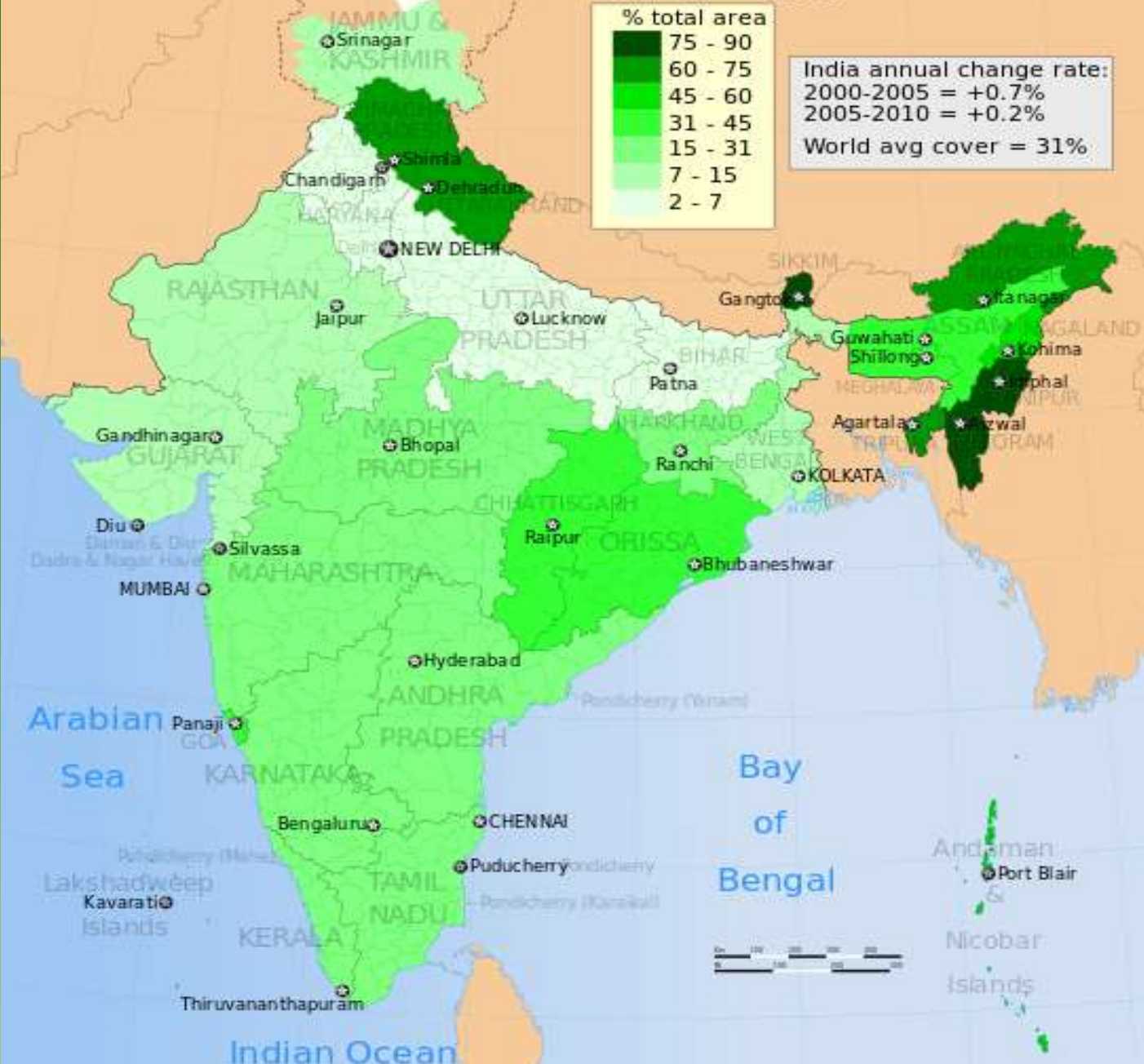


Forest Degradation in India

- At the beginning of 20th century about 30 % of land in India was covered with forests but by the end of 20th century the forest cover was reduced to 19.4%.
- As a result of exploitation, the tropical forest cover in India, is now only reduced to coastal western Ghats and northern India
- The National forest policy has recommended 33 % forest area for plains and 67 % for hills

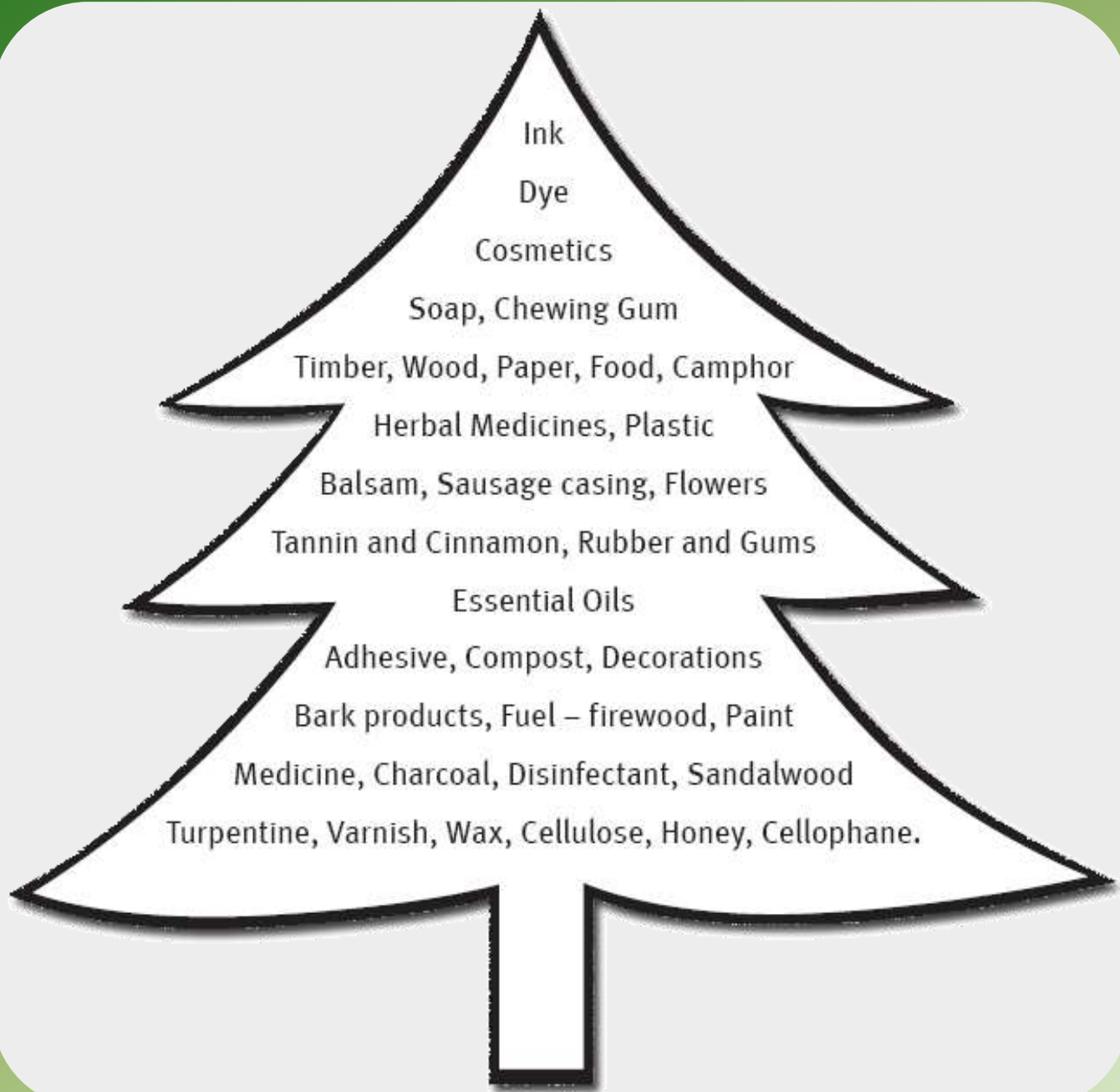


% Forest cover, Indian states 2010





Uses of forest





Importance of Forests



Direct Benefits

- Timber (plywood, door, windows, sports goods etc.)
- Raw material (forest based industries: bee keeping, furniture, beedi, sal seed oil, bamboo sticks etc.)
- Edible product (fruits, seeds, nuts, spices etc.)
- They provide natural habitat to tribal people
- Manure and fuel wood (India is the world's largest consumer of fuel-wood)
- They are an important source of national income
- Medicinal plants
- Tourism: Ecotourism
- Employment opportunities



Indirect Benefits

- Forests help in minimizing natural hazards (Flood, drought).
- They help in reducing soil erosion and siltation of downstream water bodies.
- They help in reducing desertification and land degradation.
- They help in maintaining biodiversity by providing habitat to wild animals.
- They help in regulating hydrological cycle.
- They help in regulating the gases in atmosphere.



Functions of Forests

- The functions of forest may broadly classified into following categories
- *Protective Function*
- *Productive Function*
- *Regulative Function*
- *Accessory Function*



1. Protective Functions



- **Forest Provide protection against**
- Soil erosion,
- Droughts,
- Floods,
- Noise,
- Radiations



Soil erosion



Soil erosion



Floods



Droughts



2. Productive Functions

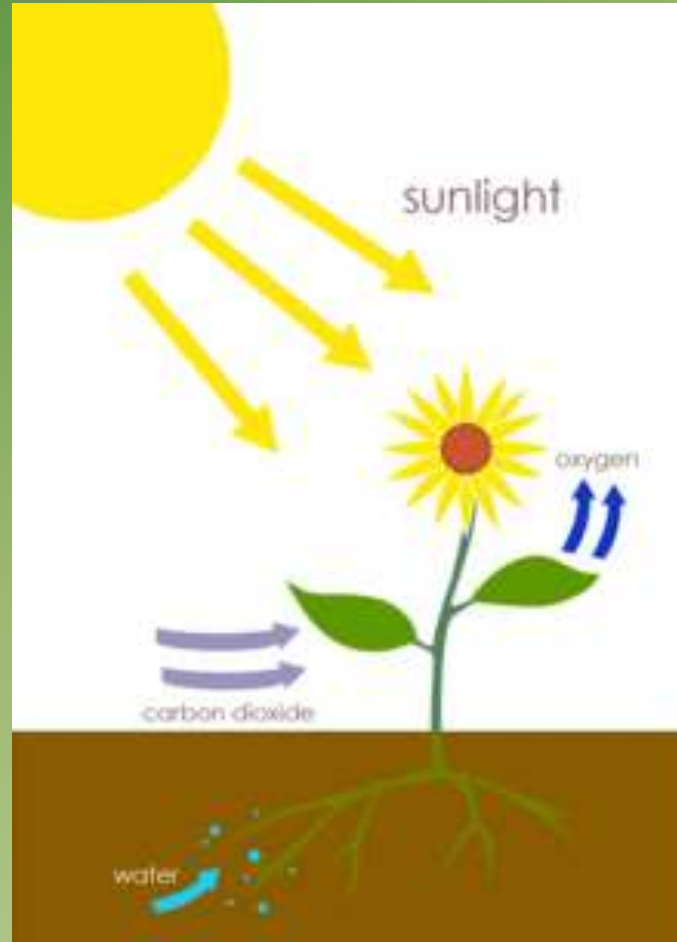
- Forest Provide various products like, gum resins, medicines, honey, pulp, bamboo, timber, Vegetables and fruits.





3. *Regulative Functions*

- The Forest **regulates the level of Oxygen and carbon dioxide in atmosphere.**
- The forests also help in **regulating temperature conditions**





OXYGEN IN THE ATMOSPHERE

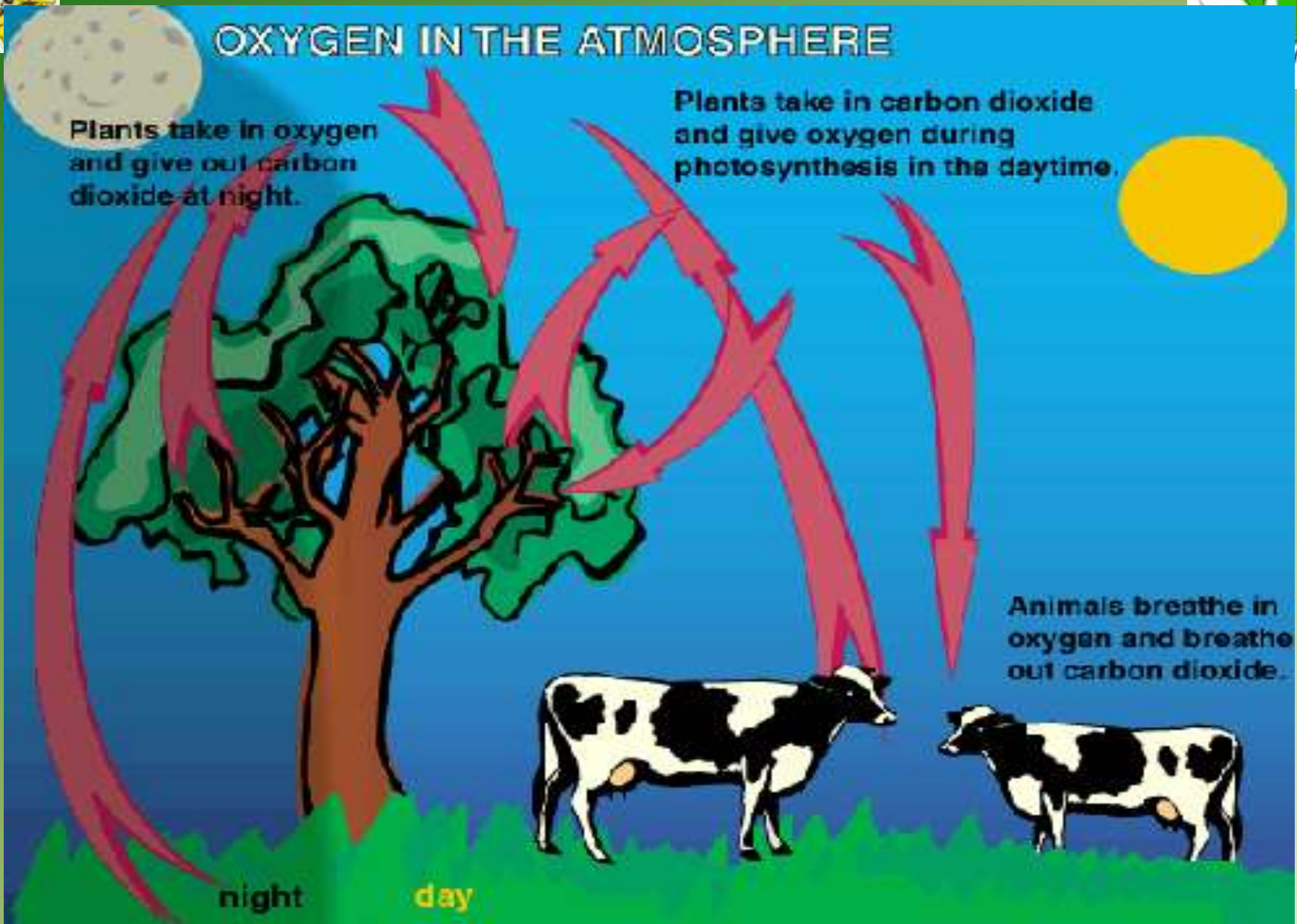
Plants take in oxygen and give out carbon dioxide at night.

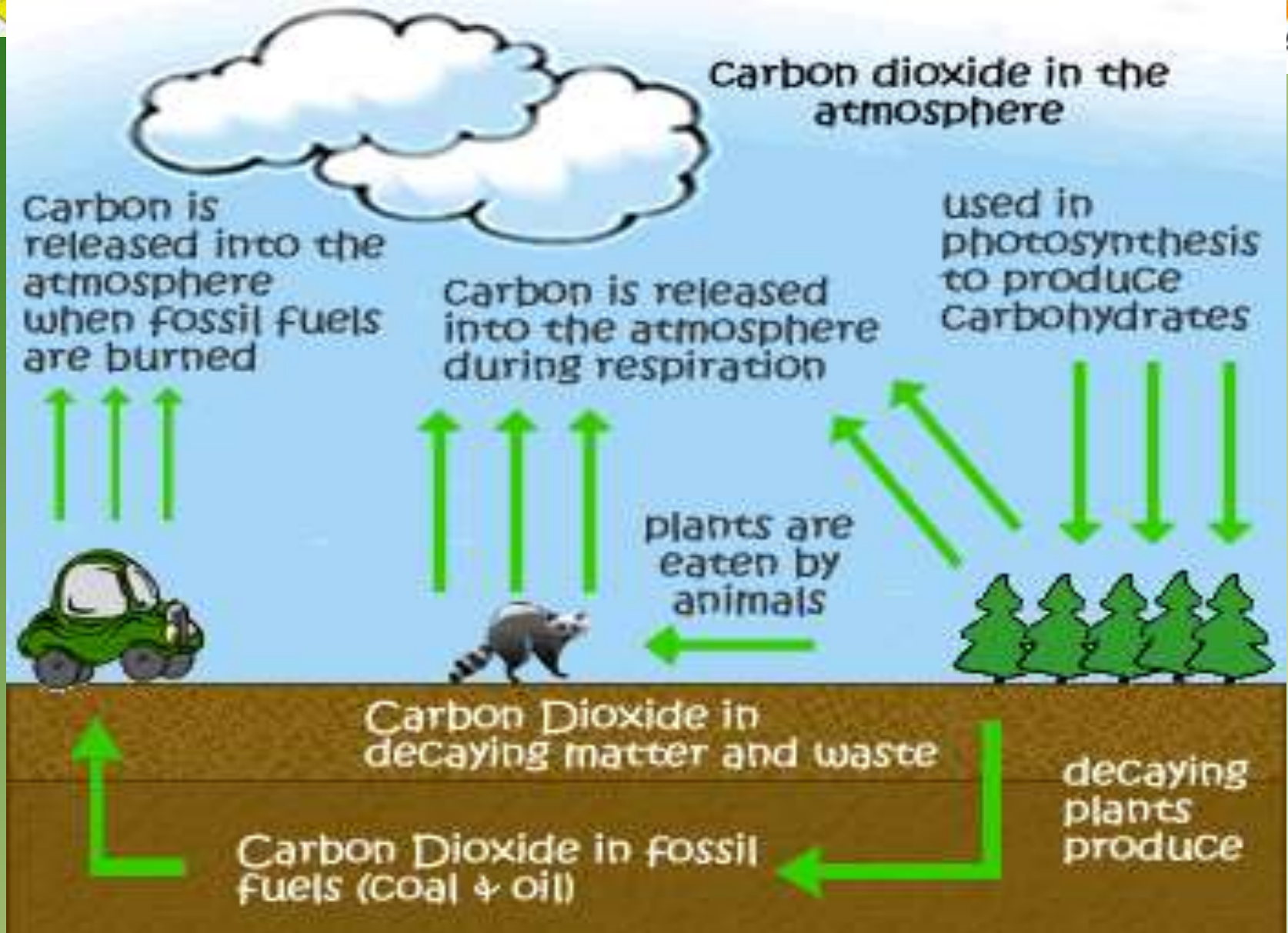
Plants take in carbon dioxide and give oxygen during photosynthesis in the daytime.

Animals breathe in oxygen and breathe out carbon dioxide.

night

day







4. Accessory Function

- Forest provides aesthetics, habitat to various flora and fauna besides that it also has an recreational value.





Ecological Importance or uses of Forests



- ***Regulation of global climate and temperature***
- Forest play a crucial role in regulation of global climate and temperature as forest cover absorb the solar radiations that would otherwise be reflected back into the atmosphere by bare surface of the earth.
- Transpiration of plants increases the atmosphere humidity which affects the rainfall, cools the atmosphere and thus regulate the hydrological cycle



Reduction of Global Warming

- The main green house gas CO_2 is used by forests for photosynthesis process the **forest act as a sink for CO_2** there by reducing the green house effect due to CO_2 .

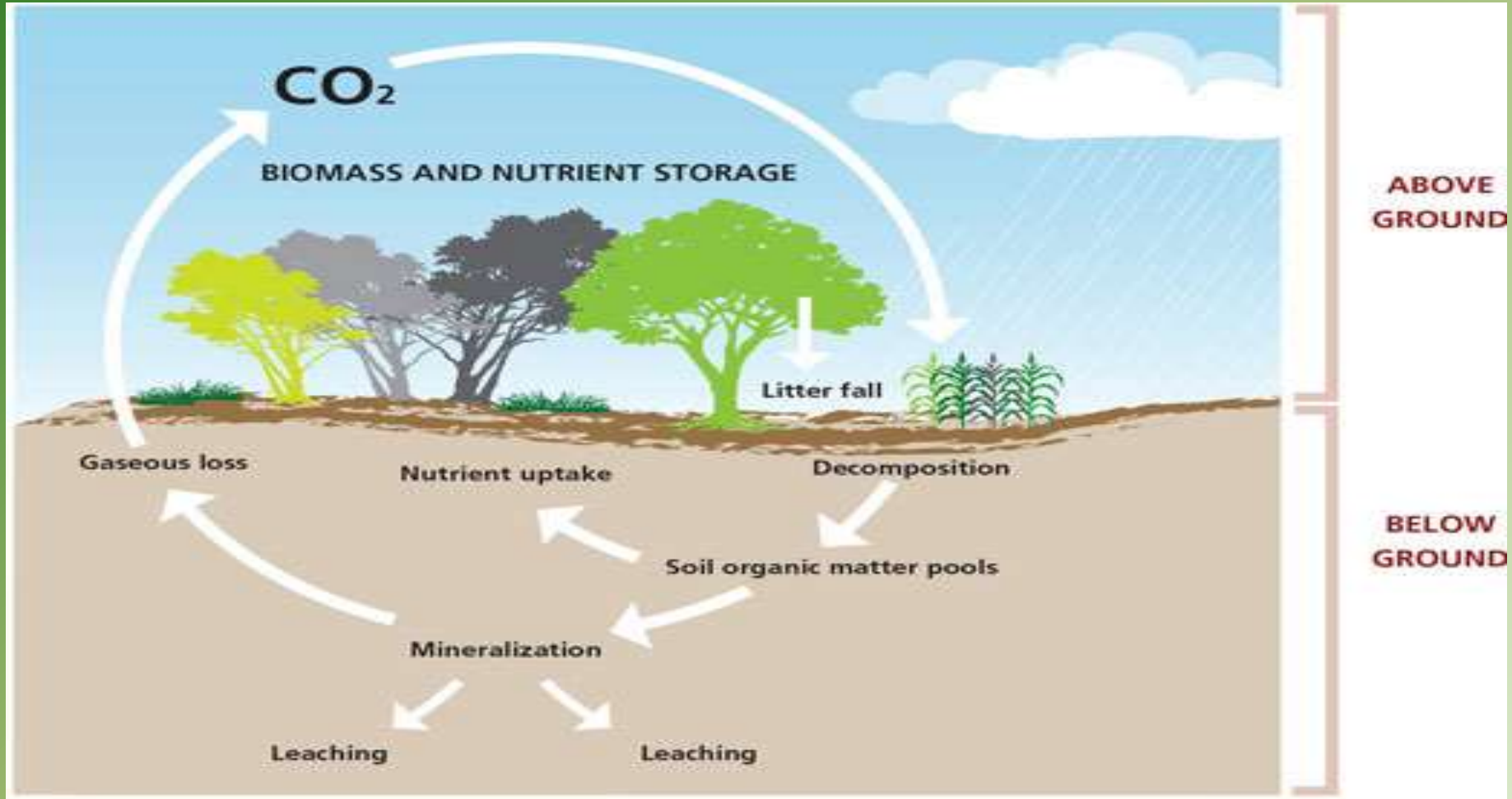




Production of Oxygen



- During Photosynthesis process forest releases oxygen a very important gas for human survival thereby **forests are called as lungs of earth.**





Conservation of Soil

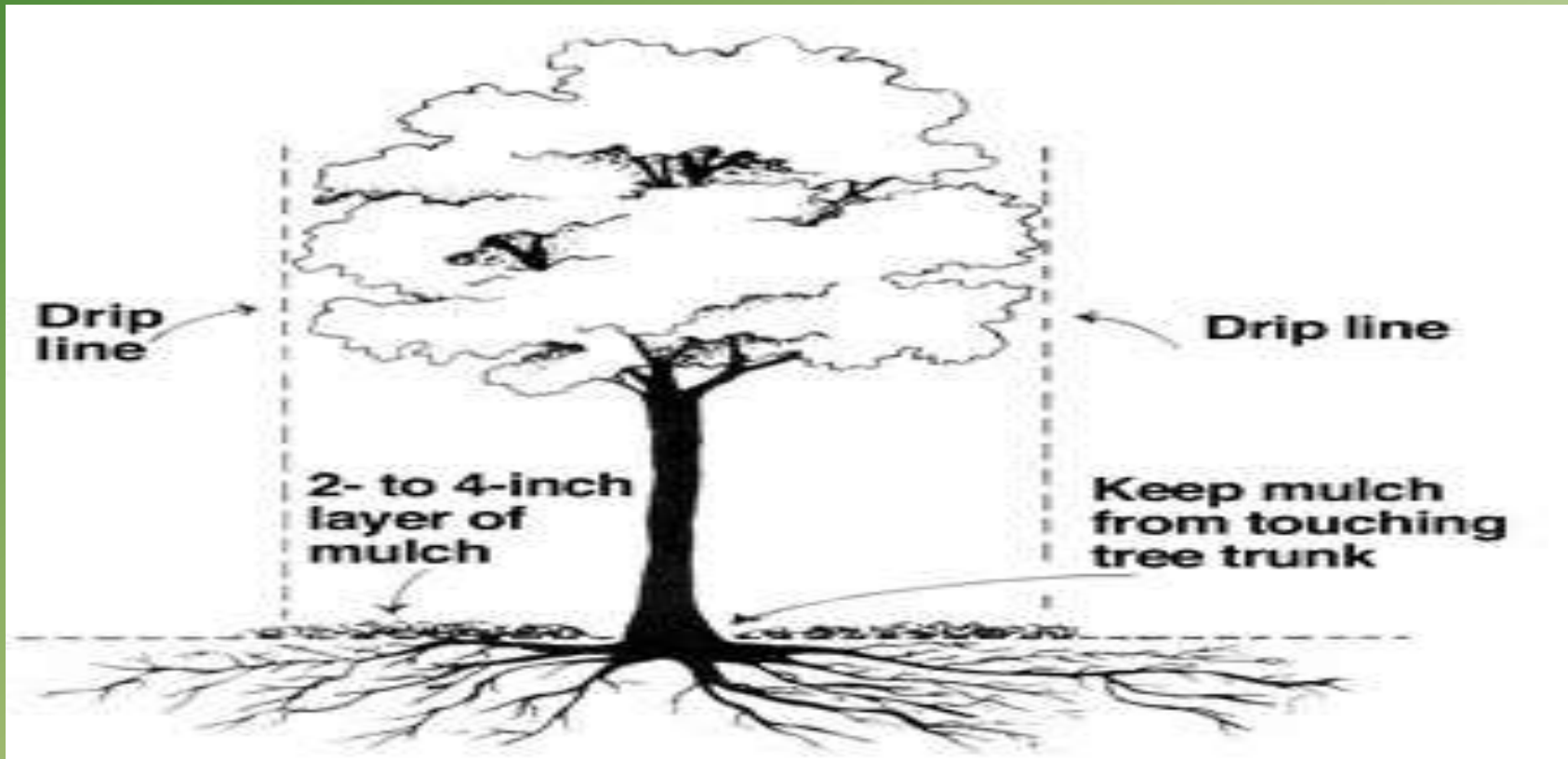
- They prevent **soil erosion** by
- binding the soil particles tightly in their roots.
- reducing the velocity of wind and rain which are chief agents causing erosion





Improvement in fertility of Soil

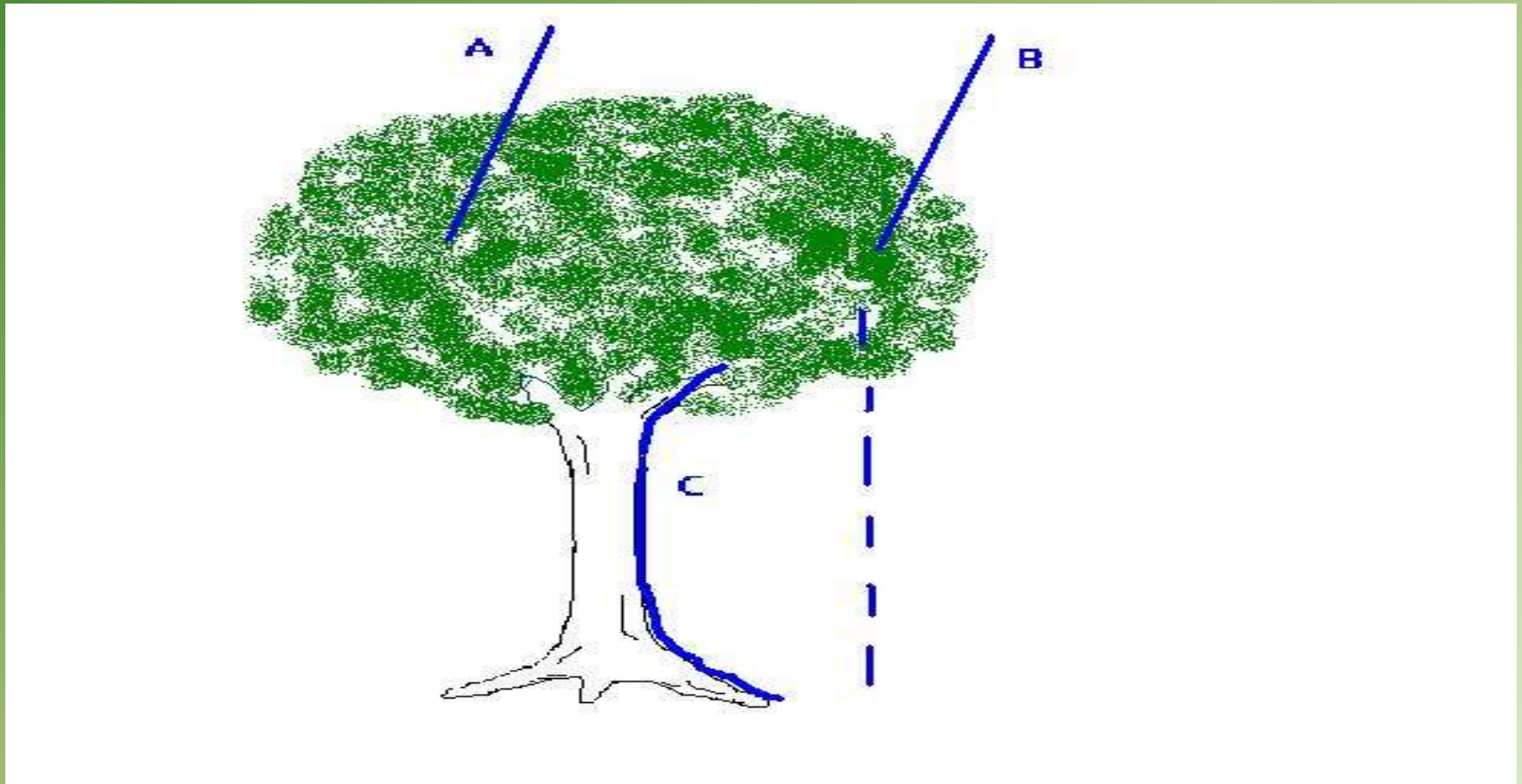
- The fertility of soil increases due to humus formed by the decay of forest litter (leaves, branches, stems roots etc.)





Control of water flow

- The **forest act as a giant sponge** they slow down runoff, absorbing and holding water that recharges springs, streams, and ground water.





Habitat to wild life

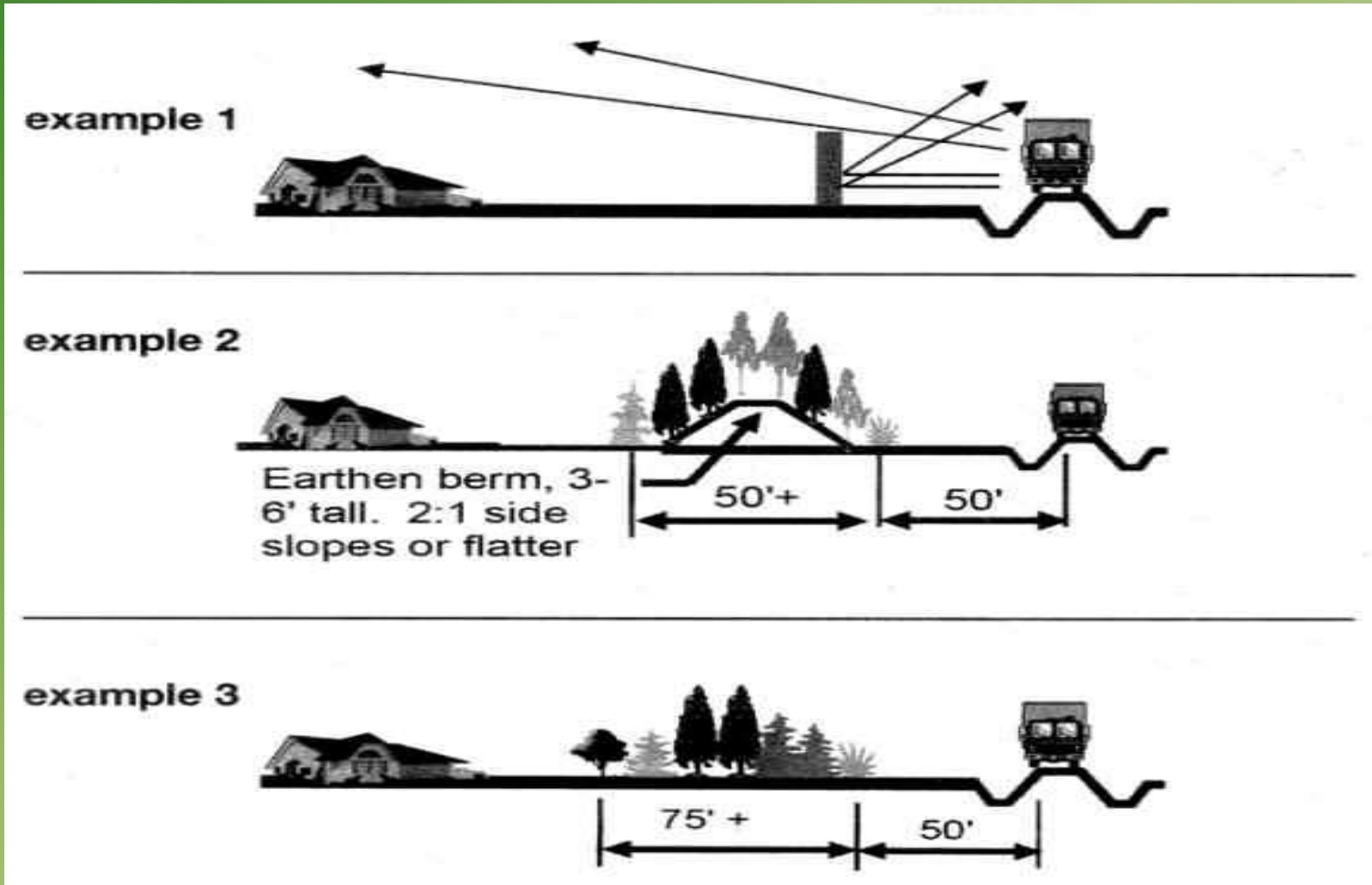
- They provide the habitat for high wild life species





Absorption of Noise

- Forest cover absorbs the noise and helps in preventing noise pollution





Absorption of air pollutants

- Forest absorbs many toxic gasses and air pollutants and can help in keeping air pure.





Economical Importance of Forest



- **Timber:** Wood used for commercial purposes like **for making furniture** and other items like **boats, bridges** and other day to day uses.
- **Fuel Wood:** The wood is used as fuel for cooking and other purposes by poor people.
- **Raw material for wood based industries:** forest provide raw material for various wood based industries like **paper and pulp, sports goods, furniture, match boxes etc.**





- **Food:** Fruits, roots, leaves of plants and trees along with the meat of forest animals provide the food to the tribal people.
- **Miscellaneous Products:** Miscellaneous products like, resin, gums, oils, medicines, honey are provided by forests





Over-exploitation of Forests

Deforestation



- The permanent destruction of forest is called deforestation
- Forest are exploited since early times for humans to meet human demand





Causes of Deforestation

- Encroachment of forest land for agricultural purposes
- Expansion of cities.
- Construction of dams, canals and highways
- Establishment of industrial areas
- Demand for firewood
- Mining
- Shifting Cultivation
- Forest Fires





Causes of Deforestation

- **Population explosion:** Population explosion is the root cause of all the environmental problems, vast area of forests are cleared for human settlement
- **Shifting Cultivation:** It is a traditional agroforestry system in which felling and burning of forests followed by cultivation of crop for few years and abandon of cultivation allow forests for re-growth cause extreme damage to forest.





- ***Growing food demand:*** To meet the food demand of rapidly growing population more and more forests are cleared off for agricultural purpose.
- ***Fire wood:*** Increasing demand of wood for fuel increases pressure on forests.
- ***Raw material for wood based industry:***
Increasing demand of wood for making **furniture, plywood, paper, match box etc** results into tremendous pressure on forests.





- **Infrastructure development:** Massive destruction of forest occurs for various infrastructure development like, big dams, highways projects etc.
- **Forest fires:** Forest fires may be natural or man made cause a huge loss of forest
- **Over grazing:** Overgrazing of land by cattle result into soil erosion, desertification.
- **Natural forces:** Floods, storms, heavy winds, snow, lightening are some of the natural forces





Effects of Deforestation

Large scale of destruction of forests leads to a number of adverse environmental effects.

- Loss of natural habitat of wild animals and plants
- Increased intensity and frequency of natural disasters
- Land Degradation
- Loss of forest products
- Change in climatic conditions
- Siltation of rivers and canals
- Loss of revenue
- Change in water cycle and reduced rainfall
- Increase socio economic problems



Effects of Deforestation

- Deforestation adversely affects and damages the environment
- The adverse effect of deforestation are discussed below:
- ***Soil erosion:*** The soil gets washed away with rain water on sloppy areas in the absence of trees leading to soil erosion.
- ***Expansion of deserts:*** Due to strong winds laden by rock dust, land mass gradually gets converted in atmosphere.



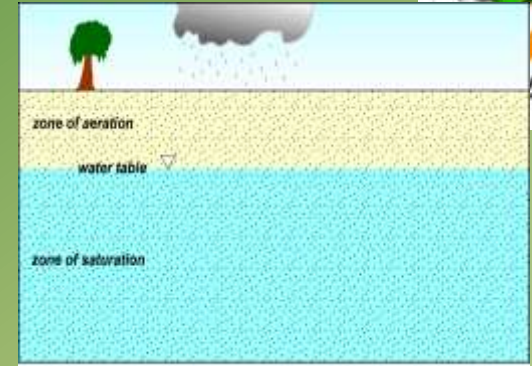


- ***Decrease in rainfall :*** In the absence of forest, rainfall declines considerably because forest bring rains due to high rate of transpiration. It maintains humidity in atmosphere
- ***Loss of fertile land:*** Less rainfall results into loss of fertile land owing to less natural vegetation growth.
- ***Effect on climate:*** Deforestation induces global climate change. **Climate becomes warmer due to lack of humidity in deforested areas,** also pattern of rainfall changes





- **Lowering of Water table:** Lack of recharging of underground reservoir, results into lowering of water table
- **Economic Losses:** Deforestation will cause loss of industrial timber and non timber products
- **Loss of biodiversity:** Loss of flora and fauna result into loss of bio-diversity leading to disturbance in ecological balance world wide.
- **Environmental changes:** It will lead to increase in carbon dioxide concentration and other pollutants which results in Global warming.





Control of Deforestation



- Mining activities should be prohibited
- Cutting of trees should be followed by massive plantation
- Strict environmental laws should be imposed
- Forest extension should be carried out
- Public awareness regarding medicinal, environmental and economical significance



Afforestation

“conversion of bare or cultivated land into forest”





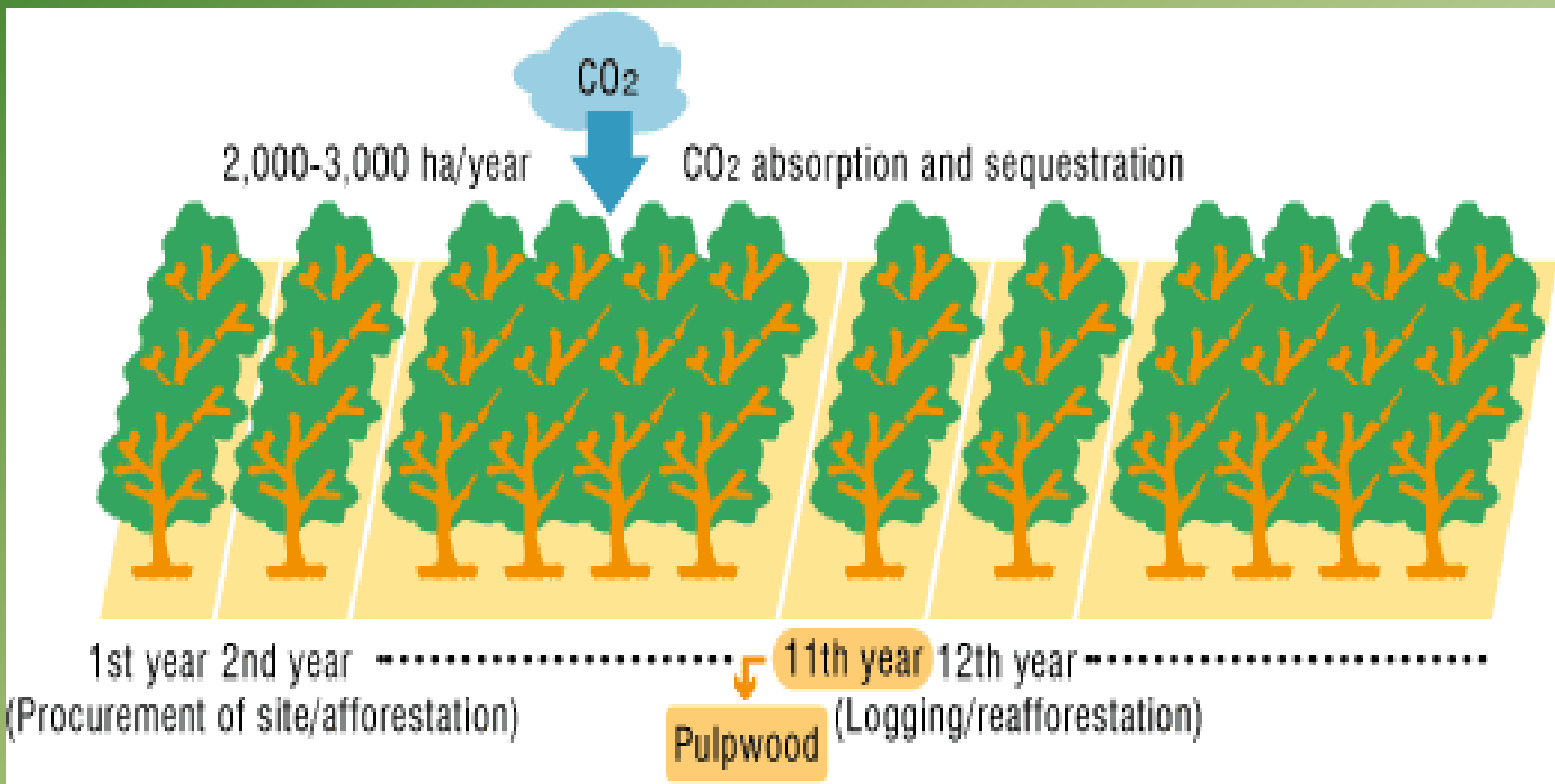
Afforestation

- The conservation measure against the deforestation is afforestation. The development of forest by planting trees on waste land is called afforestation
- The main objective of afforestation:
 - To control the deforestation
 - To prevent soil erosion
 - To regulate rainfall and maintain temperature





- To control atmospheric condition by keeping it clean
- To promote planned uses of wasteland
- To Protect forest ecosystem and to get benefits of forest products.





Dams and their effects on Forest and Tribal People

- When a dam is constructed across any river a huge artificial lake is developed in the catchment area of that dam. It is also known as back waters. The backwaters covering a large surface area. Create a lot of ill-effects on the living environment. They are as follows:
- It creates the loss of forest which are submerged under the back waters of the dam.
- It creates danger to the habitat of the wild life. The wild life are forced to migrate.
- It also affects the land under cultivation, in the catchment area as the crops get submerged under water.
- The roads, already in existence are put under water after the construction of dam. So the road network is damaged.



*Human activities have a very
adverse impact on forests*



*Even
deserts are
affected by
human
activities*





Mountain ecosystems provide vital ecosystem services, but they are facing severe degradation due to climate changing.





Impact of Human Activities on Forests



- The clearing and burning of the forests result in:
 - loss of biodiversity
 - extinction of species
 - soil erosion
 - disturbance of the carbon cycle leading to global warming.
 - landslides and floods
 - increased siltation of rivers.
- Many forests affected by acid deposition originating from industries.
- Harvesting of old growth forests destroys habitat for endangered species.

Please, Help Reduce Global Warming !



PLANT A TREE NOW !

Thank You