

## Chapter 10.6

# Conservation of Natural Resources

Anything which is useful to man or can be transformed into a useful product can be referred to as a resource. A natural resource is the resource obtained from nature. A natural resource can be of the following two types : living (biotic) or non-living (abiotic).

(1) **Biotic resources** : These resource are directly or indirectly derived from photosynthetic activity of green plants. Food, fruits, wood, fibre, milk, milk products, fish, meat and leather are termed as biotic resources. Coal, oil and natural gas are also biotic resources as they were produced by photosynthetic activity of plants which occurred millions of years ago.

(2) **Abiotic resources** : Mineral material, fresh water, rocks, salts and chemicals etc. are termed as abiotic resources as biological activity is not involved in their formation.

**Types of natural resources** : The natural resources can be classified into two categories :

(1) **Inexhaustible resources** : These are the natural resources which are unlimited, the quality of these natural resources may be degraded but not the quantity. These include air, clay, sand, solar energy etc.

(2) **Exhaustible resources** : They are natural resources with finite supply which if used indiscriminately are likely to diminish and then get exhausted. *e.g.*, minerals, fossil fuels, forests, pastures, aquatic organisms. Exhaustible resources are of two types, renewable and nonrenewable.

### (i) Renewable resources

Renewable resources are those resources which can be regenerated.

These are mostly biological in nature and include forestry, agriculture, animals (biomass-based) etc.

These can reproduce itself in nature and we may harvest them continuously through a sustained proper planning and management. Solar energy, wind energy, water energy (tides) and geothermal energy belong to this category, since these are available in an inexhaustible form in nature.

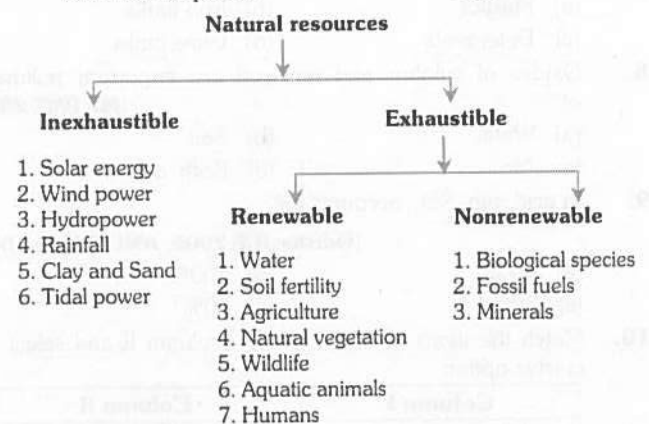
### (ii) Non-renewable resources

They are physical resources like coal, oil deposits, natural gas, minerals, soil, metals, etc. These are available in nature only in limited amounts and cannot be reproduced.

Coal, petroleum and natural gas are the common sources of energy. They, being of organic origin, are also called fossil fuels.

These account for 90% of the world's production of commercial, energy, hydroelectric and nuclear power accounting for only 10%. The figures are :

Oil	–	39.5%
Coal	–	30.3%
Natural gas	–	19.6%
Hydro-electric and nuclear power	–	10%



□ Natural resources are also classified on the basis of their presence in different countries.

(1) **National resources** : They are confined to national boundaries, *e.g.*, minerals, lands.

(2) **Multinational resources** : They are shared by more than one country, *e.g.*, some rivers, lakes, migratory animals.

(3) **International resources** : They are shared by all inhabitants of the earth, *e.g.*, sunlight, air.

## Conservation

It may be defined as the most efficient and most beneficial utilization of the natural resources. Conservation is also defined as the rational use of the environment to provide a high quality of living for the mankind.

**Aim of conservation :** The true aim of conservation, thus, includes.

(1) To ensure the preservation of a quality environment that considers aesthetic, recreational as well as product needs.

(2) To ensure a continuous yield of useful plants, animals and materials by establishing a balanced cycle of harvest and renewal.

**Living resource conservation has three specific objectives**

(1) **To maintain the essential ecological processes and the life support system :** This system has five elements (air, water, land, flora and fauna) which are interconnected, interrelated and interdependent; deterioration in one inevitably affects the other four elements.

(2) **To preserve the biological diversity :** It includes two related concepts genetic diversity and ecological diversity. The genetic diversity is the amount of the genetic variability among individuals of a single species (intraspecific genetic variability) as also between species (interspecific genetic variability). The ecological diversity means the species richness. It is the number of species of the flora and fauna found in a region (for example, India has about 45,000 species of plants and about 65,000 species of animals).

(3) **To ensure that any utilization of the species and ecosystems is sustainable :** Infact, natural resources may be conserved by efficient utilization which requires a proper balance between the supply and demand. Sustainable utilization means planned utilization so that a continuous yield of the useful plants, animals and materials may be obtained.

**The conservation of the following resources is necessary**

(1) **Minerals :** Minerals are largely nonrenewable inorganic resources that are presently mined from lithosphere. Availability/distribution is quite unequal Malayasia and Indonesia are rich in tin, tungsten and manganese but deficient in molybdenum. North America has abundant molybdenum but little tin, tungsten and manganese. South Africa has rich deposits of gold, platinum and uranium but little iron and silver. India has abundant iron, manganese, dolomite, chromite and mica but is deficient in lead, potassium, phosphorus, nickel, copper, silver and gold. Phosphate rocks have recently been discovered in Jawar Kota in Rajasthan. Mineral resources of scarce elements (e.g., silver, copper, mercury, tungsten) are liable to be exhausted within next 20-100 years. With continued use even plentiful minerals will become scarce and hence expensive, e.g., iron, aluminium.

(i) **Degradation of environment :** Every step of mineral extraction, processing, refinement and disposal causes degradation of environment.

(a) **Mineral processing** releases a number of pollutants into air. It also produces a number of wastes which bring about water and soil pollution.

(b) **Mining** not only damages the land, it also pollutes soil water and air.

(c) **Mine dust** destroys nearby vegetation and makes the soil barren. It is called mine spoil.

(ii) **Conservation of minerals**

(a) **Reuse :** An article can be reused several times, e.g., 16-17 times a glass bottle. Life of a machine/article can be prolonged with small care. However, all products cannot be reused.

(b) **Low waste :** Use and throw tendency should be checked where a durable and repairable article is concerned. Other points of wastage should be checked and wastage controlled.

(c) **Manufacturing waste :** It should not be thrown but reprocessed to be used in other industries.

(d) **Substitution :** Scarce metals which can be replaced by more abundant metals, e.g., copper in electric wires with aluminium, metallic pipes with plastic pipes. Plastics, ceramics and high strength glass fibres are being used in place of steel, tin and copper in many industries.

(e) **Recycling :** A number of metals can be recycled through reprocessing, e.g., gold, lead, nickel, steel, copper, aluminium, zinc. Recycling and reuse reduce pressure on mining and processing industries besides energy consumption and pollution. However, some minerals are lost during use, e.g., zinc, lead and chromium in paints.

(2) **Forests :** Forests are extensive self-sustained wooded tracts of land with abiotic community predominated by woody vegetation consisting of trees and shrubs with a close canopy. Woodland is closer to human habitation, possesses open canopy and is managed and maintained by human beings. Forests contain 90% of the terrestrial biomass. Forestry is a branch of science which is connected with establishment, protection, management and exploitation of forests. Silviculture (= sylviculture) is a branch of forestry connected with cultivation and breeding of forest plants.

**Table : 10.6-1 Forest cover in India**

Class		Area (Sq.km)	% Geographic area
1.	Dense forests (> 40% canopy cover)	3,77,358	11.5
2.	Open forests (10-40% canopy cover)	2,55,064	7.8
3.	Mangrove (< 10% canopy cover)	4,871	0.1
		6,37,293	19.4
4.	Scrub (< 10% canopy cover)	51,896	1.6
5.	Nonforest (Other Land Use)	25,98,074	79.0
	<b>Total</b>	32,87,263	100%

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(i) **Forest functions** : Forests have three types of function :

(a) **Productive functions** (Economic uses) : Forests provide a number of articles of economic use, e.g., wood, fruit, resins, alkaloids, essential oil, latex, pharmaceuticals.

(b) **Regulative functions** : They regulate global biogeochemical cycles, particularly carbon and water, check floods and drought by absorption, storage and release of water etc.

(c) **Protective functions** (Ecological functions) : They provide protection from excessive cold, excessive heat, drought, noise, radiations and smells besides providing shelter and conserving water and soil.

(ii) **Economic uses**

Wood consumption is estimated at 3-2 billion m<sup>3</sup>. 46% of wood is used in industry while 54% is consumed as fuel wood. Consumption of fuelwood is low in advanced countries (16%) while it is high in other countries (75-80%). Larger pieces of wood are used in timber. After timber, the major industrial consumer of wood is paper industry which consumes the maximum amount of bamboo.

(iii) **Ecological uses**

(a) **Protection of land** : Plant cover protects soil from drastic changes in temperature, action of wind, action of rain drops, holding soil, preventing landslides and making the soil spongy as well as fertile.

(b) **Climate** : Moderating and moistening effects.

(c) **Frequency of rainfall** : Increases. Atmospheric humidity becomes high.

(d) **Pollution** : Forests reduce atmospheric pollution absorbing gases and collecting SPM.

(e) **Shelter** : To wild animals. Over 40 million tribals and villagers live in forests. The number of cattle grazing in forests is 200 million.

(iv) **Retention of subsoil water** : Plant litter and humus prevent run-off, hold water like a sponge and allow percolation resulting in perennial fresh water through springs.

(v) **Deforestation** : It is removal, decrease or deterioration of forest cover of an area. In 1900, forests occurred in 7000 million ha which were reduced to 2890 million ha in 1985 and about 2400 million ha in 2000. Tropical forests have come down from 1600 million ha to 938 million ha. In India, one third of the land was covered by forests in late nineteen thirties. In 1951 it was only 23%.

**Causes** : (a) Jhuming (b) Hydroelectric projects (c) Forest fires (d) Human establishments (e) Overgrazing (f) Requirement of wood (g) Quarrying and mining.

(vi) **Effects**

(a) **Shrinking fuelwood** : In Himalayas a woman spends half day on collecting fuel. In India, availability of fuel-wood is 58 million m<sup>3</sup>/yr against requirement of 300 million m<sup>3</sup>.

(b) **Reduced timber** : There is decreased availability of timber and other farm products.

(c) **Change in climate** : Deforestation results in reduced rainfall, increased drought, hotter summers and colder winters.

(d) **Global warming** : Deforestation increases atmospheric CO<sub>2</sub> content by releasing carbon stored in organic matter and reduced primary productivity.

(e) **Rainfall** : Amount and periodicity of rainfall decreases. In drier areas deforestation, therefore, leads to desertification or formation of desert.

(f) **Drought** : There is very little water in rivers during dry season causing drought.

(g) Loss of biodiversity and germplasm etc.

(vii) **Conservation and management of forests** : Forests cover has to be increased to reverse the effect of past deforestation. For this sustained efforts are made for reforestation and afforestation. Tree plantation movement or Van Mahotsava is being carried out in India since 1950 where by both government and private agencies perform tree plantation during July and February every year. Conservation of forests aims at management of forests in such a way as to maintain them at optimum form and derive optimum sustainable benefit for present as well as future generations. Two major strategies are adopted.

(a) **Production or Commercial forestry** : It is plantation of useful trees and shrubs for meeting the commercial requirements without causing any undue demand on the natural forests. It is of three types – social forestry, agroforestry and production plantation.

(b) **Protection or Conservation forestry** :

Degraded forests are mended through silviculture practices. The forests are allowed to recoup before allowing its exploitation.

Certain forests included under sanctuaries and national parks are not allowed to be exploited.

Well stocked and mature forests are exploited scientifically.

Prevention of scraping and Litter removal.

Advanced silviculture.

Pesticides.

Fire fighting equipment.

Census.

Economy in extraction and use of timber.

**Sustained yield block cutting** : Cutting is allowed only in nonvulnerable forests at a rate which is equal to their regeneration capacity.

**Chipko movement** : Chipko movement was born in March 1973 in Gopeshwar in Chamoli when trees were not allowed to be cut by village Folk. The movement has two leaders Chandi Prasad Bhatt of Gopeshwar and Sunderal Bahuguna of Silyara in Tehri. It is a movement initially meant for protecting trees but now meant for preservation of environment including habitat and wildlife.

A similar movement was undertaken by pandurang hegde in the south. It is known as appiko movement. It aims at uliso (conservation), belesu (growth – plantation) and balasu (rational use).

❑ **Bishnoi Community** : In 1731, the king of Jodhpur (Rajasthan) asked his ministers to arrange wood for constructing a new palace. The ministers and workers went to forest for cutting down the trees. A Bishnoi woman Amrita Devi showed exemplary courage by protecting trees from the men cutting them. She sacrificed her life along with her three daughters, while hugging the trees to protect them from the workers of king. The Government of India has recently instituted The Amrita Devi Bishnoi Wild Life Protection Award for the individuals or communities from rural areas that have shown extraordinary courage and dedication in protecting wild life.

(viii) **Other forms of forestry**

(a) **Social forestry** (Started in 1976 by NCA) : Raising quick growing multipurpose plants in common village lands for meeting requirement of fodder, firewood and small timber.

(b) **Urban forestry** : It is plantation of fruit, flower and shade bearing plants in urban areas to reduce pollution and ultimate yield of wood.

(c) **Production plantation** : It is growing of industry required trees on specific, either fallow or free grazing lands. Production plantation decreases pressure on real forests.

(d) **Reserve forests** : They are forests grown over ecologically fragile areas where our water regimes are not located. Felling of trees and grazing are not allowed.

(e) **Agroforestry** : It is plantation of multipurpose trees/shrubs/horticulture plants/grasses alongwith crops for stabilising soil, meeting the need of fodder, fruit and timber of the community. It is of three types – agri-silvicultural, agri-pastoral and agri-silvi-pastoral.

(3) **Grasslands (Rangeland)** : They are biomes dominated by grasses and herbs (especially leguminous). Grasslands provide forage to cattle and support wildlife based on grazing food chain. Tall grasses are used in thatching and as fuel. Grasslands are quite stable because highly branched fibrous root systems hold the soil particles firmly and prevent soil erosion. They are, however, prone to invasion by trees and shrubs as well as desertification. The total area under grass cover is about 18% of total land in India. Therefore, the area available for grazing in India is roughly 37% (19% forested + 18% grassland).

(i) **Grassland degradation** : Grasslands have been put to three types of pressures.

(a) **Overgrazing** : At one time in the history of human civilization, cattle were reared in large number. The number continues to be high. For example in arid and semiarid areas of India, the number of grazing animals is 2-10 times higher than their grasslands can support.

(b) **Erosion** : Overgrazing denudes the soil of plant cover. Trampling by cattle decreases soil porosity. The exposed hardened soil undergoes erosion by wind and water. Wind erosion is more common where drought conditions prevail for long periods. It causes desertification or conversion of once fertile land into desert.

(c) **Conversion** : Overpopulation and pressure to raise agriculture yield for feeding it. As a result several grasslands with fertile soils have been converted into agricultural lands, e.g., North American prairies. The pressure on remaining less fertile grasslands increases for feeding cattle.

(ii) **Grassland management**

(a) Grazing should be limited to only that number of animals which can be comfortably supported by a piece of grassland.

(b) Removal of tree seedlings, bushes, shrubs and weeds which tend to reduce productivity of grasslands.

(c) Occasional seeding with high yielding leguminous herbs for maintaining soil fertility.

(d) Grasslands should be closed to grazing when new plant growth is to take place, like rainy season.

(e) A grassland should be divided into blocks with each block allowed to be grazed on rotational basis. This allows other blocks to recover.

(f) Reducing loss of soil and water from the grassland by contour bunding.

(g) Occasional controlled burning of dried mulch to promote release of nutrients and prevent growth of tree and shrubs.

(4) **Soil erosion and Soil conservation** : Top soil is the vital part of the soil and serves as the chief source of nutrition for plants (feeding zone). Loss or disturbance of top soil by natural agents like water, wind, gravity or ice is called soil erosion.

Soil erosion has been called 'creeping death of the soil' by Rama Rao.

Soil erosion is of two types :

❑ **Geological or Natural erosion** : It is caused by nature.

❑ **Accelerated or Artificial erosion** : It is caused by man and animals.

(i) **Types of soil erosion**

(a) **Water erosion** : It is caused by fast running water or by continuous heavy rain. It may be :

❑ **Sheet erosion** : Due to heavy rain, top fertile soil is removed in the form of thin sheet.

❑ **Rill erosion** : Fast running water cut stream or groove like structure in soil.

❑ **Gully erosion** : On steep slopes, fast running water cuts the soil deep and form channel like structure called gullies.

❑ **Riparian erosion** : During floods fast running water cut off the margins of river.

Due to heavy rains the minerals are also lost from top soil and soil becomes less fertile.

(b) **Wind erosion** : Soil erosion by wind is common in dry places and most severe in arid regions where soil is chiefly sandy and the vegetation is poor or even absent.

The wind throws away smallest soil particles into air where they get suspended giving a dusty appearance to the air. It is called suspension. By this method the soil particles are transported to longer distance.

(c) **Land slide or Slip erosion** : The hydraulic pressure caused by heavy rains and gravitational force cause the fall off the rocks in hilly areas.

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(d) **Overfelling (Deforestation) and Overgrazing erosion** : These process reduce vegetation thus make the soil surface open for erosion (sheet erosion).

(ii) **Soil conservation** : Prevention of soil erosion is called as soil conservation.

### Methods of soil conservation

(a) **Strip cropping** : Crops are arranged in bands or strips to check the flow of water.

(b) **Crop rotation** : Crop rotation is the method of alternative sowing of leguminous and cereal crops (wheat , maize). The rotation of crops can be planned depending upon the climatic conditions, type, slope and properties of soils.

Such crops which check soil erosion should be sown during the rainy season. Legumes are useful in rotation of crops because of having nodulated roots. Soil fertility is usually maintained in the field by rotation of crops. The minerals which are consumed by cereal crop in first year are again supplied by leguminous crops in the second year.

(c) **Reforestation or Afforestation** : Growing of forest trees is most effective in controlling soil erosion. Afforestation also helps in prevention of floods. Indiscriminate felling of trees have resulted in the formation of extensive ravines along Yamuna and Chambal area. The Government of India has introduced the festival of 'Van Mahotsava'. In this festival planting of trees is done on open waste land.

(d) **Terracing** : Hilly slopes are divided into small flat fields called as terraces to check the flow of water.

(e) **Contour farming** : It is the oldest method in low rainfall area. Field is divided in furrow and ridges. Ridges at same level are called as contour.

(f) **Green manuring** : Basically this practice is meant for increasing soil fertility but it also checks soil erosion.

(g) **Dry farming** : A practice for cultivation of crops in low and moderate rainfall areas.

(h) **Mulching** : Basal plants parts are used to make a soil cover which help in moisture conservation.

(5) **Water resources** : Three fourth surface of earth (71% of total) is covered by oceans which contain 97.5% of total water. It is marine water with about 3.5% salt content. Only 2.5% water is fresh water which occurs on land. Most of this water (1.97%) occurs as frozen ice caps and glaciers. 0.5% water (fresh water) occurs as ground water. Rivers and lakes contain 0.02%, soil 0.01%, while atmosphere possesses 0.001% of water as vapours.

Fresh water is the major renewable resource in terrestrial habitats being essential component of all living beings, a habitat for several organisms, determinant of vegetation and climate, floods and droughts which also has a number of human uses.

### (i) Problems related to water resources

(a) Nearly 40% of human population resides in arid and semi arid areas where most of time, energy and efforts are spent in procuring water for domestic and agriculture use.

(b) At most of the other places more water is withdrawn from surface and subsurface reservoirs than their recharging. As a result many wetlands have dried up. Ground water is becoming scanty at many places.

(c) Supply of fresh water to urban and industrial areas has always been a problem because of the huge amount involved. The average consumption of fresh water per person in modern society is 350-700 litres per day. Further, several industries consume large quantities of fresh water. The disposal of used water is still another problem. As a result there is a great amount of misuse and abuse of fresh water.

(d) Excessive irrigation in arid/semiarid areas increases soil salinity.

(e) Over-withdrawal of ground water in coastal regions results in movement of saline water from sea in underground aquifers, resulting in spoilage of water quality.

### (ii) Conservation of water resources

(a) **Rainwater harvesting** : Surface storage and recharging of groundwater should be carried out.

(b) **Afforestation** : It helps in preventing soil erosion, reduces surface run off, retains water and protects water sheds for continued water supply.

(c) **Industry** : Wastage should be reduced. Waste water can be recycled.

(d) **Domestic water supply** : Wastage should be reduced. Waste water should be treated and used in irrigation and other purposes.

(e) **Irrigation** : Assured irrigation is available to only 40% area as compared to over 90% in advanced countries. There is a lot of wastage of agriculture water because only 50% of water supplied to soil is useful, the rest goes waste. Bricklining of irrigation channels and sprinkling technique of irrigation are recommended to save water.

### (iii) Management of water resources

(a) **Dams and Reservoirs** : They can be constructed to control floods and ensure round the year supply of water besides generation of electricity.

(b) **Desiltation** : Dredging and desiltation of water bodies should be undertaken regularly to prevent decrease in capacity for storage.

(c) **Desalination** : Sea water and saline underground water can be converted into fresh useful water through desalination.

(d) **Canals** : They are made to carry water in arid and semiarid area.

(6) **Wet Lands** : It occupies about 6% of the world land. These are low lying, marshy, swampy or peat lands which may get inundated upto depth of six meters. It can be natural or artificial. Fresh water wet lands are of 3 types :

(i) **Marshes** : Poorly drained, frequently flooded low lying areas having grass like plants.

(ii) **Swamps** : Permanently water logged or wet areas supporting dense covering of tree and shrubs.

(iii) **Riverine** : Low land along streams which are periodically flooded.

Salt water wetland are of 2 types

(a) **Estuaries** : These are most highly productive ecosystems which provide food and habitat to several marine and other organisms.

(b) **Mangroves Swamps** : These are coastal wet lands of tropical seas which contain a number of trees and shrubs in the intertidal region. These allows the sediments to settle. They build up soil along the shoreline which is colonised by other plants. Slowly mangrove expands into ocean. They provide habitat to crabs, oysters and other marine animals.

(7) **Fisheries** : Fishes are also one of the important biotic resources and are greatly valued by man as food. Unfortunately, in the last few year fish fauna of our inland waters has greatly depleted on account of overexploitation and pollution of natural waters due to sewage and industrial wastes. It is therefore, necessary that these colourful creatures of our aquatic environment should be preserved. Fishery managers have developed many techniques to improve fish habitats. Some are :

(a) Large, artificial fielding reefs in the offshore waters of the oceans and freshwater lakes to provide hiding places and additional food which attracts the fish.

(b) Spawning channels to replace vital spawning areas destroyed or no longer accessible.

(c) Fix toxicants to destroy undesirable fish populations and restore the balance in favour of the game or commercial fish.

(d) Fertilization and artificial enrichment.

## T Tips & Tricks

✍ The coal reserves of the world are higher than that of petroleum.

✍ Maximum output of zinc in India is from Rajasthan.

✍ Agriculture consumes maximum water all over the world.

✍ Social forestry programme is started in 1976.

✍ Van Mahotsav was started by K.M. Munshi in 1950.

✍ Rich and St. Barbibaker is known as "tree saint in India".

✍ Soil erosion : In India, wind and water erosion deteriorate some 40,000 ha every year. It is 5-18% of global erosion.

✍ World forestry day is 21<sup>st</sup> March.

✍ World habitat day is 4<sup>th</sup> October.

✍ Some Abbreviations

CAZRI : Central Arid Zone Research Institute (Jodhpur).

CPCB : Central Pollution Control Board.

IBP : International Biological Programme.

IUCN : International Union for Conservation of Nature and Natural Resources.

MAB : Man and Biosphere

NEERI : National Environmental Engineering Research Institute.

WWF : World Wild life Fund (World Wide Fund for Nature).

UNEP : United Nations Environment Programme.

CPHERI : Central Public Health Engineering Research Institute at Nagpur.

## Ordinary Thinking

### Objective Questions

#### Conservation of Natural Resources

- Chipko movement was launched for the protection of  
[BHU 1994; HPMT 1994; CPMT 1998; CBSE PMT 2009; MP PMT 2011; WB JEE 2016]
  - Grasslands
  - Forests
  - Livestock
  - Wet lands
- An inexhaustible non-conventional universal source of energy is  
[DUMET 2009]
  - Wind energy
  - Solar energy
  - Hydrothermal energy
  - Tidal energy
- The percentage of forest cover recommended by the National Forest Policy (1988) is  
[Kerala PMT 2009]
  - 33% for plains and 67% for hills
  - 37% for plains and 63% for hills
  - 20% for plains and 70% for hills
  - 23% for plains and 77% for hills
  - 30% for plains and 60% for hills
- Removal of top fertile soil by wind or water is
  - Siltation
  - Soil erosion
  - Weathering of soil
  - Leaching
- Which one of the following expanded forms of the followings acronyms is correct  
[DUMET 2010; CBSE PMT (Pre.) 2011]
  - IUCN = International Union for Conservation of Nature and Natural Resources
  - IPCC = International Panel for Climate Change
  - UNEP = United Nations Environmental Policy
  - EPA = Environmental Pollution Agency
- In this soil conservation method, several grasses are left out in soil after the crop is harvested  
[GUJCET 2007]
  - Contour farming
  - Terrace farming
  - Tillage
  - Crop rotation
- Soil erosion can be prevented by  
[CPMT 1993, 95, 2003; Pb. PMT 1999; BHU 2000]
  - Overgrazing
  - Removal of vegetation
  - Afforestation
  - Increasing birds population
- Which of the following countries depends on desalination process for getting fresh water  
[VITEEE 2006]
  - Dubai
  - Iran
  - France
  - Albania
- A renewable exhaustible natural resources is  
[CBSE PMT (Pre.) 2010; WB-JEE 2016]
  - Forest
  - Coal
  - Petroleum
  - Minerals
- Which one of the following is not a method of soil conservation  
[KCET 2010]
  - Mulching
  - Overgrazing
  - Strip cropping
  - Crop rotation

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11. "National Institute of Oceanography" is situated at  
(a) Bombay (b) Panaji (Goa)  
(c) Lucknow (d) Chennai
12. Soil conservation is the process where [CBSE PMT 1993]  
(a) Sterile soil is converted to fertile soil  
(b) Soil is aerated  
(c) Soil erosion is allowed  
(d) Soil is protected against loss
13. National Environmental Engineering Research Institute (NEERI) is situated at [KCET 1999, 2000; Kerala CET 2003]  
(a) New Delhi (b) Nagpur  
(c) Bhopal (d) Baroda
14. Deforestation may reduce the chances of [CBSE PMT 1990]  
(a) Rainfall (b) Frequent cyclones  
(c) Erosion of surface soil (d) Frequent land slides
15. Source of energy which does not evolve  $CO_2$  is [RPMT 1995, 96]  
(a) Coal (b) Oil  
(c) Organic compounds (d) Nuclear energy
16. Sal forests are found in India  
(a) In western ghats (b) Dehradun valley  
(c) Nilgiri hills (d) Satpura mountains
17. Petroleum is a [CBSE PMT 1992]  
(a) Non-renewable source (b) Renewable source  
(c) A synthetic product (d) An inconvenient source
18. Slash and burn agriculture is the other name of [AFMC 2012]  
(a) Jhoom Cultivation (b) Step farming  
(c) Organic farming (d) Crop rotation
19. Minerals and metals are [CBSE PMT 1992; Kerala PMT 2009]  
(a) Renewable resources  
(b) Non-renewable resources  
(c) Renewable and non-renewable resources  
(d) Biodegradable resources
20. Forests participate in [CPMT 1994]  
(a) Controlling pollution  
(b) Prevention of soil erosion  
(c) Maintenance of ecological balance  
(d) All the above
21. Non-renewable source is [RPMT 1995]  
(a) Water and gas  
(b) Plant and coke  
(c) Coke and mineral substances  
(d) Energy and water
22. Which of the following is a renewable resource [Bihar MDAT 1995]  
(a) Fossil fire (b) Metal  
(c) Water (d) All the above
23. Chipko Andolan (Movement) which was started in 1973 in Garhwal/Himalayas (Gopeshwar) near Alaknanda river was for the first time initiated by [AMU (Med.) 1997; Odisha JEE 2011]  
(a) Chandi Prasad Bhatt (b) Sunder Lal Bahuguna  
(c) Baba Amte (d) Vinoba Bhave
24. Deforestation leads to [AMU (Med.) 1998; MHCET 2003]  
(a) Soil erosion (b) Global warming  
(c) Soil protection (d) Both (a) and (b)
25. Land mass occupied by forest is about or According to Indian forest policy what percentage of the land area should be under forest cover [CBSE PMT 1999; AIEEE (Pharmacy) 2003]  
(a) 11% (b) 22%  
(c) 30% (d) 60%
26. Forests should be conserved as they provide [Pb. PMT 2000]  
(a) Food (b) Medicine  
(c) Wood (d) All of these
27. Afforestation with regard to urban development is called [Pb. PMT 2000]  
(a) Social forestry  
(b) Integrated Forest Management  
(c) Both (a) and (b)  
(d) None of these
28. Social forestry is useful in yielding [Pb. PMT 2003]  
(a) Floriculture (b) Timber  
(c) Medicines (d) Multipurpose uses
29. In India highest amount of coal is present in [MP PMT 2003]  
(a) West Bengal (b) Maharashtra  
(c) Jharkhand (d) Assam
30. Which of the following is a non-renewable energy source [HP PMT 2005]  
(a) Hydropower (b) Tidal power  
(c) Geothermal energy (d) Nuclear energy
31. More than 70% of world's freshwater is contained in [CBSE PMT 1994, 2005]  
(a) Polar ice (b) Glaciers and mountains  
(c) Antarctica (d) Greenland
32. Mine spoil is  
(a) Wastes from mines  
(b) Wastes from mine processing  
(c) Land degraded by mining  
(d) Both (a) and (b)
33. The government of India in 1980s has introduced a concept to work closely with the local communities for protecting and managing forests. The concept is [AIIMS 2009; NEET (Phase-I) 2016]  
(a) Forest Research Institutes  
(b) Panel of local communities for forest management  
(c) Joint Forest Management  
(d) Jhum cultivation
34. Overgrazing causes  
(a) Negative pollution (b) Positive pollution  
(c) Rill erosion (d) Reduction in crop yield
35. Forest control drought though  
(a) Lot of water plants  
(b) Increasing rainfall  
(c) Retention of water and prevention of erosion  
(d) Functioning as water shed
36. Fossil fuels have been formed by a [DPMT 1996]  
(a) Conventional process  
(b) Natural process  
(c) Non-conventional process  
(d) All the above
37. The name of Smt. Thimmakka is associated with the [KCET 2011]  
(a) Planting and conservation of avenue trees  
(b) Agitations against hydroelectric project  
(c) 'Appiko' movement  
(d) Conservation of fauna and flora of the western ghats

38. Fertility of soil is measured by its ability to [CBSE PMT 1992]  
 (a) Retain nutrients (b) Hold organic materials  
 (c) Hold water (d) Support life
39. Forests take part is [CPMT 1994]  
 (a) Control of atmospheric pollution  
 (b) Prevention of soil erosion  
 (c) Maintenance of natural balance  
 (d) All the above
40. Afforestation should be with [Haryana PMT 1994]  
 (a) Exotic species (b) Indigenous species  
 (c) Bamboos (d) Eucalyptus
41. American water plant that has become a troublesome water weed in India is [CBSE PMT 1993; AFMC 2000]  
 (a) *Cyperus rotundus* (b) *Eichhornia crassipes*  
 (c) *Trapa latifolia* (d) *Trapa bispinosa*
42. Which of the following is a mismatch with respect to inexhaustible natural resources [DUMET 2010]  
 (a) Solar energy (b) Water  
 (c) Rainfall (d) Wind power
5. Soil fertility can be maintained without addition of nutrients due to  
 (a) Floods  
 (b) Crop residue  
 (c) Activity of microorganisms  
 (d) Favourable temperature and water
6. Geothermal energy is [Pb. PMT 1998]  
 (a) Nonrenewable nonconventional energy source  
 (b) Nonrenewable conventional energy source  
 (c) Renewable nonconventional energy source  
 (d) Renewable conventional energy source
7. Greatest problem in water conservation is to reduce the amount of [DUMET 2009]  
 (a) Ground water (b) Precipitation  
 (c) Run-off water (d) Evaporation
8. Ecofriendly method is [CBSE PMT 1999]  
 (a) Plantation of  $C_3$  plants (b) Plantation of sugarcane  
 (c) Energy plantation (d) None of the above

## GT Critical Thinking

### Objective Questions

1. Restoration of ecological equilibrium in mined areas can be achieved through  
 (a) Revegetation of the mined habitats  
 (b) Conversion of mined habitats into agricultural ecosystems  
 (c) Prevention of soil erosion  
 (d) Prevention of grazing
2. 'Social forestry' aims at [AIIMS 1996]  
 (a) Growing different types of plantations together  
 (b) Growing one type of trees on the land  
 (c) Management of forests by village bodies  
 (d) Management of forests by cooperative societies
3. If we remove half of the forest cover of earth, the crisis that will occur [CBSE PMT 1996]  
 (a) Many species would become extinct  
 (b) Population, pollution and ecological imbalance will rise  
 (c) Energy crisis will commence  
 (d) The remaining forest will correct the imbalance
4. Jhoom cultivation refers to [MP PMT 2013]  
 (a) Tribal people cultivating Jamun trees  
 (b) Tribal people cultivating medicinal plants  
 (c) Tribal people of north-east following slash – burn agriculture  
 (d) Tribal people of north-east rearing erisilk worms using castor plant leaves

## AR Assertion & Reason

Read the assertion and reason carefully to mark the correct option out of the options given below :

- (a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion  
 (b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion  
 (c) If the assertion is true but the reason is false  
 (d) If both the assertion and reason are false  
 (e) If the assertion is false but reason is true
1. Assertion : "Chipko Andolan" was done by women of Reni village.  
 Reason : "Chipko Andolan" was done to protect wild life.
2. Assertion : Recently, the government of india instituted the Amrita Devi Bishnoi Wildlife Protection Award.  
 Reason : We can speed up the reforestation by planting trees. [AIIMS 2009]
3. Assertion : Nuclear energy can be produced only by fusion of certain elements.  
 Reason : Nuclear reactions generate enormous energy.
4. Assertion : Litter burning is not suggested by ecologists.  
 Reason : Burning litter enchances  $CO_2$  content of the air.

## Answers

### Conservation of Natural Resources

1	b	2	b	3	a	4	b	5	a
6	c	7	c	8	d	9	a	10	b

## 1634 Conservation of Natural Resources

11	b	12	d	13	b	14	a	15	d
16	b	17	a	18	a	19	b	20	d
21	c	22	c	23	a	24	d	25	c
26	d	27	b	28	d	29	a	30	d
31	a	32	c	33	c	34	a	35	c
36	b	37	a	38	d	39	d	40	b
41	b	42	b						

### Critical Thinking Questions

1	a	2	c	3	b	4	c	5	c
6	a	7	d	8	c				

### Assertion and Reason

1	c	2	b	3	e	4	c		
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# AS Answers and Solutions

## Conservation of Natural Resources

4. (b) Loss of top fertile soil or disturbance in soil structure is called soil erosion.
6. (c) Tillage is a method of soil conservation. In this process the underground parts of plants like maize, potato and several grasses are left out after the crop is harvested. These parts remain underground. This way, the fertility of soil improves and its binding is maintained.
7. (c) Afforestation means to cultivate the forest. The soil is hold by the roots of the forest plants and soil erosion can be prevented.
12. (d) Prevention of soil erosion is called as soil conservation.
14. (a) Destruction of forest is called deforestation and in absence of plants water cycle gets disturbed.
15. (d) Nuclear reactor does not emit  $CO_2$  in atmosphere.
22. (c) Renewable resources are those which can be again generated or produced artificially or naturally e.g., forest, water, marine resources etc.
25. (c) Until recently, forests covered one third of land surface.
26. (d) Trees provide us food, clothes, wood (for fuel and furnitures) medicines, shelter for animals and helps in purifying our environment. So, it is very necessary to conserve forests.
31. (a) Three fourth surface of earth is occupied by oceans which contain 97.5% of total water. This is marine water with about 3.5% salt contents. Rest water i.e., 2.5% is fresh water which occurs on land. Most amount of this water (about 1.97%) occurs as frozen ice caps and glaciers and 0.5% fresh water occurs as ground water.
32. (c) Mine dust destroys nearby vegetation and make the soil barren. It is called mine spoil.
40. (b) For afforestation native species should be preferred. Exotic species can be employed on only selective basis.

### Critical Thinking Questions

2. (c) Social forestry started in 1976 by NCA in which raising quick growing multipurpose plants in common village lands for meeting requirement of fodder, firewood and small timber.
3. (b) Habitats of a large variety of organisms would be destroyed and food chains would be disturb leading to population and ecological imbalance.
4. (c) Traditional system of agroforestry which allows regrowth of forests after clearing and cultivation in an areas for a few years is called Jhoom or Shifting cultivation.

### Assertion and Reason

1. (c) The popular 'Chipko Andolan' was started in 1973 in Gopeshwar, U.P. The villagers under the leadership of Chandi Prasad Bhatt pledged that they would not permit any more falling of trees. A group of women of Reni village also stopped the contractor from cutting the trees by hugging the trees whenever they were tried to cut. 'Chipko Andolan' advocates the slogan of planting 5F's – food, fodder, fuel, fibres and fertilizers trees to make communities self sufficient in all their basic needs.
2. (b) Amrita Devi Bishnoi Wild Life Protection Award is for individuals or communities from rural areas that have shown extraordinary courage and dedication in protecting wildlife.
3. (e) Nuclear energy is obtained from fusion or fission of atoms of certain elements. Nuclear fusion involves the fusion of the nuclei of two atoms instead of the splitting of atoms that occurs in nuclear fission. Nuclear reaction consists of both fusion and fission of atom. The result is the release of enormous quantities of energy.
4. (c) Soil fertility is restored by recovery of minerals from decomposition of fallen leaves, twigs, dead roots, dead animals and animal excreta. Litter burning contributes very less  $CO_2$  emission and is not responsible for increased  $CO_2$  content. But, litter burning deprives the soil from recovery of minerals.

## Conservation of Natural Resources

## SET Self Evaluation Test

1. Terracing is an effective method of soil conservation in  
[CPMT 1993, 2002; BHU 1999; RPMT 2005]  
(a) Desert areas (b) Hill areas  
(c) Plain areas (d) None of the above
2. Uniform soil erosion by running water is [BHU 2001]  
(a) Gully erosion (b) Rill erosion  
(c) Riparian erosion (d) Sheet erosion
3. Recurrence of floods in the plains of North India is due to excessive  
(a) Siltation of dams  
(b) Rainfall  
(c) Agriculture  
(d) Deforestation in catchment area
4. Eroded soils are  
(a) Devoid of plant nutrients  
(b) Richer in plant nutrients  
(c) Unaltered in plant nutrients  
(d) Fit for agriculture
5. Water is a resource [CBSE PMT 1992]  
(a) Non-degradable nonmaintainable  
(b) Degradable maintainable  
(c) Renewable  
(d) Non-renewable
6. Fuel wood crisis can be overcome by [APMEE 1999]  
(a) Better wooden stoves  
(b) Efficient wood extraction  
(c) Greater afforestation  
(d) Using alternate energy source
7. An antiferrest measure is [Pb. PMT 2003]  
(a) Afforestation (b) Selective grazing  
(c) Clearing Forest (d) Selective felling
8. Value of a resource is dependent on its  
(a) Quality  
(b) Quantity  
(c) Requirement and type of society  
(d) All of these
9. Universal nonpolluting source of energy is [Wardha 2003]  
(a) Fossil fuel (b) Sun  
(c) Nucleus (d) Wind and water
10. An agroforestry, taungya consist of  
(a) Growing crops in between rows of trees  
(b) Growing crops after removal of trees  
(c) Growing crops on degraded soils  
(d) None of the above
11. Estauries are  
(a) Freshwater wetlands  
(b) Salt water wetlands  
(c) Least productive ecosystem  
(d) None of the above
12. Best source of renewable energy is [MP PMT 1995]  
(a) Cattle (b) Petroleum  
(c) Coal (d) Trees
13. Mulching is helpful in  
(a) Increasing soil fertility  
(b) Improvement of soil structure  
(c) Moisture conservation  
(d) Better crops
14. A system of rotating crops with legume or grass pasture to improve soil structure and fertility is called [NEET (Phase-I) 2016]  
(a) Ley farming  
(b) Contour farming  
(c) Strip farming  
(d) Shifting agriculture

## AS Answers and Solutions

1	b	2	d	3	d	4	a	5	c
6	d	7	c	8	d	9	b	10	a
11	b	12	d	13	c	14	a		

1. (b) Terracing farming is a widely practised in hilly area in which slope is divided into a number of flat fields for slowing down the flow of water.
4. (a) When soil erosion occurs the top soil is removed and only the top soil is fertile as it contains organic matter and nutrients and productivity of land is reduced due to devoid of plant nutrients.
10. (a) In taungya, agriculture crops are grown in between rows of planted trees like Sal and Teak.
13. (c) Mulching is a covering of harvested field with plant litter or polythene in order to decrease run off, prevent growth of weed and retention of water.