

# SCIENCE

## (Biology)

### Chapter 16: Management of Natural Resources



## Management of Natural Resources

- Any matter or energy, derived from the environment, which can be used by all living organisms, including man, for their welfare constitute our **natural resources**.
- Forests and wildlife, water, coal and petroleum are some of our important natural resources.
- A system of controlling the use of natural resources in such a way so as to avoid their wastage and allow their use in the most judicious way is called **management of natural resources**.
- We need to manage our resources to ensure that they are used judiciously, to prevent their exploitation for short-term gains, and to make equitable distribution of natural resources and deal with environmental problems.
- **Sustainable development** is development which meets the needs of the present generation as well as preserves the resources for future generations.

### Pollution in Ganga

- The river Ganga is used as a sewage dump for more than 100 cities stretching across Uttar Pradesh, Bihar and West Bengal.
- Dumping of untreated sewage, excreta and chemicals from industries increases the toxicity of the water.
- This makes it inhabitable for the flora and fauna in the river system.
- In 1985 the GAP (Ganga Action Plan) project was initialised to curb the poor quality of the water of river Ganges.

The 5 R's to save the environment can be performed by each individual in our society:

**Refuse:** This means to say No to things people offer you that you don't need. Refuse to buy products that can harm you and the environment, say No to single-use plastic carry bags.

**Reduce:** This means that you use less. You save electricity by switching off unnecessary lights and fans. You save water by repairing leaky taps. Do not waste food. Can you think of other things that you can reduce the usage of?

**Reuse:** This is actually even better than recycling because the process of recycling uses some energy. In the 'reuse' strategy, you simply use things again and again. Instead of throwing away used envelopes, you can reverse it and use it again. The plastic bottles in which you buy various food-items like jam or pickle can be used for storing things in the kitchen.

**Repurpose:** This means when a product can no more be used for the original purpose, think carefully and use it for some other useful purpose. For example, cracked crockery, or cups with broken handles can be used to grow small plants and as feeding vessels for birds.

**Recycle:** This means that you collect plastic, paper, glass and metal items and recycle these

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materials to make required things instead of synthesising or extracting fresh plastic, paper, glass or metal. In order to recycle, we first need to segregate our wastes so that the material that can be recycled is not dumped along with other wastes

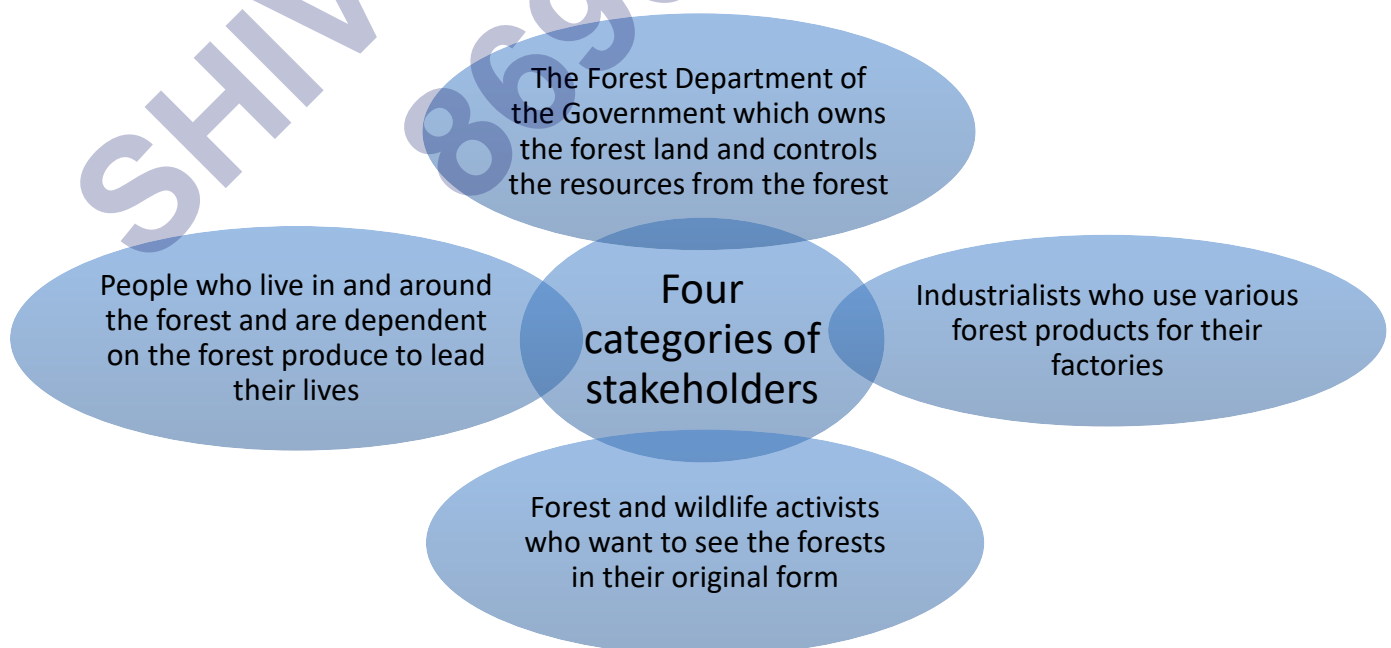
### Why Do We Need to Manage Our Resources

- Because the resources available to us are limited and take millions of years to form.
- With the human population increasing at a tremendous rate the demand for resources is also increasing which increases the use of resources.
- Exploiting or reckless use of natural resources causes damage to the environment.
- The management of natural resources should be in a sustainable manner so that these will last for generations to come.
- And should be available to everyone i.e., should be equally distributed to everyone.

### Forests and Wildlife

- **Forests** refer to a large piece of land covered with trees, shrubs and herbs growing naturally and sustaining a variety of life forms.
- Uncultivated plants and non-domesticated animals which live in their natural habitat collectively constitute the **wildlife** of an area.
- Naturally occurring plants and animals constitute the **flora** and **fauna** of the forest.
- The main aim of management of forests and wildlife is to conserve the vast inherited biodiversity, because loss of biodiversity leads to loss of ecological stability of the forest ecosystem.

### Stakeholders in the Management of Forests



## Sustainable Management of Forests

People's participation in the management of forests can help in increasing the forest produce as well as in their conservation.

### INSTANCES OF PEOPLE'S PARTICIPATION IN THE MANAGEMENT OF FORESTS

#### The Case of Khejri trees

- In 1731, Amrita Devi Bishnoi led a group of 363 people who sacrificed their lives for the protection of Khejri trees in Khejrli village near Jodhpur in Rajasthan.

#### The Chipko Andolan

- The Chipko Andolan also called the 'Hug the trees movement' was organised under the leadership of Sunderlal Bahuguna to stop the destruction of forests.
- The movement began in 1970s in a remote village called Reni in Garhwal in the Himalayas.

#### Revival of Sal forests

- A forest officer, A. K. Banerjee got the villagers involved in protecting 1.272 hectares of badly degraded Sal forests of West Bengal.
- In return, the villagers were given employment in silviculture and harvesting operations.
- They were also given 25% of the final harvest and were allowed to collect fuel wood and fodder on the payment of a nominal fee.

## Conservation of Wildlife

Large-scale poaching of wild animals disturbs the food chains in which these animals occur. This results in undesirable consequences for the entire ecosystem.

### Measures to be Taken for the Conservation of Wildlife

Breeding of wild animals in captivity and then releasing them into their original natural habitat.

Enacting and enforcing strict laws, action plans and projects started by non-government organisations.

Ban on hunting and killing of endangered animals.

Establishment of national parks, wildlife sanctuaries and biosphere reserves.

Educating the public about the importance of wildlife conservation by observing 'Wildlife Week'.

## Water

- Water is an important constituent of the body. Nearly 75% of our body weight is due to the presence of water.
- Rains, rivers, lakes, ponds, wells, tube wells, dams, oceans and glaciers are the important sources of water.

## Dams

<b>What are dams?</b>	<ul style="list-style-type: none"> <li>• The large reservoir of a dam stores a huge amount of water which is allowed to flow downstream at the desired rate.</li> <li>• The Dharoi dam on the river Sabarmati, the Ukai dam on the River Tapi and the Machhu dam on the river Machhu are some famous dams.</li> </ul>
<b>Uses of dams</b>	<ul style="list-style-type: none"> <li>• They regulate the flow of water.</li> <li>• They also ensure the storage of water for irrigation and for generating electricity.</li> </ul>
<b>Problems faced in the construction of dams</b>	<ul style="list-style-type: none"> <li>• Social problems arise because construction of dams causes the displacement of a large number of tribals and peasants who are then rendered homeless.</li> <li>• Construction of dams leads to several environmental problems such as deforestation and loss of biodiversity leading to ecological imbalance.</li> <li>• Economic problems arise because the construction of dams involves spending of large amounts of public money without generating proportionate funds.</li> </ul>

## Rainwater Harvesting

<b>What is rainwater harvesting?</b>
<ul style="list-style-type: none"> <li>• Rainwater which falls on roofs and terraces of buildings can be collected through pipes and stored in underground tanks or can be allowed to percolate into the soil and used to recharge the groundwater table. This is called water harvesting or rainwater harvesting.</li> </ul>
<b>Advantages of rainwater harvesting</b>
<ul style="list-style-type: none"> <li>• The main aim of rainwater harvesting is to check the runoff water.</li> <li>• It also prevents flooding of living areas and streets in cities.</li> <li>• It can also reduce topsoil loss or soil erosion and improve plant growth.</li> </ul>
<b>Method of rainwater harvesting</b>
<ul style="list-style-type: none"> <li>• In rainwater harvesting, tanks are fitted with motors for lifting water for use.</li> <li>• Water from the open space around buildings can also be recharged into the ground by simple, effective methods.</li> </ul>

### Traditional methods of rainwater harvesting

- In traditional methods of rainwater harvesting, water is not only stored but also used to recharge the groundwater.

Region	Traditional water harvesting structures
Rajasthan	Tanks, Khadins, Nadis
Maharashtra	Tals, Bandharas
Bihar	Ahars, Pynes
Uttar Pradesh and Madhya Pradesh	Bundhis
Himachal Pradesh	Kuhls
Kerala	Surangams
Kandi belt of Jammu region	Ponds
Karnataka	Kattas

### Bawris

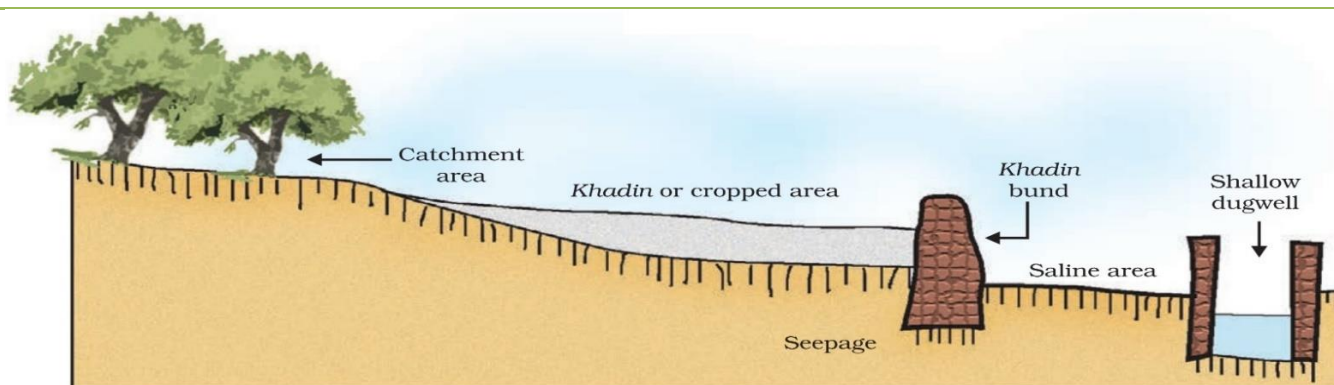
- Bawris or step-wells are wells or ponds constructed in the ground. The water in bawris can be reached by descending a set of steps.
- With acute shortage of water, people began to revive these traditional bawris. As a result, despite scanty rains, these places are managing their water needs well.

### Khadin

- Khadin consists of a 100–300-m long embankment called bund made of Earth.
- Rainwater from the catchment area flows down the slope and collects in front of the bund forming a reservoir.
- Sluiceways or pathways through the bund allow excess water to flow through and collect in shallow wells dug behind the bund.
- The water which collects in both the reservoir and the wells seeps into the land and recharges the groundwater. Later, crops can be grown on the water-saturated soil.

### Water harvesting structures on the level terrain

- The water harvesting structures on the level terrain are mostly crescent-shaped, earthen embankments or straight, low concrete and rubble check dams.
- The main purpose of these water harvesting structures is to recharge the groundwater beneath the surface so as to provide moisture for vegetation.
- The water does not evaporate, does not form breeding grounds for mosquitoes and is also protected from human and animal waste.



Traditional water harvesting system — an ideal setting of the khadin system

## Coal and Petroleum

- Fossil fuels such as coal and petroleum are **non-renewable resources** of energy and exist on the Earth in a limited amount.
- On burning in air, coal produces mainly **carbon dioxide** as well as **oxides of nitrogen and sulphur** as products. Increased quantities of carbon dioxide in the atmosphere can cause climatic changes and lead to global warming.
- Burning of coal in the absence of air produces **carbon monoxide** gas. High concentrations of carbon monoxide and oxides of nitrogen and sulphur are poisonous and pollute the environment.
- **Acid rain** is caused because of sulphur particles present in coal.
- Burning of coal also generates waste products which contain **arsenic, mercury, uranium, thorium** and other heavy metals which are harmful to human health and the environment.
- Burning of coal produces dust nuisance and contaminates land and water.

## Alternatives to Reduce the Consumption of Coal and Petroleum

Switch off electrical appliances when not required.

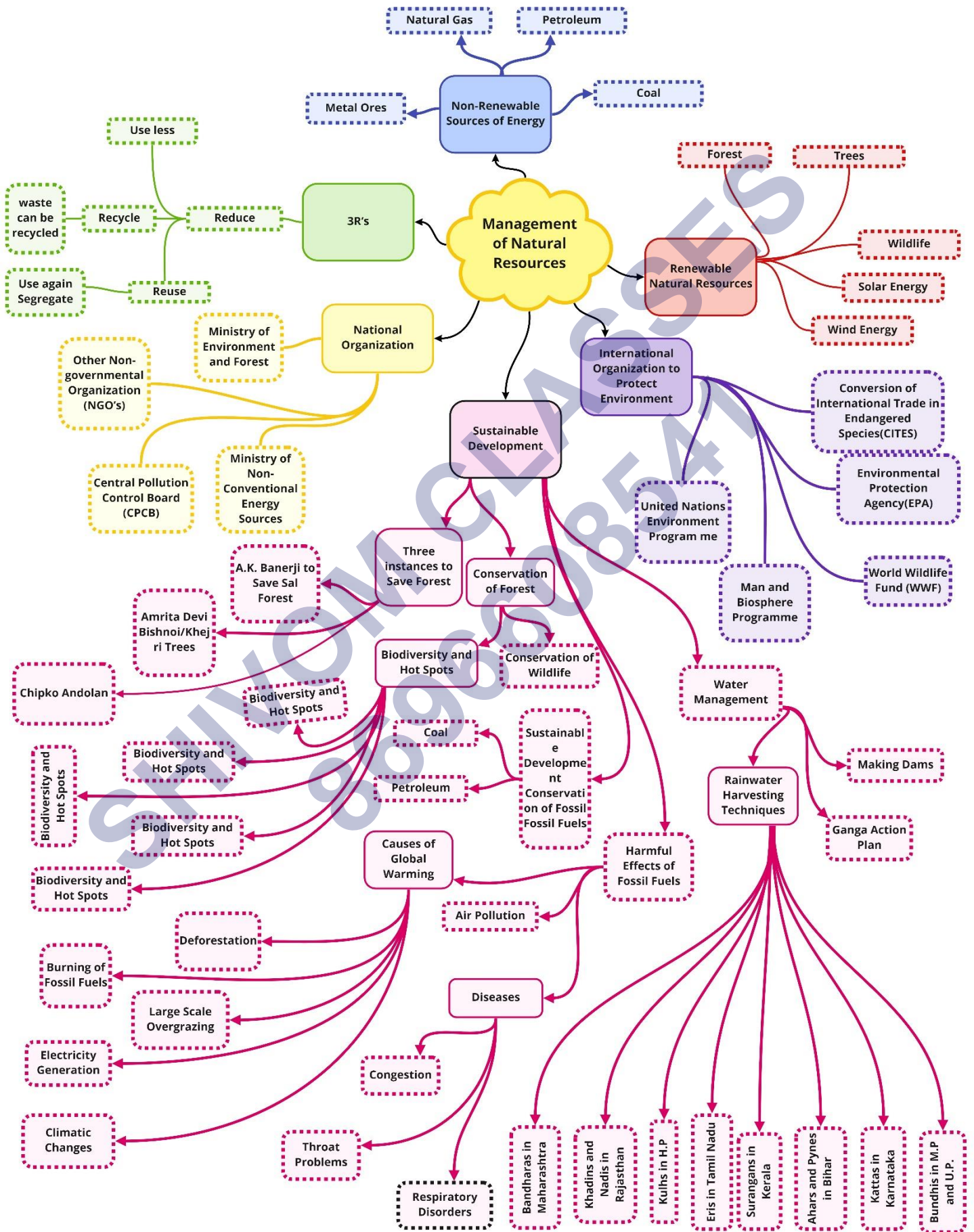
Use energy-efficient electrical appliances like CFL.

Use pressure cookers or solar cookers for cooking food.

Use of biogas as a domestic fuel should be encouraged.

Bicycles should be used instead of cars and scooters to travel short distances.

Class : 10th Biology  
Chapter-16 : Management of Natural Resources





## Important Questions

### ➤ Multiple Choice Questions:

1. Surangams are the age-old concept of water harvesting in
  - (a) Karnataka
  - (b) Kerela
  - (c) Tamil Nadu
  - (d) Andhra Pradesh
2. The quality of environment can be improved by-
  - (a) deforestation
  - (b) over use of natural environment
  - (c) erosion
  - (d) conservation
3. Which one of the following is an example of nonrenewable resource?
  - (a) Water
  - (b) Vegetation
  - (c) Wind
  - (d) Coal and minerals
4. Which of the following community in Rajasthan has a religious tenet of conservation of forest and wildlife?
  - (a) Munda
  - (b) Jaiswal
  - (c) Bishnoi
  - (d) Jain
5. Which of the following is not an use of forest?
  - (a) Controls floods.
  - (b) Used to make paper.
  - (c) Causes soil erosion.
  - (d) Resin, gum and drugs are obtained.
6. Which environmental problem is associated with the construction of high rise dams?
  - (a) A large number of human settlements are submerged in the water.

- (b) It contributes to deforestation and loss of biodiversity.
- (c) It involves the spending of huge amounts of money.
- (d) All of the above

7. What do you mean by GAP

- (a) Government Action Plan
- (b) Ganga Action Plan
- (c) Government Agency for Pollution Control
- (d) Government Animal Protection Plant

8. Ganga Action plan was started in:

- (a) 1975
- (b) 1985
- (c) 1995
- (d) 2005

9. Which of the following canals brought about greenery in Rajasthan ?

- (a) Rajiv Gandhi Canal
- (b) Indira Gandhi Canal
- (c) Jawaharlal Canal
- (d) Mahatma Gandhi Canal

10. Which of the following is the age-old concept of water harvesting system in Madhya Pradesh?

- (a) Bundhis
- (b) Ponds
- (c) Bandharas
- (d) Nadis

### ➤ Very Short Question:

1. How is the increase in demand for energy affecting air environment already?
2. Which one of the following is a renewable resource: Natural gas, petroleum, Ground water, coal?
3. Fire wood is our conventional fuel. List any four reasons for replacing it by alternate sources of energy.
4. Which one of the following gases is the major constituent of biogas:  $\text{CO}_2$ ,  $\text{H}_2$ ,  $\text{CH}_4$ ,  $\text{CO}_2$ ?
5. State an instance where human intervention saved the forest from destruction.
6. What is meant by renewable natural resources?

7. Why are coal and petroleum considered to be non-renewable sources of energy?
8. A person lives near a forest. Make a list of four items which he can get from the forest to meet his daily needs.
9. State any one reason for conservation of forests and wildlife.
10. Give two examples to emphasise the concept of REUSE.

### ➤ Short Questions:

1. Write two advantages of classifying energy sources as renewable and non-renewable.
2. What are fossil fuels? Give two examples of fossil fuels.
3. Why should we conserve forests? Suggest any two ways to conserve forests.
4. List four changes you would incorporate in your lifestyle in a move towards sustainable use of available resources.

Or

Every one of us can do something to reduce our consumption of various natural resources. List four such activities based on 3-R approach.

5. State two reasons each of conserving
  - (a) Forest
  - (b) Wildlife.
6. What are natural resources? State two factors that work against an equitable distribution of these resources.
7. What is water harvesting? Mention any two water harvesting structures.
8. Why must we conserve our forests? List any two causes for deforestation taking place.

### ➤ Long Questions:

1. The nature and wildlife enthusiasts who do not depend upon forests have considerable say in their management. Initially the conservationists raised their voice for particular animals like tigers, elephants, rhinoceros. They have now recognized the need to preserve biodiversity?
  - (a) Explain reason for this change of approach of wildlife enthusiasts.
  - (b) State two values that inspire them for this approach.
2. Yamuna River passing through 22Km in Delhi was once described as the life line of the city but today it has become one of the most polluted rivers in the country. According to CPCB, the water quality of Yamuna River falls under the category "E" which makes it fit for only for recreation and industrial cooling. It is completely unfit for underwater life.
  - (a) Give two possible causes of water pollution in Yamuna River.

- (b) Suggest any one method by which pollution could be reduced in Yamuna river.
- (c) Mention the values portrayed by you here?

### ✓ Answer Key-

#### ➤ Multiple Choice Answers:

1. (b) Kerela
2. (d) conservation
3. (d) Coal and minerals
4. (c) Bishnoi
5. (c) Causes soil erosion.
6. (d) All of the above
7. (b) Ganga Action Plan
8. (b) 1985
9. (b) Indira Gandhi Canal
10. (a) Bundhis

#### ➤ Very Short Answers:

1. Answer: Increased consumption of fossil fuels (coal, petroleum, natural gas) is releasing a lot of polluting gases ( $\text{CO}_2$ , CO,  $\text{SO}_2$ ,  $\text{NO}_x$ ) some of which are causing green house effect and producing acid rain.

2. Answer: Ground water.

3. Answer:

It results in deforestation,

Energy value is small.

It is bulky,

It causes more pollution.

4. Answer:  $\text{CH}_4$  (methane).

5. Answer: Silent Valley (Kerala). A dam was proposed to be built up here but opposition from environmentalists and others forced to government to convert it into biosphere reserve.

Garwal Himalayas (Uttarakhand). 'Chipko andolan prevented the destruction of forests and saved the environment from deterioration.

Kelase Forests (Karnataka). The felling of trees in the forests was opposed by 'apiko chaluvti' led by Pandurang Hegde

6. Answer: Renewable natural resources are those resources of nature which are replenished regularly and are therefore, likely to remain available indefinitely if

they are not used beyond their renewability, e.g., forests.

7. Answer: Coal and petroleum are considered non-renewable sources of energy as they are not being formed continuously in nature and are, therefore, not replenished. Continuous use will result in their depletion one day.
8. Answer:
  - Firewood.
  - Bamboo and thatch.
  - Food articles (edible fruits and nuts).
  - Grazing animals and fodder.
9. Answer: Forests protect soil, retain and regulate flow of rainwater while wildlife maintains an ecological balance of the area.
10. Answer: Reuse saves a lot of resources, e.g., reuse of carry bags, re-use of plastic bottles and jars.

### ➤ Short Answer:

1. Answer:
 

A judicious use of non-renewable energy resource so as to prevent its depletion. Increasing use of renewable energy source but not beyond its renewability. Stress should be laid on exploitation of inexhaustible sources of energy like solar energy.
2. Answer: Fossil fuels are energy yielding combustible substances that have been formed million of years ago by compression and anaerobic heating of organic matter.
 

Examples. Coal, Petroleum.
3. Answer: We should conserve forests because they not only provide a number of economically important products but also provide shelter to wild animals, protect soil, regulate water flow and climate.
 

Forests are conserved through

  - Regular sustained yield block cutting and
  - Separation of commercial forestry (production plantation) from natural forestry.
4. Answer:
  - Electricity: Reduce consumption of electricity by switching off unwanted fans and bulbs, changing incandescent bulbs to compact fluorescent lamps.
  - Water: Prevent overflow of water by closing the taps when water is not required. Leaky taps are got repaired immediately.
  - Refills: Use of refills instead of purchasing new packs, e.g., pens.
  - Cloth Bags: Using cloth bags instead of polythene, plastic or paper bags.

5. Answer:

#### Conservation of Forests:

- Forest provide a number of economically important products
- They protect the soil, retain and regulate flow of rain water.

#### Conservation of Wildlife:

- Wildlife is important in maintaining ecological balance of the area,
- It is gene bank for improvement of domesticated plants and animals.

6. Answer:

Definition: Natural resources are living and non-living components of nature which can be used by humans to meet their requirements.

Factors Against Equitable Distribution,

- Unequal availability of resources, abundant at one place and deficient at another place,
- Excessive use of resources by rich people and struggle for the resource in the area of deficiency by common man.

7. Answer:

Definition. Water harvesting is capturing, collection and storage of rain water and surface run off for filling water bodies and recharging ground water.

Harvesting Structures,

- Khadin
- Kattas.

8. Answer:

(a) Why Conserve Forests: We should conserve forests because they not only provide a number of economically important products but also provide shelter to wild animals, protect soil, regulate water flow and climate.

(b) Causes of Deforestation:

- Clearing forests for agriculture, roads, canals, human habitation.
- Overgrazing and excessive felling of trees.

### ➤ Long Answer:

1. Answer:

(a) Nature and wildlife enthusiasts are highly educated, well connected and influential persons who are concerned about degradation of environment and depletion of natural resources including forests and wildlife. They were initially concerned about the dwindling population of big animals like tigers, elephants and rhinoceros. The enthusiasts soon realized that ecological balance can be

maintained only by preserving the biodiversity of nature. They have, therefore, started emphasising on creation of protected areas where exploitation is minimal and preservation is maximum.

(b)

- Love of Nature. Nature in its entirety is a pleasure to watch. It has inspired all our poets, writers and artists besides providing recreation to all others.
- Welfare of Tribals. Tribals have been living in and around forests for centuries. They not only meet their requirements from forests but are also traditionally conservationists with a lot of traditional knowledge of wildlife uses. By conserving biodiversity the welfare of the tribals will also be taken care of.

2. Answer:

(a) Causes of Water Pollution:

- Passage of untreated and half treated sewage into river.
- Passage of untreated industrial effluents into it.
- Dumping of garbage, waste water and other materials by people living in slums on the bank of river.

(b) Prevention of Pollution:

- Only properly treated and tested water should be allowed to be passed into river.
- Industrial effluents should not be allowed to flow into river. Every industrial unit must have its own effluent treatment.
- Slums should be shifted away from the banks and parks developed there to prevent future encroachments.

(c) Values:

- Critical thinking
- Problem solving
- Control of pollution
- Love for nature.