

Conservation of Biodiversity

Forest is one of the most useful renewable resources. They are our national wealth. In India about 21% of the country's total area consists of forest land. Forests are home to several kinds of plants, animals and microorganisms. The number and types of plants and animals found in a forest depends on the soil and climatic conditions of the region. In this chapter you will study the need and ways for the conservation of all forms of life present on the earth.

BIODIVERSITY

The variety and variability of all animals, plants and microorganisms found on the earth is called **biodiversity**.

Maximum biodiversity occurs in a forest. The regions which are rich in biodiversity are called **megadiversity centres**. There are 12 megadiversity centres in the world. India is one of the twelve megadiversity centres of the world.

DEFORESTATION

Large scale cutting of trees is called deforestation. It results in loss of habitats of several plants, animals and microorganisms living in that area.

Causes of Deforestation

Trees are cut in the forest on a large scale to clear the land for some useful purposes listed below.

1. Procuring land for agricultural use.
2. Procuring timbers for building houses, roads, railway tracks, dams, etc.
3. Procuring land for setting up industries and mining.
4. Procuring land for setting up special economic zones (SEZ).

5. To obtain forest products like wood, food, rubber, honey, resins, etc.

Consequences of Deforestation

The consequences of deforestation on the environment are very serious. Some of the harmful effects are given below.

1. Reduced Rainfall

You have studied about water cycle in your earlier classes. Water cycle gets disrupted due to deforestation. The area gets less rainfall which may create drought-like situations.

2. Induces More Soil Erosion

The top soil is easily carried away by wind or water in the absence of tree cover, thus increases soil erosion. The soil thus loses its fertility. Gradually a fertile land gets converted into a desert. It is called **desertification** (Fig. 7.1).



Fig. 7.1 Large scale deforestation is causing imbalance in nature

3. Imbalance of Atmospheric Gases

Deforestation disturbs the balance between carbon dioxide (CO_2) and oxygen (O_2) level in the atmosphere. It results in increase in the concentration of CO_2 which leads to global warming.

4. Change in Climate

Deforestation brings about change in climate and increases pollution level on the earth.

5. Natural Calamities

Deforestation increases the chances of natural calamities such as floods, droughts, landslides, cloudburst, etc.

6. Destruction of Natural Habitat

Cutting of trees on a large scale destroys the natural habitat of several plants, animals and microorganisms. This disturbs the ecological balance in nature. Several food chains and food webs get affected due to this imbalance.

7. Scarcity of Forest Products

Clearing of trees from forests results in shortage of forest products.

8. Reducing Water Table

In the absence of tree cover, rainwater cannot infiltrate into the ground to charge the aquifer. It leads to the lowering of ground water level in the absence of replenishment.

Conservation of Forests

The maintenance and upkeep of forest is called **forest conservation**. The following steps should be undertaken to conserve them.

1. Massive afforestation work should be undertaken to cover large areas of land with appropriate trees.
2. Felling of trees in the forest should be banned.
3. Every piece of barren land should be planted with trees.
4. Weeds, damaged trees, crowded trees, diseased trees, etc. should be removed.
5. Forest fire must be prevented.
6. Forest nurseries should be established on a large scale.

FLORA AND FAUNA

All the plants found in a particular area are termed as **flora**. All the animals and

microorganisms found in a particular area are referred to as **fauna**.

The flora and fauna of a place together form the biodiversity of that place.

ACTIVITY 7.1

Try to identify the flora and fauna of your place and list them.

WILDLIFE

Plants, animals and microorganisms which live in nature or are present in their wild natural habitat constitute **wildlife**.

Causes of Extinction and Depletion of Wildlife

1. Indiscriminate Hunting

Several species have become extinct due to their hunting by man for food, pleasure and animal products. The examples are disappearance of the bird **dodo** in Mauritius and the cheetah in India.

2. Destruction of Natural Habitat

Man has destroyed the natural habitats of wildlife for his settlement, cropping, plantation, mining and raising of dams, overgrazing by domestic animals, etc. Deforestation and environmental pollution has disturbed the migratory routes of many birds.

3. Introduction of Exotic Species

Man not only destroys the natural habitat, but also sometimes changes the structure of the biotic community of a place by introducing exotic species of his interest. Such species compete with the native species for food and space and may threaten the later with extinction. For example, the introduction of

exotic trout and bass fish in the USA is endangering the native species of fish.

4. Forest Fires

Setting the forest on fire not only kills the useful animals but also causes large-scale destruction of the plant life.

5. Overexploitation of Natural Resources

Several animals and plants are valuable sources of food and other materials. Fish, prawns and crabs constitute an important part of human food. Man has, however, over-exploited these resources. Overfishing in sea is causing a grave situation and the picture is not encouraging with respect to fresh water fishing. The rate of consumption of fish is greater than its replenishment.



Fig. 7.2 Overfishing is resulting in rapid depletion of fish population

6. International Trade of Animal Products

The legal or illegal export of plant and animal products from the developing countries to the affluent countries is an important international trade and has brought several animal and plant species to extinction.

7. Legal Lapse

The failure of enforcement of the existing laws of wildlife management is yet another reason for the rapid depletion of wildlife.

8. Human Ignorance

Man is mainly responsible for depletion and extinction of wildlife on the earth. This is largely due to ignorance of the common man regarding the value of wildlife and the probable consequences of the disappearance of wildlife to man himself.

THE SPECIES IN DANGER OF EXTINCTION

The International Union for Conservation of Nature and Natural Resources (IUCN) has identified and categorised the species of plants and animals which are under the possible or imminent danger of becoming extinct in the near or distant future into three groups.

1. Endangered Species

These are the species which face immediate threat of extinction. Their number has been drastically reduced to a critical level either due to their indiscriminate hunting or due to destruction of their habitats. If the same factors continue, these species would soon become extinct. **Indian rhino** (Fig. 7.3), **Asiatic lion** and **great Indian bustard** are some examples of endangered species.



Fig. 7.3 The Indian rhino is an endangered species

2. Vulnerable Species

These are species that are declining but still have sufficient number of individuals in their natural habitat. However, in near future they might represent the category of endangered species, in case the causal factors for their decline are not removed. **Musk deer**, **sambhar**, **spotted deer** (Fig. 7.4) and **black buck** are a few examples of vulnerable species.



Fig. 7.4 The spotted deer is a vulnerable species

3. Rare Species

These are localised in certain geographical area and exhibit scattered population considering the global environment. Thus their overall population in the world is small. In future these species may enter into the category of vulnerable or endangered species. **Indian elephant** (Fig. 7.5), **wild buffalo** and **Asiatic wild ass** are a few examples of this category.

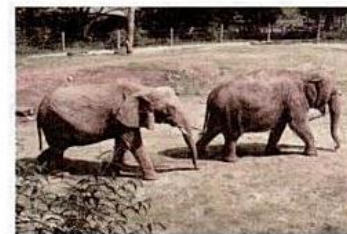


Fig. 7.5 The Indian elephant has been included in the rare species category

THREATENED SPECIES

A species belonging to any one of the above three categories is classified as threatened. These species are to be identified and conserved to avoid their entry into the category of rare, vulnerable or endangered species.

PROTECTED SPECIES OF INDIAN WILDLIFE

The following wild animals have been enlisted as threatened and protected species in India.

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|-------------------------------|-------------------------|
| 1. Musk deer | 2. Bharat swamp deer |
| 3. Duck | 4. Horned pheasant |
| 5. Monal pheasant | 6. Great Indian bustard |
| 7. Indian Gazelle or Chinkara | 8. Pea fowl |
| 9. Gharial | 10. Marsh crocodile |
| 11. Python | 12. Leathery turtle |
| 13. Albino snow leopard | |

PROTECTED AREAS IN INDIA

To protect and conserve the wildlife in India, the government has passed the **Wildlife Protection Act** in 1972. Under this Act, a large number of **national parks**, **sanctuaries** and **biosphere reserves** have been established in different parts of India.

National Parks

A national park is characterised by an area reserved for the betterment of wildlife where foresting, grassing or cultivation is prohibited. It protects the flora and fauna of the reserved area. Private ownership is not allowed in a national park.

In all, there are 97 national parks in India which are spread over 38,200 square

kilometres constituting nearly 1.16 per cent of the total geographic area of the country.

Important national parks in India are given in Table 7.1.

TABLE 7.1
Important National Parks in India

Name of the National Park	State
Jim Corbett National Park	Uttarakhand
Kanha National Park	Madhya Pradesh
Palamau National Park	Jharkhand
Tadoba National Park	Maharashtra
Simplipal National Park	Orissa

ACTIVITY 7.2

Visit a national park or a sanctuary located in your area. Which animals are being protected there? Do they belong to endangered species? What are the special protective measures being taken? Which are the other animals being kept there? What is the contribution of human beings in this protected area? How are they keeping check on hunting? Write all the details in your record book.

Sanctuaries

A wildlife sanctuary is aimed at protecting the wild animals. In a wildlife sanctuary, cutting of trees for timber and other forest products is permitted to private operators with specific instructions to ensure that the well being of wild animals does not suffer.

At present there are 508 sanctuaries in India. Names of some important sanctuaries are given in Table 7.2.

TABLE 7.2
Important Sanctuaries in India

Name of the Sanctuary	State
Bharatpur Bird Sanctuary	Rajasthan
Kaziranga Wildlife Sanctuary	Assam
Sultanpur Lake Bird Sanctuary	Haryana
Bandipur Wildlife Sanctuary	Karnataka
Periyar Wildlife Sanctuary	Kerala



Fig. 7.6 Bharatpur Bird Sanctuary



Fig. 7.7 Kaziranga Wildlife Sanctuary is the home of the Indian rhino

ACTIVITY 7.3

Make an outline map of India and show at least five places where wildlife sanctuaries are located.

Biosphere Reserves

A biosphere reserve is designed to provide protection to the wild flora and fauna, the domesticated animals and plants, as well as to the traditional life styles of the tribals of the area. At present there are 14 biosphere reserves in India. A biosphere reserve is much larger than a national park or a sanctuary.

Important Biosphere Reserves in India

1. Nilgiri Biosphere Reserve
2. Nanda Devi Biosphere Reserve
3. Uttarakhand Biosphere Reserve
4. Nokrok Biosphere Reserve
5. Sundarbans Biosphere Reserve

ACTIVITY 7.4

Find out the number of national parks, wildlife sanctuaries and biosphere reserves in your state.

Zoological Park

Zoos are places where animals and birds are protected by keeping them in special cages or enclosures for public exhibition. The animals are fed and cared regularly by zoo authorities. Zoos play an important role in creating awareness among the people about the need to conserve nature.

ACTIVITY 7.5

Visit a zoo located in your area. Which animals are being kept there? What special protective measures have been taken? Are these animals properly cared for and fed in the zoo? Are the animals comfortable in a zoo? Write all the details in your record book.

Botanical Gardens

Botanical gardens have been established to conserve rare and threatened plants. There are about 1600 botanical gardens all over the world. Most botanical gardens also serve as seed banks where seeds are preserved under controlled conditions.

ENDEMIC SPECIES

Endemic species are those which remain confined to a specific geographical area. They are not naturally found anywhere else. Peacock, the national bird of India, is endemic to India. The Indian biodiversity is very rich as far as endemic animals and plants are concerned. They are mostly found in North-East India, the Western Ghats, North-West Himalayas and the Andaman and Nicobar Islands.

Some Species Endemic to India

1. Lion-tailed Macaque (Western Ghats)
2. Malabar Parakeet (Malabar region)
3. Nilgiri Langur (Nilgiri hills)
4. Nilgiri Tahr (Nilgiri hills)
5. Great Indian Bustard



Great Indian Bustard



Nilgiri Tahr

Fig. 7.8 Some endemic species

PROJECT TIGER

The **Project Tiger** conservation programme was initiated in 1973 for the purpose of saving the tiger population from extinction in India. This is one of the success stories of wildlife conservation in the whole world. The population of wild tigers in India was about 40,000 at the turn of the century. By 1972, the number was reduced to about 1800. The project of conservation of tiger population was launched by the Government of India with the help of international agencies like World Wildlife Fund, etc. Nine tiger reserves in nine states with a total area of 13,017 sq. km were set aside with a tiger population of about 300. Today there are 27 reserves spread over 17 states. Out of the total area, an area of 4,936 sq. km is set apart as a core zone free from all human interference. Cattle grazing in this area has been stopped and several villages have been moved out.



Fig. 7.9 Project Tiger was instrumental in saving the Indian tiger from extinction

RED LIST AND RED DATA BOOK

The **Red List** is a compilation of endangered wildlife species. The **Red Data Book** provides information on population status of the endangered species. Both the Red List and Red Data Book show the risk of extinction of wildlife based on biological data.

The first Red Data Book of animals was compiled in 1991. In addition, IUCN

adopted a revised set of Red List categories in 1994.

ACTIVITY 7.6

From the Internet, collect information about at least 10 species of animals which are on the Red List and find mention in the Red Data Book. Write the names of the animals. Is there any animal found in your area from the list? What conservation measures are being taken by your State Government? Collect information and keep a record of it.

MIGRATION

The movement of animals in large numbers from one place to another and back to their original home is called **migration**. Animals migrate during winter and breeding seasons. When the conditions become favourable, the animals return home. Birds migrate to find plenty of food and to escape in hospitable climate. Birds are well known for their long migratory flights.

The **Arctic tern** is a sea bird which travels from the north pole to the south pole each year. **Siberian cranes** travel large distances and come to India during winter. Can you give any reason for this?



Fig. 7.10 The Arctic tern on flight

Eels, which live in fresh water, go to the sea to lay their eggs. After hatching of the young ones, eels return to the fresh water river again.

CONSERVATION OF WILDLIFE OR BIODIVERSITY

Conservation of wildlife involves the protection, preservation, perpetuation and judicious control of population of rare species of plants and animals in their natural habitats.

The following important steps are proposed by scientists all over the world to save existing wildlife.

1. Special attention should be given to conserve the species which fall in the category of endangered, vulnerable or rare species.
2. Proper planning of land and water utilisation should be done to ensure the protection of wildlife in their natural habitats or in the man-made habitats such as zoos and botanical gardens.
3. Efforts should be made to preserve as many varieties of food crops as possible, including forage plants, timber trees, livestock, aquaculture animals and domesticated animals.
4. Each country should identify the habitats and areas of wild relatives of the economically useful species and ensure the safety of these species.

5. Wildlife sanctuaries and national parks should be made keeping in mind the feeding, breeding and environmental needs of the species concerned.
6. Alternative measures should be adopted to allow the survival of a species being exploited by a country or a community or an industry.
7. The products of wild plants and animals being used for international trade should be allowed only at levels which would not endanger the related wildlife.
8. Migratory route should be marked out and protected for migratory birds.
9. Strict laws have to be framed and enforced to check poaching, illegal hunting and trade of animal products.
10. Restoration of streams, rivers, ponds and other waterbodies to their natural conditions.
11. Restoration of forests, fields, grassland and swamps.
12. Prevention of unnecessary destruction of wildlife by educating human beings concerning causes, results and remedial measures of wildlife depletion.
13. Increased support from state and central government agencies for the conservation of natural resources.
14. Prevention of devastating forest fires.
15. Regulation and control on fishing, hunting, and collection of wild products from the forests.