Chapter 5

Biodiversity

Points To Study:

5.1 What is biodiversity?
5.2 Degradation of biodiversity
5.3 Conservation of biodivesity
- Wildlife sanctuary
- National park
- Zoological park
- Botanical garden

5.4 Biodiversity Hot Spots

5.1 What is biodiversity?

Different types of innumerable animals, plants and organisms are found on the earth. Organisms found in different habitats and environment have different nature and different structural organisms. Our ancient literature has also mentioned about the geographical nature of India.

Uttaryatsmundrasya himadreschaiv dakshinam
Arsha tadbharatah naam bharti yatra santati.

(That means between the north of Indian ocean and south of Himalayan range, the land area is called India.)

The environmental and climatic conditions of our country greatly vary from Jammu and Kashmir in the north to Kanyakumari in the south. Because of different climatic conditions, people living in different geographical areas have different culture, dressing, eating habits etc.

Do the environment also affects the species of animals, plants and microorganisms of that area?

Yes, the environment also affects the spieces of animals, plants and microorganisms of that area?

Let us list the animals and plants found in our near by area in the table 5.1.

Table 5.1 Plants and animal found in our near by area.

Name of plants	Name of animals

From the above table we can conclude that different types of animals and plants of different species are in our near by area. These animals and plants are the specificity of our area. Thus the spieces of plants and animals found in a particular area is called the biodiversity of that area.

Are the species of animals, plants and microorganisms found in whole India are similar?

Let us try to find out:-

Due to the diversity of environmental conditions of different geographical areas, the species of animals and plants found in these areas are also different. . In whole world, there about 2,50,000 plant species, out of which 45,000 species are found in India only. This diversity in animals, plants and microorganisms in India is comparatively more than the other countries. Thus India is called a bio diversity rich nation.

Do you know about such animals and plants?

1) Which you have studied in science books or those which are conserved in plant and animal museums but are not found in natural or artificial protected areas.
2) Which are not found in natural habitats but are in protected areas.
3) Those which, if not conserved timely, can extinct because of their decreasing number.
4) Which are found exclusively in a particular area.

The above mentioned four types of animal and plant species are categorised by International Union for Conservation of Nature (IUCN)) in following classes:

I) Extinct species ii) Extinct in natural habitat

iii) Endangered species iv) Endemic species

I) Extinct species : These are the plants and animals species which have been lost forever, none of the representative is alive today. Example:

Animal species: Dodo bird, wild pigeon, Woolly mammoth, Tasmanian Tiger

Plant species: Saint Helena olive, woods cycades, Kokia koki.

Fig 5.1 Dodo bird

Fig 5.2 Woods Cycads

ii)Extinct in natural habitat : These are plants and animals species which are no longer found in their natural habitats but their representative members are still living in artificial habitats. like :

Animal species: Hawaii crow, Vyoming frog, Black soft coated tortoise

Fig 5.3 Hawaii Crow

Plant species: Kalimantan mango (Kasturi)

iii)Endangered species: The species of plants & animals whose number have been reduced to a critical stage & they may become extint in near future. If their timely consersation efforts are not taken. Example:

Animal species : Asiatic lion, Dolphins of Ganga, Black buck, One horned Rhino, Desert lizard, Godawan,

Plant species: Paneerbandh, Rohida, Indrok, Guggal, Fog

Asiatic Lion

Krishna buck

Leopard

Godawan

Son Chirraiya

Vulture

Paneer Bandh

Rohida

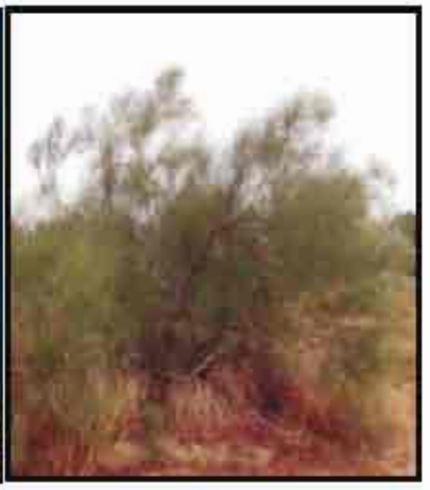

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Fig 5.4 Endangered species

iv) Endemic species : These are the animals and plants species that are found exclusively in a particular area called as endremic species. They are not found in any other area in their natural from. In the Panchmarhi biosphere reserved area Sal and wild mango are endemic plants and Indian giant squirrel and flying squirrel are the endemic animals of that area. Other examples are:

Animal species: Snow Leopard (Himalayan range),Gangetic Dolphins of River Ganga (Ganga river)

Plant species : Indrok, Penpa, Khedula, Su-Fog (Rajasthan), Red Sandal (South western Ghats)

Gangetic Dolphin

Snow Leopard

Su-phog(Ephedra)

Indrok

Fig 5.5 Endemic Species

Let us categorise all the examples according their classes in the Table 5.2

Table 5.2

Sr. No.	Name of class	Animal species	Plant species
1.	Extinct		
2.	Extinct in natural habitat		
3.	Endangered		
4.	Endemic		

Observe the above table and try to find out which plants and animals species are in more than one class.

5.2 Degradation of biodiversity

We generally came to know through news media on special days like World Environment Day, Earth day etc, that there is a fall in biodiversity on the earth.

Have you ever wondered why there is such a fall in bio diversity? Come let us find out.

You might have seen a tree in a near by area. How many organisms are dependent on that tree. How many birds live on that tree? Try to find out.

Now just imagine if this tree has been cut down?

On cutting down the tree, habitats of all animals and birds dependent on it will be lost. Along with that, small insects which are not visible to us but are of importance to us will also get destroyed. Among all those organisms which are destroyed, some organisms are such that they have habitat only on specific trees. Thus cutting down of specific trees result in decrease in number of their dependent organisms and in near future they will reach to an extinction. This loss of biodiversity is called biodiversity degradation.

Let us study the causes of biodiversityv degradation.

Degradation of Biodiversity: in last 200 years, many of the animal and plant species have been extinct and many are at border of extinction. The existence of plants and animals on earth is due to their interrelationship and inter-dependence. Biodiversity is essential for for the existence of organisms. Biodiversity degradation is an important environmental issue. Main causes of biodiversity degradation are as follows:

Deforestation :

Clearing of forests due to man made or natural causes is called deforestation. Main causes of deforestation are:

- Wood is required for fuel, furniture, structural work, paper, decorative woodden items, ships etc. For this wood, forests are being cut down recklessly and in uncontrolled manner.
- Overgrazing by animals is also a main cause of deforestation.
- Fast growing population and urbanization is also a cause of forest destruction. To support the growing population with food grains, forests are cut down to make agricultural land. Apart from these forests are also being cut down for roads, railway tracks, dams, buildings, factories etc.

Hunting of animals and birds-

- Many animals are hunted for their teeth, meat, skin, horn, bones etc. Due to reckless hunting many species of plants and animals are near extinction.

Harmful effects of deforestation

Deforestation causes following harm effects on biodiversity

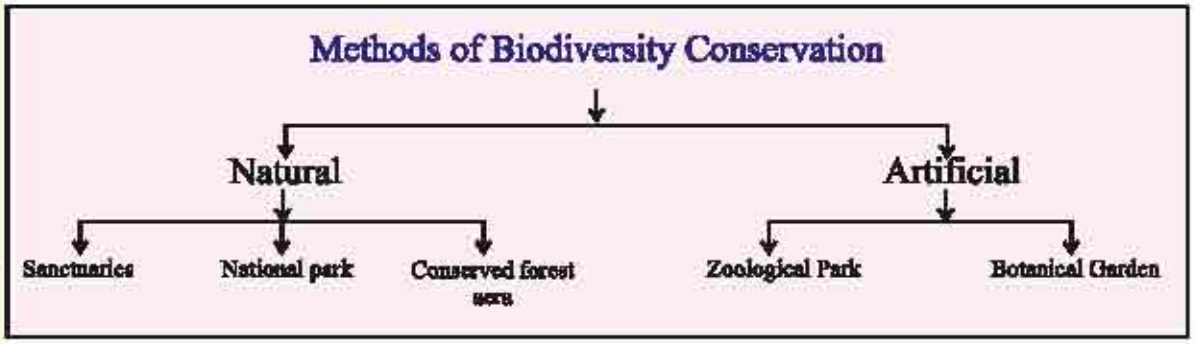
- Roots of plants and trees bind the soil firmly. Due to cutting of trees, soil becomes loose and is flown away due to strong winds or waterflow. The upper layer of soil in rich in humus and nutrients. Due to its flow away, the fertility of soil decreases which causes harm effects on vegetation.
- For various species of animals, birds and plants, forest is the best natural habitat. With deforestation, their habitats are also destroyed.
- We know that plants take carbon-dioxide (CO_2) and releases oxygen (O_2) during photosynthesis. Due to deforestation, the balance of these gases in atmosphere is getting disturbed. Due to increasing amount of carbon-dioxide in atmosphere, world's temperature is rising which is called Global warming.
- Trees absorb water from the soil through their roots and this water is released in the air as water vapours by the process of transpiration. Due to deforestration, the amount of water vapour is continously decreasing in the atmosphere which results in less rainfall.
- Due to decreasing vegetation in the hilly areas, the capablity of soil to bind firmly is being lost,this has lead to increasing incidenses of land slides like-disaster in Uttrakhand.

- Plants animals are also adversely affected by air, water soil pollution.
- Environment is changing greatly due to the natural or man made causes. The species which do not get adapted to this changed environment are becoming rare or extinct.
- Natural disasters like earthquakes, drought floods, cyclone etc are also causes of extinction of many species of plants & animals..

5.3 Conservation of biodiversity

Let us think how we can conserve biodiversity-

We can use following processes to conserve biodiversity:



Conservation of biodiversity- It is our responsibility for conservation of this biodiversity. We have to conserve our degrading biodiversity using above mentioned methods and by bringing awareness in the society.

Many national and international organizations are working for protection of forests and wildlife.

Our central and state governments have also formulated many laws, regulations and policies for their protection and conservation. We should follow the rules, laws and policies made by our government to protect environment and biodiversity and we should also inspire others to do the same. Wildlife sanctuaries, National Parks, Zoological Parks, Botanical gardens etc. are the protected areas for plants and wild animals established by central and state government.

Wildlife Sanctuary and National Parks

Many wildlife sanctuaries and National Parks are being established in many countries of the world to conserve some important species of animals, plants and birds in their natural habitats. In our country we have more than 510 wild life sanctuaries and 102 national parks. Cutting of trees and hunting animals are prohibited in these areas. Some of the wildlife sanctuaries and national parks are as follows: Bandhavgarh in M.P.(tiger), Bandipur in Karnataka (Tiger), Gir in Gujarat (Asiatic Lion), Kaziranga in Assam(Indian Rhino), Kanha in M.P.

(Tiger), Periyar in Kerela (Asiatic elephant), Dachigum in Kashmir (Kashmir Stag), Keoladeo National park in Bharatpur(Siberian crane), Ranthambore in Rajasthan (tiger), Sunderban (Tiger). Rajasthan has 30 wildlife sanctuaries, 4 National parks and 4 restricted areas.

Zoological park or Protected Area

Zoo is a place where animals and plants are Exhibited for general public to give information & spread awareness about wildlife. These are also working as the breeding centres for the animals which are extinct in wild. Their main objective is to create awareness among the people about environment conservation and to produce a zeal of love and care of wild life attached with the animals.

Fig 5.6 Ranthambhore National park

Fig. 5.7Gir national park

Botanical Gardens

These are established for conservation of plants species which are extinct in wild species and endangered species. There are about 1600 botanical gardens in the world. These are established as seed banks and conservation of vegetation. In India, Acharya Jagdish Chandra Bose Indian botanical Garden is in Sibpur, Howrah, West Bengal. It is spread in about 269 acres of land.

Migration places of : To avoid adverse environmental condition of thier native places, many species of exotic birds in their breeding season fly for long distances & visit India which has varied climatic condition. These are called Migratory birds.

Example: Siberian Crane.

Fig 5.8 Herd of migratory birds

Their important visiting sites in Rajasthan are:

1. Khichan near Faulodi, Jodhpur.
2. Keoladeo National park Ghana, Bharatpur.
3. Near Guda Bishnoiyan, Kakani pond, Jodhpur.
4. Talchapar, Churu.
5. Deedwana, Nagaur.

5.4 Biodiversity Hot Spots

The bio geographical reagions which are very with rich in biodiversity and habitats of various endemic species, but whose biodiversity is degraded due to selfish human interest are called biodiversity hot spots (Norman Mayres, 1988). These biodiversity hot spots include endangered, threatened and endemic plants and animal species. There are 34 Biodiversity Hot Spots, out of which two are in India. They are Western Ghats and Eastern Himalyan area. Due to fast deforestation, species found in these hot spots are in danger and it is necessary to save them.

Plants are the only living organism on the earth which can convert the solar energy into chemical energy used in food substances. That is why it is writly said in

Yavad bhumandal dhate ssailvan kananam
Tavat tishthti mediyanam santati putra pautriki

(Durga Saptshati)

(This means that as long as our earth is prosperous with forests including trees and mountains, it will nourish human generations).

We should work for conservation for our rare biodiversity.

Recycling Paper

Do you know that to obtain 1 ton of paper, 17 big trees have to be cut down. Thus we should save paper and use it wisely. By recycling paper we can not only save trees but can also save water and energy used to produce paper.

Red Data book: It is a book in which records of all endangered species are kept. There are separate Red Data books for plants, animals and other species.

Also have a look:

Biodiversity of cows in Rajasthan :

1. **Kankrej:** This breed is found in Barmer, Pali and Sanchore and Naigad areas of Jalore. They have average length, strong body, broad chest, and straight back, forehead is broad and slightly dished in the centre, the horns are lyre shaped, ears are large and pedulous shaped, nose slightly upturned and a shorter tail some of its characteristic features. Due to its fast walk and capability to bear weight, it is liked by the farmers.
2. **Malvi :** These are famous as load bearers. Found in malvi area of Jhalawar, their body is well built and are grey coloured. As the age of male increases, the colour darkens. This breed has two types: (a) Big Malvi and (b) Small malvi. Big Malvi is found in Jhalawar and small Malvi is found in Kota and Udaipur districts. The back is straight but tghe hindquarters are drooping. The legs are powerful but short. The dwelap is well developed and the sheath is moderately pendulous. The head is short and broad with dished forehead. The muzzle is broad dark coloured and slightly upturned. the horns, which emerge from the outer angles of the poll in an outward and upward direction, are strong and pointed. The ears are short and pointed and not drooping. the tail is of moderate length with black switch reaching to about the fetlock.
3. **Rathi :** These cows give milk in more quantity. These are the hybrid variety of Sahiwal, Red Sindhi and Haryana breeds. The breed is almond coloured or sometimes spotted also. This breed is one of the best breed of cows in Rajasthan. These cows give milk about 25 to 30 pounds. Their tail is long and stomach is large. Their bulls are heavy in weight.
4. **Nagori :** the Nagori bulls are active and are famous for ploughing. Solahak area of Nagore is considered as their native place of origin. Long, deep and powerful frames, flat forehead, large and pedulous ears, moderate sized horns, fine and slightly loose skin, moderately length tail reaching just below the hocks and terminating in a tuft of black hairs, muscular and powerful shoulders and forearms are some of their characteristic features.

Breeds of Tharparkar and Gir varieties are also found in our area.

What have you learnt

- The plants and animals species found in a particular area are called the biodiversity of that area.
- Those species of plants and animals whose any representative is no longer alive are called extinct species.
- Organisms whose count is decreasing below a certain limit and are at the margin of extinction are called Endangered animals.
- Animals and plants species which are found exclusively in a particular area are called Endemic species.
- The main causes of deforestation are reckless and uncontrolled cutting down of trees for wood, overgrazing by the animals, over growing population and urbanisation.
- Due to increasing carbon dioxide in atmosphere, the temperature of the earth is increasing. This is called global warming.
- Wildlife sanctuary, parks, zoo, Botanical gardens are conserved and protected areas for the plants and animals species.
- Red Data book has the record of all the endangered species. There are separate Red Data books for plants, animals and other species.

□□□

EXERCISES

Mark the correct option

1. The species which is not found in natural habitat but is present in conserved area is called

(a) Endangered (b) Extinct

(c) Extinct in natural habitat (d) Endemic ( )

2. Which of the following is Endangered species:

(a) Neem (b) Khejdi

(c) Indrok (d) Ber ( )

Fill in the blanks

1. Record of all the Endangered Species are kept in _____
2. Those plants and animals species whose any representative member is no longer alive is called _____
3. The plants and animals species which are found exclusively in a particular area are called _____ to that area.
4. There are _____ biodiversity hotspots in the whole world.

Short answer type questions

1. Which are the conserved and protected areas for the plants and animals?
2. What is the Red Data book?
3. What are the biodiversity Hot Spots?
4. Why the Botanical gardens were established?

Long answer type questions

1. What are the causes and harmful effects of Deforestation? Write a note.
2. What efforts have been taken for biodiversity conservation? Write in detail.

Activity

1. Study the biodiversity of forests and sanctuary of your district. Make an elaborated report which having photrographs and diagrams of their vegetation and animals.
2. With the help of your elders, parents and teachers, find out which plants and animals were once found in your near by areas but now are extinct, or which are now very less in number. Make a list.
3. Make a table of Sanctuaries, their districts' name, and conserved animals of Rajasthan on a chart.
4. Find out the Endangered Bio species, and participate in the social work, and other projects related for their conservation.

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