UNIT 22

CONSERVATION OF PLANTS AND ANIMALS

Learning Objectives

W1H7K9

After the completion of this lesson, students will be able to:

- understand deforestation, afforestation and reforestation.
- list out the endangered species.
- understand the importance of conservation of wildlife.
- know about Red Data Book and its advantages.
- list out the importance of Peoples' Biodiversity Register.
- know about the functions of animal welfare organisations.

Introduction

Our planet earth is filled with so many species of plants and animals. According to the scientists there are about 70 – 100 lakh species on the earth. The sum total of all these animals is called biodiversity. Bio means life, diversity means variety or different. Thus, bio-diversity means variety of life forms on the earth and the essential interdependence of all living things. When you travel through the forests in the mountain ranges you can see variety of life forms. Forests are abundant with fruit trees and flowers and inhabited by chirping birds, prancing deer and plenty of other animals. All through the literature of ages, it has been mentioned that India is full of forests filled with wildlife. Unfortunately, from then to now, most of these forests have been cut down. This phenomenon is seen all across the world. Forests as a natural resource are decreasing in area in the recent years. In this lesson we are going to learn about deforestation, endangered species, conservation of plants and animals and wildlife sanctuaries and national parks.

22.1 Deforestation

Forests are the important renewable resources. They cover about 30 percent of the world's land surface. They produce oxygen and maintain the level of carbon dioxide in the atmosphere. Forests provide many important goods such as timber, paper and medicinal plants. They control water runoff, protect soil, and regulate climate changes. But the forests all around the world are being destroyed. Destruction of forests in order to make the land available for different uses is known as deforestation. Deforestation has resulted in several ecological imbalances such as increase in temperature, deficiency in rainfall etc. It has also resulted in the extinction of several species of animals and plants.

22.1.1 Causes of Deforestation

Deforestation may be caused by nature or it may be due to human activities. Fires and floods are the natural causes for deforestation. Human activities which are responsible for deforestation include agricultural expansion, cattle breeding,

illegal logging, mining, oil extraction, dam construction and infrastructure development. Let us study about some of them in this section.

a. Agricultural Expansion

With increasing population, there is an overgrowing demand for food production. Hence, large amount of trees are chopped down for crop production and for cattle grazing. More than 40% of the forests are cleaned to obtain land and to meet the needs of agriculture.

b. Urbanization

With the expansion of cities more land is needed to establish housing and settlement. Requirements like construction of roads, development of houses, mineral exploitation and expansion of industries also arise due to urbanisation. Forests are destroyed to meet all these needs.

c. Mining

Mining of coal, diamond and gold require a large amount of forest land. So, a large number of trees is cut down to clear the forest area. Moreover, the waste that comes out from mining pollutes the environment and affects the nearby plants.

d. Construction of dams

To provide water supply to the increasing population, large size dams are constructed. Hence, a great extend of forest area is being cleared.

Figure 22.1 Dam

e. Timber Production

We need wood to meet the needs of our daily life. Wood-based industries like paper, match-sticks, furniture need a substantial amount of wood supply. Wood is the most commonly used fuel. Thus, a large number of trees are being cut down for fuel supplies. Some people are involved in illegal wood cutting and destroy more number of trees. This is the main reason for the destruction of some valuable plants.

Figure 22.2 Destruction of trees

DO YOU KNOW?

Chipko Movement is primarily a forest conservation movement. The word 'Chipko' means 'to stick' or 'to hug'. Sunderlal Bahuguna was the founder of this movement. It was started in 1970s with the aim of protecting and conserving trees and preserving forest from being destroyed.

f. Forest fire

In many forests, fires are usually expected from time to time. They may be caused by humans, accidents or natural factors. Forest fires wipe out thousands of acres of forest land each year all over the world. This has tremendous effects on biodiversity and the economy as well.

Figure 22.3 Forest fire

g. Cyclones

Cyclones destroy the trees on a massive scale. They not only destroy the trees but also affect the livelihood of so many people who depend on them.

More to know

Name of the Cyclone	State	Year
Fani	Orissa	2019
Gaja	Tamil Nadu	2018
Phethai	Andhra Pradesh	2018
Ockhi	Tamil Nadu	2017
Vardah	Tamil Nadu	2016

22.1.2 Effects of Deforestation

There has been a long history of interdependence between man and the forests. Our survival without forest will be very difficult. They supply us the oxygen we need, cause rainfall and provide so many things needed for our life. But increase in population has resulted in the destruction of forests. Every year 1.1 crore hectares of forests have been cut down around the world. In India alone 10 lakh hectares of forests are destroyed which has resulted in so many harmful effects. Let us study about some of them.

a. Extinction of species

Deforestation has resulted in the loss of many wonderful species of plants and animals and many are on the verge of extinction. More than 80% of the world's species remain in the tropical rainforest. Reports say that about 50 - 100 species of animals are being lost each day as a result of destruction of their habitats.

b. Soil Erosion

Widespread trees in the forests protect the soil from the heat of the sun. When the trees are cut down, soils are exposed to the sun's heat. Extreme temperature of the summer dries up the moisture and makes the nutrients to evaporate. It also affects the bacteria that helps in the breakdown of organic matter. The roots of the trees retain the water and the top soil which provides nutrients to the plants. When the trees are cut down, soil is eroded and washed away along with the nutrients.

DO YOU KNOW?

Long distance travel by birds to escape severe environmental conditions is called migration. Many birds and many other animals migrate long distances during unfavourable season. Siberian Crane migrates from Siberia to India during winters to escape harsh conditions in Siberia and to get comfortable conditions and food in India. Siberian crane, on an average can travel 200 miles in a single day.

c. Water cycle

Trees suck the water from the roots and release the water into the atmosphere in the form of vapour during transpiration. When trees are cut down the amount of water vapour released decreases and hence there is a decrease in the rainfall.

d. Floods

Trees absorb and store a large amount of water with the help of their roots. When the trees are cut down, the flow of water is disrupted and it leads to flooding in some areas.

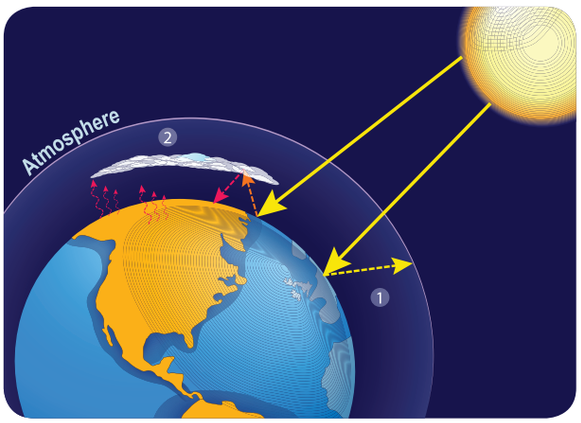


Figure 22.4 Global warming

DO YOU KNOW?

Amazon forest is the largest rain forest in the world, located in Brazil. It covers 6000000 square km. It helps to stabilize the earth's climate and slow global warming by fixing Co_2, and producing 20% of the world's oxygen in the process. It has about 390 billion trees. It is the lungs of the planet.

e. Global warming

We inhale oxygen present in the atmosphere and release carbon dioxide as waste. In turn trees absorb the carbon dioxide and provide us the oxygen during photosynthesis. Deforestation reduces the number of trees and hence more amount of carbon dioxide accumulates in the atmosphere. Carbon dioxide along with water vapor, methane, nitrous oxide and ozone forms the green house gases. These gases are responsible for global warming.

The solar energy falling on the earth's surface is reflected into the atmosphere. A part of this energy is reflected by the green house gases back to the earth to keep it warm and a part goes into the space. But gases such as methane and carbon dioxide accumulating in the atmosphere trap the heat energy inside the atmosphere leading to increase in temperature. This is called global warming. This results in the melting of glaciers in the polar region and affects the living organisms like polar bear.

f. Destruction of home land

Indigenous people live in and depend on forests for their survival. They get their food and many other resources from the forests. Destruction of forests affects their livelihood .

Activity 1

Collect information about a nearby forest in your area and find out the rare species of plants and animals found there. Collect some pictures of plants and animals which you do not find around you and prepare an album.

22.2 Afforestation

As we all know due to deforestation the climate is changing alarmingly in these days and there is no seasonal rainfall. Because of this many cities are facing water scarcity and many of the lands are becoming barren. Water is needed for life to exist on the earth. So, we need to grow forests. Afforestation is the process of planting trees, or sowing seeds, in a barren land

DO YOU KNOW?

The term social forestry was first used in 1976 by the then National Commission on Agriculture, Government of India. It means the management and protection of forests and afforestation on barren land with the purpose of helping the environment, social and rural development. It is to raise the plantations thereby reducing the pressure on the traditional forest area.

to create a forest. Afforestation helps us to create the forests differently from natural forests.

Figure 22.5 Afforestation programme

22.2.1 Importance of Afforestation

The world is experiencing a great change in the climate in the recent years than ever before. These changes in the climate have given an alarming signal to everyone. To protect our planet earth, afforestation would be a better solution. Importance of afforesatation is given below.

- Afforestation helps the wild animals and even humans to have shelter and to find their food source.
- Through afforestation we can increase the supply of oxygen. Trees planted can increase the water vapour in the atmosphere to get the rainfall.
- By planting trees the amount of carbon dioxide in the atmosphere can be reduced and thus the effects of air pollution, green house gases and global warming can be controlled.
- Afforestation enables us to avoid desertification of land.

Wangari Maathai founded the Green Belt Movement in Kenya in the year 1977. GBM has planted over 51 million trees in Kenya. She was awarded the Nobel Peace Prize for 2004.

- Barren lands experience strong winds and it causes soil erosion. Top soil is washed away during rainfall. Afforestation helps to grow more trees so that they can hold the top soil along with the nutrients.
- Creating forests provides us fodder, fruits, firewood and many other resources.
- Industries need specific type of trees. Afforestation helps us to grow a particular type of trees.

Activity 2

Discuss about afforestation in the class and write a brief report on your discussion.

22.3 Reforestation

Reforestation is the natural or intentional replanting of the existing forests that have been destroyed through deforestation. Reforestation may sound similar to afforestation but both of them are not same. Reforestation is replanting of trees in a land area which had lost its forest cover for some reason. But afforestation is growing forest in an area which originally had no tree cover. Reforestation is an effective strategy to fight global warming. In addition to benefiting the climate, reforestation helps in protecting important species of animals. Reforestation helps to rebuild habitat loss and degradation which are the leading threats to the health and endangerment of species.

Activity 3

Observe the important days related to conservation of nature. Also organise a ralley on protecting forest.

22.3.1 Importance of Reforestation

Both afforestation and reforestation are important for protecting the habitat, increasing the supply of forest products,

finding solution to climate changes and for many other reasons. Importance of reforestation is given below.

- Reforestation improves the quality of air we breathe by reducing carbon dioxide in it.
- The effects of deforestation can be checked and global warming can be reduced.
- Reforestation restores habitat loss, degradation and removes the threats to species.
- Forest restoration can reverse the damage done by soil erosion. Reforestation will revive the watersheds which are important aspects of environmental well-being.
- Reforestation maintains the water cycle of the area as trees absorb moisture through the leaves and roots.
- Transpiration of trees helps to restore the moisture of the atmosphere and to maintain the temperature in the local environment.

Table 22.1 Difference between Deforestation and Reforestation

Deforestation	Reforestation
When the plants or trees are cut down, it is called deforestation.	When the plants or trees are grown or planted, it is called reforestation.
Deforestation has a negative effect on the environment.	Reforestation has a very good effect on the nature, as it builds the environment.

Table 22.2 Differences between Afforestation and Reforestation

Afforestation	Reafforestation
Trees are planted in new areas where there was no forest cover.	It is practiced in areas where forests have been destroyed.
One sapling is planted to get one tree.	Two saplings are planted to replace every felled tree.
It is practiced to bring more area under forest.	It is practiced to avoid deforestation.

22.4 Endangered Species

Our country is a home for variety of species with rich flora and fauna. Flora is the plant life occurring in a particular area. Fauna is the animal life occurring in a particular area.The Royal Bengal Tigers, the Asiatic Cheetah and several other birds are found in India. But due to various reasons like environmental pollution, deforestation, loss of habitat, human interference, poaching and hunting many animals in India are extinct and many are endangered. Species which no longer exist on earth are called extinct species. E.g. Dinosaurs, Dodo. An endangered species is an animal or a plant that is considered to be at the risk of extinction. It means that there are only

Figure 22.6 Endangered Animals

Activity 4

Observe the following days in your school

World Forest Day	-	March 21
World Water Day	-	March 22
Environmental Day	-	June 5
World Nature Conservation Day	-	July 28
Ozone Day	-	September 16

few of them left on the earth and soon they might extinct. It is reported that nearly 132 species of plants and animals are critically endangered in India. Snow leopard, Bengal tiger, Asiatic lion, Purple frog and Indian giant squirrel are some of the endangered animals in India.

DO YOU KNOW?

Each year, 22nd May is celebrated as World Biodiversity Day. Biodiversity is a term used to describe the different plants, animals, marine life, microorganisms, insects, habitats, ecosystem etc. that make our planet so unique and so fascinating.

Many algae, fungi, bryophytes, ferns and gymnosperms are disappearing with the destruction of forests. And, each disappearing species may take away with it many species of animals and microbes which depend on them for food and shelter. Similarly, list of animals on the verge of being lost is endless. Prawns, oysters, lobsters, crabs, squid, octopus, cuttlefish, beetles, dragonfly, grasshoppers, fish and even frogs are dying by absorbing poisonous gases through their skin. Locust is one insect which has almost disappeared from India. Following animals are getting rare these days.

- Reptiles: Some lizards, turtles, crocodiles and gharials.
- Birds: Falcon, eagle, hawk, vulture, peacock-peahen, pigeon, duck.
- Mammals: Wild cats such as tigers, lions, deer such as chinkara and blackbuck, chiru (Tibetan goat), musk deer, rhino, elephants, blue whale, flying squirrel.

Table 22.3 Endangered plants and animals.

Endangered Plants	Endangered Animal
Umbrella tree	Snow Leopard
Malabar lily	Asiatic Lion
Rafflesia flower	Lion tailed macaque
Indian mallo	Indian Rhinoceros
Musli plant	Nilgiri Tahr

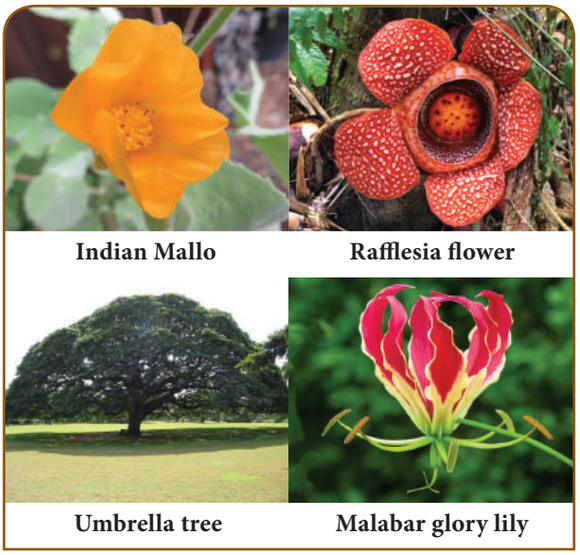


Figure 22.7 Endangered plants

Activity 5

Collect as many pictures of wild plants and wild animals as possible. Prepare a poster showing the endangered species separately.

22.4.1 Determination of Endangerment

Whether a particular species is endangered or not is determined by the following ways.

- When the geographical range of the species is limited.
- The population of the species is limited i.e., less than 50 adult individuals.
- When the population has decreased or will decrease by more than 80% in 10 years.
- If the population is less than 250 individuals and is continuously declining at 25% for the past three years.
- There is a high possibility of extinction in the wild.

DO YOU KNOW?

Yeoman Butterfly has been declared state butterfly of Tamil Nadu. This species is endemic to Western Ghats. It is among 32 butterfly species found in Western Ghats.

22.4.2 Causes for Endangerment

There are various reasons why a species may become endangered or extinct. Some of them are explained below.

a. Loss of habitat

Trees that provide food and shelter to so many species are destroyed due to human intervention.

b. Over hunting and poaching

Large number of animals are hunted for their horns, skin, teeth and many other valuable products.

c. Pollution

Number of animals are affected by pollutions like air pollution and water pollution. In the recent years more number of animals is affected by wastes in the form of plastic.

d. New habitat

Sometimes animals are taken by people to new habitat where they do not naturally live. Some of them may extinct and some may survive. The new ones may also get attacked by the species already living there and cause their extinction.

e. Chemicals

We use pesticides and other chemicals to get rid of damaging insects, pests or weeds. But they can also poison desired plants and animals if we do not use them correctly.

DO YOU KNOW?

At one time Dinosaur, ferns and some gymnosperms were wide spread on the earth. They disappeared from the earth, may be due to shortage of space and food or due to climatic change.

f. Diseases

Diseases due to various unknown reasons may affect the animals and make them extinct.

g. Natural calamities

Animals may also be destroyed due to natural disasters like flood and fire.

22.4.3 Saving Endangered Species

Nature is beautiful and it is filled with different plants and animals. For maintaining healthy ecological balance on the earth, animal and plant species are important. They have medicinal, scientific, ecological and commercial value. Each organism on the earth has a unique place in food chain that contributes to the ecosystem. But they are endangered mainly due to human activity. We need to take certain measures to protect them and preserve them.

- Some of the animal species are endangered mainly because of hunting and poaching. If it is controlled there can be a significant change in the number of endangered animals.
- Controlling pollution can have a positive impact on animals, fish and birds all over the world.
- When we consume more, more pollutants are put into the environment. By consuming less, we can protect the ecosystems.
- Animals often mistake plastic for food and hence plastics harm and cause endangerment of many species. Limiting the amount of plastic and recycling it can save the endangered animals.
- Recycling things and buying eco friendly products will preserve the environment resources and hence the animals.
- Pesticides and chemicals which cause damage to the environment should be avoided.
- Planting native trees will provide food to the animals.

DO YOU KNOW?

Planting the native trees like Neem tree, Umbrella tree and Banyan tree in our surrounding will be helpful for the animals. Many birds and animals find shelter in those trees.

22.4.4 Government Initiatives

In order to preserve the plants and animals, government has taken lot of initiatives and some acts have also been passed to protect them. For example, Project Tiger is a wildlife conservation project initiated in India in 1972 to protect the Bengal Tiger. It was launched on 1st April 1973 and has become one of the most successful wildlife conservation ventures. Corbett National Park was the first National Park in India to be covered under project Tiger. Due to 'Project Tiger' the population of Tiger has increased in India from 1400 in 2006 to 2967 in 2018. Apart from this, government has enacted the following Acts.

1. Madras Wildlife Act, 1873.
2. All India Elephant Preservation Act, 1879.
3. The Wild Bird and Animal Protection Act, 1912.
4. Bengal Rhinoceros Preservation Act, 1932.
5. All India Wildlife Protection Act, 1972.
6. Environmental Protection Act, 1986.

22.5 Red Data Book

The Red Data Book is the file for recording rare and endangered species of animals, plants and fungi. Even some local sub-species that exist within the territory of a state or country are recorded in red data books. Red data book gives important data for observational studies and monitoring programmes on habits and habitats of rare and endangered species. This book is created to identify and protect the species which are about to extinct.

Red Data Book is maintained by the International Union for Conservation of Nature. It is an international organization working in the field of nature conservation and sustainable use of natural resources. It was founded in 1964 with the aim of maintaining a complete record of every species that ever lived. The Red Data Book classifies species mainly into three categories namely, threatened, not threatened and unknown. This book also has information as to why a species has become extinct along with the population trends and its distribution.

The Red Data Book contains colour-coded information sheets like black for species which are extinct, red for species that are endangered and so on. They are arranged according to the extinction risk of many species and subspecies. The following figure gives the colour coded information.

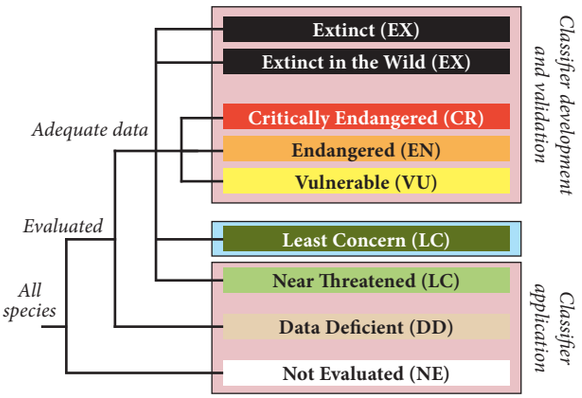


Figure 22.8 IUCN Red List Categories

DO YOU KNOW?

WWF – World Wildlife Fund
ZSI – Zoological Survey of India
BRP – Biosphere Reserve Programme
CPCB – Central Pollution Control Board
IUCN – International Union for Conservation of Nature

22.5.1 Advantages of the Red Data Book

- It helps to evaluate the population of a particular species.
- The data given in this book can be used to evaluate the species at the global level.
- The risk of a species becoming globally extinct can be estimated with the help of this book.
- It provides guidelines for implementing measures for protecting endangered species.

22.5.2 Disadvantages of the Red Data Book

- The information available in the Red Data Book is incomplete. Many extinct species are not updated in this book.
- The source of the book's data has been speculated.

- This book maintains the complete record of all animals, plants, other species but it has no information about the microbes.

World Wildlife Day is observed on March 3rd every year.

22.5.3 Red Data Book of India

India, a mega-diverse country with only 2.4% of the world's land area, accounts for 7-8% of all recorded species, including over 45,000 species of plants and 91,000 species of animals. The country's diverse physical features and climatic conditions have resulted in a variety of ecosystems such as forests, wetlands, grasslands, deserts, coastal and marine ecosystems which harbour and sustain high biodiversity and contribute to human well being. Four out of 34 globally identified biodiversity hotspots, the Himalayas, the Western Ghats, the North-East, and the Nicobar Islands, can be found in India.

India became a state member of IUCN in 1969, through the Ministry of environment, Forest and Climate Change (MoEFCC). The IUCN India country office was established in 2007 in New Delhi. Red Data Book of India contains the conservation status of animals and plants which are found in the Indian subcontinent. Surveys conducted by the Zoological Survey of India and the Botanical Survey of India under the guidance of the Ministry of Environment, Forest and Climate Change provide the data for this book.

22.6 Conservation

According to WWF (World Wildlife Fund) there has been 60% decrease in the size of population of animals, birds, fish, reptiles and amphibians over the past 40 years. In order to leave something for the future generation, we need to conserve it now. Conservation is the protection, preservation, management of wildlife and natural resource such as forest and water. Conservation of biodiversity helps us to protect, maintain and recover endangered animals and plant species. Conservation is of two types. They are:

- In-situ conservation (within habitat)
- Ex-situ conservation (outside the habitat)

22.6.1 In-situ conservation

It is nothing but conservation of living resources within the natural ecosystem in which they occur. This is achieved by protection of natural habitat and maintenance of endangered species in certain protected areas such as national parks, wildlife or bird sanctuaries and biosphere reserves. In India, there are about 73 national parks, 416 sanctuaries and 12 biosphere reserves.

a. National Parks

National park is an area which is strictly reserved for the betterment of the wildlife. Here, activities like forestry, grazing or cultivation are not permitted. Even private ownership rights are not allowed in these areas. The national parks cover an area of 100 – 500 square kilometers. In these parks a single plant or animal species are preserved.

Table 22.4 National Parks in India

Name	State	Established year
Jim Corbett National Park	Uttarakhand	1936
Dudhwa National Park	Uttar Pradesh	1977
Gir National Park	Gujarat	1975
Kanha National Park	Madhyapradesh	1955
Sundarbans National Park	West Bengal	1984

Figure 22.9 Tiger in Corbett National Park

Table 22.5 National Parks in Tamil Nadu

Name	District	Established year
Guindy National Park	Chennai	1976
Gulf of Mannar National Park	Ramanathapuram	1980
Indira Gandhi National Park	Coimbatore	1989
Mudumalai National Park	The Nilgiris	1990
Mukurthi National Park	The Nilgiris	1990

b. Wildlife sanctuaries

Sanctuary is a protected area which is reserved for the conservation of animals only. Human activities like harvesting of timber, collection of forest products and private ownership rights are allowed here. Controlled interference like tourist activity is also allowed. The differences between national parks and wildlife sanctuaries are given in Table 22.6

Table 22.6 Wildlife Sanctuaries in Tamil Nadu

Name	District	Established year
Meghamalai Wildlife Sanctuary	Theni	2016
Vandaloor Wildlife Sanctuary	Chennai	1991
Kalakad Wildlife Sanctuary	Thirunelveli	1976
Grizzled Squirrel Wildlife Sanctuary	Virudhunagar	1988
Vedanthangal Wildlife Sanctuary	Kanchipuram	1936

Figure 22.10 Vedanthangal wildlife sanctuary

Table 22.7 Difference between National Parks and Wildlife Sanctuaries

Wildlife Sanctuary	National Parks
Human activities are allowed.	No human activities are allowed.
Main aim is to protect a particular flora or fauna.	Flora, fauna or any other objects of historical significance are protected.
There are no fixed boundaries.	Boundaries are fixed and defined.
It is open to the general public	Not usually open to the public.
Sanctuaries are usually formed by the order of central or the state government	National Parks are formed by the state or central legislature.
A sanctuary can be upgraded to a national park	A national park cannot be downgraded to a sanctuary.

c. Biosphere reserves

Biosphere is a protected area where human population also forms the part of the system. The area of these places will be around 5000 square kilometers. They conserve the eco system, species and genetic resources. These areas are set up mainly for economic development.

Table 22.8 Biosphere Reserves in India

Name of Biosphere	State / Union Territory
Nanda Devi	U.P
Nokrek	Meghalaya
Manas	Assam
Sunderbans	West Bengal
Gulf of Mannar	Tamil Nadu
Nilgiri	Tamil Nadu
Great Nicobars and Similipal	Andaman and Nicobar / Orissa

Activity 6

Find out the national parks and wildlife santuaries in Tamil Nadu. Visit those places and collect more information about them.

Advantages of In-situ conservation

- Species can be adapted to their habitat.
- Species can interact with each other.
- Natural habitat is maintained.
- It is less expensive and easy to manage.
- Needs of indigenous people are protected.

22.6.2 Ex-situ Conservation

It is the conservation of wildlife outside their habitat. Establishing zoos and botanical gardens, conservation of genes, seedling and tissue culture are some of the strategies followed in this method.

a. Botanical gardens

It is a place where flowers, fruits and vegetables are grown. These places provide a healthy and calm environment.

b. Zoological parks

Zoological parks are the areas where wild animals are conserved. In India there are about 800 zoological parks.

The oldest zoo is Schoenbrunn Zoo in Vienna, established in the year 1759. In India the first Zoo was established in Barrachpur in the year 1800.

c. Tissue Culture

It is a technique of growing plant cells, tissues, organs, seeds or other plant parts in a sterile environment on a nutrient medium.

d. Seed bank

The seed bank preserves dried seeds by storing them in a very low temperature. The largest seed bank in the world is the Millennium Seed Bank in England.

e. Cryo Bank

It is a technique by which a seed or embryo is preserved at a very low temperature. It is usually preserved in liquid nitrogen at –196ºC. This is helpful for the conservation of species facing extinction.

Advantages of Ex-situ conservation

- It prevents the decline of species.
- Endangered animals can be breeded in these ways.
- Threatened species are breeded and released in natural environment.
- It is useful for conducting research and scientific work.

22.7 PBR (People's Bio-diversity Register)

People's Bio-diversity Register is a document which contains comprehensive information on locally available bio-resources including landscape and demography of a particular area or village. Bio-resources mean plants, animals and microorganisms or parts thereof, their genetic material and by-products with actual or potential use or value. A Bio-diversity Management Committee is set up in each local body according to the provisions of Biological Diversity Act, 2002. This committee prepares the People's Biodiversity Registers with the guidance and technical support of National Biodiversity Authority and the State Biodiversity Boards.

Preparation of this register promotes conservation, preservation of habitats and breed of animals and gathering of knowledge relating to biological diversity. The register entails a complete documentation of biodiversity in the area related to the plant, food source, wildlife, medicinal source, traditional knowledge etc.

22.8 Biomagnification

Biomagnification is the increase in contaminated substances due to the intoxicating environment. The contaminants might be heavy metals such as mercury, arsenic, and pesticides such as polychlorinated biphenyls and DDT (Dichloro Diphenyl Trichloro ethane). These substances are taken up by the organisms through the food they

consume. When the organisms in the higher food chain feed on the organisms in the lower food chain containing these toxins, these toxins get accumulated in the higher organisms.

22.8.1 Causes of Bio-magnification

Following are the major causes of bio-magnification:

a) The agricultural pesticides, insecticides, fertilizers and fungicides are very toxic and are released into the soil, rivers, lakes, and seas. These cause health issues in aquatic organisms and humans.

b) Organic contaminants cause adverse impact on the health of humans, animals, and wildlife.

c) Industrial activities release toxic substances which enter into the organism through food chain leading to bio-magnification.

d) Mining activities generate a large amount of sulphide and selenium deposits in water. These toxic substances are absorbed by the aquatic organisms in the food chain.

22.8.2 Effects of Bio-magnification

Following are the effects of bio-magnification on living organisms and the environment:

a) It has more impact on humans causing cancer, kidney problems, liver failure, birth defects, respiratory disorders, and heart diseases.

b) It also affects the reproduction and development of marine organisms.

c) The destruction of coral reefs affects the lives of many aquatic animals.

d) The chemicals and toxins which are released into the water bodies disrupt the food chain.

More to know

Dr. K. Sakhila Banu, a scientist from Texas A&M University, USA has found out that the water contaminated by chromium metal induces infertility in female species and also causes oxidative stress in the human placenta which could affect the growth of the baby. She is from Pudupattinam village in Ramnad district, Tamil Nadu.

22.9 Animal Welfare Organisations

Animal welfare organizations are the group of people concerned with the health, safety and psychological wellness of animals. They include animal rescue groups which help animals in distress, and others which help animals suffering from some epidemic. In this section we will study about some of them.

22.9.1 Blue Cross

Blue Cross is a registered animal welfare charity in the United Kingdom, founded in 1897 as 'Our Dumb Friends League'. The vision of this charity is that every pet will enjoy a healthy life in a happy home. The charity provides support for pet owners who cannot afford private veterinary treatment, helps to find homes for unwanted animals, and educates the public in the responsibilities of animal ownership.

Blue cross was founded to care for working horses on the streets of London, UK. It opened its first animal hospital, in Victoria, London, on 15 May 1906.

Captain V. Sundaram founded the Blue Cross of India, the largest animal welfare organization of Asia in Chennai in the year 1959. He was an Indian pilot and animal welfare activist. Now, Blue Cross of India is country's largest animal welfare organizations and it runs several animal welfare events like pet adaptation and animal right awareness. Blue Cross of India has received several international and national awards. This organization is entirely looked after by volunteers. The main office is located at Guindy, Chennai, with all amenities like hospitals, shelters, ambulance services and animal birth controls, etc. Activities of the organization include, providing shelters, re-homing, adoption, animal birth control, maintaining hospitals and mobile dispensary and providing ambulance services.

22.9.2 CPCSEA

CPCSEA stands for 'The Committee for the Purpose of Control and Supervision of Experiments on Animals'. It is a statutory committee set up under the Prevention of Cruelty to Animals Act, 1960. It has been functioning since 1991 to ensure that animals are not subjected to unnecessary suffering during experiments on them.

Objectives of CPCSEA

i) To avoid unnecessary pain before and after experiment.

ii) To promote the human care of animal used in experiments.

iii) To provide guidelines for animal housing, breeding and maintenances.

iv) To promote the human care of animal used in biomedical and behavioural research and testing.

Functions of CPCSEA

i) Approval of animal house facilities.

ii) Permission for conducting experiments involving usage of animals

iii) Action against establishments in case of established violation

iv) Registration of establishments conducting animal experimentation or breeding of animals for this purpose.

Points to Remember

- Human activities which are responsible for deforestation include agricultural expansion, cattle breeding, illegal logging, mining, oil extraction, dam construction and infrastructure development.
- Afforestation helps the wild animals and even humans to have shelter and to find their food source.
- Reforestation will revive the watersheds which are important aspects of environmental well-being.
- Snow leopard, Bengal tiger, Asiatic Lion, Purple frog and Indian giant squirrel are some of the endangered animals in India.
- For maintaining healthy ecological balance on this earth, animal and plant species are important.
- Red Data Book gives important data for observational studies and monitoring programmes on habits and habitats of rare and endangered species.
- Conservation of biodiversity helps us to protect, maintain and recover endangered animals and plant species.
- When the organisms in the higher food chain feed on the organisms in the lower food chain containing these toxins, these toxins get accumulated in the higher organisms.

A-Z GLOSSARY

Biodiversity	Variety of life forms.
Bio magnification	Increasing concentration of substances such as toxic chemical in the tissues of organism at successively higher level in a food chain.
Deforestation	Removal of forest.
Extinct species	Species which have disappeared completely from the earth.
Endangered species	A species of plant or animal that is in immediate danger of biological extinction.
Endemic species	Plants and animals species that are found only in a particular area.
Flora	Plant life occurring in a particular region.
Fauna	Animal life occurring in a particular region.
National Park	Protected area of land in which a typical ecosystem with all its wild plants and animals are protected and preserved in natural surroundings.

Reforestation	Replanting of trees.
Red Data Book	Recording about endangered species.
Wildlife Sanctuary	Protected area of land, wetland or sea reserved for the conservation of wild animals, birds and plants.

TEXTBOOK EXERCISES

A8G9J2

I. Choose the best answer.

1. The plants found in a particular area are known as _____
   a) fauna b) flora
   c) endemic d) rare
2. Deforestation means _____
   a) cleaning of forest b) to grow plants
   c) to look after plants d) None of these.
3. The Red Data Book gives a list of _____
   a) endemic species b) extinct species
   c) natural species d) None of these
4. Insitu conservation is_____
   a) off site conservation
   b) on site conservation
   c) Both a and b d) None of these
5. Wildlife Protection Act was implemented in _____
   a) 1986 b) 1972 c) 1973 d) 1971

II. Fill in the blanks.

1. WWF stands for _____.
2. The animal found in a particular area is known as _____.
3. Red Data Book is maintained by _____.
4. Mudhumalai Wildlife Sanctuary is located in _____ district.
5. _____ is observed as 'World Wildlife Day'

III. Match the following.

Gir National Park	Madhya Pradesh
Sundarabans National Park	Uttara khand
Indira Gandhi National Park	West Bengal
Corbett National Park	Gujarat
Kanha National Park	Tamil Nadu

IV. Answer very briefly.

1. What is global warming?
2. What is known as extint species?
3. Give few example for extinct species.
4. Name two endangered animals.
5. What is IUCN?

V. Answer briefly.

1. What is biosphere reserve?
2. What is tissue culture?
3. What is endangered species? Give two examples.
4. Write the advantages of the Red Data Book.
5. Mention four main reasons for the conservation of forests.
6. What do you understand by the term bio magnification?
7. What is PBR?

VI. Answer in detail.

1. What is deforestation? Explain the causes and effects of deforestation.

2. Discuss the advantages of in-situ and ex-situ conservation.
3. Write about the types of conservation.
4. Write a note on Blue Cross.

VII. Higher Order Thinking Questions.

1. Is it possible to find dinosaurs today? Why?
2. Animals are affected by deforestation. How?
3. Why did the numbers of tiger and black buck decrease?

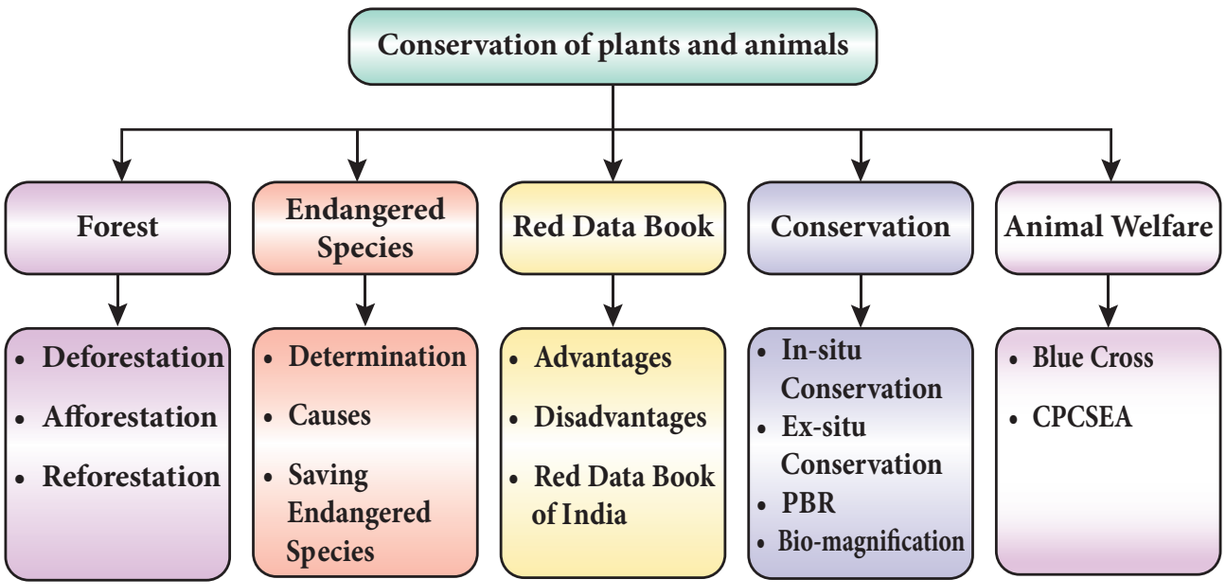
REFERENCE BOOKS

1. Environmental biology- Verma P S – S Chand & co publisher
2. Indian wildlife –The great wildlife series- APApublication
3. Endangered Animals of India – S M Nair – National book trust India

INTERNET RESOURCES

www.Bluecrossofindia.org
www.cpcsea.nic.in
www.pbr.com

Concept Map



ICT CORNER

Conservation of Plants and Animals

Watch the wild animals lively from your screen

Step 1 Open the browser and type the URL or scan the QR code given below. click on the LIVE ANIMAL YARD which is on the left of the page displayed.

Step 2 The page will open with icons showing animals click on the animal you wish.

Step 3 Click on the play button diplayed on the screen.

Step 4 Repete the action again by selecting the other animals or birds.

Web URL: https://www.aazp.in/

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