213en11

11

BIO-DIVERSITY

You must have seen variety of grass, plants, bushes, trees, insects, birds, animals or beautiful landscape around you. We rely on this diversity of plants and animals to provide us food, fuel, medicine and other essentials without which we cannot live. These species are the product of more than four billion years of evolution. This rich bio diversity is being lost at an alarming rate largely because of human activities. However, there are many things that each one of us can contribute in preserving these species, plants, animals and other living organisms. There are lots of things which you can help in saving these precious diversities. It is very important for us to know about diversity of plants, animals and micro-organisms. In this lesson, we will learn about some of these plants, animals, their importance and distribution in India and need for their conservation.

OBJECTIVES

After studying this lesson you will be able to:

- explain the concept of bio-diversity;
- explain the status of bio-diversity in India;
- establish the significance of biodiversity;
- describe natural vegetation and wildlife in India;
- locate forests, wildlife sanctuaries, national parks, biosphere reserves and wetlands in an outline map of India; and
- recognise our role in conserving natural vegetation and wildlife in our region.

11.1 BIO-DIVERSITY

Biodiversity is a short form of biological diversity. In simple terms biodiversity is the total number of **genes**, **species** and **ecosystems** of a region. It includes (i) genetic

diversity, (ii) species diversity and (iii) ecosystem diversity. Plants and animals constitute only a small component of biodiversity. Do you know that the invisible micro-organisms constitute a large component of bio-diversity.

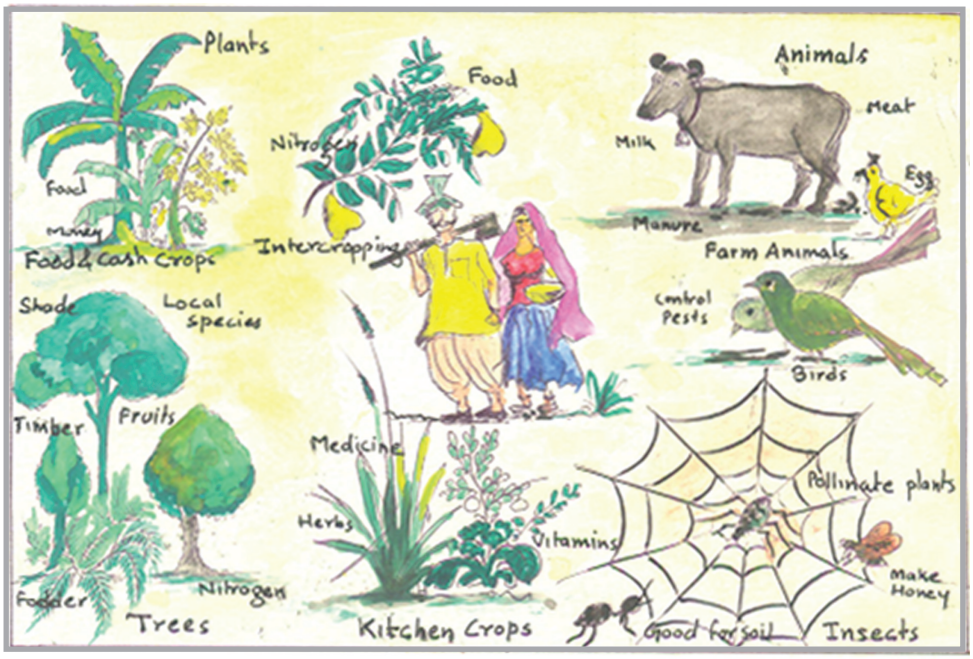


Figure 11.1 *Biodiversity*

Genes: The basic biological unit of heredity. Genes of an individual belonging to the same species are similar and genes control the characteristics of particular species.

Species: A group of very similar having some common characteristics or qualities and capable of interbreeding.

Ecosystem – Any segment of the landscape that includes biotic (living) and abiotic (non-living) components is known as ecosystem.

11.1.1 Status of biodiversity in India

Biodiversity increases as we move from the poles towards the equator. India is located between 8°4′ North and 37°6′ North latitudes and 68°7′ East and 97°25′ East longitude. Due to this position India has such rich biodiversity. Although India

has only 2.42% of the world's land area but its contribution to the world's biodiversity is approximately 8% of the total number of species which is estimated to be 1.75 million (As per Global Biodiversity Assessment of UNEP of 1995). 6% of the world species are found in India. 45000 plants species comprising about 12 % of world's flora are found in Indian forests. Two of the twelve biodiversity **hotspots** in the world are in India. They are the North-Eastern region and the Western Ghats.

- A biodiversity **hotspot** is a region with a high level of endemic species. Endemic species are those species that are found in a certain limited area.
- **Mega biodiversity**: A unique combinations of different plants and animal species which is not available anywhere else.

11.2 SIGNIFICANCE OF BIODIVERSITY

Biodiversity is fundamental to the existence of life on the earth. Its significance cannot be underestimated. There are varieties of living things that exist in a given physical environment. These are interdependent and interrelated in the form of an **ecosystem**. Do you know that plants occur in distinct groups of communities in areas having similar climatic conditions? The nature of vegetation in any area determines the animal life. When the vegetation of a place is altered, animal life also changes and simultaneously it affects mankind. Loss of any component in the system adversely affects other components of the system. We are an integral part of the ecosystem. By cutting trees and killing animals, human beings lead to ecological imbalance. How does the ecosystem get influenced by human beings? Collect some articles from the newspaper and magazines which will help you in understanding human impact on ecosystem. We must understand that all plants and animals in an area are interdependent and interrelated in their physical environment? Ecosystem is extremely valuable in different facets of human life which includes the following:

- Providing food, water, fiber, fuel etc.
- Regulating of climate and disease (For example: people are suffering from cold and cough in winters and stomach infections in monsoon etc.

11.2.1 Causes of Loss of Biodiversity

Increasing population and changing lifestyle leads to extenssive commercial exploitation of the natural resources. This results in loss of biodiversity. Consequently it is adversely affecting the ability of the nature to continue delivering the goods and services for human existence. The loss of biodiversity affects not only the physical environment but also the social, cultural, religious and spiritual well being of human life.

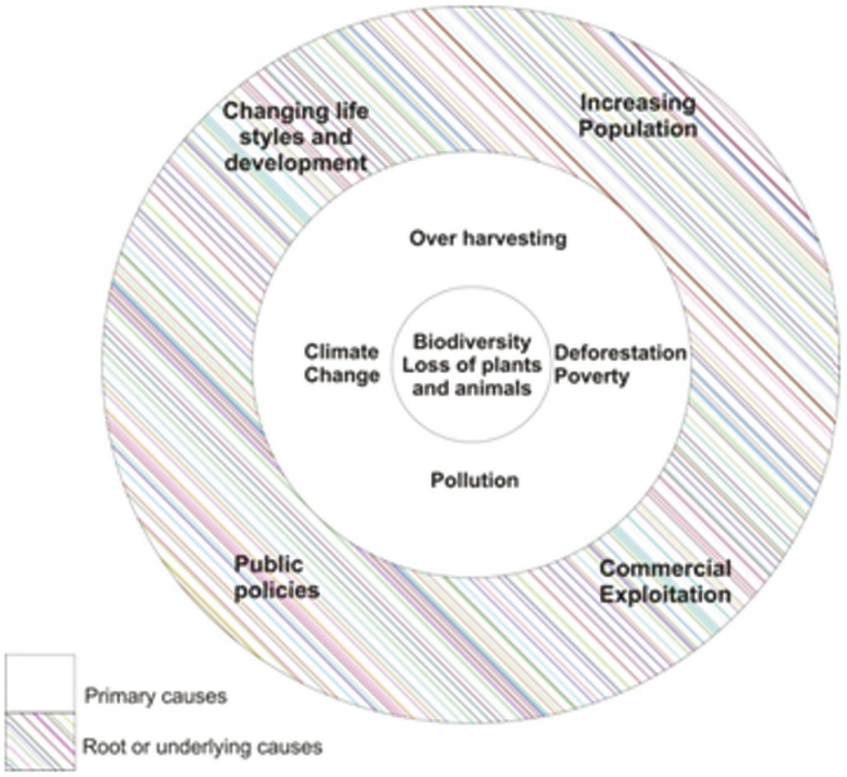


Figure 11.2 *Causes of Loss of Biodiversity*

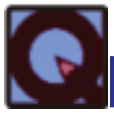
Do you know

- United Nations had proclaimed the year 2010, the International Year of Biodiversity.
- According to IUCN (International Union for Conservation of Nature), by 2010 around 18,788 species out of 52,017 so far assessed are threatened with extinction. Of the world's 5,490 mammals, 78 are extinct, 188 critically endangered, 540 endangered and 492 vulnerable. Amphibians are also in danger of extinction, 1,895 of the planet's 6,285, are the most threatened group of species.
- Extinction of individual species, destruction of natural habitats, land-use conversions, climate change, pollution and degradation is continuing at an alarming rate. Do you think this has anything to do with the extinction of various species.

ACTIVITY 11.1

Can you mention the names of three species of plants and animals/birds found in your locality and their importance for the residents of your locality? One example has been done for you.

Sr. No.	Plants	Importance	Sr. No.	Animals/Birds	Importance
1.	Neem	Give us medicine, wood ,oxygen and shade	1.	**Vulture**	Keeps environment free of carcasses and waste, restrict spread of diseases, help control a number of pest like rats
2.			2.		
3.			3.		
4.			4.		



INTEXT QUESTIONS 11.1

1. "Bio-diversity is fundamental to the existence of life on the earth" Justify the statement by giving any two reasons.
2. Explain **hotspots** in 30 words.

11.3 NATURAL VEGETATION AND WILDLIFE

In our ecosystem, vegetation and wildlife are valuable resources. We all know that plants provide us with timber, give shelter to man and animals, produce the oxygen we breathe, prevent soil erosion and natural calamities such as floods, high speed winds and help in storage of underground water, give us fruits, nuts, latex, turpentine oil, gum, medicinal plants and also the paper that is so essential for our studies. These are some of the innumerable uses of plants. Wildlife includes animals, birds, insects, reptiles as well as the aquatic life forms. They provide us milk, meat, hides and wool. Insects like bees provide us honey, help in pollination of flowers and have an important role to play as decomposers in the ecosystem. The birds feed on insects and act as a decomposers as well. Vulture due to its ability to feed on dead livestock is a scavenger and considered a vital cleanser of the environment. So life forms, big or small, all are integral in maintaining a balance in the ecosystem.

11.3.1 Natural Vegetation in India

As in any other part of the world, natural vegetation of India is also determined by climate, physiographic and soil factors. If we look at the figure 11.3, we find that based on factors of temperature, rainfall and topographic conditions, India has diverse vegetation patterns as summarized below. Dense natural vegetation found in North-Eastern region, Western Ghats and Andaman Nicobar. The Northern plain and North-Western Region supports very scanty vegetation and is under cultivation. The

Deccan region is full of scrubs and mixed deciduous forests. Natural vegetation of India can broadly be divided into the following groups:

(i) Tropical Evergreen Forests

(ii) Tropical Deciduous Forests

(iii) Thorn Forests

(iv) Tidal Forests

(v) Himalayan Forests

(i) Tropical Evergreen Forests

Trees in these forests remain green all the year round as the **climate of the region is warm** and wet throughout the year. The leaves of these trees do not fall in any particular season. Hence, they are evergreen. These forests are found in the areas having more than **200 cm of rainfall** with a short dry season. The trees reach a **height up to 60 meters or even more**. It has a dense and mixed vegetation of all kinds including trees, shrubs, climbers, creepers, epiphytes and ferns giving it a multilayered structure. Hence, their economic exploitation is not viable. The number of species of trees is very large in a small area. **Rosewood, ebony, mahogany, rubber, jack wood and bamboo are the important species** of trees found in Tropical Evergreen Forests. In India, this type of vegetation is found in the areas of heavy rainfall in **Western Ghats, upper parts of Assam and islands of Lakshadweep, Andaman and Nicobar**. Hardwood from these forests is used for furniture, handicraft etc. They prevent landslides and soil erosion.

ii) Tropical Deciduous Forests

Trees in these forests shed their leaves once in a year. That is why they are called tropical deciduous forests. These are most widespread forests of India. These forests are found in the areas receiving annual rainfall between 75 to 200 cms. As far as the physical distribution of this type of forests is concerned they are found in the entire country excluding some parts of Deccan Plateau, North-Eastern Region, Western Ghats and Eastern coast. These forests have been subject to extensive clearance by man for the purpose of cultivation. Still some patches of natural vegetation are found along the foothills of Himalayas, hilly regions of peninsular and central part of the country. On the basis of the availability of rainfall these forests are further divided into **moist deciduous** and **dry deciduous**.

(a) The moist deciduous forests are found in the areas of **rainfall between 100 to 200 cm**. These are distributed mainly in the eastern parts of the country,

Northeastern states along the **foothills of Himalayas, Jharkhand, Odisha and Chhattisgarh, and eastern slopes of Western Ghats**. **Teak, Bamboo, Sal, Shisham, Sandalwood, Khair, Kusum, Arjun, Mahua, Jamun and Mulberry are the important species** of trees found in these forests.

(b) **The dry deciduous forests** are spread in the areas receiving annual **rainfall between 75 to 100 cms** annually. These forests are found in the interior parts of the **Peninsular plateau and the plains of Uttar Pradesh, Madhya Pradesh and Bihar**. Tree **species of these forest are Teak, Sal, Peepal, and Neem**.

(iii) Thorn Forests

The areas with **less than 75 cm of annual rainfall** are characterized by the natural vegetation of thorny trees and bushes. **Climate of this part is mainly dry** with occasional wet period, so it does not support dense vegetation. They are mainly found in **North-Western India, interior parts of the Peninsular India including semi**

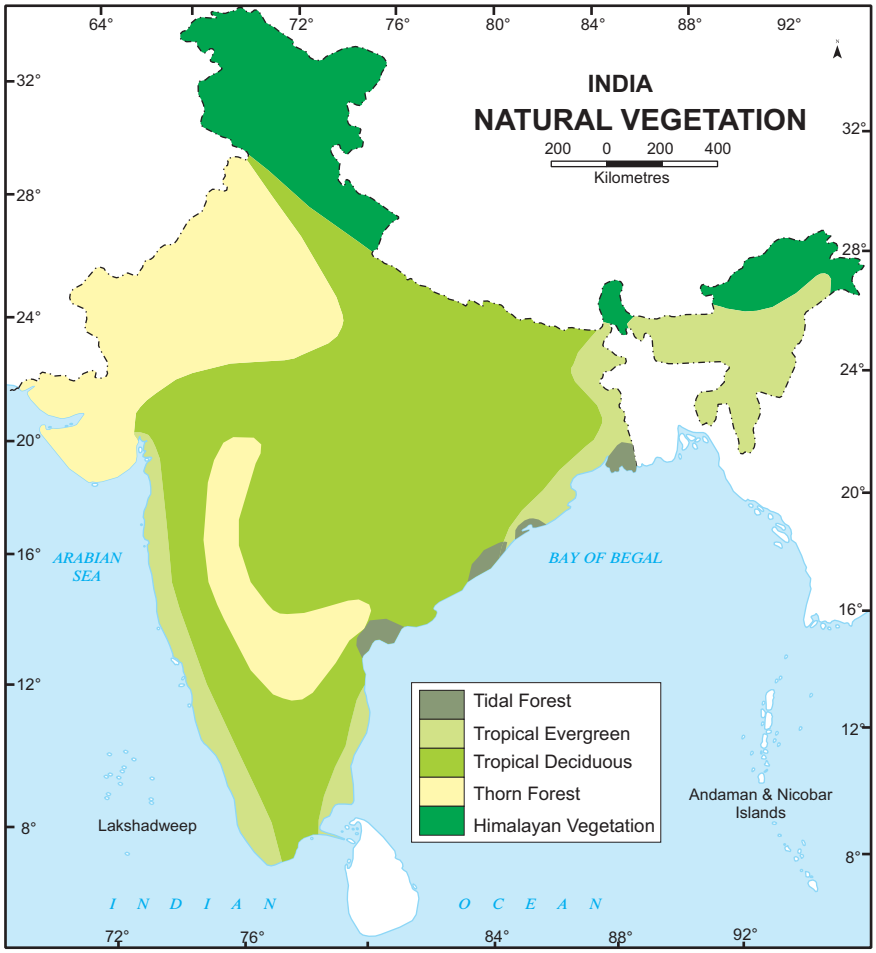


Figure 11.3 *Natural Vegetation of India*

arid areas of Gujarat, Rajasthan, Madhya Pradesh, Chhattisgarh, Uttar Pradesh, Haryana, Karnataka, Andhra Pradesh and Maharashtra. Vegetation of these forests is widely distributed in the form of small trees and bushes with deep roots. The stems are succulent to conserve water. Leaves are mostly thick and small to minimize evaporation. **Acacia, euphorbias, babul, cacti, khair, date and palms** are common variety of trees in this type of vegetation.

(iv) Tidal Forests

As suggested by the name, these forests are found in tidal creeks and swamps influenced by the tides and wetland topography. These areas are characterized by mud, silt and water accumulated on the surface. Roots and branches of the trees are submerged under water for specific period of time. They are also called mangrove forests. Mangroves are practically evergreen with thick leathery leaves. Such types of forests are found in the deltas of Sundarbans, Mahanadi, the Godavari, Krishna, Kaveri rivers and in the Andaman and Nicobar Islands. Mangrove or Sundari is the common tree in sunderbans while palm, coconut, keora, and agar are other important species of tidal forest. It is interesting to know that this type of forests have remained away from the large scale commercial exploitation. These forests are located along the coasts. They provide protection against cyclones.

(v) Himalayan Forest

As is evident by the name that these forests are mainly found in the mountainous region of the Himalayas. The decreasing in temperature and increasing in altitude lead to varied types of vegetation depending upon the factors like slope of the mountain and sunrays receiving side. The ecosystem is highly fragile. Himalayan forests have been exploited in many ways in recent decades. Areas with relatively low altitude up to 1000 meters, warm climate and good amount of rainfall are characterized by dense vegetation cover. These areas look like tropical forest. Sal and Bamboo are main species in these areas. **Between the elevation of 1000 to 2000 meters evergreen broad leave Oak and Chestnut are the common species** found in these forests. In eastern Himalayas the same elevation is occupied by sub tropical Pine forests. Chir is common species found in this part. Moist temperate forest in Himalayas are found **between the elevation 1500 to 3500 meters which receives annual rainfall in the range of 100 to 250 cm. Oak, laurel, chestnut, cedar, Silver, Fir, spruce rhododendron and deodar are the main species** found in this part of Himalayas. They have been widely exploited for their timber. **Alpine forest found in Himalayas at the height of between 3000 to 3800 mts with large and extensive highland grassland and sparsely distributed pine, birch, sliver, fir and rhododendron trees.**

INTEXT QUESTIONS 11.2

1. Why are the tropical rain forests called evergreen forests? Explain in 30 words.
2. Give reasons
   (i) Tidal Forest areas along the eastern coast experienced severe destruction during cyclones in recent years because

   .....

   .....

   (ii) Himalayan Forests have been economically more exploited in comparison to Tropical Evergreen Forests because

   .....

   .....

11.3.2 Wildlife in India

You have studied earlier in the lesson that due to its unique geographical position, India is rich in wildlife. Wildlife of India is a great natural heritage. It is estimated that about 80 percent of all known plant and animal species on the earth are found in India. Many plants synthesize substances that are useful to the maintenance of health in humans and other animals. In recent decades, human encroachment has posed a threat to India's wildlife. In response to this, the system of National parks, Wildlife sanctuaries and protected areas, first established in 1935, has substantially expanded through **wildlife protection Act 1972.** Efforts are being made to protect and preserve biological diversity of our country under various programs. India has preserved vast tracts of natural habitats, birds and plants in its **551 Wildlife Sanctuaries, 96 National Parks, 25 Wetlands and 15 Biosphere Reserves** spread almost in all the states of India. Besides this, there are **33 Botanical Gardens, 275 Zoological Parks,** Deer Parks, Safari Parks , Aquaria etc. to make people aware conservation of threatened and endangered wildlife species in their respective areas. In India, for the purpose of effective conservation of natural habitat of wildlife, special schemes like **Project Tiger 1973** and **Project Elephant 1992** have been launched. These are very important as many species are at the brink of extinction. However, none of these efforts will be truly successfull unless all Indian recognize their role in conserving bio-diversity.

(i) Wildlife Sanctuaries: The main objective of the wildlife sanctuaries is to ensure maintenance of viable population of wildlife and their desired habitat. The wildlife sanctuaries in India are home to around 2000 different species of birds, 3500

species of mammals, nearly 30000 different kinds of insects and more than 15000 varieties of plants. These sanctuaries and forest reserves are home to several endangered species of animals and birds like the Asiatic Elephant, the Royal Bengal tiger, the Snow Leopard and the Siberian Crane. Many of the forest reserves and wildlife sanctuaries of India are famous for particular species of animals. For instance, the Kaziranga in Assam is known for the Indian Rhinoceros, Periyar in Kerala is famous for its elephants. India is also home to several migratory animals and birds like Olive Ridley Sea Turtles, Siberians Cranes and Flamingos.

(ii) National Parks: The purpose of establishing national parks is "to conserve the natural and historic objects and the wild life and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." By 1970, India only had five national parks. In 1972, India enacted the Wildlife Protection Act to safeguard the habitats of conservation reliant species. The two main objectives of the Act are; to provide protection to the endangered species listed in the Act and to provide support to the conservation area of the country classified as national park.

Table 11.1 Rare Species of Animals Found in National Parks

National Parks (wild life sanctuaries)	Rare species of wild animals protected
1. Dachigram (J&K)	Hangul , Musk deer
2. Corbett (Uttrakhand)	Tiger, Elephant, Panther , Deer
3. Dudhwa (U.P.)	Elephants and Tiger
4. Kanha (M.P.)	Tiger, Barasingha
5. Badipur (Karnataka)	Tiger and Barasingha
6. Periyar (Kerala)	Elephants
7. Bharatpur (Rajasthan)	Different types of water birds
8. Deset Park (Rajasthan)	Desert wolf, Fox
9. Gir (Gujarat)	Lion, Panther, Chital
10. Kaziranga (Assam)	Rhino, Wild Buffalo
11. Manas (Assam)	Elephant, Rhino, Wild Buffalo
12. Nam Dafa (Arunachal Pradesh)	Tiger, Gaur, Wild buffalo
13. Sundarbans (West Bengal)	Royal Bengal Tiger

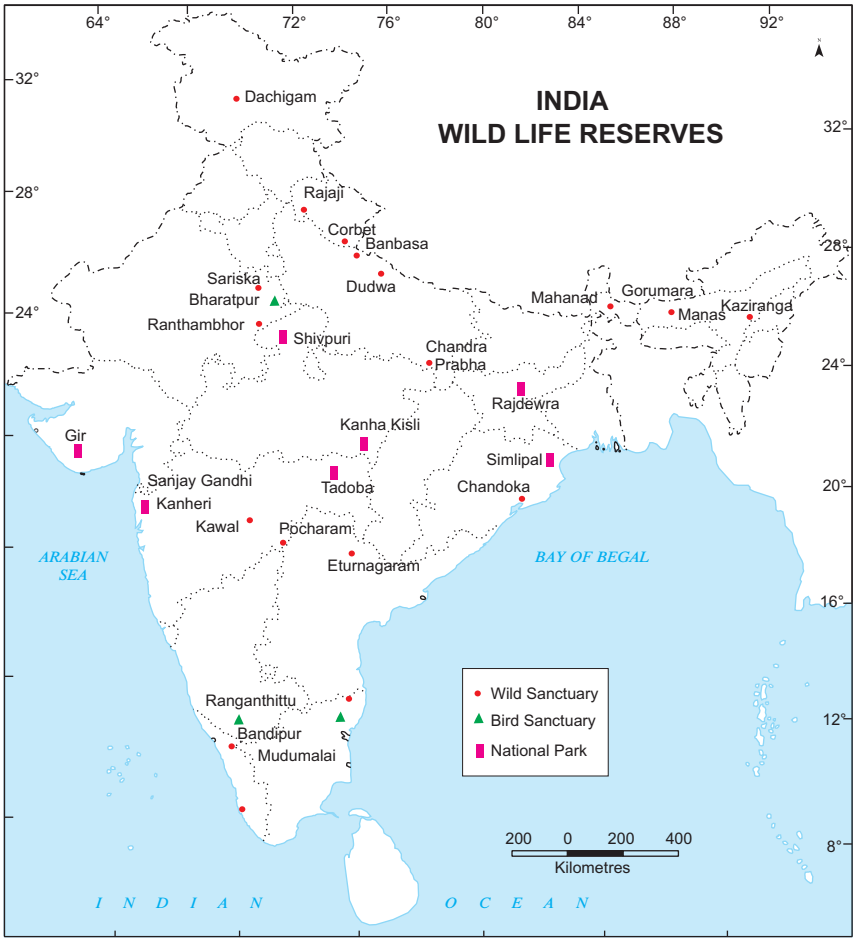


Figure 11.4 *National Park, Wildlife Sanctuaries and Bird Sanctuaries in India*

(iii) Wetlands: A **wetland** is an area of land where soil is saturated with moisture either permanently or seasonally. Such areas may also be covered partially or completely by shallow pools of water. Wetlands include swamps, marshes, and bogs, among others. The water found in wetlands can be saltwater, freshwater, and brackish. Most importantly wetlands also serve as natural wastewater purification systems. Wetlands are considered as biologically the most diverse of all ecosystems. Plant life found in wetlands includes mangrove, water lilies, cattails, sedges, tamarack, black spruce, cypress, gum, and many others. Animal life includes many different amphibians, reptiles, birds, insects, and mammals. Wetlands perform two important functions in relation to climate change. They have mitigation effects through their ability to sink carbon, and adaptation effects through their ability to store and regulate water. The Convention on Wetlands of International Importance (Ramsar Convention), is an international treaty designed to address global concerns regarding wetland loss and degradation. The primary purpose of the treaty is to list wetlands of international importance and to promote their wise use with the ultimate goal of preserving the world's

wetlands. Methods include restricting access to the majority portion of wetland areas, as well as educating the public to combat the misconception that wetlands are wastelands.

Do you know

About 25 wetlands or Ramsar sites have been identified of significance in India.

Table 11.2 Wetlands in India

No.	Name	State	Area(km²)
1.	Ashtamudi	Kerala	614
2.	Bhitarkanika Mangroves	Odisha	650
3.	Chilika Lake	Odisha	1165
4.	East Calcutta Wetlands	West Bengal	125
5.	Kolleru Lake	Andhra Pradesh	901
6.	Loktak Lake	Manipur	266
7.	Point Calimere	Tamil Nadu	385
8.	Pong Dam Lake	Himachal Pradesh	157
9.	Sambhar lake	Rajasthan	240
10.	Tsomoriri	Jammu and Kashmir	120
11.	Upper Ganga canal	Uttar Pradesh	266
12.	Vembanad-Kol Wetland	Kerala	1512
13.	Wular Lake	Jammu and Kashmir	189
14.	Harike Lake	Punjab	41
15.	Bhoj Wetland	Madhya Pradesh	32

(iv) Biosphere Reserves

Biosphere Reserves are multipurpose protected areas to preserve the genetic diversity in representative ecosystems. The Indian government has established 15 Biosphere Reserves, which protect larger areas of natural habitat (than a National Park or Wildlife Sanctuary), and often include one or more National Parks and/or preserves along buffer zones that are open to some economic uses. Protection is granted not only to the flora and fauna of the protected region, but also to the human communities who inhabit these regions. The main objectives to establish them are: (i) to conserve diversity and integrity of the life of plants, animals and micro-organisms, (ii) to promote eco friendly sustainable life in the areas, and (iii) to promote

ecological conservation, research, education, awareness and training in the life of such areas.

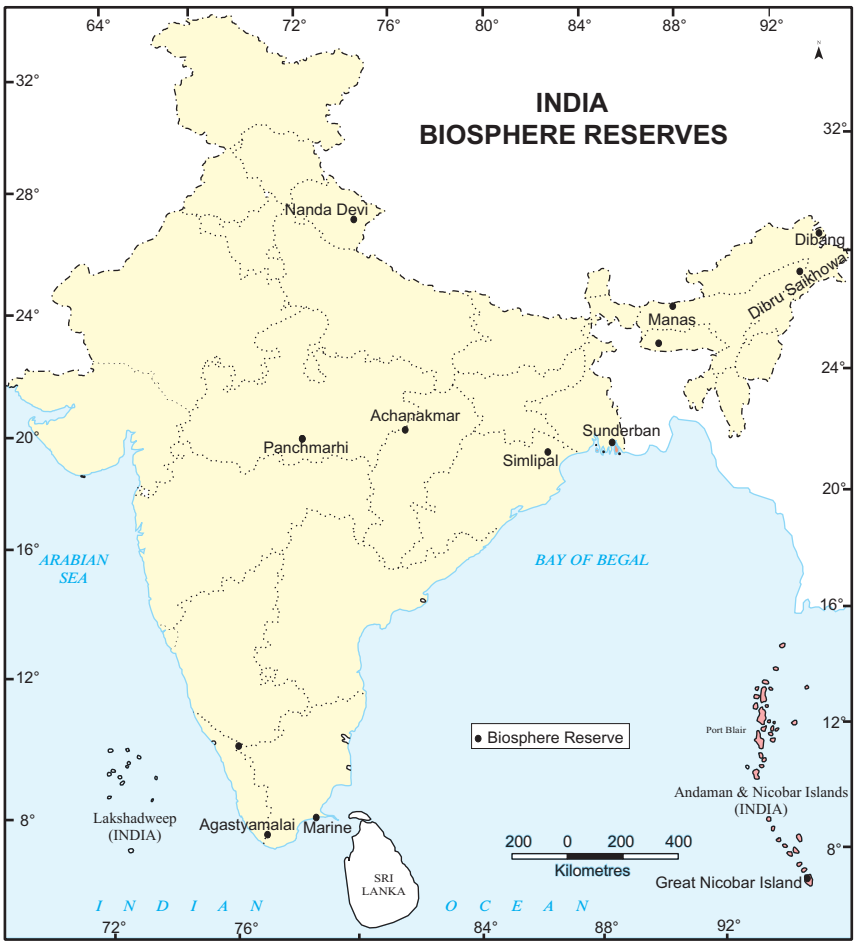


Figure 11.5 *Biosphere Reserves in India*

Table 11.3 Biosphere Reserves

No.	Name	State
1.	Nilgiri	Tamil Nadu, Kerala and Karnataka
2.	Gulf of Mannar	Tamil Nadu
3.	Sundarbans	West Bengal
4.	Nanda Devi	Uttarakhand
5.	Dihang-Dibang	Arunachal Pradesh
6.	Pachmarhi	Madhya Pradesh
7.	Simlipal	Odisha
8.	Achanakmar Amarkantak	Madhya Pradesh and Chhattisgarh

9.	Manas	Assam
10.	Kanchenjunga	Sikkim
11.	Agasthyamala	Kerala
12.	Great Nicobar	Andaman & Nicobar Islands
13.	Nokrek	Meghalaya
14.	Dibru-Saikhowa	Assam
15.	Rann of Kachchh	Gujarat

11.4 NEED OF CONSERVATION OF BIO-DIVERSITY

In section 11.1 we have described bio-diversity as the total number of genes, species and ecosystems of a region. We have also learnt that biodiversity is fundamental to our existence on the earth. We look for food, water, shelter and fibre in nature. All these are interrelated and interdependent. If any one component is disrupted, it would have multiple impacts on other components of biodiversity. If we want to conserve our natural vegetation and wildlife we need to relook at the way we exploit these. It is time to re-look at our lifestyle and bring it in harmony with nature. Vegetation is an integral part of our life. Let's see how plant life and vegetation impacts us:

(i) Vegetation is a key component of biodiversity. Without vegetation, the animals and some micro-organisms would die for lack of habitat, food and oxygen.

(ii) Plant's root systems hold the soil together, protecting it from being blown away by the wind or washed away by water.

(iii) Vegetation plays a major role in the water cycle. Plants provide a link between the ground and the atmosphere by drawing water up from the ground and releasing it through the leaves into the air as water vapour.

(iv) Vegetation is a natural barrier and slows down the flow of water over the surface of the ground.

(v) Through photosynthesis, vegetation removes carbon dioxide from the air and replaces it with oxygen. Other pollutants can also be filtered out of the air by vegetation.

(vi) Vegetation acts as a stabilising influence in the greenhouse effect. Conversely, clearing of vegetation releases high amounts of carbon dioxide – the main greenhouse gas.

(vii) Wildlife plays an important role in maintaining balanced food. This role helps in maintaining ecological balance resulting in healthy biodiversity.

(viii) The invisible micro-organism play an important role of scavengers, improving soil fertility and are of immense medicinal value.

You can now feel that conservation of biodiversity is of great significance not only to the world or national heritage but also for the survival of local people in any part

of the globe. We as a responsible citizen of the world need to understand our positive role in making responsible living choices. This would be our contribution in conserving biodiversity.

Peoples Participation in Conserving Biodiversity

(A Case Study)

Twenty-five years old Rajender Singh left his job and committed himself to rural development. With four companions he boarded a bus and travelled to a desolate village near Alwar. By this time Alwar had been opened to miners and loggers, who decimated its forests and damaged its watershed. Its streams and rivers dried up, then its farms. Dangerous floods now accompanied the monsoon rains. Overwhelmed by these calamities, villagers abandoned their Johads (water bodies). As men shifted to the cities for work, women spirited frail crops from dry grounds and walked several kilometers a day to find water. This was Alwar when Rajendra Singh first arrived in 1985. Before that he worked with nomadic tribes and tried to understand issues of natural resources management in rural areas.

Upon advice of a local village elder, he began organizing villagers to learn how to repair and deepen old johads. He initiated an awareness campaign for Gram Swawlamban, which is organised every year during the summer months for forty days in different hundreds of villages. In this campaign discussion on Gram Swawlamban, soil conservation, improved seeds, collection of herbal medicine and shramdan were the activities undertaken. Singh coordinated all these activities to mesh with the villager's traditional cycle of rituals. He played a catalyzing role in the building of 8600 johads (water harvesting structures) in 1058 villages spread over 6500 sq.km. Out of these 3500 were built by TBS and as an after effect of these the community was motivated to build the remaining 5100 structures.

Through his determination, vision, hard work and dedication, he has transformed the life of people in 1058 villages of Aravali hills. He has turned the arid land into cultivable, densely afforested large tracts making a wild life sanctuary by water management, made the dry rivers flow throughout the year. Aquatic life and bird sanctuary have flourished. Animal life has become lively, with desert beaming with life all around.

Do you know

There is so much we can do to save nature.

Think what we give back to nature in lieu of what we take away. If we cut down a tree, we should plant two small ones in its place. Buy only those products which have not been tested on animals. Do not waste paper. Try to use recycled paper.

ACTIVITY 11.2

Find out if there is any wetlands in your locality and its distance from your place of residence.

INTEXT QUESTIONS 11.3

1. Fill in the blanks correctly from the alternatives provided in the bracket:-
   (i) At present there are ..... wild life sanctuaries (441/551)
   (ii) ..... in Assam is known for the Indian Rhinoceroses. (Manas/Kaziranga)
   (iii) HarikeWetlands is located in ..... (Punjab/ Himachal Pradesh)
   (iv) ..... biosphere reserve is in the state of Tamil Nadu. (Gulf of Mannar/Pachmarhi)
2. Define Wetlands

   .....
3. Make a list of any three efforts you can make to safeguard Biodiversity of your surroundings.
   (i) .....
   (ii) .....
   (iii) .....

WHAT YOU HAVE LEARNT

- We are fortunate to have such a great biodiversity on the planet we live on.
- Being an integral part of nature, it is important for us to save it.
- People all over the world are working to safeguard this irreplaceable natural wealth and biodiversity.
- Natural vegetation and wildlife are important aspects of biodiversity.
- India is among the twelve mega biodiversity countries of the world having rich wildlife heritage and great range of natural vegetation.
- It is really important to know about the threats and the need of conservation of this natural wealth.

TERMINAL EXERCISES

1. Define biodiversity. Explain the interrelationship between natural vegetation, wildlife and micro-organisms.
2. Describe in brief the characteristics and distribution of Tropical Evergreen Forests in India.
3. Give any two differences between the moist deciduous forests and the dry deciduous forests in India.
4. State three objectives for establishment of biosphere reserves in India.
5. What are the main causes of loss of biodiversity? State any four.
6. Justify the need for conservation of natural vegetation, wildlife and micro-organisms with suitable reasons.
7. Study the table given below and answer the following questions.

Natural Parts/Wild life Sanctuary	Protected Wild Animals
1. Kaziranga	1. Tiger
2. Manas	2. Elephant
3. Periyar	3. Musk Deer
4. Corbett	4. Lion
5. Dachigram	5. Rhino
6. Wild Buffalo	
7. Panther	
8. Beer	

   (a) Match the name of the animal to the national park in which they are protected?

   (b) Encircle the animal which are not protected in any national park?

   (c) Write the name of the animal which is protected in more than one National Park?

8. Refer to Figure No.11.3

   (a) Find out the type of vegetation in your state.

   (b) Which areas have thorn forests?

   (c) Which areas have tidal forests and why are they restricted to those areas?

ANSWER TO INTEXT QUESTION

11.1

1. Biodiversity is fundamental to the existence of life on the earth because this is extremely valuable in different facets of life which includes providing of food, water, fiber, fuel etc. and regulating of climate and diseases.
2. A biodiversity hotspot is a region with a high level of endemic species. Endemic species are those species that are found in a limited area.

11.2

1. Trees in these forests remain green all the year round as the climate of the region is warm and wet throughout the year. The leaves of the trees do not fall in any particular season. Hence they are evergreen.
2. (i) Tidal forests along the eastern coast provide protection against cyclones. But in recent years due to massive deforestation, these areas have been experiencing severe destruction during cyclones in recent years

   (ii) Tropical evergreen forest has a dense and mixed vegetation of all kinds and hence, their economic exploitation is not viable whereas species in Himalayan vegetation are less dense and found in pure stand.

11.3

1. (a) 551

   (b) Kaziranga

   (c) Punjab

   (d) Gulf of Mannar
2. A wetland is an area of land where soil is saturated with moisture either permanently or seasonally. Such areas may also be covered partially or completely by shallow pools of water.
3. Some of the efforts you can make to safeguard Bio diversity of your surroundings are: (i) stop cutting trees; (ii) plant more trees; (iii) protect all animals; (iv) establishment of hospitals for injured birds or animals; (v) stop throwing garbage and polluting environment.