ChronicleIAS

Class IXth NEW NCERT
Chapter-5

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5

Natural Vegetation and Wildlife

Have you observed the type of trees, bushes, grasses and birds in the fields and parks in and around your school? Are they similar or there are variations? India being a vast country you can imagine the types of bio-forms available throughout the country.

Our country India is one of the 12 mega bio-diversity countries of the world. With about 47,000 plant species India occupies tenth place in the world and fourth in Asia in plant diversity. There are about 15,000 flowering plants in India, which account for 6 per cent in the world's total number of flowering plants. The country has many non-flowering plants, such as ferns, algae and fungi. India also has approximately 90,000 species of animals, as well as, a rich variety of fish in its fresh and marine waters.

Natural vegetation refers to a plant community, which has grown naturally without human aid and has been left undisturbed by humans for a long time. This is termed as a **virgin vegetation**. Thus, cultivated crops and fruits, orchards form part of vegetation but not natural vegetation.

Do You Know?

The virgin vegetation, which are purely Indian are known as endemic or indigenous species but those which have come from outside India are termed as exotic plants.

The term **flora** is used to denote plants of a particular region or period. Similarly, the species of animals are referred to as **fauna**.

Types of Vegetation

The following major types of vegetation may be identified in our country (Figure 5.4).

(i) Tropical Evergreen Forests
(ii) Tropical Deciduous Forests
(iii) Tropical Thorn Forests and Scrubs
(iv) Montane Forests
(v) Mangrove Forests

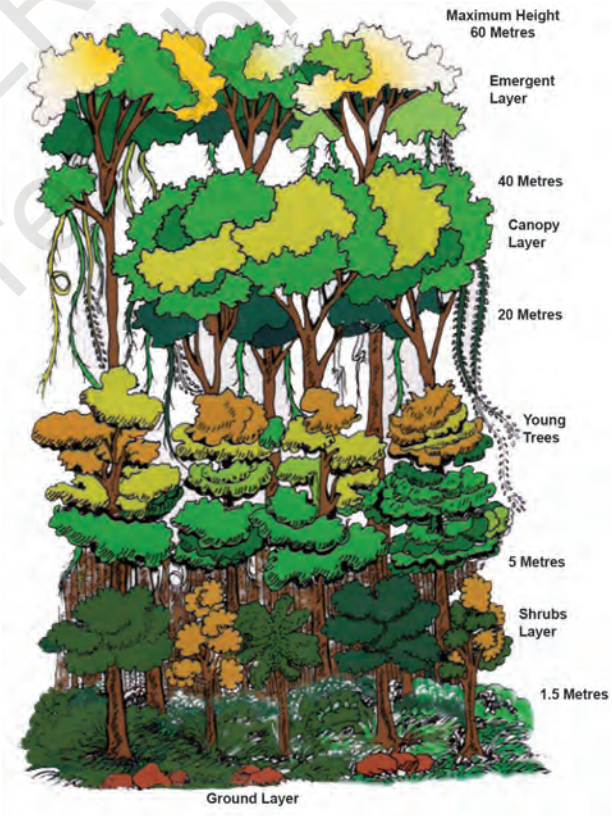

Figure 5.1 : Tropical Evergreen Forest

Tropical Evergreen Forests

These forests are restricted to heavy rainfall areas of the Western Ghats and the island groups of Lakshadweep, Andaman and Nicobar, upper parts of Assam and Tamil Nadu coast. They are at their best in areas having more than 200 cm of rainfall with a short dry season. The trees reach great heights up to 60 metres or even above. Since the region is warm and wet throughout the year, it has a luxuriant vegetation of all kinds — trees, shrubs and creepers giving it a multilayered structure. There is no definite time for trees to shed their leaves. As such, these forests appear green all the year round.

Some of the commercially important trees of this forest are ebony, mahogany, rosewood, rubber and cinchona.

The common animals found in these forests are elephant, monkey, lemur and deer. One-horned rhinoceroses are found in the jungles of Assam and West Bengal. Besides these animals, plenty of birds, bats, sloth, scorpions and snails are also found in these jungles.

Tropical Deciduous Forests

These are the most widespread forests of India. They are also called the monsoon forests and spread over the region receiving rainfall between 200 cm and 70 cm. Trees of this forest type shed their leaves for about six to eight weeks in dry summer.

Figure 5.2 : Tropical Deciduous Forest

On the basis of the availability of water, these forests are further divided into moist and dry deciduous. The former is found in areas receiving rainfall between 200 and 100 cm. These forests exist, therefore, mostly in the eastern part of the country — northeastern states, along the foothills of the Himalayas, Jharkhand, West Odisha and Chhattisgarh, and on the eastern slopes of the Western Ghats. Teak is the most dominant species of this forest. Bamboos, *sal, shisham,* sandalwood, *khair, kusum, arjun* and mulberry are other commercially important species.

The dry deciduous forests are found in areas having rainfall between 100 cm and 70 cm. These forests are found in the rainier parts of the Peninsular plateau and the plains of Bihar and Uttar Pradesh. There are open stretches, in which teak, sal, *peepal and neem* grow. A large part of this region has been cleared for cultivation and some parts are used for grazing.

In these forests, the common animals found are lion, tiger, pig, deer and elephant. A huge variety of birds, lizards, snakes and tortoises are also found here.

The Thorn Forests and Scrubs

In regions with less than 70 cm of rainfall, the natural vegetation consists of thorny trees and

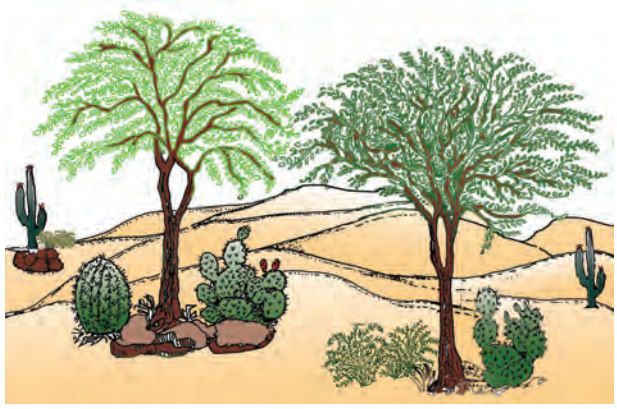

Figure 5.3 : Thorn Forests and Scrubs

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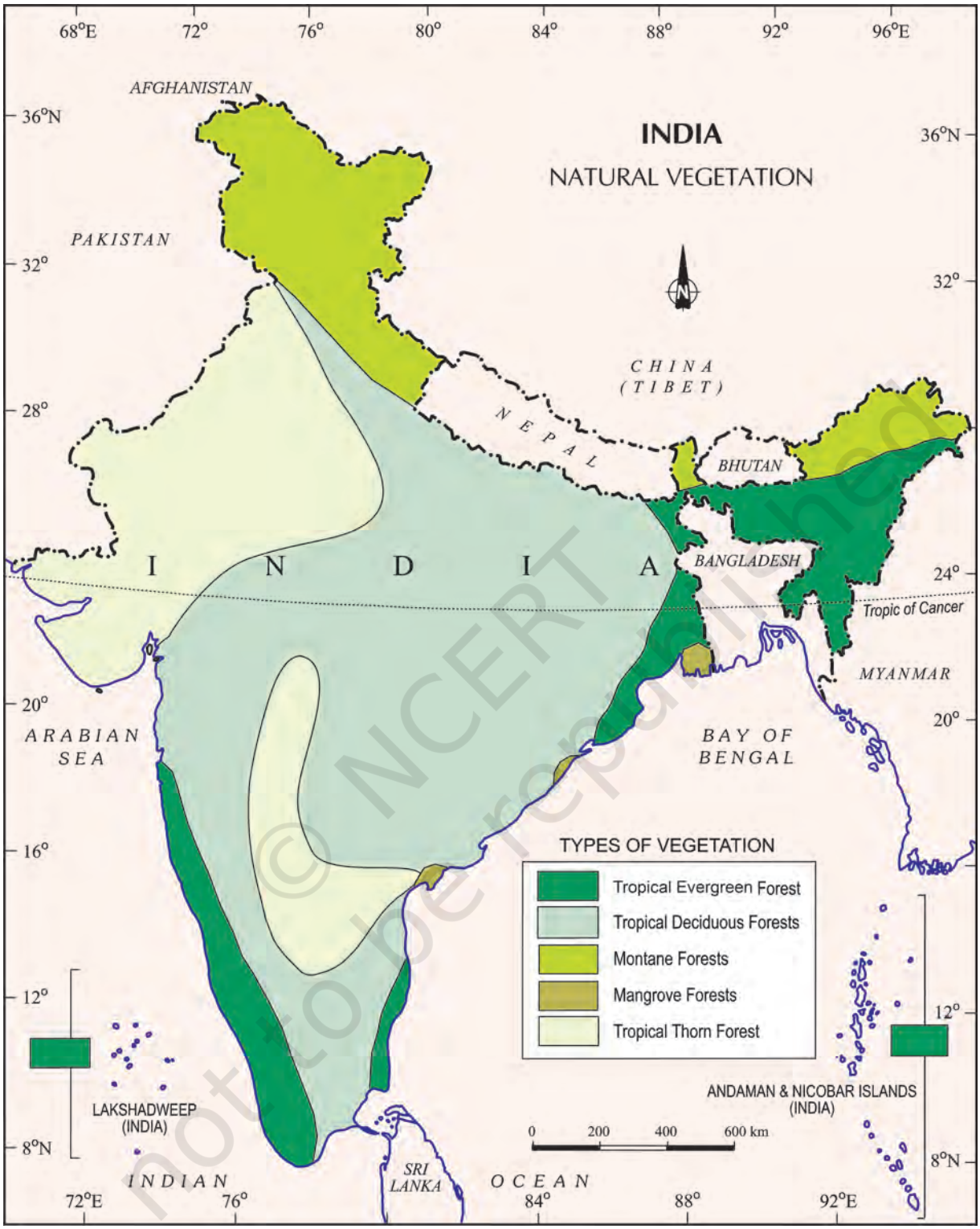


Figure 5.4 : Natural Vegetation

Study the given map for the forest cover and try to find the reasons as to why certain states have more forest area as compared to others?

bushes. This type of vegetation is found in the north-western part of the country, including semi-arid areas of Gujarat, Rajasthan, Madhya Pradesh, Chhattisgarh, Uttar Pradesh and Haryana. Acacias, palms, euphorbias and cacti are the main plant species. Trees are scattered and have long roots penetrating deep into the soil in order to get moisture. The stems are succulent to conserve water. Leaves are mostly thick and small to minimise evaporation. These forests give way to thorn forests and scrubs in arid areas.

In these forests, the common animals are rats, mice, rabbits, fox, wolf, tiger, lion, wild ass, horses and camels.

Montane Forests

In mountainous areas, the decrease in temperature with increasing altitude leads to the corresponding change in natural vegetation. As such, there is a succession of natural vegetation belts in the same order as we see from the tropical to the tundra region. The wet temperate type of forests are found between a height of 1000 and 2000 metres. Evergreen broad-leaf trees, such as oaks and chestnuts predominate. Between 1500 and 3000 metres, temperate forests containing coniferous trees, like pine, deodar, silver fir, spruce and cedar, are found. These forests cover mostly the southern slopes of the Himalayas, places having high altitude in southern and north-east India. At higher elevations, temperate grasslands are common. At high altitudes, generally, more than 3,600 metres above the sea level, temperate forests and grasslands give way to the Alpine vegetation. Silver fir, junipers, pines and birches are the common trees of these forests. However, they get progressively stunted as they approach the snow-line. Ultimately, through shrubs and scrubs, they merge into the Alpine grasslands. These are used extensively for grazing by nomadic tribes, like the Gujjars and the Bakarwals. At higher altitudes, mosses and lichens form part of tundra vegetation.

The common animals found in these forests are Kashmir stag, spotted dear, wild sheep, jack rabbit, Tibetan antelope, yak, snow leopard, squirrels, Shaggy horn wild ibex, bear and rare red panda, sheep and goats with thick hair.

Mangrove Forests

The mangrove tidal forests are found in the areas of coasts influenced by tides. Mud and silt get accumutated on such coasts. Dense

Figure 5.5 : Montane Forests

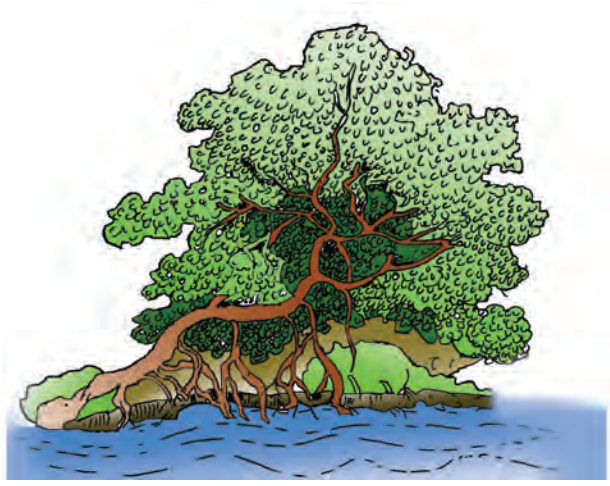


Figure 5.6 : Mangrove Forests

mangroves are the common varieties with roots of the plants submerged under water. The deltas of the Ganga, the Mahanadi, the Krishna, the Godavari and the Kaveri are covered by such vegetation. In the Ganga-Brahmaputra delta, sundari trees are found, which provide durable hard timber. Palm, coconut, *keora*, *agar*, etc., also grow in some parts of the delta.

Royal Bengal Tiger is the famous animal in these forests. Turtles, crocodiles, gharials and snakes are also found in these forests.

Let us discuss : What will happen if plants and animals disappear from the earth's surface? Can the human beings survive under such a situation? Why is biodiversity necessary and why should it be conserved?

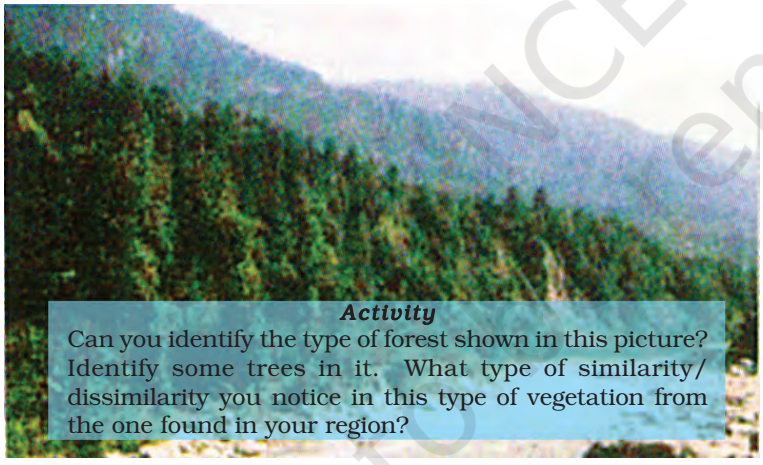
MEDICINAL PLANTS

India is known for its herbs and spices from ancient times. Some 2,000 plants have been described in Ayurveda and at least 500 are in regular use. The World Conservation Union's Red List has named 352 medicinal plants of which 52 are critically threatened and 49 endangered. The commonly used plants in India are:

Sarpagandha : Used to treat blood pressure; it is found only in India.
Jamun : The juice from ripe fruit is used to prepare vinegar, which is carminative and diuretic, and has digestive properties. The powder of the seed is used for controlling diabetes.
Arjun : The fresh juice of leaves is a cure for earache. It is also used to regulate blood pressure.
Babool : Leaves are used as a cure for eye sores. Its gum is used as a tonic.
Neem : Has high antibiotic and antibacterial properties.
Tulsi : Is used to cure cough and cold.
Kachnar : Is used to cure asthma and ulcers. The buds and roots are good for digestive problems.

Identify more medicinal plants in your area. Which plants are used as medicines by local people to cure some diseases?

Source : Medicinal Plants by Dr. S.K. Jain, 5th edition 1994, National Book Trust of India



Activity
Can you identify the type of forest shown in this picture? Identify some trees in it. What type of similarity/ dissimilarity you notice in this type of vegetation from the one found in your region?

WILDLIFE

Like its flora, India is also rich in its fauna. It has approximately 90,000 animal species. The country has about 2,000 species of birds. They constitute 13% of the world's total. There are 2,546 species of fish, which account for nearly 12% of the world's stock. It also shares between 5 and 8 per cent of the world's amphibians, reptiles and mammals.

The elephants are the most majestic animals among the mammals. They are found in the hot wet forests of Assam, Karnataka and Kerala. One-horned rhinoceroses are the other animals, which live in swampy and marshy lands of Assam and West Bengal. Arid areas of the Rann of Kachchh and the Thar Desert are the habitat for wild ass and camels respectively. Indian bison, *nilgai* (blue bull), *chousingha* (four-horned antelope), gazel and different species of deer are some other animals found in India. It also has several species of monkeys.

Do You Know? Wildlife Protection Act was implemented in 1972 in India.

India is the only country in the world that has both tigers and lions. The natural habitat of the Indian lion is the Gir forest in Gujarat. Tigers are found in the forests of Madhya

Pradesh, the Sundarbans of West Bengal and the Himalayan region. Leopards, too, are members of the cat family. They are important among animals of prey.

Do you know

The Gir Forest is the last remaining habitat of the Asiatic lion.

The Himalayas harbour a hardy range of animals, which survive in extreme cold. Ladakh's freezing high altitudes are a home to yak, the shaggy horned wild ox weighing around one tonne, the Tibetan antelope, the *bharal* (blue sheep), wild sheep, and the *kiang* (Tibetan wild ass). Furhtermore, the ibex, bear, snow-leopard and rare red panda are found in certain pockets.

In the rivers, lakes and coastal areas, turtles, crocodiles and gharials are found. The latter is the only representative of a variety of crocodile, found in the world today.

Bird life in India is colourful. Peacocks, pheasants, ducks, parakeets, cranes and pigeons are some of the birds inhabiting the forests and wetlands of the country.

We have selected our crops from a bio-diverse environment, i.e., from the reserve of edible plants. We also experimented and selected many medicinal plants. The animals were selected from large stock provided by nature as milch animal. They also provided us draught power, transportation, meat and eggs. The fish provide nutritive food. Many insects help in pollination of crops and fruit trees and exerting biological control on such insects is harmful. Every species has a role to play in the

Govt on save-vulture task

CHETAN Chauhan
New Delhi, January 30

All not lost: Tigers alive in Kuno

Tigers for Sariska

Gujarat habitat turns gull graveyard

Plumed recap

Nod to tiger protection body

HT Correspondent
New Delhi, December 16

Tigers dying, census confirms

CBI to probe Ranthambore tiger deaths

HT Correspondent
New Delhi, January 5

Rhino killed for horn

Activity

(i) Find out from the above newspaper cuttings, the main concern highlighted in the given news items.
(ii) Collect more information about various endangered species from newspapers and magazines.
(iii) Find out various steps taken by the Indian government to protect them.
(iv) Describe how you can contribute to the protection of endangered animals and birds.

Figure 5.7 : Wildlife Reserves

ecosystem. Hence, conservation is essential. As has been mentioned earlier due to excessive exploitation of plant and animal resources by human beings, the ecosystem has been disturbed. About 1,300 plant species are endangered and 20 species are extinct. Quite a few animal species are also endangered and some have become extinct.

The main causes for this major threat to nature are hunting by greedy hunters for commercial purposes. Pollution due to chemical and industrial waste, acid deposits, introduction of alien species and reckless cutting of the forests to bring land under cultivation and habitation, are also responsible for the imbalance.

To protect the flora and fauna of the country, the government has taken many steps.

(i) Eighteen biosphere reserves have been set up in the country to protect flora and fauna. Twelve out of these, the Sundarbans Nanda Devi, the Gulf of Mannar, the Nilgiri, Nokrek, Great Nicobar, Simlipal, Pachmarhi, Achanakmar-Amarkantak, Agasthyamalai, Kangchendzonga and Panna have been included in the world network of biosphere reserves.

Eighteen Bio-reserves

- Sundarbans
- Gulf of Mannar
- Nilgiri
- Nanda Devi
- Nokrek
- Great Nicobar
- Manas
- Kachchh
- Seshachalam
- Simlipal
- Dihang-Dibang
- Dibru Saikhowa
- Agasthyamalai
- Kangchendzonga
- Pachmarhi
- Achanakmar-Amarkantak
- Cold Desert
- Panna

(ii) Financial and technical assistance is provided to many botanical gardens by the government since 1992.

(iii) Project Tiger, Project Rhino, Project Great Indian Bustard and many other eco-developmental projects have been introduced.

(iv) 106 National Parks, 573 Wildlife sanctuaries and Zoological gardens are set up to take care of natural heritage.

All of us must realise the importance of the natural ecosystem for our own survival. It is possible if indiscriminate destruction of natural environment is put to an immediate end.

Migratory Birds

Some of the wetlands of India are popular with migratory birds. During winter, birds, such as Siberian Crane, come in large numbers. One such place favourable with birds is the Rann of Kachchh. At a place where the desert merges with the sea, flamingo with their brilliant pink plumage come in thousands to build nest mounds from the salty mud and raise their young ones. It is one among many extraordinary sights in the country. Is it not a rich natural heritage of ours?

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Exercise

1. Choose the right answer from the four alternatives given below:
   (i) To which one of the following types of vegetation does rubber belong to?
   (a) Tundra (c) Himalayan
   (b) Tidal (d) Tropical Evergreen
   (ii) Cinchona trees are found in the areas of rainfall more than
   (a) 100 cm (c) 70 cm
   (b) 50 cm (d) less than 50 cm
   (iii) In which of the following state is the Simlipal bio-reserve located?
   (a) Punjab (b) Delhi
   (c) Odisha (d) West Bengal
   (iv) Which one of the following bio-reserves of India is not included in the world network of bioreserve?
   (a) Manas (c) Gulf of Mannar
   (b) Nilgiri (d) Panna
2. Answer the following questions briefly.
   (i) What is a bio-reserve? Give two examples.
   (ii) Name two animals having habitat in tropical and montane type of vegetation.
3. Distinguish between
   (i) Flora and Fauna
   (ii) Tropical Evergreen and Deciduous forests
4. Name different types of Vegetation found in India and describe the vegetation of high altitudes.
5. Quite a few species of plants and animals are endangered in India. Why?
6. Why has India a rich heritage of flora and fauna?

Map Skills

On an outline map of India, label the following.
(i) Areas of Evergreen Forests
(ii) Areas of Dry Deciduous Forests
(iii) Two national parks each in Northern, Southern, Eastern and Western parts of the Country

Project/Activity

(i) Find some trees in your neighbourhood having medicinal values.
(ii) Find ten occupations getting raw material from forests and wildlife.
(iii) Write a poem or paragraph showing the importance of wildlife.
(iv) Write the script of a street play giving the importance of tree plantation and try to enact it in your locality.
(v) Plant a tree either on your birthday or one of your family member's birthday. Note the growth of the tree and notice in which season it grows faster.

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Class Xth NEW NCERT
Chapter-2

1068CH02

FOREST AND WILDLIFE RESOURCES

Narak! My Lord, you are the creator of music in the world of Lepchas

Oh Narak! My Lord, let me dedicate myself to you

Let me gather your music from the springs, the rivers, the mountains, the forests, the insects and the animals

Let me gather your music from the sweet breeze and offer it to you

Lepcha folk song

We share this planet with millions of other living beings, starting from micro-organisms and bacteria, lichens to banyan trees, elephants and blue whales. This entire habitat that we live in has immense biodiversity. We humans along with all living organisms form a complex web of ecological system in which we are only a part and very much dependent on this system for our own existence. For example, the plants, animals and micro-organisms re-create the quality of the air we breathe, the water we drink and the soil that produces our food without which we cannot survive. Forests play a key role in the ecological system as these are also the primary producers on which all other living beings depend.

Biodiversity or Biological Diversity is immensely rich in wildlife and cultivated species, diverse in form and function but closely integrated in a system through multiple network of interdependencies.

Flora and Fauna in India

If you look around, you will be able to find that there are some animals and plants which are unique in your area. In fact, India is one of the world's richest countries in terms of its vast array of biological diversity. This is possibly twice or thrice the number yet to be discovered. You have already studied in detail about the extent and variety of forest and wildlife resources in India. You may have realised the importance of these resources in our daily life. These diverse flora and fauna are so well integrated in our daily life that we take these for granted. But, lately, they are under great stress mainy due to insensitivity to our environment.

Activity

Find out stories prevalent in your region which are about the harmonious relationship between human beings and nature.

Conservation of Forest and Wildlife in India

Conservation in the background of rapid decline in wildlife population and forestry has become essential. But why do we need to conserve our forests and wildlife? Conservation preserves the ecological diversity and our life support systems – water, air and soil. It also preserves the genetic diversity of plants and animals for better growth of species and breeding. For example, in agriculture, we are still dependent on traditional crop varieties. Fisheries too are heavily dependent on the maintenance of aquatic biodiversity.

In the 1960s and 1970s, conservationists demanded a national wildlife protection programme. The Indian Wildlife (Protection)

Tribal girls using bamboo saplings in a nursery at Mukhali near Silent Valley

Leaf litter collection by women folk

Tribal women selling minor forest produce

Fig. 2.1

Act was implemented in 1972, with various provisions for protecting habitats. An all-India list of protected species was also published. The thrust of the programme was towards protecting the remaining population of certain endangered species by banning hunting, giving legal protection to their habitats, and restricting trade in wildlife. Subsequently, central and many state governments established national parks and wildlife sanctuaries about which you have already studied. The central government also announced several projects for protecting specific animals, which were gravely threatened, including the tiger, the one-horned rhinoceros, the Kashmir stag or *hangul*, three types of crocodiles – fresh water crocodile, saltwater crocodile and the *Gharial*, the Asiatic lion, and others. Most recently, the Indian elephant, black buck (chinkara), the great Indian bustard (*godawan*) and the snow leopard, etc. have been given full or partial legal protection against hunting and trade throughout India.

Project Tiger

Tiger is one of the key wildlife species in the faunal web. In 1973, the authorities realised that the tiger population had dwindled to 1,827 from an estimated 55,000 at the turn of the century. The major threats to tiger population are numerous, such as poaching for trade, shrinking habitat, depletion of prey base species, growing human population, etc. The trade of tiger skins and the use of their bones in traditional medicines, especially in the Asian countries left the tiger population on the verge of extinction. Since India and Nepal provide habitat to about two-thirds of the surviving tiger population in the world, these two nations became prime targets for poaching and illegal trading.

"Project Tiger", one of the well-publicised wildlife campaigns in the world, was launched in 1973. Tiger conservation has been viewed not only as an effort to save an endangered species, but with

Fig. 2.2: Rhino and deer in Kaziranga National Park

equal importance as a means of preserving biotypes of sizeable magnitude. Corbett National Park in Uttarakhand, Sunderbans National Park in West Bengal, Bandhavgarh National Park in Madhya Pradesh, Sariska Wildlife Sanctuary in Rajasthan, Manas Tiger Reserve in Assam and Periyar Tiger Reserve in Kerala are some of the tiger reserves of India.

The conservation projects are now focusing on biodiversity rather than on a few of its components. There is now a more intensive search for different conservation measures. Increasingly, even insects are beginning to find a place in conservation planning. In the notification under Wildlife Act of 1980 and 1986, several hundred butterflies, moths, beetles, and one dragonfly have been added to the list of protected species. In 1991, for the first time plants were also added to the list, starting with six species.

Activity

Collect more information on the wildlife sanctuaries and national parks of India and cite their locations on the map of India.

Types and Distribution of Forest and Wildlife Resources

Even if we want to conserve our vast forest and wildlife resources, it is rather difficult to manage, control and regulate them. In India, much of its forest and wildlife resources are either owned or managed by the government through the Forest Department or other government departments. These are classified under the following categories.

(i) ***Reserved Forests:*** More than half of the total forest land has been declared **reserved forests**. Reserved forests are regarded as the most valuable as far as the conservation of forest and wildlife resources are concerned.

(ii) ***Protected Forests:*** Almost one-third of the total forest area is protected forest, as declared by the Forest Department. This forest land are protected from any further depletion.

(iii) ***Unclassed Forests:*** These are other forests and wastelands belonging to both government and private individuals and communities.

Reserved and protected forests are also referred to as permanent forest estates maintained for the purpose of producing timber and other forest produce, and for protective reasons. Madhya Pradesh has the largest area under permanent forests, constituting 75 per cent of its total forest area. Jammu and Kashmir, Andhra Pradesh, Uttarakhand, Kerala, Tamil Nadu, West Bengal, and Maharashtra have large percentages of reserved forests of its total forest area whereas Bihar, Haryana, Punjab, Himachal Pradesh, Odisha and Rajasthan have a bulk of it under protected forests. All North-

Gharial on the brink

The gharial population has been at its lowest since the 1970s. What went wrong and what can we do?

ROMULUS WHITAKER and JANAKI LENIN

CRITICALLY ENDANGERED: *Captive gharial at the Madras C*

Bird deaths blamed on dirty Yamuna

Delhi Govt Report Points To Toxic Elements in Stagnant Water

By Nidhi Sharma/TNN

New Delhi: It is official now. The recent bird deaths reported in Okhla sanctuary were because of polluted Yamuna water and contaminated fish and not because of bird flu. The wildlife departments of UP and Delhi have sent reports to respective governments saying that more such deaths cannot be ruled out till the polluted water in this sanctuary is cleaned.

Fifty-three migratory birds were found dead in Okhla bird sanctuary earlier this month. Later UP authorities had arrested three fishermen and claimed that they had added poison to water to kill fish. These poisoned fish were reportedly

WISPY tendrils of mist rise delicately from the water surface, tinged gold by the dawn. Your breath hangs as little clouds of vapour as you gaze upon the Girwa River on a cold winter morning. A trio of hollow clapping sounds from the other side of the river, half a kilometre away tells you that an adult male gharial is advertising his presence. It is the height of the breeding season. The place seems trapped in a time in early history when man was still clad in animal skins. It is only as the sun rises higher and burns the mist off the water that the world comes into focus with appalling clarity. The five-km stretch of the Girwa River in Katerniaghat Wildlife Sanctuary is one of the only three wild breeding sites left in the world for the most unique of all the hatched by FAO consultant Bob Bustard. When they reached a metre in length, they were released in the wild.

ability to support larger numbers of the animal.

During the dry summer months, the

Dhruva Basu compile of the last 10 years drastic decline in g

Can you find out the reasons for the above mentioned problems?

eastern states and parts of Gujarat have a very high percentage of their forests as unclassed forests managed by local communities.

Community and Conservation

Conservation strategies are not new in our country. We often ignore that in India, forests are also home to some of the traditional communities. In some areas of India, local communities are struggling to conserve these habitats along with government officials, recognising that only this will secure their own long-term livelihood. In Sariska Tiger Reserve, Rajasthan, villagers have fought against mining by citing the Wildlife Protection Act. In many areas, villagers themselves are protecting habitats and explicitly rejecting government involvement. The inhabitants of five villages in the Alwar district of Rajasthan have declared 1,200 hectares of forest as the Bhairodev Dakav 'Sonchuri', declaring their own set of rules and regulations which do not allow hunting, and are protecting the wildlife against any outside encroachments.

The famous **Chipko** movement in the Himalayas has not only successfully resisted deforestation in several areas but has also shown that community afforestation with indigenous species can be enormously successful. Attempts to revive the traditional conservation methods or developing new methods of ecological farming are now widespread. Farmers and citizen's groups like the **Beej Bachao Andolan** in Tehri and **Navdanya** have shown that adequate levels of diversified crop production without the use of synthetic chemicals are possible and economically viable.

In India joint forest management (JFM) programme furnishes a good example for involving local communities in the management and restoration of degraded

Sacred groves - a wealth of diverse and rare species

Nature worship is an age old tribal belief based on the premise that all creations of nature have to be protected. Such beliefs have preserved several virgin forests in pristine form called Sacred Groves (the forests of God and Goddesses). These patches of forest or parts of large forests have been left untouched by the local people and any interference with them is banned.

Certain societies revere a particular tree which they have preserved from time immemorial. The Mundas and the Santhal of Chota Nagpur region worship mahua (**Bassia latifolia**) and kadamba (**Anthocaphalus cadamba**) trees, and the tribals of Odisha and Bihar worship the tamarind (**Tamarindus indica**) and mango (**Mangifera indica**) trees during weddings. To many of us, peepal and banyan trees are considered sacred.

Indian society comprises several cultures, each with its own set of traditional methods of conserving nature and its creations. Sacred qualities are often ascribed to springs, mountain peaks, plants and animals which are closely protected. You will find troops of macaques and langurs around many temples. They are fed daily and treated as a part of temple devotees. In and around Bishnoi villages in Rajasthan, herds of blackbuck, (chinkara), nilgai and peacocks can be seen as an integral part of the community and nobody harms them.

forests. The programme has been in formal existence since 1988 when the state of Odisha passed the first resolution for joint forest management. JFM depends on the formation of local (village) institutions that undertake protection activities mostly on degraded forest land managed by the forest department. In return, the members of these communities are entitled to intermediary benefits like non-timber forest produces and share in the timber harvested by 'successful protection'.

The clear lesson from the dynamics of both environmental destruction and reconstruction in India is that local communities everywhere have to be involved in some kind of natural resource management. But there is still a long way to go before local communities are at the centre-stage in decision-making. Accept only those economic or developmental activities, that are people centric, environment-friendly and economically rewarding.

Activity

Write a short essay on any practices which you may have observed and practised in your everyday lives that conserve and protect the environment around you.

"The tree is a peculiar organism of unlimited kindness and benevolence and makes no demand for its sustenance, and extends generously the products of its life activity. It affords protection to all beings, offering shade even to the axemen who destroy it".

Gautama Buddha (487 B.C.)

1. Multiple choice questions

(i) Which of the following conservation strategies do not directly involve community participation?

(a) Joint forest management
(b) Beej Bachao Andolan
(c) Chipko Movement
(d) Demarcation of Wildlife sanctuaries

2. Match the following.

Reserved forests	Other forests and wastelands belonging to both government and private individuals and communities.
Protected forests	Forests are regarded as most valuable as far as the conservation of forest and wildlife resources.
Unclassed forests	Forest lands are protected from any further depletion.

3. Answer the following questions in about 30 words.

(i) What is biodiversity? Why is biodiversity important for human lives?
(ii) How have human activities affected the depletion of flora and fauna? Explain.

4. Answer the following questions in about 120 words.

(i) Describe how communities have conserved and protected forests and wildlife in India?
(ii) Write a note on good practices towards conserving forest and wildlife.

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Class XIth NEW NCERT
Chapter-5

CHAPTER

5

NATURAL VEGETATION

Have you ever been to a forest for a picnic? You might have surely gone to a park if you live in a city or to a mango, guava or coconut orchard, if you live in a village. How do you differentiate between the natural vegetation and the planted vegetation? The same variety may be found growing wild in the forest under natural conditions and the same tree may be the planted one in your garden under human supervision.

Natural vegetation refers to a plant community that has been left undisturbed over a long time, so as to allow its individual species to adjust themselves to climate and soil conditions as fully as possible.

India is a land of great variety of natural vegetation. Himalayan heights are marked with temperate vegetation; the Western Ghats and the Andaman Nicobar Islands have tropical rain forests, the deltaic regions have tropical forests and mangroves; the desert and semi desert areas of Rajasthan are known for cactii, a wide variety of bushes and thorny vegetation. Depending upon the variations in the climate and the soil, the vegetation of India changes from one region to another.

On the basis of certain common features such as predominant vegetation type and climatic regions, Indian forests can be divided into the following groups:

TYPES OF FORESTS

(i) Tropical Evergreen and Semi Evergreen forests
(ii) Tropical Deciduous forests
(iii) Tropical Thorn forests
(iv) Montane forests
(v) Littoral and Swamp forests.

Tropical Evergreen and Semi Evergreen Forests

These forests are found in the western slope of the Western Ghats, hills of the northeastern region and the Andaman and Nicobar Islands. They are found in warm and humid areas with an annual precipitation of over 200 cm and mean annual temperature above 22°C. Tropical evergreen forests are well stratified, with layers closer to the ground and are covered with shrubs and creepers, with short structured trees followed by tall variety of trees. In these forests, trees reach great heights up to 60 m or above. There is no definite time for trees to shed their leaves, flowering and fruition. As such these forests appear green all the year round. Species found in these forests include rosewood, mahogony, aini, ebony, etc.

The semi evergreen forests are found in the less rainy parts of these regions. Such forests have a mixture of evergreen and moist deciduous trees. The undergrowing climbers provide an evergreen character to these forests. Main species are white cedar, hollock and kail.

Figure 5.1 : Evergreen Forest

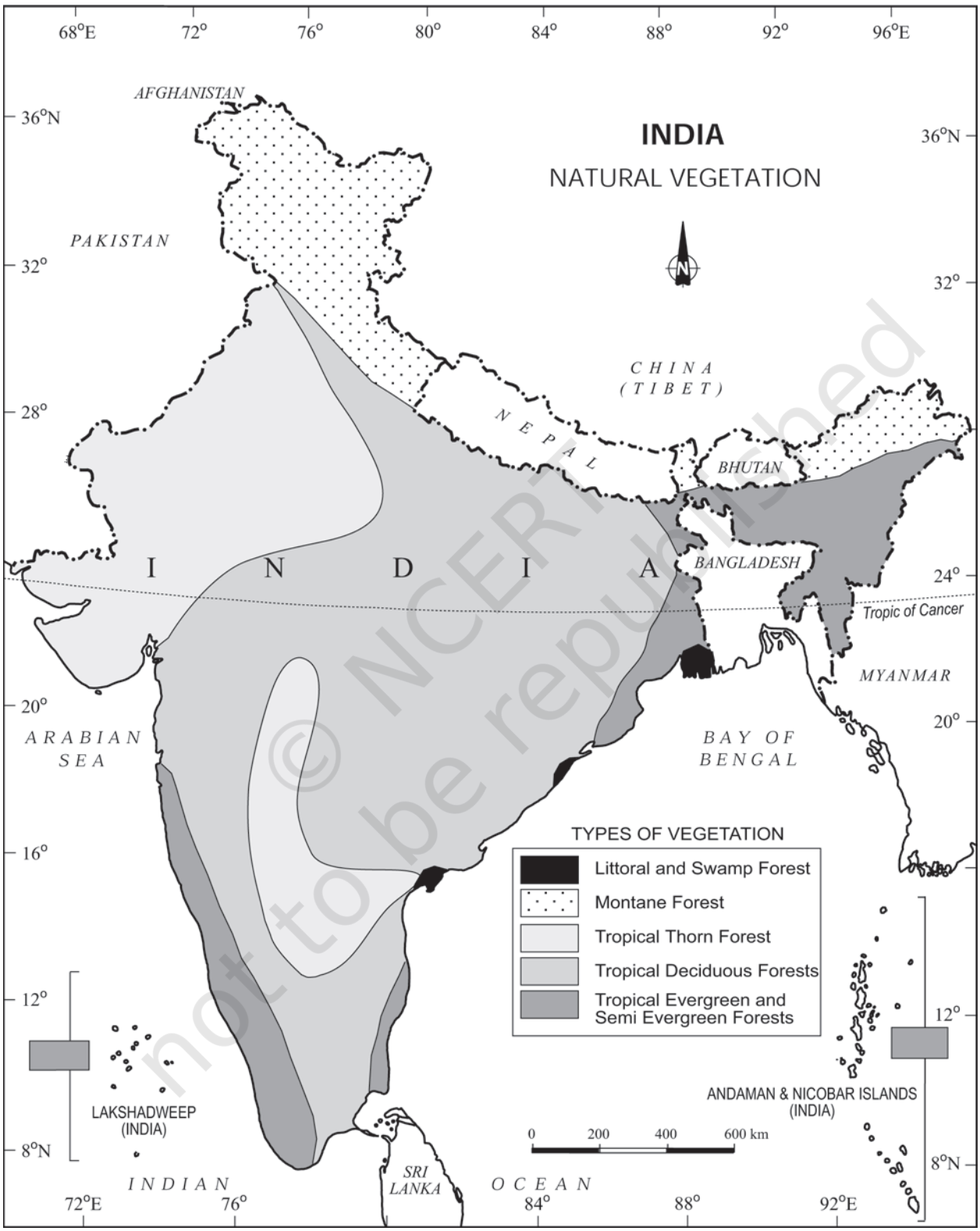

Figure 5.2 : Natural Vegetation

The British were aware of the economic value of the forests in India, hence, large scale exploitation of these forests was started. The structure of forests was also changed. The oak forests in Garhwal and Kumaon were replaced by pine (chirs) which was needed to lay railway lines. Forests were also cleared for introducing plantations of tea, rubber and coffee. The British also used timber for construction activities as it acts as an insulator of heat. The protectional use of forests was, thus, replaced by commercial use.

Tropical Deciduous Forests

These are the most widespread forests in India. They are also called the monsoon forests. They spread over regions which receive rainfall between 70-200 cm. On the basis of the availability of water, these forests are further divided into moist and dry deciduous.

Figure 5.3 : Deciduous Forests

The Moist deciduous forests are more pronounced in the regions which record rainfall between 100-200 cm. These forests are found in the northeastern states along the foothills of Himalayas, eastern slopes of the Western Ghats and Odisha. Teak, *sal, shisham, hurra, mahua, amla, semul, kusum,* and sandalwood etc. are the main species of these forests.

Dry deciduous forest covers vast areas of the country, where rainfall ranges between 70 -100 cm. On the wetter margins, it has a transition to the moist deciduous, while on the drier margins to thorn forests. These forests are found in rainier areas of the Peninsula and the plains of Uttar Pradesh and Bihar. In the higher rainfall regions of the Peninsular plateau and the northern Indian plain, these forests have a parkland landscape with open stretches in which teak and other trees interspersed with patches of grass are common. As the dry season begins, the trees shed their leaves completely and the forest appears like a vast grassland with naked trees all around. *Tendu, palas, amaltas, bel, khair,* axlewood, etc. are the common trees of these forests. In the western and southern part of Rajasthan, vegetation cover is very scanty due to low rainfall and overgrazing.

Tropical Thorn Forests

Tropical thorn forests occur in the areas which receive rainfall less than 50 cm. These consist of a variety of grasses and shrubs. It includes semi-arid areas of south west Punjab, Haryana, Rajasthan, Gujarat, Madhya Pradesh and Uttar Pradesh. In these forests, plants remain leafless for most part of the year and give an expression of scrub vegetation. Important species found are *babool, ber*, and wild date palm, *khair, neem, khejri, palas*, etc. Tussocky grass grows upto a height of 2 m as the under growth.

Figure 5.4 : Tropical Thorn Forests

Montane Forests

In mountainous areas, the decrease in temperature with increasing altitude leads to a corresponding change in natural vegetation. Mountain forests can be classified into two types, the northern mountain forests and the southern mountain forests.

The Himalayan ranges show a succession of vegetation from the tropical to the tundra, which change in with the altitude. Deciduous forests are found in the foothills of the Himalayas. It is succeeded by the wet temperate type of forests between an altitude of 1,000-2,000 m. In the higher hill ranges of northeastern India, hilly areas of West Bengal and Uttaranchal, evergreen broad leaf trees such as oak and chestnut are predominant. Between 1,500-1,750 m, pine forests are also well-developed in this zone, with Chir Pine as a very useful commercial tree. Deodar, a highly valued endemic species grows mainly in the western part of the Himalayan range. Deodar is a durable wood mainly used in construction activity. Similarly, the *chinar* and the walnut, which sustain the famous Kashmir handicrafts, belong to this zone. Blue pine and spruce appear at altitudes of 2,225-3,048 m. At many places in this zone, temperate grasslands are also found. But in the higher reaches there is a transition to Alpine forests and pastures. Silver firs, junipers, pines, birch and rhododendrons, etc. occur between 3,000-4,000 m. However, these pastures are used extensively for transhumance by tribes like the Gujjars, the Bakarwals, the Bhotiyas and the Gaddis. The southern slopes of the Himalayas carry a thicker vegetation cover because of relatively higher precipitation than the drier north-facing slopes. At higher altitudes, mosses and lichens form part of the tundra vegetation.

Figure 5.5 : Montane Forests

The southern mountain forests include the forests found in three distinct areas of Peninsular India viz; the Western Ghats, the Vindhyas and the Nilgiris. As they are closer to the tropics, and only 1,500 m above the sea level, vegetation is temperate in the higher regions, and subtropical on the lower regions of the Western Ghats, especially in Kerala, Tamil Nadu and Karnataka. The temperate forests are called *Sholas* in the Nilgiris, Anaimalai and Palani hills. Some of the other trees of this forest of economic significance include, magnolia, laurel, cinchona and wattle. Such forests are also found in the Satpura and the Maikal ranges.

Littoral and Swamp Forests

India has a rich variety of wetland habitats. About 70 per cent of this comprises areas under paddy cultivation. The total area of wet land is 3.9 million hectares. Two sites — Chilika Lake (Odisha) and Keoladeo National Park (Bharatpur) are protected as water-fowl habitats under the Convention of Wetlands of International Importance (Ramsar Convention).

> An international convention is an agreement among member states of the United Nations.

The country's wetlands have been grouped into eight categories, viz. (i) the reservoirs of the Deccan Plateau in the south together with the lagoons and other wetlands of the southern west coast; (ii) the vast saline expanses of Rajasthan, Gujarat and the Gulf of Kachchh; (iii) freshwater lakes and reservoirs from Gujarat eastwards through Rajasthan (Keoladeo National Park) and Madhya Pradesh; (iv) the delta wetlands and lagoons of India's east coast (Chilika Lake); (v) the freshwater marshes of the Gangetic Plain; (vi) the floodplains of the Brahmaputra; the marshes and swamps in the hills of northeast India and the Himalayan foothills; (vii) the lakes and rivers of the montane region of Kashmir and Ladakh; and (viii) the mangrove forest and other wetlands of the island arcs of the Andaman and Nicobar Islands. Mangroves grow along the coasts in the salt marshes, tidal creeks, mud flats and estuaries.

They consist of a number of salt-tolerant species of plants. Crisscrossed by creeks of stagnant water and tidal flows, these forests give shelter to a wide variety of birds.

Figure 5.6 : Mangrove Forests

In India, the mangrove forests spread over 6,740 sq. km which is 7 per cent of the world's mangrove forests. They are highly developed in the Andaman and Nicobar Islands and the Sunderbans of West Bengal. Other areas of significance are the Mahanadi, the Godavari and the Krishna deltas. These forests too, are being encroached upon, and hence, need conservation.

Forest Conservation

Forests have an intricate interrelationship with life and environment. These provide numerous direct and indirect advantages to our economy and society. Hence, conservation of forest is of vital importance to the survival and prosperity of humankind. Accordingly, the Government of India proposed to have a nation-wide forest conservation policy, and adopted a forest policy in 1952, which was further modified in 1988. According to the new forest policy, the Government will emphasise sustainable forest management in order to conserve and expand forest reserve on the one hand, and to meet the needs of local people on the other.

The forest policy aimed at : (i) bringing 33 per cent of the geographical areas under forest cover; (ii) maintaining environmental stability and to restore forests where ecological balance was disturbed; (iii) conserving the natural heritage of the country, its biological diversity and genetic pool; (iv) checks soil erosion, extension of the desert lands and reduction of floods and droughts; (v) increasing the forest cover through social forestry and afforestation on degraded land; (vi) increasing the productivity of forests to make timber, fuel, fodder and food available to rural population dependant on forests, and encourage the substitution of wood; (vii) creating of a massive peoples movement involving women to encourage planting of trees, stop felling of trees and thus, reduce pressure on the existing forest.

Forests and Life

To a vast number of tribal people, the forest is a home, a livelihood, their very existence. It provides them food, fruits of all kinds, edible leaves, honey, nourishing roots and wild game. It provides them with material to build their houses and items for practising their arts. The importance of forests in tribal economy is well-known as they are the source of sustenance and livelihood for tribal communities. It is commonly believed that the tribal communities live in harmony with nature and protect forests.

Forest and tribals are very closely related. The age-old knowledge of tribals regarding forestry can be used in the development of forests. Rather than treating tribals as minor forest produce collectors they should be made growers of minor forest produce and encouraged to participate in conservation.

Based on the forest conservation policy the following steps were initiated:

Social Forestry

Social forestry means the management and protection of forests and afforestation on barren lands with the purpose of helping in the environmental, social and rural development.

The National Commission on Agriculture (1976) has classified social forestry into three

categories. These are Urban forestry, Rural forestry and Farm forestry.

Urban forestry pertains to the raising and management of trees on public and privately owned lands in and around urban centres such as green belts, parks, roadside avenues, industrial and commercial green belts, etc.

Rural forestry lays emphasis on promotion of agro-forestry and community-forestry.

Agro-forestry is the raising of trees and agriculture crops on the same land inclusive of the waste patches. It combines forestry with agriculture, thus, altering the simultaneous production of food, fodder, fuel, timber and fruit. Community forestry involves the raising of trees on public or community land such as the village pasture and temple land, roadside, canal bank, strips along railway lines, and schools etc. Community forestry programme aims at providing benefits to the community as a whole. Community forestry provides a means under which the people of landless classes can associate themselves in tree-raising and thus, get those benefits which otherwise are restricted for landowners.

Farm Forestry

Farm forestry is a term applied to the process under which farmers grow trees for commercial and non-commercial purposes on their farm lands.

Forest departments of various states distribute seedlings of trees free of cost to small and medium farmers. Several lands such as the margins of agricultural fields, grasslands and pastures, land around homes and cow sheds may be used for raising trees under non-commercial farm forestry.

Wildlife

You would have visited a zoo and may have seen animals and birds in captivity. Wildlife of India is a great natural heritage. It is estimated that about 4-5 per cent of all known plant and animal species on the earth are found in India. The main reason for this remarkable diversity of life forms is the great diversity of the ecosystem which this country has preserved and supported through the ages. Over the years, their habitat has been disturbed by human activities and as a result, their numbers have dwindled significantly. There are certain species that are at the brink of extinction.

Some of the important reasons of the declining of wildlife are as follows:

(i) Industrial and technological advancement brought about a rapid increase in the exploitation of forest resources.
(ii) More and more lands were cleared for agriculture, human settlement, roads, mining, reservoirs, etc.
(iii) Pressure on forests mounted due to lopping for fodder and fuelwood and removal of small timber by the local people.
(iv) Grazing by domestic cattle caused an adverse effect on wildlife and its habitat.
(v) Hunting was taken up as a sport by the elite and hundreds of wild animals were killed in a single hunt. Now commercial poaching is rampant.
(vi) Incidence of forest fire.

It is being felt that conservation of wildlife is of great significance to the national as well as the world heritage along with the promotion of ecotourism. What steps have been initiated by the government in this direction?

Wildlife Conservation in India

The protection of wildlife has a long tradition in India. Many stories of *Panchtantra* and *Jungle Books*, etc. have stood the test of time relating to the love for wildlife. These have a profound impact on young minds.

In 1972, a comprehensive Wildlife Act was enacted, which provides the main legal framework for conservation and protection of wildlife in India. The two main objectives of the Act are; to provide protection to the endangered species listed in the schedule of the Act and to provide legal support to the conservation areas of the country classified as National parks, sanctuaries and closed areas. This Act has been

comprehensively amended in 1991, making punishments more stringent and has also made provisions for the protection of specified plant species and conservation of endangered species of wild animals.

There are 103 National parks and 563 wildlife sanctuaries in the country.

Wildlife conservation has a very large ambit with unbounded potential for the well-being of humankind. However, this can be achieved only when every individual understands its significance and contributes his bit.

For the purpose of effective conservation of flora and fauna, special steps have been initiated by the Government of India in collaboration with UNESCO's 'Man and Biosphere Programme'.

Figure 5.7 : Elephants in their Natural Habitat

Table 5.1 : List of Biosphere Reserves

Sl. No.	*Name of the Biosphere Reserve and Total Geographical Area (km²)*	*Date of Designation*	*Location in the States/UT*
1.	**Nilgiri (5520)**	01.08.1986	Part of Wynad, Nagarhole, Bandipur and Madumalai, Nilambur, Silent Valley and Siruvani Hills (Tamil Nadu, Kerala and Karnataka).
2.	**Nanda Devi (5860.69)**	18.01.1988	Part of Chamoli, Pithoragarh and Almora Districts in Uttarakhand.
3.	**Nokrek (820)**	01.09.1988	Part of East, West and South Garo Hill Districts in Meghalaya.
4.	Manas (2837)	14.03.1989	Part of Kokrajhar, Bongaigaon, Barpeta, Nalbari, Kamrup and Darang Districts in Assam
5.	**Sunderban (9630)**	29.03.1989	Part of delta of Ganges and Brahamaputra river system in West Bengal.
6.	**Gulf of Mannar (10500)**	18.02.1989	Indian part of Gulf of Mannar extending from Rameswaram island in the North to Kaniyakumari in the South of Tamil Nadu.
7.	**Great Nicobar (885)**	06.01.1989	Southern most island of Andaman and Nicobar Islands.
8.	**Similipal (4374)**	21.06.1994	Part of Mayurbhanj District in Odisha.
9.	Dibru-Saikhowa (765)	28.07.1997	Part of Dibrugarh and Tinsukia Districts in Assam
10	Dehang Debang (5111.5)	02.09.1998	Part of Upper Siang, West Siang and Dibang Valley Districts in Arunachal Pradesh.
11.	**Pachmarhi (4981.72)**	03.03.1999	Part of Betul, Hoshangabad and Chhindwara Districts in Madhya Pradesh.
12.	**Khangchendzonga (2619.92)**	07.02.2000	Part of North and West Districts in Sikkim
13.	**Agasthyamalai (3500.36)**	12.11.2001	Part of Thirunelveli and Kanyakumari Districts in Tamil Nadu and Thiruvananthapuram, Kollam and Pathanmthitta districts in Kerala.
14.	**Achanakmar-Amarkantak (3835.51)**	30.03.2005	Part of Anuppur and Dindori Districts of Madhya Pradesh and Bilaspur district of Chhattisgarh
15.	Kachchh (12,454)	29.01.2008	Part of Kachchh, Rajkot, Surendranagar and Patan Districts in Gujarat.
16.	Cold Desert (7770)	28.08.2009	Pin Valley National Park and surroundings; Chandratal and Sarchu and Kibber Wildlife sanctuary in Himachal Pradesh.
17.	Seshachalam (4755.997)	20.09.2010	Seshachalam hill ranges in Eastern Ghatsencompassing part of Chittoor and Kadapa Districts in Andhra Pradesh.
18.	**Panna (2998.98)**	25.08.2011	Part of Pann and Chhattarpur Districts in Madhya Pradesh.

* Sites with bold letters have been included in the World Network of BRs of UNESCO.
Source : Annual Report 2018-19, Ministry of Environment and Forests, Government of India.

Figure 5.8 : India : Biosphere Reserves

Special schemes like Project Tiger (1973) and Project Elephant (1992) have been launched to conserve these species and their habitat in a sustainable manner.

Project Tiger has been implemented since 1973. The main objective of the scheme is to ensure maintenance of viable population of tigers in India for scientific, aesthetic, cultural and ecological values, and to preserve areas of biological importance as natural heritage for the benefit, education and enjoyment of the people. Initially, the Project Tiger was launched in nine tiger reserves, covering an area of 16,339 sq. km, which has now increased to 50 tiger reserves, encompassing 71,027.10 sq. km of core tiger habitats distributed in 18 states. The tiger population in the country has registered an increase from 1,411 in 2006 to 2,967 in 2020 which is 70 per cent of the global tiger population.

Project Elephant was launched in 1992 to assist states having free ranging population of wild elephants. It was aimed at ensuring long-term survival of identified viable population of elephants in their natural habitat. The project is being implemented in 16 states.

Apart from this, some other projects such as Crocodile Breeding Project, Project Hangul and conservation of Himalayan Musk deer have also been launched by the Government of India.

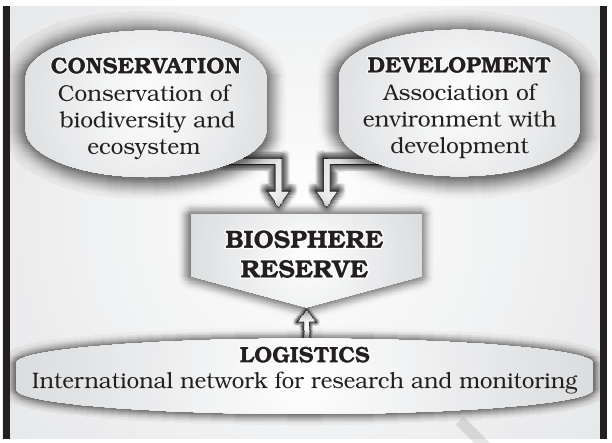

Figure 5.9 : Objectives of a Biosphere Reserve

Biosphere Reserves

A Biosphere Reserve is a unique and representative ecosystem of terrestrial and coastal areas which are internationally recognised within the framework of UNESCO's Man and Biosphere (MAB) Programme. The Biosphere Reserve aims at achieving the three objectives as depicted in Figure 5.9.

There are 18 Biosphere Reserves in India (Table 5.1, Figure 5.8). Twelve Biosphere Reserves have been recognised by the UNESCO on World Network of Biosphere Reserves.

EXERCISES

1. Choose the right answer from the four alternatives given below.

(i) Sandalwood is an example of:
(a) Evergreen forest (c) Deltaic forest
(b) Deciduous forest (d) Thorny forest

(ii) Which one of the following was the purpose of Project Tiger?
(a) to kill tigers (c) to protect tigers from illegal hunting
(b) to put tigers in the Zoo (d) to make films on tigers

(iii) In which one of the following states is the Nandadevi Biosphere reserve situated?
(a) Bihar (c) Uttarakhand
(b) Uttar Pradesh (d) Odisha

(iv) How many of the Biosphere reserves from India are recognised by the UNESCO?

(a) One (c) Twelve

(b) Two (d) Four

(v) Which one of the following proportion of area of the country was targeted to be under forest in Forest Policy of India?

(a) 33 (c) 55

(b) 44 (d) 22

2. Answer the following questions in about 30 words.

(i) What is natural vegetation? Under what climatic conditions are tropical evergreen forests develop?

(ii) What do you understand by social forestry?

(iii) Define Biosphere reserves?

(iv) What is the difference between forest area and forest cover?

3. Answer the following questions in not more than 150 words.

(i) What steps have been taken up to conserve forests?

(ii) How can people's participation be effective in conserving forests and wildlife?

Project/Activity

1. On the outline map of India, mark and label the following.

(i) Areas having Mangrove forests.

(ii) Biosphere reserves of Nanda Devi, Sunderbans, Gulf of Mannar and Nilgiri.

(iii) Mark the location of Forest Survey of India Head Quarter.

2. List the trees, bush and shrub species found around your school. Write their local names and their uses.