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# UNIT 26 VEGETATION AND WILDLIFE

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## Structure

- 26.0 Objectives
- 26.1 Introduction
- 26.2 The Biogeographic Zones and the Wildlife
  - 26.2.1 Zone 1: The Trans-Himalayas
  - 26.2.2 Zone 2: The Himalayas
  - 26.2.3 Zone 3: The Indian Desert
  - 26.2.4 Zone 4: The Semi-Arid
  - 26.2.5 Zone 5: The Western Ghats
  - 26.2.6 Zone 6: The Deccan Peninsula
  - 26.2.7 Zone 7: The Gangetic Plain
  - 26.2.8 Zone 8: North-East India
  - 26.2.9 Zone 9: The Islands
  - 26.2.10 Zone 10: The Coasts
- 26.3 The Value of Wildlife
- 26.4 The Impacts of Tourism on Wildlife
- 26.5 Let Us Sum Up
- 26.6 Keywords
- 26.7 Answers to Check Your Progress Exercises

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## 26.0 OBJECTIVES

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After studying this Unit you should be able to:

- define the terms vegetation and wildlife,
- differentiate between, and apply in proper context the terms vegetation and wildlife,
- prepare an account of the wildlife species that occur in the different biogeographic zones of India,
- enumerate the importance of wildlife to humans, and
- analyse and discuss the impacts of tourism on wildlife.

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## 26.1 INTRODUCTION

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We begin this Unit by understanding the meaning and scope of the two terms that appear in the title of this Unit, that is, vegetation and wildlife. One may say, it is very simple, vegetation refers to the variety of plants inhabiting a given area. And wildlife includes all animals - whether large or small, herbivores or carnivores, game animals and also the birds inhabiting a given area, precisely a **wild-area**. Just hold, doesn't the term 'wild-area' ring something in your mind? Well, wild-areas are those areas that are out of reach or are not frequented/disturbed by human beings. Implying thereby, that **all the species occurring therein are in perfect harmony with nature. They are well adapted to the climate, soil types and the overall geographical conditions of that area. In addition, they are capable of surviving and completing their life cycle, one season after the other, all by themselves without any human care and help.** Alright, then what is the scope of the term 'wildlife'? Does it only include the diverse kinds of animal life? The answer is, not any more. Presently, **the scope of wildlife is not limited to animals only. Now it includes all living beings occurring in wild conditions - the animals, the plants, the microorganisms and all other lesser known living beings.** Hence, **vegetation is a component of 'wild-life'**. It should be clear to you that these two terms are neither complimentary, nor antonyms as was the 'past-belief', which still prevails in some quarters today.

In this Unit we shall discuss the wildlife characterising the different biogeographical zones of our country. You are familiar with the ten biogeographical zones discussed in **Block-1, Unit 3, Sect. 3.4, pp. 47-49** and also briefly described in **Unit 4, Sect. 4.5, pp. 64-65** of this course. We shall

Environmental  
impact : 1

**Endemic species** – species confined to a particular region, e.g., *Azadirachta indica* (neem) is endemic to Indian sub-continent.

**Endangered species** – A species is considered endangered when its numbers are so few and/or its habitat is so small that it may become extinct if not given adequate protection.

**Subspecies** – A taxonomic subdivision of a species, with some less obvious morphological\* differences from the other subspecies and often with a different geographical distribution or ecology, e.g., a species 'A' may have a number of subspecies  $a_1, a_2, a_3$  and so on.

\* morphology is the study of structure or form of organisms.

**Variety** – A taxonomic subdivision of a subspecies, consisting of individuals with uniform characters that have arisen either due to genetic isolation\* or due to various cultivation practices.

\* genetically isolated group of individuals do not exchange genetic material with the members of other similar group. In other words, two genetically isolated groups of individuals are unable to breed freely.

geographic conditions. This would enable you to register and associate the wildlife species with their habitat conditions. A number of illustrations of wild species included in the text, **not drawn to the same scale**, would further help you in establishing these associations. The description of the wildlife of each biogeographic zone also includes information on the endemic and the endangered species. This information may come in handy if you visit any of these zones some day, or wish to undertake some project, or contribute in the conservation work. In the next Section we would briefly discuss the value of wildlife about which you have already read in **Unit-4** (Sect. 4.5, pp. 65-66). The last Section presents an illustrative account of the impacts of tourism on the wildlife. Hope you would enjoy studying this Unit.

## 26.2 THE BIOGEOGRAPHIC ZONES AND THE WILDLIFE

Our country, which occupies just two per cent of the total land mass, harbours a rich biodiversity comprising of about five per cent of the known biodiversity from the world over. The numerical figures of the familiar categories of living organisms would give you a feel of the 'rich biodiversity' that we have in our country. There are about:

81,000 species of animals, including  
50,000 species of insects, and  
12,000 species of birds,  
45,000 species of various other categories of plants, including  
15,000 species of flowering plants.\*

In addition, these species may have several sub-species which in turn may have countless varieties. All these make the wildlife in India one of the richest in the world. The prime reason for such a rich biodiversity is because of the availability of an extraordinary diversity of habitats in India: from the cold and arid high-altitude regions of the trans-Himalayas to the dense, tropical rainforests of south India; from the searingly hot Thar desert in the west to the lush mangrove forests of the eastern coastal areas; and several variations in between. In fact, an entire life time would be inadequate to see the entire range of habitats.

You may recall from your study of Block-1 that the country has been divided into ten biogeographic zones: Trans-Himalayas, Himalayas, Indian Desert, Semi-Arid, Western Ghats, Deccan Peninsula, Gangetic Plains, North-East India, Islands, and Coasts (also see Fig. 1.). This classification was developed at the Wildlife Institute of India by Rodgers & Panwar (1988) and it is being largely followed. What are these biogeographic zones? These represent the major species groupings. In addition, each of these ten zones indicates a distinctive set of physical, climatic and historical conditions. The Himalayas and Gangetic Plains are examples of two adjacent but obviously extremely different zones.

### 26.2.1 Zone 1: The Trans-Himalayas

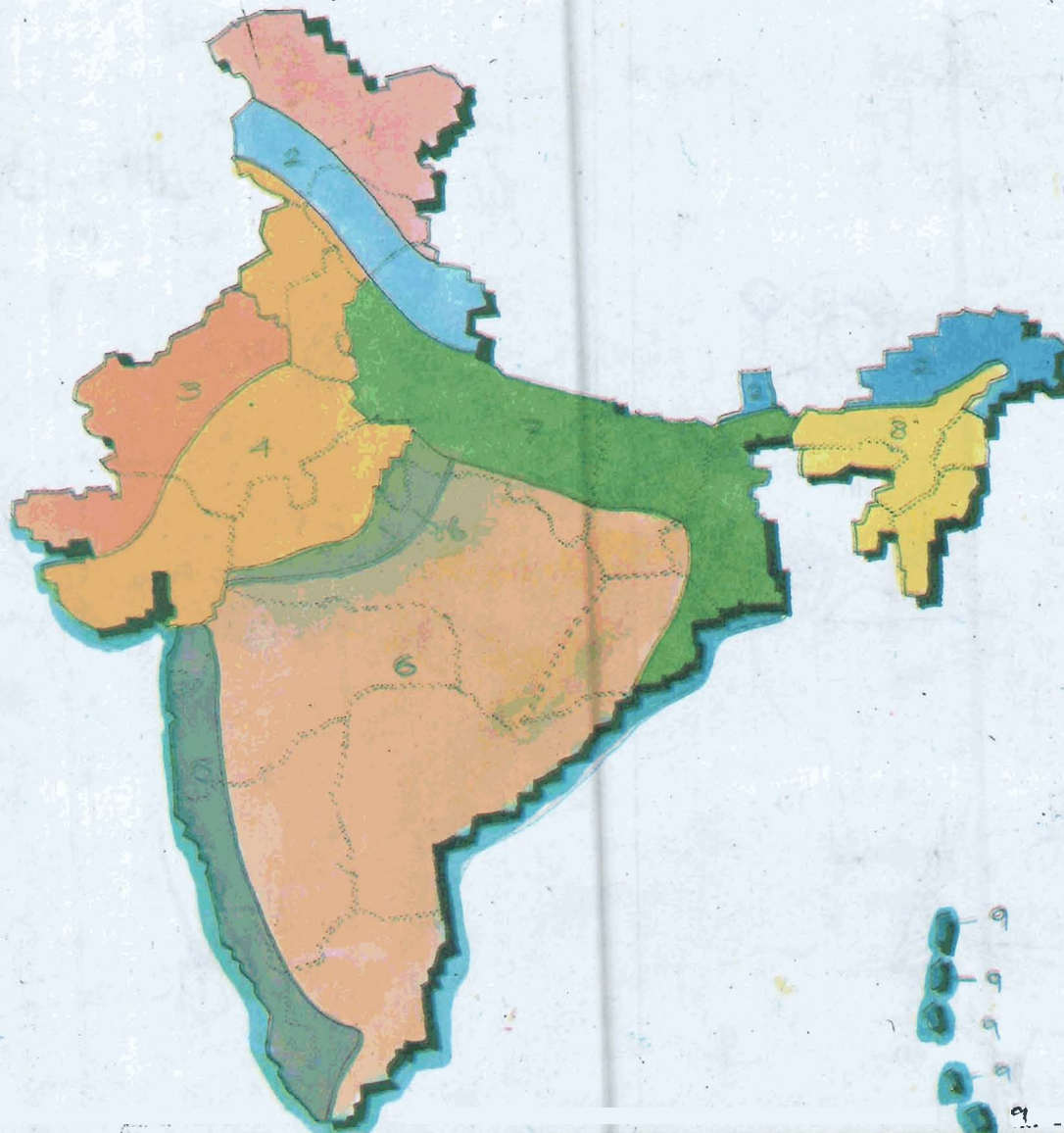
This zone has an area of about 1,86,200 sq km\*\* and it covers mainly Ladakh and Lahul-Spiti. This zone is much more extensive than the area within India, because of its high altitude mountainous terrain which are between 4,500-6,000m. Taking the topography into account, the area comes out to be around 2.6 million sq km.

#### The Wildlife of the Trans-Himalayan Zone

This zone represents an extremely fragile ecosystem, because of its harsh climatic conditions and the inhospitable terrain. There are three mountain ranges running across this zone in India: Zaskar, Ladakh and Karakoram. Each slope has its own major valley-slope system. Each of these three mountain ranges is very interesting from the biological point of view. To the east, the Ladakh and Zaskar ranges merge into the southern margin of the Tibetan Plateau and the beginning of an internal drainage marsh and lake systems (eg., Tso Morari). Most of its area in the north is above the snowline. Siachen Glacier, covering an area of about 1,180 sq km is a major constituent of this area. This, in fact is the largest such area outside the polar region.

\* These figures are based on the survey of nearly 70% of the geographical area of the country surveyed so far survey of remaining areas is continuing.

\*\* 1,86,200 sq km



|   |                |    |                  |
|---|----------------|----|------------------|
| 1 | TRANSHIMALAYAN | 6  | DECCAN PENINSULA |
| 2 | HIMALAYAN      | 7  | GANGETIC PLAIN   |
| 3 | INDIAN DESERT  | 8  | NORTH-EAST INDIA |
| 4 | SEMI-ARID      | 9  | ISLANDS          |
| 5 | WESTERN GHATS  | 10 | COASTS           |

Fig. 1: The biogeographic zones of India. From: W.A. Rodgers & H.S. Panwar, 1988. Planning a Wildlife Protected Area Network in India. Vol. 1., Department of Environment, Forests and Wildlife, Government of India.

The vegetation of Ladakh and Lahul-Spiti is largely a sparse alpine steppe. In addition, several endemic species also occur here. This area within India, alongwith Pakistan and Tibet, has the richest wild sheep and goat communities in the whole world. There are eight distinct species and sub-species of sheep, the familiar ones are: Urial or Shapu, Argali or Nayan, Marco Polo Sheep, Markhor (Fig.2a-d) and Blue Sheep. The flatter plateaux have a distinct grazing community comprising of Wild Yak, Tibetan Ass, Tibetan Gazelle, Ibex and Tibetan Antelope (see Fig. 3a-e). In addition to these herbivores, there is an equally distinctive set of carnivores including Snow Leopard, Indian Wolf, Pallas's Cat, Fox and smaller animals like Marbled Pole Cat, Pika and Marmot (see Fig. 4a-d). Of these the Pallas's Cat is endemic to this area. The lakes and marshes too, have a distinctive avifauna including the spectacular Black-necked Crane, which is a migratory bird. Avifauna refers to the birds of an area collectively.

Steppe - a dry grassy plain.

Since this ecosystem has very low primary productivity, the various kinds of animal populations are found in considerable altitudinal migration. Many of the species concentrate in valley areas during winters. The increasing human intrusion is endangering the delicate ecological balance of this extremely fragile ecosystem.

Net Primary Productivity of a plant or a community is the overall gain in dry weight.



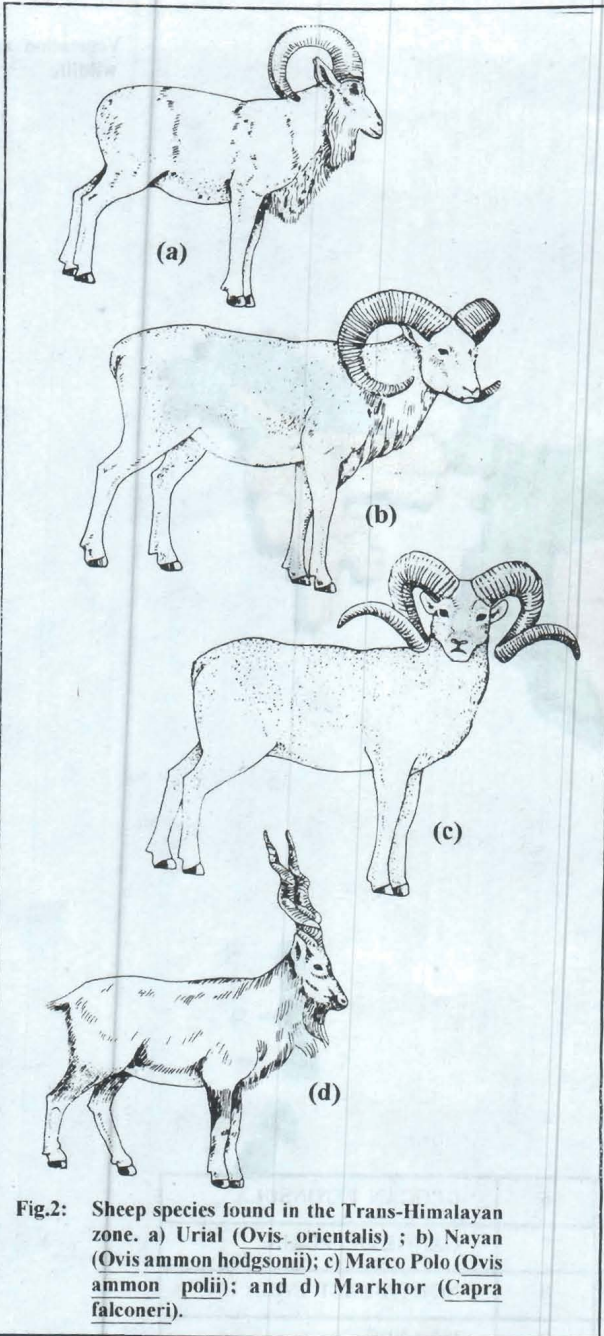


Fig.2: Sheep species found in the Trans-Himalayan zone. a) Urial (*Ovis orientalis*); b) Nayan (*Ovis ammon hodgsonii*); c) Marco Polo (*Ovis ammon polii*); and d) Markhor (*Capra falconeri*).

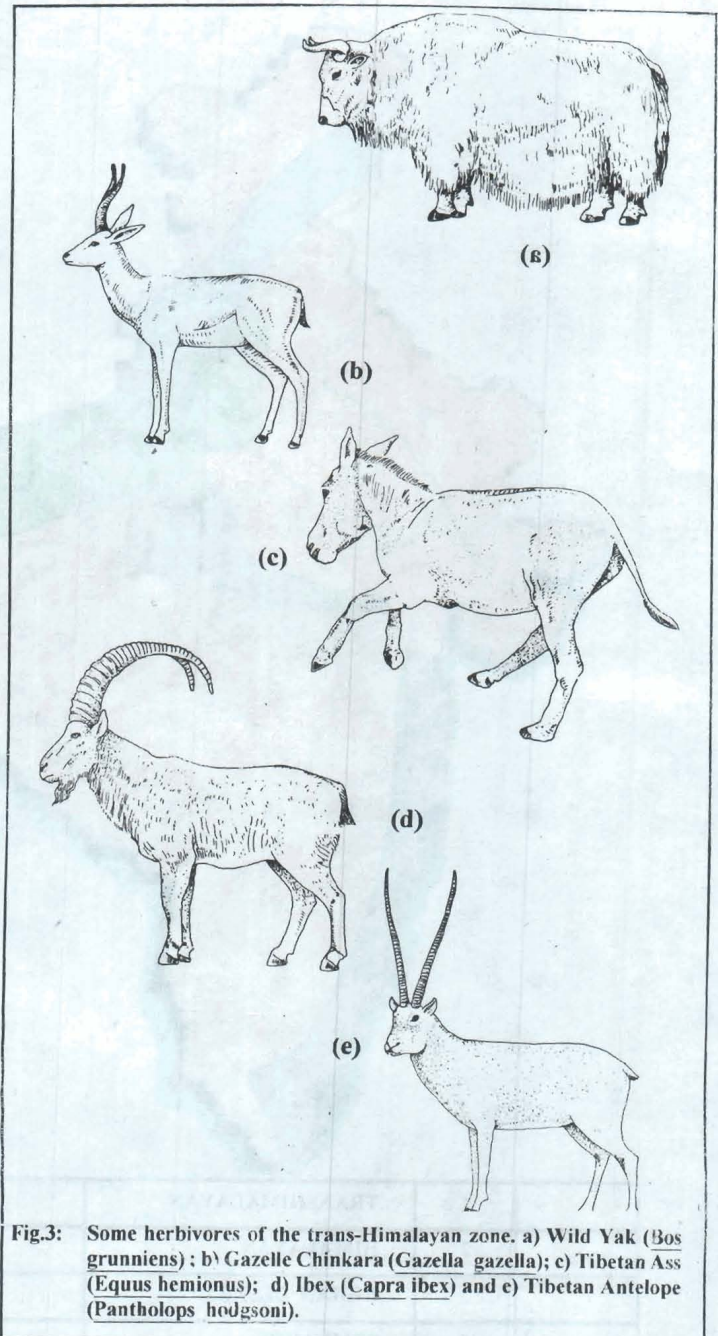


Fig.3: Some herbivores of the trans-Himalayan zone. a) Wild Yak (*Bos grunniens*); b) Gazelle Chinkara (*Gazella gazella*); c) Tibetan Ass (*Equus hemionus*); d) Ibex (*Capra ibex*) and e) Tibetan Antelope (*Pantholops hodgsoni*).

### 26.2.2 Zone 2: The Himalayas

The Himalayan mountain ranges in India stretch for over 2,000 km from arid Mediterranean areas in the west, to the wet Chinese-Malayan areas in the east. This zone covers an area of 236,300 sq km in India, and forms about seven per cent of the country's total land surface. The environment here is extremely harsh, as there are steep slopes, unconsolidated soils and intense rainfall. Moreover, the pressures of human habitation, and the demand for timber, firewood and food are intense. All these factors have led to rapid degradation of this ecosystem that has taken toll of the biological resources occurring here. There are more endangered species in the Himalayas than anywhere else in India.

#### The Wildlife of the Himalayan Zone

The Himalayan zone is one of the richest areas of India in terms of habitat and species diversity. It shares its boundaries with many other ecosystems (see Fig. 1). The wildlife is so diverse that we need to look at it along its altitudinal and longitudinal ranges, and also along its east-west axis.

First let us look at the wildlife within the altitudinal and longitudinal range of Himalayas. These are:

Vegetation and  
wildlife

- (i) The **lower sub-tropical foot-hills**. These have typical mixed deciduous community merging into Chir Pine (Fig.5a) and then Ban Oak. The fauna consists largely of Sambar, Muntjac, Wild Boar (Fig.6a-c), Black Bear, Goral (Fig. 6d) and Kalij Pheasants. Deciduous community refers to plants that shed their leaves seasonally.
- (ii) The **temperate areas**. These lie below 3,500 m. This zone has a complex mixture of vegetation types with forests of Maples (Fig.5b) and Walnuts, Moru and Oak (Fig.5c), and a variety of conifers such as the Blue Pine, Fir and Spruce (Fig.5d-g). All these grow in an altitudinal sequence. The fauna consists of Musk Deer (Fig.6e), Serow (Fig.6f), Koklas and Monal pheasants. In winters, the high altitude fauna such as Tahr (Fig.6g) move to these areas.
- (iii) The **sub-alpine area**. This area has forest and scrub vegetation of Birch and Rhododendrons (Fig.5h) interspersed with grasslands with several kinds of herbs. These communities merge into the alpine communities, with sparser cover to over 5,000 m, where only rocks and snow dominate. Here, Musk Deer, Serow and Tahr share the lower ranges with Bharal, and in the west Ibex are more common at higher levels. Along with altitude, the Pheasants of wooded areas give way to the Snowcock. The Panther gives way to the Snow Leopard and Wolf. The Black Bear is replaced by Brown Bear.

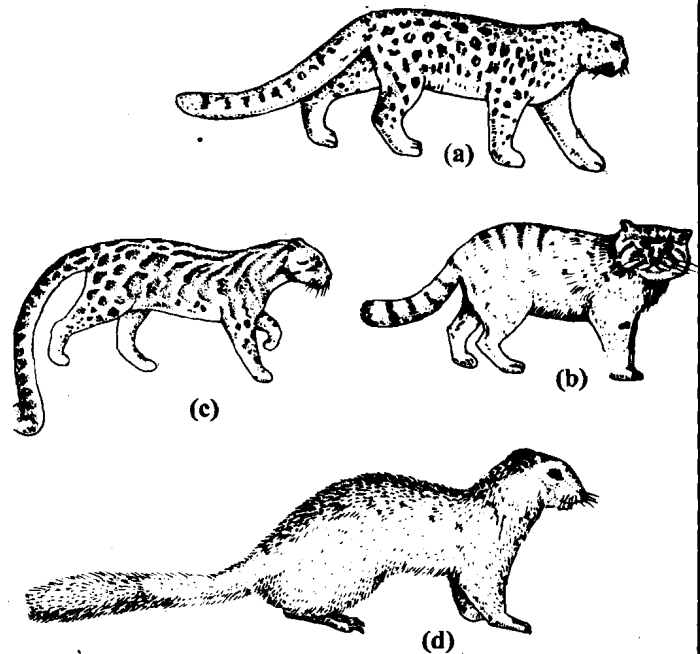


Fig.4: Some carnivores of the trans-Himalayan zone, a) Snow Leopard (*Panthera uncia*); b) Pallas's Cat (*Felis manul*); c) Marbled Pole Cat (*Felis marmorata*); and d) Marmot (*Marmot caudata*).

On moving along the east-west axis characteristic communities can be seen as well. We divide this axis in three sub zones, i.e., the western, central and the eastern zones.

- (i) **The Western Zone:** This is a comparatively drier area with Deodars (Fig.7a) and Blue Pines. In addition, there are vast expanses of grassy meadows. Several species of Bovids are typical of this area. These include the Bharal, Ibex, Markhor, Goral, Serow and Tahr. The Tahr is now missing from Kashmir. The Hangul which is a sub-species of Red Deer is restricted to this area.
- (ii) **The Central Zone:** There is a poor representation of large herbivores. The Ibex, Markhor and Hangul populations have dwindled to nil. The Sikkim Stag is now thought to be extinct in the Indian territory.
- (iii) **The Eastern Zone:** The Brown Bear, Bharal and Tahr found in other areas are absent here. Mishmi Takin a herbivore, is found here (Fig.8a). This area has a higher tree line, and supports arboreal forest animals at higher altitudes. The Binturong, Red Panda (Fig.8b,c) and Lesser Cats are the characteristic eastern faunal elements found here. The Orchids are profuse (two examples shown in Fig.7b,c) and the alpine areas have an abundance of dwarf Rhododendrons that are shrubby.

Arboreal animals – the ones living on trees.

Endemism is high in nearly all groups of plants and animals found here. Though some species are widespread along the Himalayas, others have tiny restricted ranges. In addition to the endemic species there are quite a few endangered species also. As mentioned earlier, this area is regarded as a highly degraded ecosystem. Many large mammals are on the endangered species list. There are indications that the Sikkim Stag is lost from the Indian territory. All evidences indicate that the Tahr may have disappeared from Kashmir as may have the Western Tragopan. The populations of Markhor, Tahr and Serow have dwindled to low densities. The Hangul Stag is virtually restricted to a protected area only.

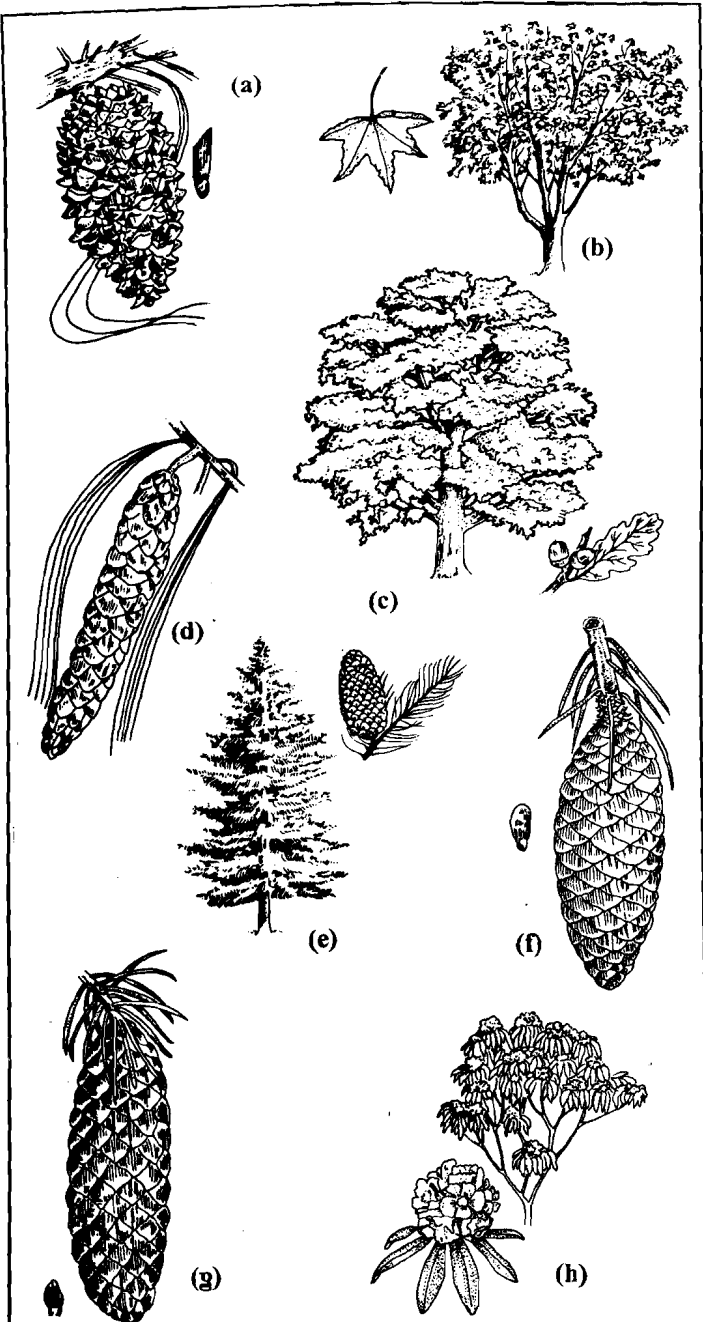


Fig.5: Some representative members of the Himalayan vegetation. a) Chir Pine (*Pinus roxburghii*) - a cone; b) Maple (*Acer* sp.); c) Oak (*Quercus* sp.); d) Blue Pine (*Pinus wallichiana*) - a cone; e) Fir (*Abies* sp.), Tree and a cone; f) Spruce (*Picea smithiana*) found in Western Himalayas, a cone; g) Spruce (*Picea spinulosa*) from Eastern Himalayas, a cone; h) Rhododendron (*Rhododendron* sp.)

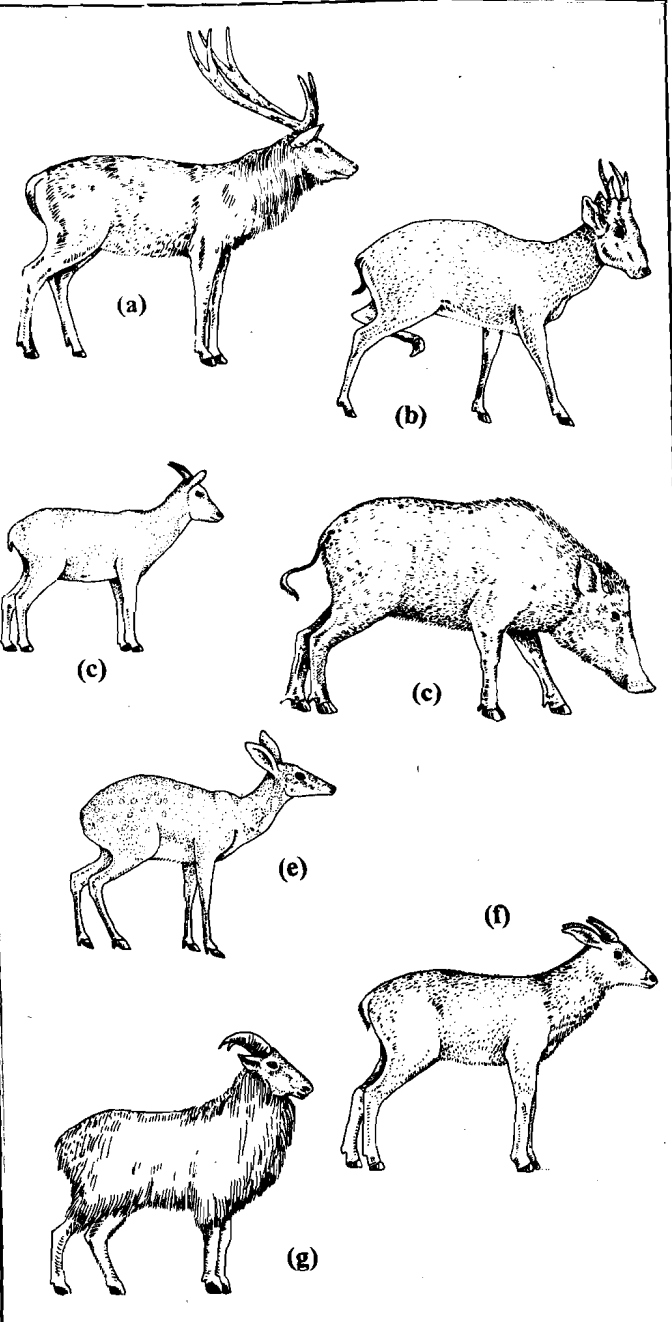


Fig.6: Some wildlife species distributed along the altitudinal and longitudinal range of Himalayas. a) Sambar (*Cervus unicolor*); b) Muntjac (*Muntiacus muntjak*); c) Wild Boar (*Sus scrofa*); d) Goral (*Nemorhaedus goral*); e) Musk Deer (*Moschus moschiferus*); f) Serow (*Capricornis sumatraensis*); and g) Tahr (*Hemitragus jemlabicus*).

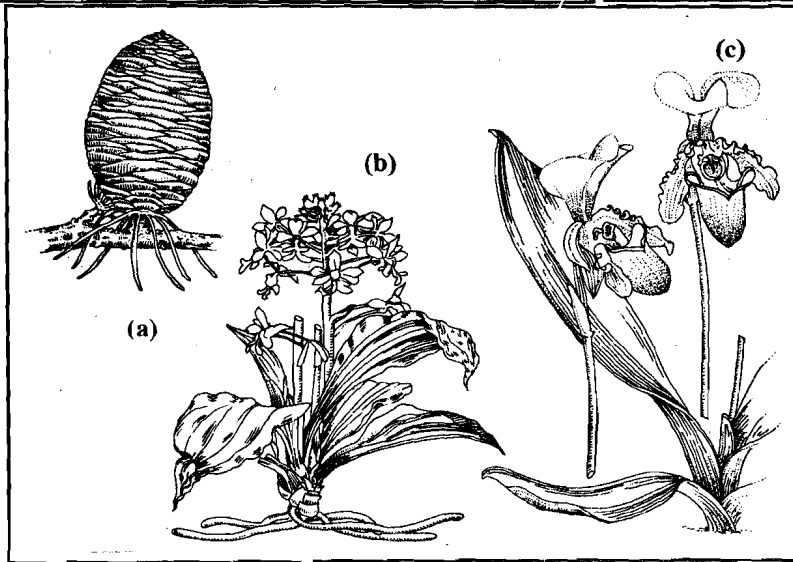


Fig.7: a) Deodars, *Cedrus deodara* predominates the western zone of Himalayas. b,c) Orchids constitute characteristic vegetation of the Eastern Himalayan zone. b) *Calanthe triplicata*, and c) *Paphiopedilum spicerianum*.



### 26.2.3 Zone 3: The Indian Desert

This zone is located in the western part of the country and is also known as the Thar desert. It covers west Gujarat and west Rajasthan. Parts of Punjab and Haryana were once a part of this desert, but the irrigated cultivation has changed the situation there. Biogeographically, the Thar is the eastwards extension of the Sahara-Arabian desert system spread through Iran, Afghanistan, Baluchistan to the India-Pakistan border. Because of the extreme seasonality of rainfall and extreme livestock pressures, it is a fragile ecosystem.

#### The Wildlife of the Indian Desert

The wildlife of the desert zone is peculiar not because of its great diversity or density, but because of the extraordinary ecological adaptations to the desert conditions. Several of the species are endemic to the Thar Desert. A distinct sub-species of Wild Ass is confined to the Rann of Kutch. Its populations in Pakistan have dwindled away. Besides this, the Desert Fox, Desert Cat (Fig.9a), Houbara Bustard and some Sand Grouse species

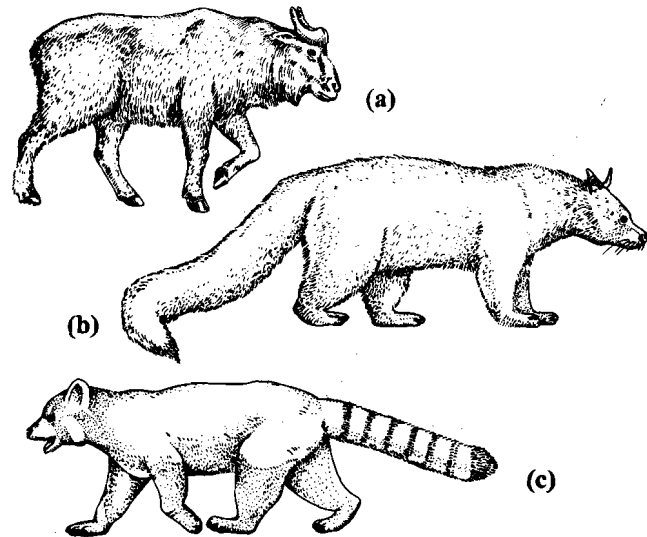


Fig.8: Some animal species of the Eastern Himalayas. a) Takin (*Budorcas taxicolor*); b) Binturong (*Arctictis binturong*); and c) Red Panda (*Ailurus fulgens*).

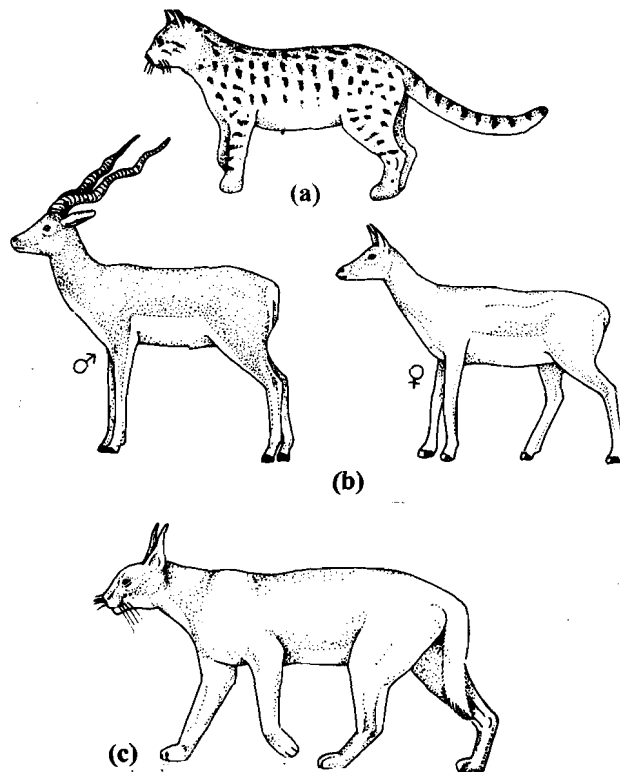


Fig.9: a) Desert Cat (*Felis libyca*); b) Blackbuck (*Antelope cervicapra*) male (♂) and female (♀); and c) Caracal (*Felis caracal*).

are restricted only to the Thar area. This region also has the exclusive breeding sites of birds like the Flamingoes (Fig.10a) in the Indian sub-continent breed chiefly in the Rann of Kutch. In addition, there are many species, that are in the endangered species' list. For example, the Chinkara, Blackbuck (Fig.9b), Wolf, Caracal (Fig.9c) and Great Indian Bustard (Fig.10b), have significantly numbered populations in this zone. The plant communities are very peculiar. Within the Rann of Kutch, extensive areas are subjected to saline or brackish flooding every monsoon and there appears a typical salt marsh-salt bush plant community of halophytes. *Prosopis cineraria*, *Salvadora oleoides* are common trees of Indian deserts. Human inhabitation has modified much of the desert area, and as a result, exotic species as *Prosopis juliflora* (Fig.11) are becoming increasingly widespread.

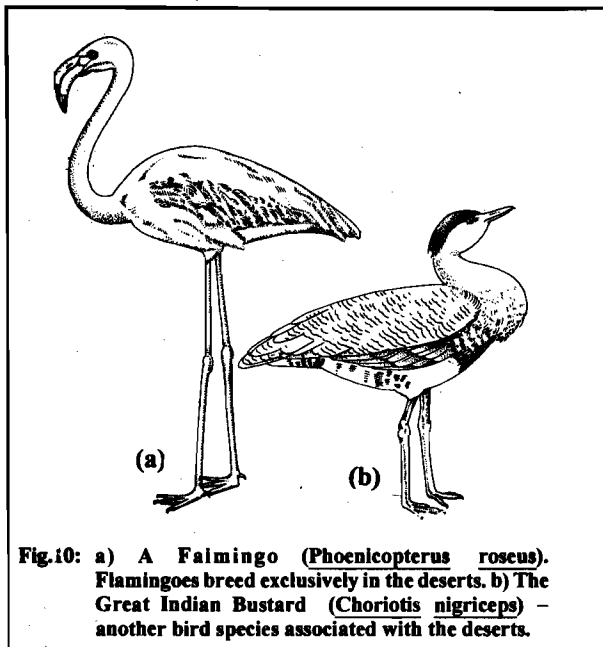


Fig.10: a) A Faimingo (*Phoenicopterus roseus*). Flamingoes breed exclusively in the deserts. b) The Great Indian Bustard (*Choriotis nigriceps*) – another bird species associated with the deserts.

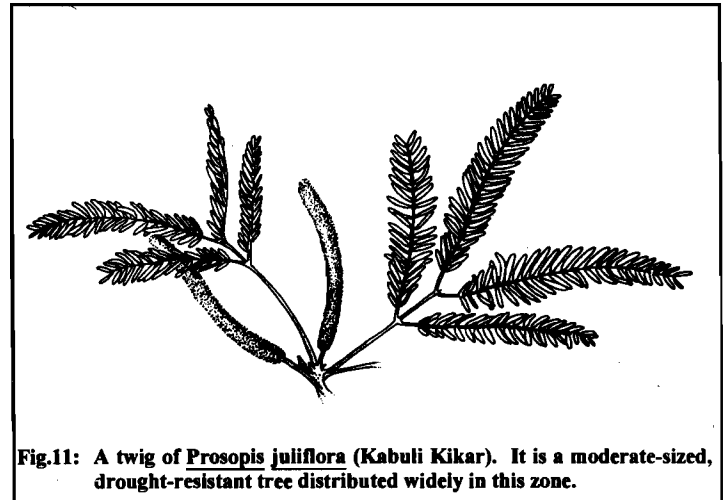


Fig.11: A twig of *Prosopis juliflora* (Kabuli Kikar). It is a moderate-sized, drought-resistant tree distributed widely in this zone.

#### 26.2.4 Zone 4: The Semi-Arid

This zone with an area of 508,000 sq km occupies 15% of the total area in our country. The presence of several grass species and palatable shrubs in these areas has made them a favourite of a vast number of wildlife species. This zone shares common boundary with Western Gujarat and Rajasthan, Maharashtra; and includes areas of Punjab, Haryana and Madhya Pradesh.

##### The Wildlife of the Semi-Arid Zone

This zone has strong biological links with western Asia, primarily with Pakistan, Iran, Middle-east and Northern Africa. Many of the plants found here show African affinity, e.g., *Acacia* sp., *Anogeissus* sp., *Balanites* sp., *Capparis* sp., and *Grewia* sp. (see Fig.12). One can see pure gregarious forests of *Anogeissus pendula* along the gentler slopes of Aravalli and associated hill ranges. This is the only area where it occurs in this form. Outside this area, *A.pendula* occurs in north Madhya Pradesh, mixed with teak.

The fauna consists of larger herbivores – Blackbuck, Chowsingha, Gazelle and Nilgai (Fig.13a). The Sambar is restricted to the wooded hills and Chital to the moist valley areas. Amongst the carnivores, the Asiatic Lion is restricted to a small area in Gujarat whereas Cheetah is now extinct. Many of the species found here are in very low densities, and these are of conservation interest, e.g., Caracal, Jackal, Wolf, Sloth Bear (Fig.13b), Blackbuck, Great Indian Bustard, Lesser Florican (Fig.13c), Flamingoes and both resident and migratory species of waterfowl. The rivers and lakes too have prominent forms such as the Crocodile – Mugger and Gharial, and turtle populations. The largest population of Star Tortoise are seen in this zone.

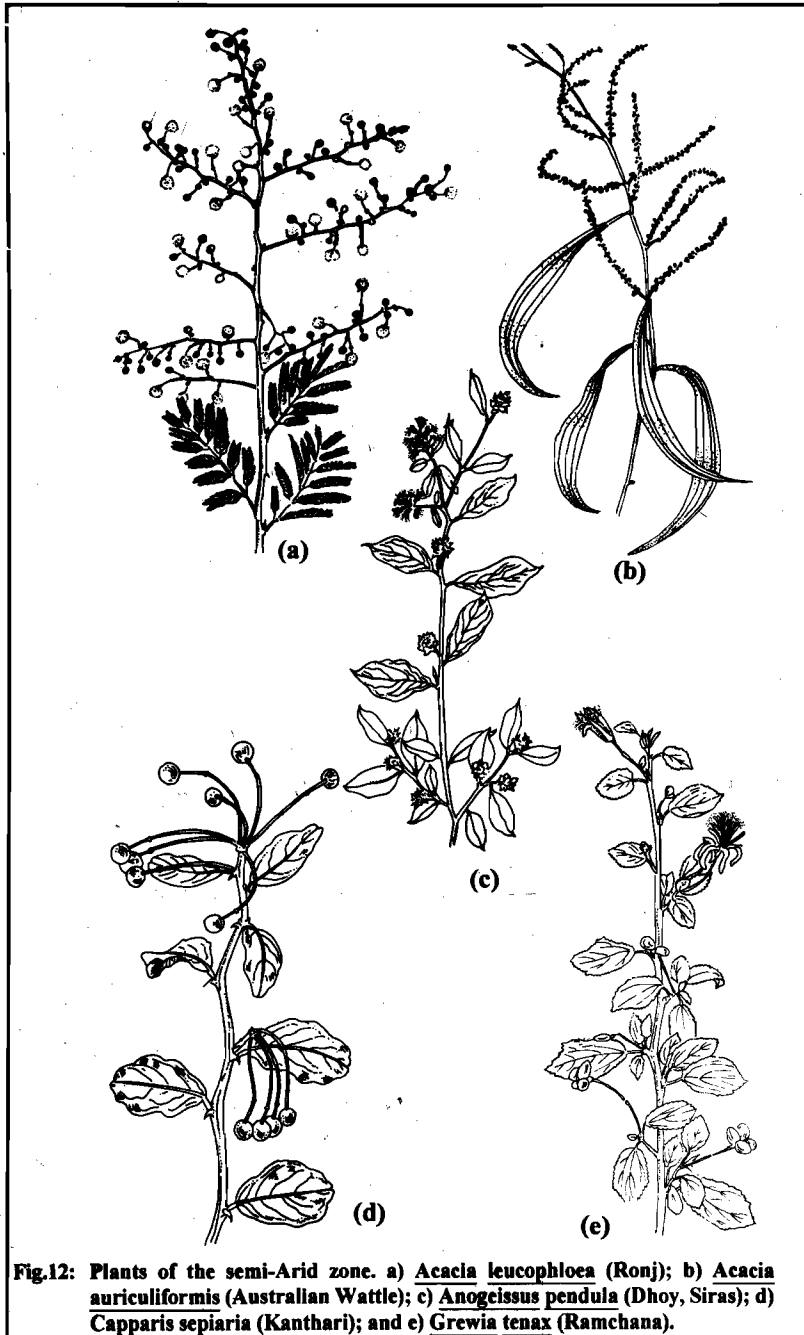


Fig.12: Plants of the semi-Arid zone. a) *Acacia leucophloea* (Ronj); b) *Acacia auriculiformis* (Australian Wattle); c) *Anogeissus pendula* (Dhoy, Siras); d) *Capparis sepiaria* (Kanthari); and e) *Grewia tenax* (Ramchana).



## 26.2.5 Zone 5: The Western Ghats

The Western Ghats represent one of the major tropical evergreen forest regions in India. The total area of Western Ghats is about 160,000 sq km. In the west, the zone is bound by the coast and in the east, it shares boundary with the Deccan peninsular zone. The tropical evergreen forests occupy about one third of the total area of this zone. In recent years, a large chunk of the forest cover has been lost and this zone is now of great conservation concern, more so because of its exceptional biological richness. About two-thirds of India's endemic plants are confined to this region. However, the potential of many of these species is yet to be tapped. Besides harbouring diverse biological communities, the forests in this zone also play an important role in maintaining the hydrological cycle.

### The Wildlife of Western Ghats

The Western Ghats have a stretch of about 1,500 km, encompassing a considerable gradient of temperature and rainfall, which produces several species associations. Longitudinally, the Ghats extend from sea-level in the west, rise abruptly to a highly dissected plateau up to 2,700 m in height and then descend, often equally abruptly to the dry Deccan plains below 500 m. This gradient produces a change from evergreen to semi-evergreen to moist deciduous to dry deciduous formations. This elongated mountain chain has been cut by wide valleys in a few places, preventing dispersal of less mobile species and encouraging local speciation. The major biogeographic barriers or forest gaps are the Moyar Gorge, Palghat Gap and Shencottah Gap separating the Nilgiri, Anamalai and Agastyamalai mountain blocks. After discussing the overall terrain of this zone let us discuss its plant life.

Out of the 15,000 odd species of flowering plants found in India, about 4,000 or 27% of the total, are found in this zone. And the Western Ghats constitute just 5% of the total land area!! Of these 4,000 species almost half of them (about 18,00 species) are endemic to this region.

We have mentioned earlier about the geographic variation in the 1,500 km stretch of this zone. Likewise, the evergreen forest formation is also not uniform down the length of the Ghats. The distinctive divisions recognised by their dominant species, are described in Table 1.

Table 1: The Major Vegetation Types Occuring Along the Stretch of the Western Ghats.

| S.No. | Vegetation  | The Affecting Factors                       |
|-------|---|---|
| 1)    | <i>Briedelia - Syzygium - Ficus - Terminalia</i>  | Winter temperature and length of dry season |
| 2)    | <i>Memecylon - Syzygium - Actinodaphne</i>        |   |
| 3)    | <i>Persea - Holigarna - Diospyros</i>             |   |
| 4)    | <i>Dipterocarpus - Mesua - Palaquium</i>          |   |
| 5)    | <i>Cullenia - Mesua - Palaquium</i>               |   |
| 6)    | Montane 'Shola' forest                            | Higher altitudes                            |
| 7)    | Riverine/Swamp forest, <i>Myristica</i> (Fig. 14) | Water-logged valleys                        |



Fig. 14: A twig of *Myristica* along with a fruit.

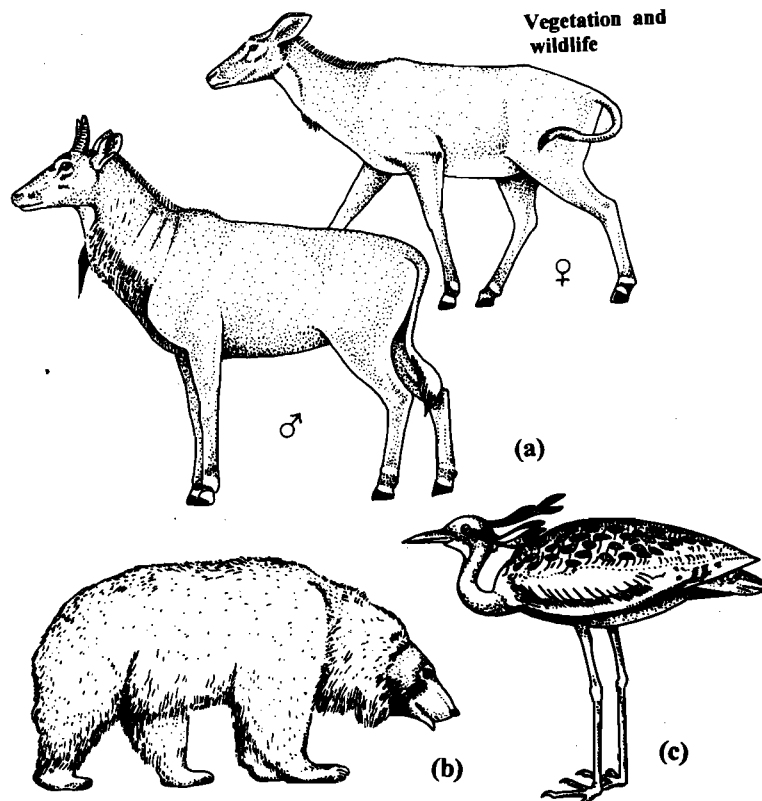


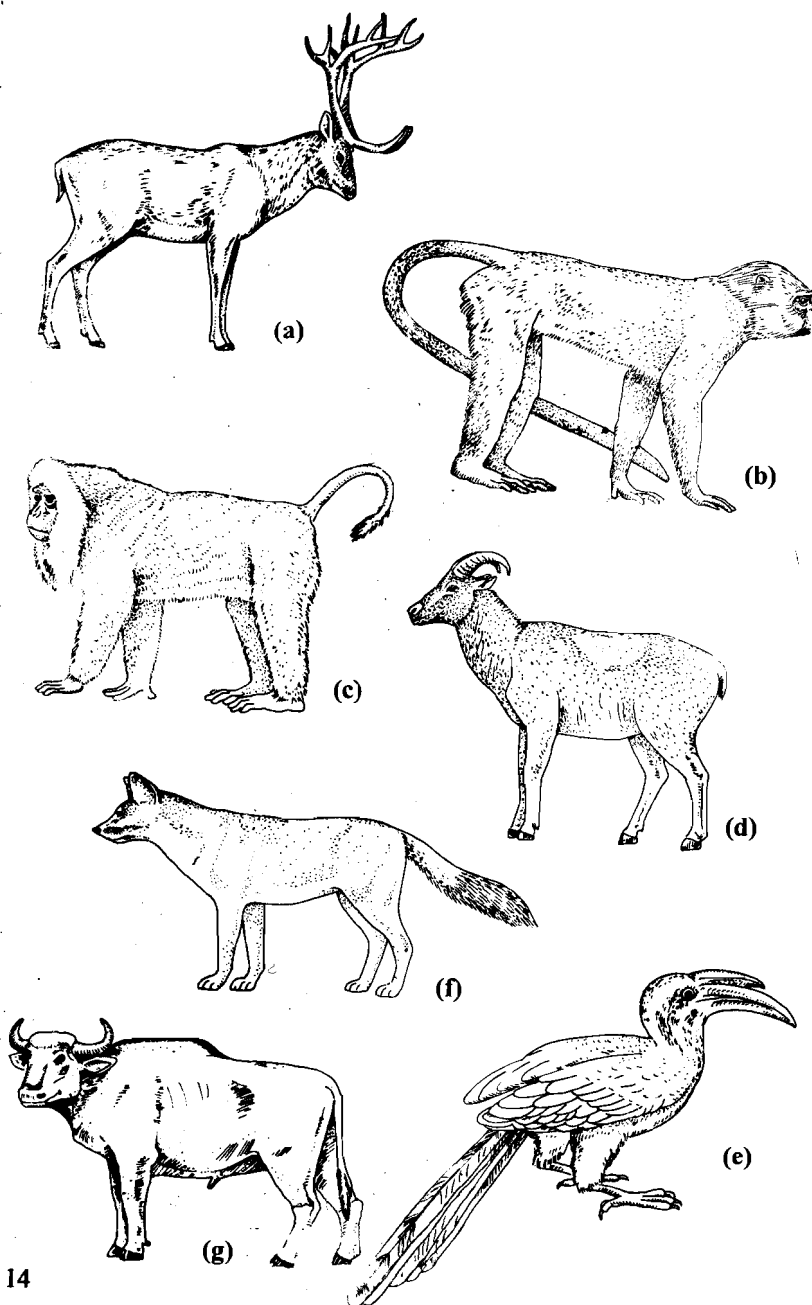
Fig.13: Some faunal elements of the semi-arid zone. a) Nilgai (*Boselaphus tragocamelus*), female (♀) and male (♂). b) Sloth Bear (*Melursus ursinus*); and c) Lesser Florican (*Sypheotides indica*).

Although these forests have great ecological similarity with the forests in North-east India and Andamans, they are very different in terms of species composition. Of the total 29 species of the timber family Dipterocarpaceae, 13 are found only in the Western Ghats and nowhere else. Of these, 4 species are highly localized endemics of conservation concern. One species, *Hopea jacobii* has not been recollected for more than half a century now. These species constitute an exceedingly important genetic stock for timber improvement.

Now let us have a look at the faunal elements of this zone. This zone has fairly good populations of most of the vertebrate species found in Peninsular India, along with an endemic faunal element of its own. The only large mammals missing are the arid bovid group of Gazelle, Blackbuck, and Nilgai with associated lesser fauna, and the moist grassland fauna of Swamp Deer (Fig. 15a) and Buffalo.

**Genera and Species - Genera plural, genus singular. Species same in plural and singular form. In Human beings or *Homo sapiens*, *Homo* refers to the genus and *sapiens* refers to the species. Note the genus is the same but only the species differ in the ancestors of man - *Homo erectus*, *Homo habilis*, *Homo kanamensis*.**

Within the vertebrates, endemic taxa are found in all the groups. The proportion of endemic taxa in amphibians is exceptionally large, i.e., almost half the genera and most species are endemic. Some of them are extremely localised. Even the freshwater fish fauna is of interest as endemic taxa, and has affinity to the taxa in north-east India. These have been important in the formulation of Hora's Satpura Hypothesis in the development of Indian biogeographic thought. Several reptiles and bird species are restricted to the Ghats. The Travancore Tortoise and Cane Turtle are two endangered taxa restricted to a small area of Central Western Ghats, also known as the Coorg-Travancore. There are 62 mammal genera in the zone, one of which, a rodent is endemic. There are several instances of linkages of biogeographic interest: with the Himalayas, e.g., the Tahr; with North-east India; and with Sri Lanka.



The well known species found exclusively in Western Ghats include the following:

Among Primates - Nilgiri Langur and Lion-tailed Macaque (Fig. 15b,c).

Rodents - *Plataconthomys*, the Spiny Dormouse of the southern ghats.

Squirrels - Several subspecies of *Ratufa indica* with separate forms in Maharashtra, Mysore, Malabar and Tamil Nadu Ghats. The Grizzled Squirrel is restricted to two localities in the drier Tamil Nadu forest.

Carnivores - Malabar Civet in southern evergreen forests, Rusty Spotted Cat in northern deciduous forests.

Ungulates - Nilgiri Tahr (Fig. 15d) in Nilgiris to Agastyamalai montane grassland.

Hornbills - Malabar Grey Hornbill (Fig. 15e).

In addition to the above endemic species, the other species found are: Tiger, Leopard, Dhole (Fig. 15f), Sloth Bear, Indian Elephant and Gaur (Fig. 15g).

### 26.2.6 Zone 6: The Deccan Peninsula

This zone covers the largest area in India that amounts to about 43% of the total land mass, and about 1,421,000 sq km area. Though a large area of this zone has been greatly altered by humans, still some forest areas exist, particularly in Madhya Pradesh, Maharashtra and Orissa.

**Fig.15: The faunal elements of Western Ghats. a) Swamp Deer (*Cervus duvauceli*); b) Nilgiri Langur (*Presbytis johni*); c) Lion-tailed Macaque (*Macaca silenus*); d) Nilgiri Tahr (*Hemitragus hylocrius*); e) Malabar Grey Hornbill (*Tockus birostris*); f) Dhole (*Cuon alpinus*); and g) Gaur (*Bos gaurus*).**

This zone has deciduous forests, thorn forests and degraded shrublands. There are small areas of semi- evergreen forests in the Eastern Ghats and, dry evergreen forests or thorn scrub on the coastal side of the plains of Andhra Pradesh and Tamil Nadu.

The Northern zone has forests dominated by the trees like Sal, especially in the North-east, Teak (Fig. 16), and miscellaneous species - (*Terminalia* - *Anogeissus* - *Chloroxylon*). The southern half of the zone has dry, thorn forests having *Acacia* - *Albizzia amara* and *Hardwickia* associations. The natural grasslands are rare.

The faunal species are widespread throughout the whole zone, e.g., Chital (Fig.17a), Sambar, Nilgai, Chowsingha, Barking Deer, and Gaur. Some species such as the Blackbuck are restricted to dry open area. Small, relict populations of species also exist, e.g., Elephant (Bihar-Orissa, and Karnataka-Tamil Nadu) and Wild Buffalo (in a small area at the junction of Orissa, M.P. and Maharashtra). The Hard Ground Swamp Deer is now restricted to a single locality in M.P. The Gharial is restricted to a few rivers flowing to the Ganges and one area in the Mahanadi river. Amongst the carnivores, the Rusty Spotted Cat has few small populations in Central India. Low density populations of Wolf are seen in the drier areas. The Tiger, Leopard, Sloth Bear, Gaur, Sambar, Chital, Chowsingha, and Boar are present in sufficiently high densities, particularly in the deciduous areas.

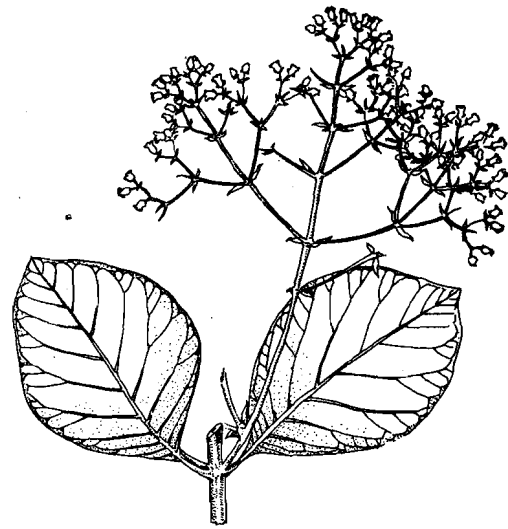


Fig.16: A flowering twig of Teak - *Tectona grandis*.

Considering the floral elements, this zone exhibits many interesting features. The Central Hill Ranges mark the beginning of a temperate flora at higher altitudes, and the Eastern Ghats harbour some endemic forms, which include the birds like the Hill Myna (Fig. 17b), lesser vertebrates and invertebrates. The valuable, endemic plant resources such as the Red Sanders and Sandalwood are of immediate conservation concern. Similarly, there is also a need for conservation measures for the species - Moist Teak, Southern and Coastal Sal, Umbrella Thorn, and especially Orissa semi-evergreen communities and dry evergreen forest.

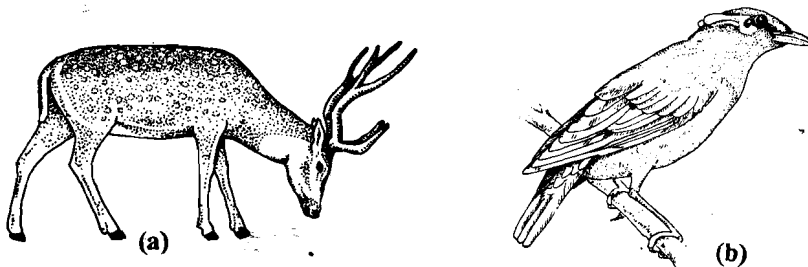


Fig.17: a) Chital (*Axis axis*); and b) Hill Myna (*Gracula religiosa*) - found in the Deccan Peninsula.

### 26.2.7 Zone 7: The Gangetic Plain

This zone has one of the most fertile areas in the world, and it supports a dense and growing human population. It covers an area of about 359,400 sq km. The original vegetation found in most of the area is no longer there, as a major portion of this area has been brought under cultivation. This zone is topographically homogeneous for hundreds of kilometers. The only natural vegetation and wildlife is found in the north, in the Shivalik Hills and the adjacent Bhabar and Terai-Duar tracts. This zone has a large number of lakes and seasonal swamps. These have usually escaped drainage. This area is the habitat for migrating waterfowl.

## The Wildlife of the Gangetic Plains

Centuries ago, this area was rich in wildlife consisting of Rhinoceros, Elephant, Buffalo and Swamp Deer. With the passage of time, their populations declined and disappeared as more and more area was brought under agriculture. However, small relict populations of Nilgai, Blackbuck and Chinkara, interspersed with dense cultivation presently exist in the western areas. The northern Terai grasslands have populations of Swamp and Hog Deer (Fig.18a) in a few places. The Rhinoceros, Bengal Florican, and Hispid Hare are found in low numbers in the Eastern Terai or Duars. The Sambar-Chital community is found in the Bhabar forests, with Goral in the areas with steeper slopes. These along with the Kaleej Pheasant shows the beginning of a transition to Himalayan conditions.

As mentioned earlier, this area is a major winter feeding ground for the migratory waterfowl which occurs in exceptional density and richness here. The wetlands and rivers also contain Crocodile – Mugger and Gharial populations, relict populations of Gangetic Dolphin (Fig. 18b) and a rich, fresh-water turtle community having over 20 species.

### 26.2.8 Zone 8: North-East India

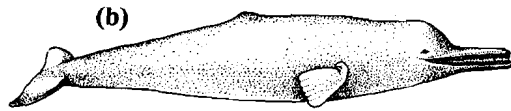
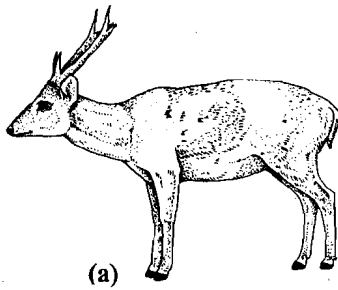


Fig.18: a) Hog Deer (*Axis porcinus*); b) Gangetic Dolphin (*Platanista gangetica*) – found in the Gangetic Plains.

North-East India represents the transition zone between the Indian, Indo-Malayan and Indo-Chinese regions as well as the meeting point of Himalayan mountains and Peninsular India. It is one of the most important zones in the Indian Subcontinent for its rich biological diversity and a large number of its species are endemic to this zone. It is not only the species of plants that are diverse, but also the animals exhibit a species richness not found anywhere else in the world. It has an area of about 171,423 sq km and includes the states of Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura. About 40% of this area is occupied by forests.

The diverse habitat conditions along with the long term geological stability have contributed to the development of endemic plant and animal groups. Many of the species contributing to the biological diversity of North-East India are restricted to the region itself, or to even smaller localised areas such as in the Khasi Hills.

The North-East alone has the original habitat that once was the common habitat of north India. The Brahmaputra valley of this zone contains unique natural vegetation – swamps, grasslands and fringing woodlands and forests. It is in these regions that the full richness of the large herbivore fauna typically found in such grasslands can be seen. The fauna consists of Rhinoceros, Buffalo, Swamp Deer, Hog Deer, Pygmy Hog and Hispid Hare. This area also contains the largest elephant populations. This is also the fly-way for waterfowl and other birds travelling between the warmth of the subcontinent and their summer grounds in Siberia and China. This zone is still poorly explored biologically and many species remain to be discovered and described. There is immense potential for greater biological values to be documented.

The North-Eastern units have biological affinity with the Indo-Chinese and Indo-Malayan areas to the east and south-east. Many species are shared and there is a gradual interchange from one region to the next. Brahmaputra river itself is a dispersal barrier for several species of animals as well as of plants. For example, Golden Langur (Fig.19a), Hispid Hare and Pygmy Hog are restricted to the north bank; Hoolock Gibbon (Fig.19b) and Stump-Tail Macaque are restricted to the south bank. Amongst evergreen forests, dominant canopy tree – *Mesua assamica* is found only on the north bank; *Dipterocarpus macrocarpus* and *Shorea assamica* are found only to the south.

Within the Assam Hills, two further gradients of variations exist: an altitudinal gradient, and a rainfall gradient.

- 1) An altitudinal gradient going from below 300 m at the southern foot of Meghalaya plateau, to around 1960 m at the highest point in Meghalaya, and to 3200 m in the highest point in the whole province on the Burma border in Manipur. This altitudinal range encompasses tropical evergreen and semi-evergreen forest, tropical moist deciduous forest, subtropical hill forest and temperate forest communities. The higher reaches of Manipur virtually show a sub-alpine shrub community.



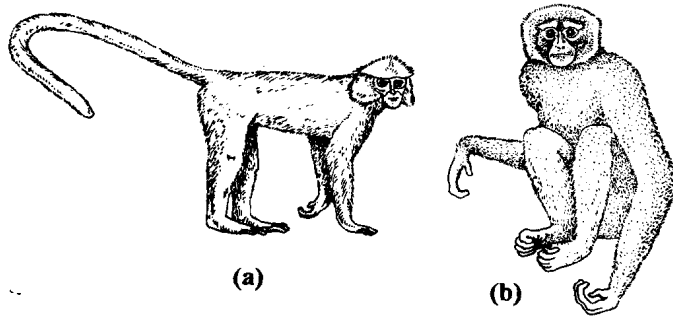


Fig.19: a) Golden Langur (*Nycticebus coucang*); and b) Hoolock Gibbon (*Hylobates hoolock*) found in the North-East India.

- 2) A rainfall gradient from exposed southern slopes, e.g., in south Meghalaya at Cherrapunji with average annual precipitation of over 11,000 mm, to sheltered rain-shadow slopes with precipitation below 1,500 mm p.a. Of the endemics, members of Magnoliaceae occur in restricted areas, whereas Balsiminaceae has wider distribution.

Meghalaya is known for its botanical value, most of which are high altitude Oak forests of Shillong-Cherrapunji plateaux. The area near Tripura-Mizoram border has exceptional wildlife species diversity with four rare primate species: Hoolock Gibbon, Leaf Monkey and both Pig-tailed and Stump-tailed Macaque.

### 26.2.9 Zone 9: The Islands

In this category we shall discuss the Andaman and Nicobar group of islands in the Bay of Bengal, and the Lakshadweeps in the Arabian Sea. The Andaman and Nicobar islands are a long group of 348 islands north-south oriented. They have a total land area of about 8,327 sq km, stretching for about 590 km. The Andamans are separated by shallow continental waters from the Burma-India coast, and the Nicobars are separated from the mainland - the Andamans, and also internally from each other by channels of about 800 m depth. These islands are actually the extensions of the Arakan Mountain range of Burma and they have several peaks over 500 m. The Barren and Narcondam Islands are volcanic, and are believed to be still active. The Andamans exhibit biogeographical affinity with Burma. And the Nicobar islands that are about 90 km from Sumatra show strong biogeographic closeness to South-east Asia. The Andaman and Nicobar Islands are one of India's three tropical moist evergreen forest zones. These islands are isolated and show linkages to the east. Their endemic flora and fauna, not found anywhere in India, make them unique in many ways.

#### The Wildlife of the Andaman and Nicobar Islands

Before discussing the wildlife, we shall briefly look into its biogeographic locations. The Andaman group of islands include 324 islands covering about 6,491 sq km area. Most of the area is taken up by the 'Great Andamans' comprising 5 islands separated by creeks. These are: North, Middle, South Andamans; and Baratang and Rutland Islands. Little Andaman is some distance away to the south. The Nicobar group is much smaller with only 24 Islands. It has 3 major subdivisions the North Group; Teresa, Tilangchong, Kamorta; Little Nicobar and Great Nicobar.

This zone possesses a unique kind of plant and animal life exhibiting a high degree of endemism. One finds these islands with impoverished mammal fauna. This may be largely due to the isolation of Andaman and Nicobar Islands and the small island size. Amongst mammals, species of rodents and bats dominate. Centuries back, pigs were introduced in these islands, and these are now known as the 'Andaman Pigs'. Besides these, some other species like the Spotted Deer, Hog Deer, Barking Deer, Goats, Elephant, Sambar, Leopard and Palm-Civet (Fig.20a) are also present. Some of these species are flourishing very well on these islands, and are believed to be reducing the native fauna that includes certain ground nesting birds and common rat. The indigenous mammal species that need to be conserved include the Nicobar Macaque, also known as the Crab-eating Macaque, and a distinctive race of the widespread Long-tailed Macaque, the Nicobar tree-Shrew, and the Dugong (Fig.20b) found commonly in the coastal waters off the Andamans and Nicobars.

The avifauna consists of 255 distinct taxa of birds, of which 112 are endemic to these islands. Some of the peculiar examples include a mound building bird found in low densities around sandy shores and littoral forests, and the Nicobar Megapode. It is highly endangered. Another interesting endemic avi-species is the Narcondum Hornbill that is restricted to 7 sq km volcanic island 'Narcondum' to the east of Andamans. The Serpent Eagle, and the 'Andamans' or 'Grey

Teal' – a gregarious Duck of brackish and fresh water forest pools, is again restricted to Andamans and is highly endangered. It has been seen that many endemic species are restricted to 'dense evergreen forests' like the Nicobar Pigeon, Andaman Wood Pigeon (Fig.20c), Nicobar Parakeet and the Nicobar Crested Serpent Eagle (Fig.20d). The conservation of these endemic species calls for immediate preservation of their original habitats.

Reptiles and Amphibia: A large number of reptile and amphibian species are endemic to the islands. Many of these species await to be discovered and the behavioural ecology of many of these birds remains to be understood. Some of the interesting reptile and amphibian species include the salt-water Crocodile that is now restricted only to a few creeks in the north, middle and Little Andaman and Great Nicobar, and on some off-shore islands. The islands have 4 species of Marine Turtle – Green, Ridley, Hawks Bill and Leathery. Of these, the only nesting beach for Leathery Turtle in India presently is on the Nicobar Islands. Most of the Hawks Bill nesting areas and over half of the Green Turtle nesting area is in the Andaman and Nicobar Islands. The small population of Asiatic Box Turtle – a fresh water turtle, is a cause of concern.

The fish and coral life: The Andaman and Nicobar Islands show a variety of coastal variations such as the mangrove estuaries, sandy and muddy shores, coral reefs, lagoons, and marine cliffs. These waters are said to have the richest fish and coral communities in India. Several species of Dolphins are present and Whale sightings are frequent.

Plants: Out of the 15,000 species of flowering plants found in India, some 2,200 species are found in these islands (two such species are shown in Fig.21). Over 200 are strict endemics. Further, 1,300 species are found nowhere else in India, and these show closeness to the species of Burma, Malaysia and the Indonesian region. It implies that about 10% of India's 15,000 flowering plant species are restricted to the 8,000 sq km area of Andaman and Nicobar forests. Extensive data on the extent of forest cover in the region glaringly point out that the forest cover of Andamans has been reduced to half in the past 100 years. At this rate, about 20% of the total species, that is, about 400 species will disappear in coming times. And remember, these are found nowhere else in India!

The seven major categories of forest vegetation described by Champion and Seth\*, (1968) are: Evergreen Forests; Semi-evergreen forests; Hill Top Stunted Evergreen Forests; Moist Deciduous Forest, Swamp Forest and Mangrove Forests. In addition, there are some non-forest plant communities found on the beach strands – fresh water ponds and rocky cliffs. The Barren Island – a volcanic island – has a grass-scrubland cover. Smaller islets have

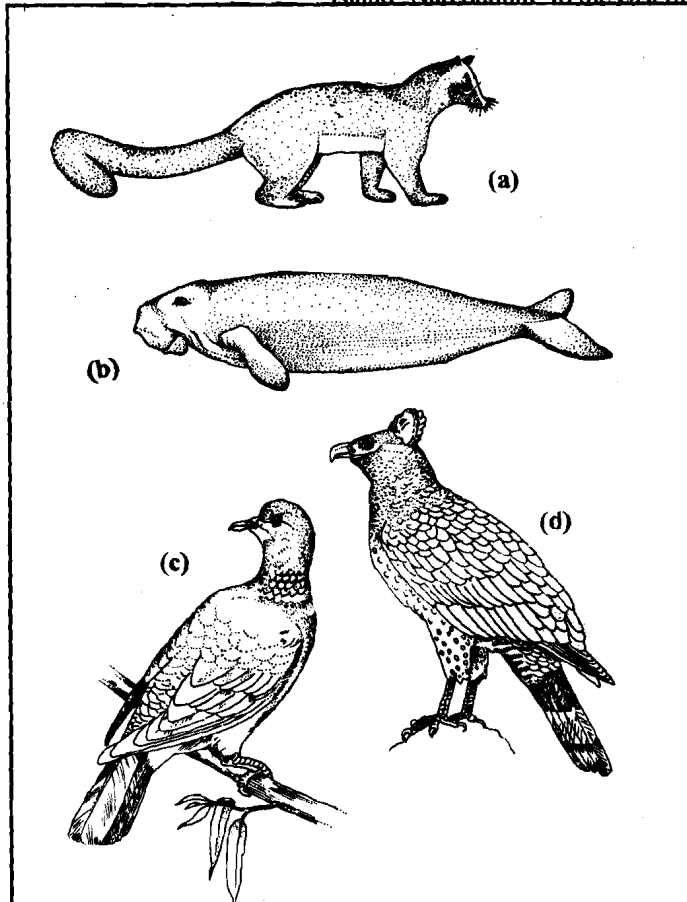


Fig.20: Some faunal elements of Andaman and Nicobar Islands. a) Palm-Civet (*Paguma larvata*); b) Dugong (*Dugong dugon*); c) Andaman Wood Pigeon (*Columba elphinstonii*); and d) Serpent Eagle (*Spilornis cheela*).

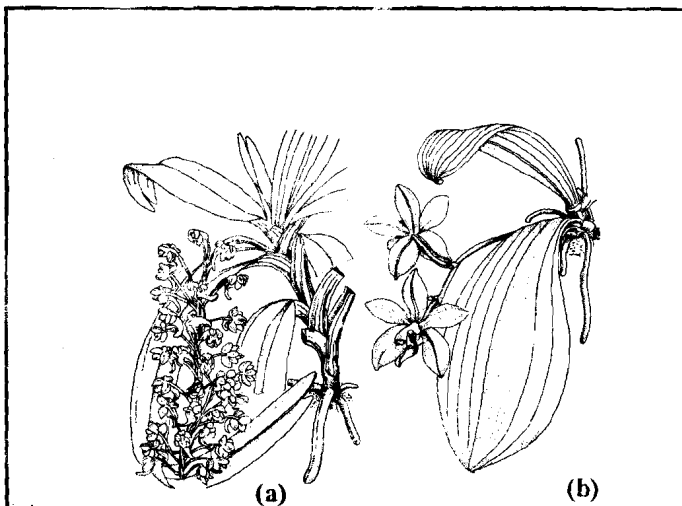


Fig.21: Two Orchid species of Andaman and Nicobar Islands. a) *Acridos emerici*; b) *Phalaenopsis speciosa*.

grass-spray sclerophyllous scrub. Many species of Andamans show affinities with Burma and North-East India. The Dipterocarpaceae is one such example with no affinity to its South Indian counterparts.

The Nicobars have affinities with Indonesia. They lack Dipterocarps, but have a high diversity of tree-ferns and Palms. The Orchid flora of Great Nicobar further lend support to their affinities

with their Indonesian counterparts. Out of the 36 species recorded, 21 are known nowhere in India except this region. Twenty of these species are restricted to the forests, and one is found on open hill-top rocky grassland in the forest hills.

The great biological resources of the Andamans have prompted the authorities to develop permanent field stations of the Botanical and Zoological Surveys of India in Port Blair.

#### The Lakshadweep Islands or Arabian Sea Islands

These islands comprise of some 25 islets, forming three main groups: Amindivi Islands in the north; Laccadive or Cannanore Islands in the centre, and Minicoy Island – a solitary island of about 175 km towards the south. These islands are of coral origin and have a typical reef lagoon system. They have a total land area of about 109 sq km including reef, bar and islets. Only 10 islands have permanently settled populations consisting of more than 25,000 people. The population density works out to be high, about 870 people per sq km. Now, most islands are planted with coconuts and not much natural vegetation is left. The major environmental threats to these fragile ecosystems include: the setting up of a cement factory that would use the fossil reef limestone commercial inshore fishing, and the demands put by tourism on the local resources.

Some of the smaller islands show a typical coralline rock-sand beach littoral vegetation of *Pandanus - Casuarina* and *Thespesia*. The reefs have excellent examples of tropical inshore marine ecosystems needing immediate protection. The shallow sea lagoons have marine angiosperm pastures that are Dugong's feeding grounds. These islands are also major feeding grounds for Turtles and there are some Green Turtle nesting sites also. Several oceanic bird species have resting sites on uninhabited islets, e.g., Brown-winged Tern, Noddy Tern, White-capped Noddy, Lesser Crested Tern and Sooty Tern. Some sea birds are so peculiar that they have chosen only two islets as their nesting sites. These are Pitti and Baliapani. Despite a ban on the collection of the eggs of these birds, people continue to illegally collect them.

#### 26.2.10 Zone 10: The Coasts

India has a vast coastal stretch of about 5689 km (Srinivasan, 1969)\*. On the west, the Arabian Sea washes the shores of Gujarat, Maharashtra, Goa, Karnataka and Kerala States. On the east, the Bay of Bengal washes the coasts of Sunderbans in West Bengal, Orissa, Andhra Pradesh and Tamil Nadu states. The southern promontory of Indian Peninsula is bathed by the Gulf of Manaar and Indian Ocean, along the coasts of southern portions of Tamil Nadu.

##### The Wildlife of Coasts

The geology of coasts is very varied and accordingly, five main communities have been described:

- a) Mangroves – that have a variety of community types from seaward to landward facing areas of estuaries, lagoons and deltas.
- b) Sandy beaches, including raised beaches and distinctive plant communities such as *Casuarina - Calophyllum - Pandanus*.
- c) Mud flats with a range of successional stages to completely terrestrial vegetation.
- d) Raised corals and rocky coast lines.
- e) Marine angiosperm pastures.

Some of the interesting coastal wildlife species include: Dugong; Hump-back Dolphin of estuarine turbid waters; Estuarine or salt-water Crocodile; Olive Ridley, Green, Hawksbill, Leather and Loggerhead sea Turtles; the Estuarine Turtle – *Batagur basker* of Sunderbans and the huge Soft-shell Estuarine Turtle; *Pelochelys birbornii* off the Utkal-Bengal Coast fish – mud skippers or semi-terrestrial Gobies, small Crabs in association with Anemones; avifaunal communities of mangrove, mud flats and lagoons. In the higher regions of mangroves, there are Spotted Deer, Pigs, Monitor Lizards, Monkeys, and the Sunderban Tiger.

India harbours some of the best mangrove swamps in the world, of which the largest stretch of mangroves in the country lies in the Sunderbans in West Bengal in an area of 4200 sq km. The predominant mangrove species are *Avicennia officinalis*, *Excoecaria agallocha*, *Heritiera*

formes, *Rhizophora mucronata* (Fig.22a) and *Xylocarpus granatum*. The region harbours a number of Molluscs, Polychaetes and Honeybees. The main species found in the west coastal regions in the states of Gujarat, Maharashtra, Goa, Karnataka and Kerala are: *Avicennia marina*; *A.officinalis*, *Ceriops tagal*, *Salvadora persica*, (Fig.22b), *Rhizophora mucronata*, *Sonneratia alba*, *Acanthus illicioli* and *Heritiera littoralis*. Coastal mangroves also occur in the states of Orissa, Andhra Pradesh and Tamil Nadu on the eastern coast. The dominant species in this region include *Bruguiera cylindrica*, *B.parviflora*, *Rhizophora mucronata*, *Phoenix palmosa*, *Avicennia officinalis*, *A.marina* and *Ceriops tagal*. In addition, a large variety of phytoplankton and sea weeds occur all along the coasts (two forms shown in Fig.23).

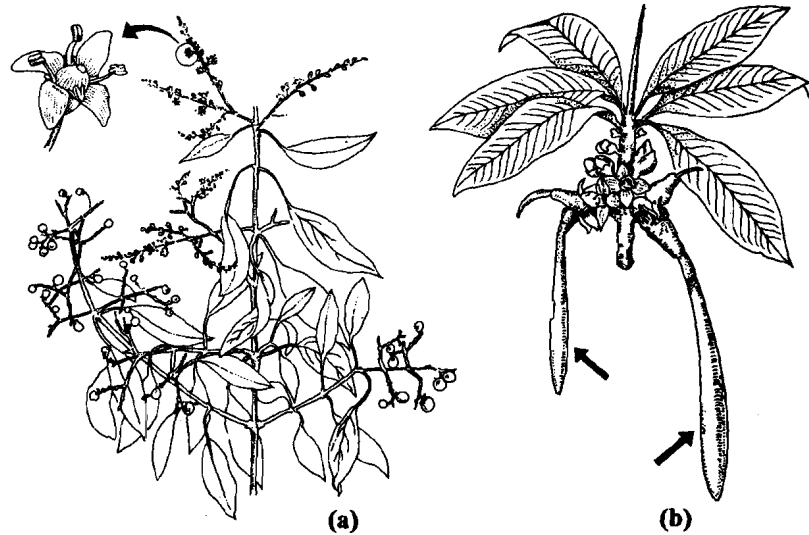


Fig.22: Two commonly seen plants found along the Indian Coasts. a) A twig of *Salvadora persica*, commonly known as 'Pilu'. b) *Rhizophora* sp. Note the two plantlets (arrows), germinated on the mother plant itself.

Associated with the coasts are the coral reefs. We shall consider them as part of the coastal ecosystems. The coral reefs are formed by the calcareous skeletons of stony coral polyps that house the corals, which are soft-bodied, radially symmetrical marine invertebrates. Each individual of a colony is called a polyp. Millions of coral skeletons cemented together over a period ranging from thousands to millions of years give rise to such reefs, which often reach great depths and even run continuously for hundred of kilometers at a stretch. The coral reefs too exhibit rich biological diversity. A variety of fishes also known as Coral Reef Fishes are found in this habitat.

Coral reefs are divided into three major types.

- (i) Fringing reefs are the most common type. They project seawards from the shore and surround island and the continental land masses.
- (ii) Barrier reefs, though similar to fringing reefs, are separated from the landmass by shallow lagoons.
- (iii) Atolls are common in the Indo-Pacific region. They rest on the summits of submerged volcanoes and they are usually oval or circular with a central lagoon.

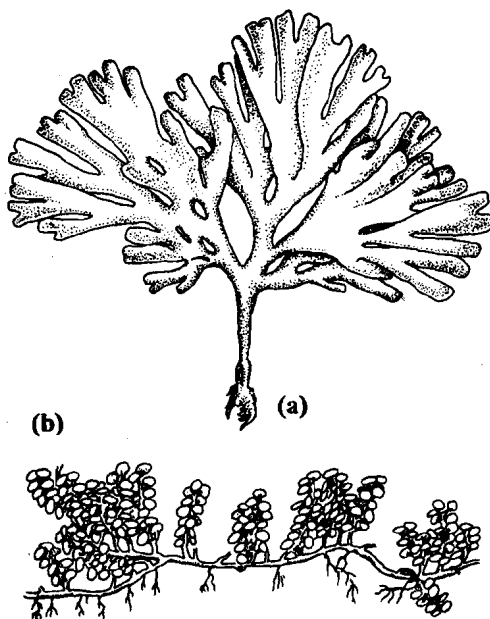


Fig.23: Luxuriantly growing marine algae constitute a major portion of the coastal vegetation. a) *Stoechospermum marginatum*, b) *Caulerpa peltata*.



**Check Your Progress-1**

1) Define the terms vegetation and wildlife.

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2) Give two strong reasons to show that the terms wildlife and vegetation have different contextual use.

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3) What is a biogeographic zone?

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4) Complete the Table given below:

| Sl. No. | Biogeographic Zones of our Country | The Physical conditions |
|---------|------------------------------------|-------------------------|
|         |                                    |                         |

## 26.3 THE VALUE OF WILDLIFE

You have studied about the importance of biodiversity, same as biological diversity in Unit-4, Subsection 4.5.2, pp.65-66 of this course. You may recall that biodiversity is the variety of life forms we see around us, this includes diversity within species, between species and of ecosystems. This term is also applied in context of the entire world. Biodiversity includes the wild as well as the cultivated species. Since the number of wildlife species is much more than the cultivated ones, the discussion in the above cited reference can be construed for the wildlife. To briefly recapitulate, biodiversity is of tremendous economic significance. A large number of products derived from forests including timber, gum, resins, oils, waxes, dyes, and rubber are of immense commercial value. The people residing in forests such as many tribes, depend largely on the wildlife for food, fodder and even recreation. Importantly, many wild species have medicinal value and the potential of innumerable species is yet to be tapped. The wildlife genepool is also of utmost importance in the field of agriculture. Many such genes from the wild have been utilized in crop improvement. It goes without saying that wildlife is a source of beauty, wonder, joy and recreational pleasure for a large number of people. Observing leaves change colour in autumn, smelling the aroma of wild flowers, watching an eagle soar overhead are some of the pleasurable experiences that are unexplainable and even not bought with money. Above all, the wildlife is of immense ecological significance. **Each species interacts with other species and plays a role in the transfer of energy and materials within and between ecosystems.** Hence, each one in its own way contributes to the stability of ecosystems. If a number of species disappear, the diversity diminishes and the number of checks and balances on plant and animal populations decreases. As species are lost, the stabilising influences of predation, parasitism and competition are disrupted and the ecosystem becomes vulnerable to disturbances that in some cases threaten to destroy it.

List of Endangered Species - Species judged as threatened are listed by private organisations. One of the most cited of such lists is the **RED DATA BOOK**. It is a loose-leaf volume of information on the status of many kinds of species. This volume is continually updated and is issued by the International Union for Conservation of Nature (IUCN) located in Morges, Switzerland. "Red" of course is symbolic of the danger that these species - both plants and animals presently experience throughout the globe. The Red Data Book was first issued in 1966 by the IUCN's Special Survival Commission as a guide for formulation, preservation and management of species listed. In this Book, information for endangered mammals and birds is more extensive than for other groups of animals and plants, coverage is also given to less prominent organisms facing extinction.

The pink pages in this publication include the critically endangered species. As the status of the animals changes, new pages are sent to the subscribers. Green pages are used for those species that were formerly endangered, but have now recovered to a point where they are no longer threatened. With passing time, the number of pink pages continue to increase. There are pitifully few green pages!

Thus, the importance of wildlife is unquestionably immense and so is the need for conserving it in its natural state. It is difficult to imagine the existence of human beings without wildlife. If one glances at the history of India, one would be amazed to know that even 2000 years ago, people were aware of the importance of wildlife. This explains why they had compassion for fellow creatures and held nature in reverence.

## 26.4 THE IMPACTS OF TOURISM ON WILDLIFE

In the previous section, while describing the wildlife in the different biogeographic zones of our country we have mentioned the names of some endangered and extinct species. What could have been the reason(s) of species various agencies as well as by some becoming endangered or completely disappearing from areas where once they were prevalent? This needs to be looked into. What we see today is the gradual and cumulative effect of a number of factors that have contributed in causing degradation of the total environment and the life therein. The list of factors is rather long, and tourism figures very prominently in it. Let us see how.

Tourism encompasses all the phenomena and relationships diverse destinations spread throughout the world, based on their interests and objectives. These may range from holidaying for relaxation to exploration of natural or historical sites or religious pilgrimages. All these require some basic infrastructure such as arranging for: accommodation, basic amenities, food, roads, transport, and waste disposal. All this is alright but how can all these affect the wildlife? The impacts of tourism on wildlife is a mixed one - some positive and some negative. Let us take up the positive impacts first. The most important positive impact is that it aids in making the tourists ecologically aware, often encouraging them to take up conservation measures and initiatives to minimise pollution. It has also led to the maintenance of scenic environment such as of historic sites, monuments and also the wildlife. Another positive feature of tourism is that it has promoted research and environmental impact studies.

The list of negative impacts of tourism on wildlife, caused directly or indirectly is rather long. In extreme cases, the damage to wildlife has been irreversible. Let us examine the kind of tourism-related activities/factors that have affected the wildlife adversely.

## Roads

Construction of roads is of prime importance to reach a tourist destination. Roads are built by clearing an area, which could be the habitat of a number of species that ultimately get dislodged. Thus, habitat disturbance and destruction are direct consequences of road laying. Roads on one hand are a necessity, and on the other hand they have become a cause of over-population of tourist sites. Badrinath is an apt example. It attracted some 40,000 tourists in 1967 and the number just shot up almost three times, to 1,25,000 in 1968 after it was linked by road, not to talk of the numbers today which run in several lakhs. The road has made Gangotri accessible but has caused major destruction of the surrounding forest, and impairment of the ecology and natural beauty of the area.

## Tourist Accommodation

Building of hotels, sites for camping, caravanning and climbing huts too cause deforestation and habitat loss of many a wild species. In addition, the species in the nearby areas continue to get disturbed and affected by the continuous tourist influx to these sites. Construction of tourist accommodation such as hotels on marine coasts making use of corals not only destroys but also disturbs the wildlife present in large areas nearby.

## Transportation

The various means of air, water and land transports, used for ferrying tourists not only disturb the wildlife, but also increase pollution by their fuel emissions and high noise levels. It must be remembered that even the traffic due to pedestrians what to say of vehicles, alters the composition of vegetation. Areas having heavy pedestrian traffic show trampling of small and tender wild-species making their survival difficult. For example, the Glénan group of islands off France's Brittany coasts were known for the naturally growing Narcissi. Recently it was noticed that the Narcissi were gradually being wiped out from this area, by being trampled by tourists, and also because of removal of their bulbs. Many of the fascinated tourists also took away some of its bulbs with them without realising the consequences.

The vehicular traffic has been notorious in crushing the eggs and killing the small animals. This, of course, may be due to carelessness or may be inadvertently done. Nevertheless, it is an important factor to contend with as this affects the food chain in the wild.

## Tourist Behaviour

This is one of the most crucial factors that affect the wildlife directly and indirectly in a number of ways:

(i) *Indiscriminate collection of wild plants and flowers.* Unorganized and carelessly conducted botanical and zoological excursions lead to mass uprooting of wild plants and capture of wild animals, thereby affecting the established wildlife populations in that area. This may still be considered as acts of ignorance. But what to say of the professional Botanical and Zoological collectors that do mass collection of wildlife species for the purpose of trade. Similarly, tourists to Badri-Kedar make offerings of Bramha Kamals (*Saussurea lappa*) to Lord Shiva. The more affluent the tourist is, the larger number of Brahma Kamals that he/she must offer. Many such practices have led to wiping out of, or endangering a number of species that are part of our cultural, religious and social heritage. Another activity that involves indiscriminate destruction of vegetation is chopping off of trees for tent-poles and fire-wood. In high alpine areas, there is urgent need of firewood. Yatri going to Amarnath often collect juniper (Fig.24) wood that because of a resin, burns even when it is wet. The excessive felling of the trees belonging to this species has put it in the threatened species' list.

(ii) *Disturbance of wildlife:* Tourism has affected the feeding and breeding habits of many wild animals. The examples given below would make this point amply clear to you. Now-a-days whale watching is becoming a popular activity of many tourists. Therefore, each year a large number of tourists gather at the whale migration sites. Whale watching is growing by nearly 10 per cent annually in Argentina, Brazil, the Caribbean, Mexico, Japan, New Zealand, South

## Vegetation and wildlife

Narcissi are flowering plants belonging to family Amaryllidaceae.

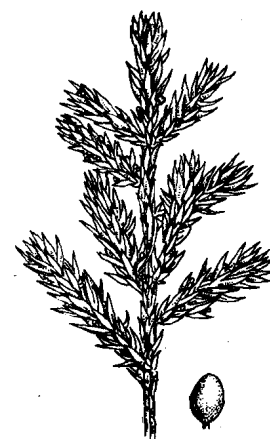


Fig.24: A branchlet of Juniper tree, with foliage and berry-like cone.

Africa, Norway and United Kingdom. It has been observed that too much intrusive observation by the tourists by boats or aircrafts builds up stress at dangerous levels for these animals. This disrupts their normal breeding, and results in the birth of still-born babies.

Another well documented case of threat to wildlife by tourists is of Mediterranean green turtle – *Caretta*. Each year about 800-1000 adult, breeding populations of females nest on the beaches. Like other marine animals, these animals live in the sea feeding in the surface waters on fish, crustaceans, algae and jellyfish. Over the years, the number of breeding populations has shown a remarkable decline. This decline is attributed to six main reasons. (a) Destruction of breeding areas as a result of coastal development in the form of hotels etc. has been one important factor. (b) A large number of turtles are hunted for their flesh and shell. (c) Pollution also has taken its toll, particularly because of the discarded plastic bags and oil lumps. Plastic bags that resemble jelly fish have been the major cause of death amongst turtles. As tourism has boomed, the plastic bags have come to almost every corner of the sea. Even in 1980s a survey near Malta found 1200-1400 pieces of plastic per sq kilometre. And the situation has only deteriorated after that and not improved. (d) The disruption in breeding habits. The female turtles are very shy. High level of day and night activity on the beach prohibits successful nesting. Even slightest noise on their breeding beaches scares them away from coming ashore to lay eggs. And if they do lay eggs, the egg-hunting humans, many of them tourists, do not even leave them to hatch. And some eggs that escape the egg-hunters, produce hatchlings, a good number of which are preyed upon by foxes. (e) The hatchlings that emerge after 52 days of incubation period of eggs, are phototropic, that is, they instinctively move towards the light after emerging from their shells, because the sea is always lighter than the land. With the rapid expansion of tourist facilities along the coasts, thousands of young turtles die because if they hatch at night they are attracted inwards to lights rather than towards the sea. (f) Increased number of four-wheel drive vehicles on mediterranean beaches crush many turtle egg nests. Similarly, each wild species has its own tale to tell.

Tourism-related activities have also been found to disturb the seasonal and regional migratory behaviour of several animals and birds. The construction as well as the use of the roads, huts, hotels, and camps disrupt the migratory animals. One glaring example of this is Bharatpur Bird sanctuary which used to be a favourite migratory haunt for the 'Siberian Crane'. And now we all hear and know that locating even a pair of 'Siberian Cranes' in this area has become a cause of celebration. Every year, a large number of tourists and bird-watching enthusiasts gather at this site to watch these magnificent birds. With the non-showing up of these birds, the future of this area as a tourist spot seems dark.

The wildlife is also affected by hunting, and invasion of their natural habitats and even by photography. The impact on large animals and birds is apparent, but not many studies have been conducted on reptiles, insects and other kinds of animals. All these are equally important for the ecosystem balance. In addition, the quality of wildlife also gets affected. It has been found that by regular exposure to a large number of tourists each day in sanctuaries, National Parks and other wildlife areas, many of the ferocious animals have lost their ferocity. For example, people throwing bits of food such as wafers, chocolates etc., have literally made the wild animals like bear and monkeys begging for more.

It is a general human tendency to get closer to wild animals and birds in Sanctuaries. This disturbs them and are not to the liking of many wild species. The loss of their privacy affects them adversely, particularly the ones that prefer to breed in seclusion. For example, the Great Indian Bustard is highly disturbed by people inspecting its nest. As a result it does not breed.

(iii) *Souvenirs from Wildlife*: It is quite natural for tourists to bring souvenirs from the place they had visited. This causes concern particularly when the souvenirs are prepared from wildlife. Many a times, the wild animals have to be captured, slaughtered or poached for this purpose. Items like stuffed animals, their furs, skins, ivory ornaments, horns, tails, key rings from hooves can only be prepared at the cost of animals' lives or inflicting deep wounds on their bodies. Even the Butterflies are not spared. They are increasingly being sought after as collector's items. As such, many of the butterfly species are already on the endangered species list.

(iv) *Sports*: Careless handling of scuba and boat equipment, surf-riding petrol-driven vehicles and other recreational vehicles leave harmful remains in water. The result is, slow and gradual pollution of the water bodies. This in turn, affects the wildlife inhabiting these water bodies. Despite the several wildlife conservation campaigns, game animals still remain a favourite sport of many tourists. In the guise of limited licensing to some tourists and people,



to kill some birds and animals, poaching of several precious animals goes on.

### Waste Disposal

It is natural that some wastes would be generated and left wherever tourists stay and visit. Gradually we are also accepting the litter strewn all over the tourist spot as a normal thing. The sight of polythene bags, bottles and cans is becoming common even in guarded areas like sanctuaries and wildlife reserves leave aside the trekking routes in Himalayas. In addition, the dumping of untreated sewage from the tourist accommodations to the nearby rivers or sea is quite common. It has if not immediate, long-term detrimental effects on the wildlife and ultimately the whole ecosystem.

The world famous Dal lake is also a victim of ineffective waste management. What has happened and is still happening in the Dal lake is that a large number of house boats discharge an incredible amount of wastes and faecal matter in the lake enriching its water with nutrients. The resultant prolific weed growth has been clogging the waters completely. This growth lowers the dissolved oxygen in water that leads to killing of fish and other water insects in the lake. Similarly the other water bodies too get heavily polluted by addition of wastes. Consider the Kumbh Mela. At a given point of time, lakhs of people congregate at one place and bathe. As a result, the coliform bacteria count which is normally around 300, soon after Kumbh Mela increases to 16,500 and persists for several kilometres downstream.

Besides the water bodies, wastes are added to deforested lands. This makes the conditions suitable for the prolific growth of the weeds changing the entire vegetation pattern, which in turn affects the other species interacting with it. Not only that, the wastes bring insects and other pathogens, endangering the vulnerable rare species. Though the generation of wastes cannot be stopped two things can be done. **One**, minimising the amount of waste generated, and **two**, ensuring that most of the wastes generated be of degradable nature. It is the non-biodegradable wastes that cause greater concern, for biodegradable wastes enter their respective nutrient cycles sooner or later, for another cycle of life.

All said and done, it is for sure that tourism industry is not only going to stay, but to flourish as it contributes to the economic development of a nation. **It has to be realised and understood that tourism and environment have to go hand in hand, in a symbiotic manner.** As such many a tourist destination is under undue stress, and is gradually losing its natural character and colour for which these were visited. We should always have this question in front of us – what if the tourist destination ceases to be a as tourist attraction? So save the goose that lays the golden eggs! It is precisely because of this reason that **eco-tourism, sustainable tourism or responsible tourism are being encouraged.** (see TS-2, Block-2, Unit-9; and Block-4, Unit-16)

### Check Your Progress-2

- 1) Why the wildlife is considered a valuable resource for mankind? Give five reasons.

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- 2) List the main impacts of tourism and related activities on the wildlife.

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## 26.5 LET US SUM UP

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In this Unit you have studied that:

- Vegetation refers to the total plant life occupying a given area.
- Wildlife includes all the living beings – both at the micro and macro levels, occurring in their natural conditions, without any human care.
- India has been divided into ten biogeographic zones, viz., Trans-Himalayas, Himalayas, Indian Desert, Semi-arid, Western Ghats, Deccan Peninsula, Gangetic Plains, North-East India, Islands and Coasts. Each of these zones has certain geographical as well as biological peculiarities. Some of the biological elements are characteristically found in certain zones only and no where else.
- The value of wildlife is immense. It is not only a source of beauty, wonder and joy but provides sustenance to a large segment of mankind. The wildlife genepool is extremely valuable to mankind especially in the field of improvement of plants and livestock. Above all the wildlife plays a crucial role in maintaining the ecological balance on this planet.
- Many of the tourism-related activities have directly or indirectly affected the wildlife. Construction of roads, tourist accomodation, use of transport in wild areas, and tourist behaviour are the broad areas casting negative impacts on the wildlife.

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## 26.6 KEYWORDS

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- Avifauna** : All the birds of an area.
- Biological** : the variability among living diversity of organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.
- Bovid** : Bovids are a family of hoofed mammals. There are about 120 species of bovids. These include antelope, bison, goat and oryx.
- Calcareous** : Containing or coated with calcium carbonate.
- Ecosystem** : A conceptual view of a biological community interacting with its physical environment.
- Endangered** : An endangered species is one which species is thought to be in danger of becoming extinct in the near future. Or when the population of a species becomes very small it may be endangered.
- Endemic Plant** : A plant that is found only in a particular area or region. Many tropical islands contain endemic species which live on that island, but are found nowhere else in the world.
- Evergreen forests** : Forests dominated by perennially green plants, that is, those plants in which bearing and loosing of leaves is a continuous process and not seasonal.
- Fauna** : A collective term denoting the animals occurring in a particular region.
- Flora** : A collective term denoting the plants of a particular region or habitat.

- Halophyte** : A plant able to grow where the soil is rich in sodium chloride or other sodium salts.
- Invertebrates** : A major group of animals lacking a backbone and internal skeleton.
- Scrub** : A tract of land covered with a generally thick growth of dwarf or stunted trees and shrubs and a poor soil.
- Seaweed** : The marine algae.
- Vertebrates** : A major group of animals with backbones.

**Vegetation and  
wildlife**

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## **26.7 ANSWERS TO CHECK YOUR PROGRESS EXERCISES**

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### **Check Your Progress-1**

- 1) See Section 26.1.
- 2) Refer to Section 26.1.
- 3) See Section 26.2. Biogeographic zone refers to the zonation based on the life forms and the physical conditions wherein they occur and thrive.
- 4) You can consult the different biogeographic zones given in Section 26.2

### **Check Your Progress-2**

- 1) See Section 26.3.
- 2) See Section 26.4.

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# UNIT 27 MOUNTAINS

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## Structure

- 27.0 Objectives
- 27.1 Introduction
- 27.2 Perceptions of the Mountains
  - 27.2.1 The Hindu World-View
  - 27.2.2 The Perceptions of the Medieval Rulers
  - 27.2.3 The British Perceptions
- 27.3 Making of Hill Stations
  - 27.3.1 Simla
  - 27.3.2 Darjeeling
  - 27.3.3 Nilgiris
  - 27.3.4 Nainital
- 27.4 Power in the Hills
- 27.5 Displacement of the Indigenous Communities
- 27.6 Leisure and Environment
- 27.7 Environmental Impact
- 27.8 Let Us Sum Up
- 27.9 Answers to Check Your Progress Exercises

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## 27.0 OBJECTIVES

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This Unit discusses the impact that hill tourism produces on the environment of the mountains. After reading this unit, you will:

- get an idea about the different ways in which mountains have been perceived from the pre-modern time;
- learn about the making of specific hill stations like Simla, Darjeeling, Ooty and Nainital;
- become familiar with the process of the displacement of the indigenous hill communities and
- acquaint yourself with the impact of new settlements and increasing population on the environmental condition in the mountains.

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## 27.1 INTRODUCTION

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Mountains evoke a deep sense of majesty. No dust encumbered paths to break the soft tenderness of the far reaching ridges of the pastoral highlands. The spray of red, yellow and violet flowers and the richness, colourfulness and variety of its vegetation lifts the spirits to behold the heaven on earth. The vegetable kingdom, terraced fields and thick foliage, smiling gardens, shaggy hills, lush and verdant valley and gushing waterfalls and undulating streams - overwhelm the imagination. These are familiar and yet staggering spectacles. The sight and sound of nature, in abundance in the mountains, are a treat to eyes and ears.

From times immemorial, human spirit was enchanted by the pristine sublimity of the mountain ranges. It led them to set foot on the mountains. Environmental impact of the human endeavors should, therefore, be an important subject of study. But before that let us look at some of the perceptions of the mountains from ancient times onward.

## 27.2 PERCEPTIONS OF THE MOUNTAINS

Mountains

Himalayas in the North and the Nilgiris in the South are the prominent Indian mountains. Environmental attitudes and the ideological perceptions about these mountains have varied considerably in the social systems that held ascendance in the subcontinent.

### 27.2.1 The Hindu World-View

In the Hindu world view, the Himalayas had religious rather than aesthetic or geographical significance. Let us quote a passage from Bharati to make this perception of the Hindu world view clearer. Bharati perceives that, "to all Hindus except those who live there, the Himalayas tend to be ascriptive rather than actual". Mount Kailash was renowned as the abode of Lord Shiva than as a potential place of settlement. Bharati further elaborates : "The Himalayas of the Rishis (priests) and Yogis is more important as an ideal to (Hindus) than are the actual rocks and the miserable huts of the people there."

Traditional Hindu  
World-View

Hindu world-view is drawn out sharply in the following extract from an article written by a scholar Anthony D King :

According to Hindu philosophy a spot of beauty is no place for social enjoyment or self-indulgence. It is the place for self-restraint, for solitary meditation which leads the mind from Nature to God. Nowhere else is this concept more exemplified than in the Himalaya. Thus, religious cities have developed around the famous holy shrines which have been set up by saints at sites of exquisite natural beauty where devotees could perform their penance and meditation in a calm and serene and sublime atmosphere."

Emergence of Badrinath, Kedarnath, Kailash Mansarovar, Vaishno Devi, Tirupathi (Terumala Hills in the South) were the reflection of this ideological trend. Pristine beauty of the mountain region with its local habitat was largely left intact.

### 27.2.2 The Perceptions of the Medieval Rulers

During the medieval times, Indian sub-continent witnessed the upsurge of the Turkish and Afghan rulers. Under Tughlaqs, Kangra region in the lower Himalayas was brought under imperial control. It was the first impulse to tamper with the indigenous communities settled in the mountaineous region. In the North-West region, hardy hill tribes constantly fought against the imperial excursions.

Under the Mughals, first efforts were made to set up a summer retreat at Srinagar. Mughal ruling elite, however, largely sought to mitigate the excessiveness of heat in the Indian plains through 'developmental' decisions and not through 'locational' decisions. These 'developmental' decisions entailed creation of underground Taikhanas, use of open-walled pavilions and light-repellent white marble, large expanse of water and well-irrigated gardens, instead of moving up the hills.

Changes in the  
Perception of  
Mountains from the  
medieval times  
onwards

### 27.2.3 The British Perceptions

Indian hills were subjected to the developmental onslaught during the nineteenth century with the advent of the British empire. Thus began the transformation of the hills from the places of pilgrimage to the resort stations. In the European world-view, attitudes towards the mountains changed from one of awe to the one filled with new adventurous and acquisitive spirit, which signified the seventeenth century Europe. Advances in science, technology and philosophy over the centuries brought about profound ideological changes. Mountains came to acquire certain beneficial qualities. Refreshing air and the purity of the physical environment arrested the attention of the travellers and the seekers of the picturesque.

British world-view -  
developmentalism in  
full flow

Environmental changes introduced during the course of the nineteenth century were shaped both by the European world-view and their experiences of the Indian climate. It led to the emergence of a new type of settlement, the 'hill stations', in the mountain regions. More than 200 such hill settlements came into existence during the colonial times.

**Environmental  
impact : 1**

**European romantic  
perceptions**

In the European world-view, the hills had both ideological and practical connotations. 'Romantics' of the Eighteenth Century Europe excited the imagination about the Himalayas. Pristine purity and unscaled and virgin terrain of the hill country fascinated the 'romantics' wary of the industrial Europe. Romantics and the seekers of the picturesque found the hill environment an idyllic setting for the creation of the countryside retreat. They were delighted by the image of the "wild", the "quaint" and the "exotic" in the Himalayas. Emily Eden described the Simla hills as "so beautiful and purple, and such masses of white clouds sailing along the valleys. About Jacko, the highest of the Simla hills, she wrote :

"A sea of pinkish white clouds rolling over them and some of their purple heads peering through like the islands... The clouds drew up like curtains in massy folds every now and then, and there were the valleys, grown quite green..., tinged with sunbeams..., and the want of shape for which the hills are to blame on common occasion was disguised by all the vapoury dress."

D.J.F. Newall, another contemporary Nineteenth Century military officer and the traveller to the Himalayas, was struck by the grandeur of the Kanchenjunga. He wrote :

"Who that has witnessed 'Kanchenjunga', its peaks lighted up by the sinking sun, whilst the grey shadows of night are stealing over the lower mountains, can ever forget a sight almost unique in the world... The grand river scenery impending over the bright flashing rivers of the Rungtee and its tributaris from the western watershed; with the deep green flood of the Teesta - semi - tropical foliage clothing its margin and lateral glands - certainly present glorious objects of admiration to the lover of the picturesque."

**Military Strategic  
considerations behind  
making settlements in  
the hills**

Practical exigencies of the imperial state and the experience of Englishmen, women and children with the Indian climate also necessitated the emergence of the hill settlement.

Practical exigencies of the Imperial State were related to the safeguard of the frontiers of their Indian colony in the North West. It was essential for the British imperialism to develop hillstations for strategic considerations to counterbalance the Russian influence in Afghanistan and Tibet, on the one hand and to keep Gorkhas under check, on the other.

**Curative aspect of the  
mountains, its  
importance for the  
British**

European elite found the Indian heat in the plains intense and malignant. Indian plains were seen to be riven with malignant diseases. Summer months, in particular, were times of epidemic and fatal diseases like malaria, cholera, black fever etc., which the European constitution was unable to withstand. Captain Peter Mundy in 1828 found the temperature of Simla peculiarly adapted to European constitution. Current ethno-medical perceptions of the early Nineteenth Century Europe emphasised the merits of 'the air', 'the waters' and the benefits of 'exercise' and 'bathing'. Bracing and salubrious mountain air fitted well within this paradigm. Lloyd found Darjeeling as a place particularly "well adapted for the purpose of sanatorium".

Climate of the Indian mountains provided affinity to the climate at Home, i.e. England. Strong nostalgia and yearning of the 'Home' led to the creation of the 'English enclaves' in the hills. In the hills they felt closest to 'Home'. Viceroy to India, Lord Lytton in the late Nineteenth Century, was struck by the nostalgia for England on his visit to Ooty. "The afternoon was rainy and the roads muddy, but such beautiful English rain, such delicious English mud. Imagine Hertfordshire lanes, Devonshire Downs, Westmoreland Lakes, Scotch Trout streams and Lusitanian views."

All these factors and new mode of production centring around industrial factory and the urban culture of Europe led to the emergence of the hill 'resorts' in the Indian horizon.

These changing perceptions about the mountains are a significant indicator of the changing environmental impact upon the mountains from the pre-colonial to the colonial times. This reflects easily in the:

**Nostalgic value of the  
mountains for the  
British**

- emerging conflict between the development versus picturesque which emerged during the course of making of these hillstations;
- the changing power equations in the mountains;
- the displacement of the indigenous communities; and
- the changing ideological-cultural variable centred around leisure and health.



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| Check Your Progress-1 |
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- 1) Write five lines on the traditional Hindu world-view on the mountains.

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- 2) How did the British perceptions of the mountains differ from the earlier perceptions?

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## 27.3 MAKING OF THE HILL STATIONS

Once the European travellers discovered the scenic delights of the Indian mountains, no efforts were spared to create hill-resorts-cum-summer capitals. More than 200 hill settlements came up on the hill tops during the course of nineteenth century. From Simla and Landaur in the North to Darjeeling in East and Ooty and Kodaikkanal in the South, innumerable hill resorts sprang up to cater to the needs of the weather weary English elite.

Aspirations of the English populace led to the modifications of the natural local habitat of the mountains. Gradually a spatially-differentiated urban system developed to erode the natural landscape of the mountain beauty to a large extent.

We trace the development of some prominent hill stations during the course of nineteenth century to understand the environmental impact upon the mountains.

### 27.3.1 Simla

Simla in the Punjab province (31.6 degree North, 77.1 degree East) lies on a spur of Central Himalayas at a height exceeding 7000 feet. A fin hill 'Jacko' (described earlier), rising 1000 feet higher and clothed with deoder, oak and rhododendron occupies the east side of the station Shimlah or 'Shumlah', (from the temple of Goddess Shyamli) as pronounced by the hill-tribes, is the actual word from which the station takes its present name. Prospect Hill and observatory hill lie along the western part of the ridge. Annandale, the beautiful glen and the centre of Simla social life under the Raj, witnesses the sprouting of yellow primroses from the dripping rocks in April. Elysium hill, named after the two Eden sisters of Lord Auckland, is on a small spur running northwards from the main ridge.

According to Gazetteer of 1904, Simla was a wild tract, a portion of which was retained at the close of Gorkha war of 1816 by the treaty of Segouli. Afterwards, the whole of the present station of Simla was bought from Rajas of Keonthal and Kothi and Maharaja of Patiala. From the time it was declared the summer capital of the British Empire in India in 1864 under the Viceroyalty of Sir John Lawrence, the development of Simla accelerated.

**Simla : Initial settlements, road buildings, new carriages, increasing population**

## Markets and the roads of Simla

Between 1868 and 1881, the population of district rose by about 32.9%, the increase being almost entirely in the Simla town. The population further rose from 13,034 in 1891 to 13,960 in 1901 in Simla proper alone.

In 1878, under Lord Lytton, the first impetus to good roads in Simla was given, for in that year two wide roads under Gorton Castle estate and 'Ladies Mile' at the back of the Jacko were constructed. By degrees the whole of Mall stretching from the Viceregal Lodge to around Jacko, some 10 miles in length, was widened and improved into a carriage drive. In 1879, consequent on the improved condition of the Mall, which admitted of the wheeled traffic, the 'jinrickshaw' commenced to supersede both the 'Jhampans' and 'dandy'. By the early twentieth century, motor cars made their entry into the hills.

Trade and commercial activities also increased in Simla. 'Native' bazaars like the Bara Bazaar, Lakkar Bazaar, Sanjauli Bazaar etc. rapidly developed.

The Lakkar Bazaar was developed by the colony of woodcarvers of exquisite craftsmanship, chiefly from Jullundur and Hoshiarpur. Owing to the brisk frontier and inter-regional trade, Cart Road from Simla to Kalka was cut out of the mountains by the Public Works Department. It was 58 miles long. In 1900, Sanjauli-Kaithu road was sought to be constructed to divert the mule and coolie traffic from the Mall between Lakkar Bazaar and Sanjauli. In conjunction with the tunnel under the Ridge, it served as a direct means of communication between Simla Bazaar and Sanjauli, quite distinct from the Mall, an exclusive preserve of the Europeans.

Mall was scientifically planned along the regularly aligned rows with the better planned shops mostly owned by the Europeans. During the British times, it had the headquarters of the Alliance Bank of Simla, established on the liquidation of United Bank of India in 1874. There also existed the branches of Delhi and London Bank (London), the Bank of Upper India (Meerut) and the Punjab Banking Company (Lahore). Messers Barrat and Company were the first European merchants in Simla. New physical-spatial and urban forms, the hotels, boarding houses and the sanatoriums emerged along with new types of economic activities and occupations. In 1845, Hotel Pavilion was opened along with the Mall. It was refurnished over the years with Tennis Courts, Billiards Table, Dance Hall etc.

Simla also emerged as an important entrepot where foreign trade was registered. Chief articles of commerce in the Simla hills were opium, potatoes, wool, borax, fur, woollen cloth, semi-precious stones, goats and horse.

Twentieth century brought about an intrusion into the mountains' environment. Kalka-Simla railway, a narrow guage line was started in 1900. It was opened to traffic in 1903. It reduced the duration from the plains to Simla hills to seven and a half hour.

As a result the thirty houses 1830 increased to about 2000 houses by the early twentieth century.

### 27.3.2 Darjeeling

Darjeeling, the summer capital of the Lieutenant Governor of Bengal, during the British Raj was under the Rajshaye division. Darjeeling lies between latitude 26 degree 30' 50" and 27 degree 12' 44" and longitude 88 degree 1' 30" and 88 degree 56' 35". It is situated at the height of 7500 feet above sea level. It is a crescent shaped loop in the area of 1234 square miles. In 1901, population of Darjeeling was 94,772.

The name 'Darjeeling' is a corruption from Dorjw-ling, which in Tibetan language means the mystic thunderbolt of the lamaist religion, a designation formerly given to the Buddhist monastery which used to stand on top of the Observatory Hill. Lepchas, the local tribes of the region claim that the region was the place of the children of the Supreme God. By the treaties of Titalya and Segouli, the Nepalese Durbar ceded 4000 square miles of territory to the East India Company in 1816. Technically this territory belonged to the Raja of Sikkim, as it was on his behalf that the East India Company had intervened. In 1835, the Sikkim ruler formally handed over the territory to the East India Company under the Governor General Lord William Bentinck. A Darjeeling gazetteer described the situation of Darjeeling as "singularly beautiful as it stands on a narrow ridge that juts out into a vast basin in the heart of Himalayas."

The year 1866 may be taken as marking an epoch in the history of Darjeeling. Peace was established within its borders and the Darjeeling gazetteer of 1908 wrote : "thenceforward began the march of progress and civilization" into the terra incognito.

## The Mall

## The Train

## Initial settlement and history

The European officials associated with the development of Darjeeling were Captain Llyod for discovering the place and securing the cession as a sanatorium and military convalescent depot at Jalapahar (at the height of 8000 feet); Dr. Campbell for the introduction of tea cultivation and general development of the district; and Lord Napier of Magdala for laying out the station of Darjeeling and in constructing the road from the plains.

The construction of Darjeeling Car Road began in 1861, from Tarai Foothills to the Virgin forests. It was a wonderful example of engineering work which made subsequent alignments of railways comparatively easy. At the same time the construction of broad metalled road from Ganges to Siliguri was pushed. It was completed in 1866 at the cost of Rs. 14.7 lakhs. Prior to its construction, the pioneering adventurers such as J D Hooker (1848), and sisters of Loreto Convent (1840) covered the journey from Calcutta to the Hills on the backs of elephants, doolies, boats and rafts. All these developments took place in the interest of wheeled traffic and development of the frontier trade.

In 1881, the construction of Darjeeling-Himalayan Railways brought Darjeeling within day's journey from Calcutta. A piece of engineering skill which adds to the attraction of the railways is that the railway line near Darjeeling makes a U-shaped loop called the Batasia loop. The population of Darjeeling doubled between 1881 and 1891.

Darjeeling was introduced on the international scene for its green-leaved and delicately flavoured tea which has a unique blend all its own. Tea gardens were laid out under the encouragement given by Dr. Campbell. The humid climate of Darjeeling ensures the success of the plantations.

### 27.3.3 Nilgiris

Nilgiris (the blue hills) were familiar to the Europeans as early as the Seventeenth Century, when Manarecate of Ferreiri visited these hills in Southern India (1602-1603). Tirmala Hills had great religious sanctity for the Hindus because the famous Tirupathi Temple is situated on top of it. British interest in the hills were more for practical considerations than for the spiritual pursuits. Ooty and Kodaikkanal are some of the well known hill stations which catered to the needs of the European ruling elites serving in the Southern plateau.

Spot where the present station of Ooty is situated was perhaps discovered in February 1820 by an unknown party of European adventurers. Mr Sullivan played a pivotal role in the drive for the development of Ooty and he was perhaps the founder of the city.

How Ooty came to acquire its present name (Ootacamund) itself is shrouded in controversy. 'Mund' in the Toda language means the village. Todas were the original tribal inhabitants in this part of the Nilgiris. Todas referred to it as 'Patkh-mund'. Sir Fredrick Price, first British official writer to trace the history of Ooty's development, was of the opinion that the name was corrupted by the immigrant Badagar agricultural community. Subsequently, the Britishers on finding the station called it Whotakaymund. Finally it came to be known as Ootacamund.

Sullivan, the collector of Coimbatore persisted on its early growth with dogged tenacity. On his insistence, a military sanatorium was found in 1827. By late Nineteenth Century, Ootacamund, 'the Queen of the hills', became the most popular summer health resort in south India.

Sullivan built the first house 'Kala-Bangla' at Ootacamund in 1822-23 of black stone. In 1820, the first road to Nilgiris, which started at Srimugai, was carried via Kotagiri and Dimhatti to Ootacamund. Sir Fredrick Price claimed that land was uncultivated. However, the existence of the Badagar agricultural community belies this claim. What could be conceded is that Sullivan introduced modern and scientific agricultural and horticultural techniques in the hills. He imported European gardener and introduced European fruits like apple and peach trees bearing straw berries. Sullivan also introduced English vegetables in Ootacamund. Barley, which may now be considered a staple grain on the lower plateau, Prine claimed, is still known to the Badagar as "Sullivan Gangi", for he imported the seed from Europe.

Since 1827, when Ootacamund was formed into the cantonment, Major Kelso organised the 'native' and European bazaars. Under the orders of the Government of Madras, an admirable sanatorium was built by Captain Underwood for invalid soldiers, sound and safe quarters for European officials and a commodious choultry for 'natives' arriving as strangers upon the hills was constructed. Between 1842 and 1848, under the Governorship of Lord Tweeddale, road from

Mountains

The early European officials involved in the development of Darjeeling

Initial road construction for wheeled transport

Beginnings of Railways

Darjeeling Tea

Nilgiris : Its importance

Ooty

Agriculture in Ooty

Ootacamund to Kotagiri was constructed. Between 1880s and 1900s, good roads were constructed all through and about Ootacamund. Conservancy was much improved; the streets were lighted with gas lamps; water works were constructed. Drainage system was among the best in India after the scheme framed by Mr O' Shaughnessy was implemented. They were supplemented by gullies with gratings. Plantation of gum trees were extended at rapid scale all along the hills around Ootacamund. A separate modern good daily market was constructed. Between 1860 and 1870, Madras railways were greatly extended. Cinchona plantations owned by the Government were also extended in Ootacamund.

### 27.3.4 Nainital

Nainital is another famous hillstation that was established during the Nineteenth Century in the Kumaun hills in the North West provinces of the British empire. It lies between latitude 29 degree 22" and longitude 79 degree 29" 35'. It is situated at the height of 6409 feet above sea-level. The population of the station in 1902 was 8455, which increased greatly during the height of the tourist season. It is picturesquely situated on the bank of a beautiful lake and was a favourite sanatorium and summer resort of Europeans from the plains. A contemporary nineteenth century geologist, Mr Oldham, observed that the valley wherein "Nainital nestles is surrounded by rocks varying greatly in structures such as splintery schists and massive limestones, which agree in one character only - that of being very disturbed as regards their stratigraphical arrangements, and much crushed and mechanically disintegrated as regards their petrological conditions.

Once Nainital became the seat of the Lieutenant Governor of North West provinces and Oudh during the late nineteenth century, the settlement of Nainital transformed the face of the Himalayas range with rapidity. Cart road was carved through the hill sides - clothed with fine forest trees, among which Oak predominates. Kumaun timber company owned by the Europeans actively engaged in the timber business to exploit the rich forests of Nainital. With the influx of the European population, various European traders set up business establishments and shops catering exclusively to the European needs. Highest peaks in the Nainital are China peak (8568 ft.) on the north, Deopatha (7987 ft.) on the west and Ayarpatha (7461 ft.) on the south.

Other prominent hillstations are the Panchmarhi, Mahabaleshwar, Dalhousie, Mussourie, Shillong etc.

However with the development of these various hillstations, the local vegetation and the general habitat of the mountains was affected. We shall go into this aspect in Sec. 27.7.

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## 27.4 POWER IN THE HILLS

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Mountains exude might in the length and breadth of their spread. In the Hindu world-view, as mentioned before, Himalayas were sacred abode of the Hindu gods and goddesses. In this respect the Himalayas were also worshipped as the part of Hindu religious system. Indigenous hill tribes were largely ignored by the spiritual leaders in search of salvation.

During the medieval period, under the Tughlaqs and later on under the Mughals, sovereignty was asserted on the hill tribes and local Rajput rulers in the Himalayan ranges.

Power machinations came to acquire ascendance only during the colonial times. British imperial machinery had at its disposal technical, scientific and industrial resources to pierce through the uncertain terrain and virgin forests. In the process, it disrupted the ecological balance in the hills. The question of power assumed importance the ambience of the advanced Imperial administration. Bureaucratic authority was introduced into the hill habitat.

Ideology of legitimacy of power, dominance and subordination were introduced into the hill society which previously exhibited an absence of sharp class divisions. Power dimensions were reflected in the large scale colonization of the hill-tracks. British imperial interests, strategic concerns for defensive security and trade led to the simultaneous process of environmental and ecological changes. British monopoly through arms and tight administration, checked the previously existing close interaction between the local tribes and nature. More of it would be discussed in Sec. 27.6.

In this section we confine to the political motives of the Imperial State. Political motives which started the 'exodus' of the imperial and provincial governments to the hills were directly related to the question of power. By 1860s, British had consolidated their hold over India. Move towards

the hills was a part of Imperial British policy to assert their superiority vis- a-vis the Indian rulers and the foreign potentates. Sir Bartle Frere focussed upon this grand imperial design in his observation that "every great Oriental ruler, with any pretensions to civilization has his summer and winter residence."

**Mountains**

Few months stay in the summer season in the hills was seen as conducive to efficient administration. Moreover certain strategic and political issues were also at stake. Himalayas in particular were of value for frontier trade and their rich wood.

**Motives behind colonial intervention**

Imperial architecture revealed another significant aspect of the power in the hills. Architecture is one of the main evidences man leaves upon the face of this earth. Architectural work involves "intellectual beauty" that is sharing in artist's imaginative process than a crude surface representation. Besides this, architecture reflects upon the material culture of the empire. In the case of British architecture in India, architectural works reveal the Imperial vision at work. Viceregal Lodge at Simla, the various Government houses of the Lieutenant Governors and Governors, the Imperial offices such as the Secretariat, suggests the impression of invincible strength and grandeur of the Raj. Indigenous, small-sized thatched huts were replaced with the huge structures of iron and mortar with a lot of plasters.

Viceregal Lodge, atop the Observatory Hill, was one such gigantic structure built at an extensive scale after levelling down a large area upon the mountain top. Under Henry Irwin, the work was begun in 1886 and it was completed in 1888. Viceroy Lord Dufferin was the first occupant. It is Tudor in design, built chiefly of grey stone from the neighbouring quarries. The house consists of a main block of three storeys, a wing called East wing of two storeys and the Kitchen wing of five storeys. Specialised provision for Kitchen, bakery, scullery, larders, wine cellar, plate room, China and glass room, pantries and store were made. Besides separate space was allotted for bedrooms, boudoir, special staircase, ball-room and an electric lift in keeping with the modern conceptions of the nineteenth century Europe.

**Architecture as a symbol of power**

Ootacamund Government House was built in 1877, under the patronage of Duke of Buckingham, then the Governor of Madras. It had a pillared portico copied from his ancestral seat in Stowe in Buckinghamshire. Fairly commodious, it had a beautiful bathroom and tasteful apartments.

**Viceregal Lodge, Simla**

'Shrubbery', the summer residence of the Lieutenant Governor of Bengal, at Darjeeling, was renowned for its artificially laid out garden. It gave the look of an English countryside house to the official residence. An impressive Darbar Hall was attached to it later.

**Government House, Ooty**

In Simla largescale extensive project of constructing the public works was undertaken in 1880s. Secretariat buildings, Army Headquarters, Post Office, Public Work Secretariat, Telegraph office, Foreign office were the manifestations of the Imperial power in the hills. Hill environment was modified to suit the needs and the tastes of the colonial elite of the urban- metropolitan England. Foreign office was built on the Prospect Hill, after levelling down the surface. It was designed in Chalet style. Snowdon, the official residence of the Commander- in-Chief was purchased in 1873. Barnes Court, the official residence of the Lieutenant-Governor of Punjab, was bought by the Punjab Government in 1800.

**Government House, Darjeeling**

To enable the upper echelons of the colonial elite to avoid excessive contact with members of their own community, hierarchical distance was introduced into the hillstation environment. Thus both the Viceroy and Commander-in-Chief enjoyed the residence atop the highest ranges in the Simla hills to maintain the rigid imperial hierarchy. Rudyard Kipling observed this power structure in evidence at Simla. He wrote : "Simla was another new world. There the Hierarchy lived and one saw and heard the machinery stripped bare. There were the Heads of the Viceregal and Military staffs and their aides-de-camp..." Viceregal Lodge in Simla symbolised in scale, elevation and form, the authority of the dominant culture. 'There can be few places in the world where the upper ten were so literally upper; the Viceroy and Commander-in-Chief naturally had the best peaks. Extensive modifications of terrain were carried out to accommodate the distinctive military, religious and recreational needs of the dominant Imperial culture.

**Official buildings in Simla**

Ecclesiastical establishments provided both for the spiritual needs of the rulers and also helped the 'mperial rulers in the task of colonising the minds of the local tribes. They complemented and sometimes preceded the Imperial efforts on their march to spread 'civilization and progress' into the virgin soil. In Ootacamund, Saint Stephens Church, Saint Thomas Church, Roman Catholic Church and the Convent and Union Chapel and Zion Chapel were erected. In Darjeeling, Saint Andrew Church was built in 1887, belonging to the Church of England. Union Chapel of non-conformists was built in 1869. In Simla, Christ Church occupies the central position atop the

**Official hierarchy in the hills**

**Environmental impact : 1**

**Churches in the hills**

Mall. Its centrality in the imperial power structure was evident from the coronation ceremonies and other Imperial services being performed in its precincts.

Schools and educational institutions were also central to the power structure being formalised into the hill environment. Education offered an effective channel for discrimination and the control over the knowledge by the colonial rulers. Hill environment also provided perfect setting for the nurturing of the delicate constitution of the children. The 1907 Darjeeling gazetteer observed : "The thin, pallid and peevish child is not long in the Darjeeling before becoming fat, rosy and active, while the child who constantly suffered from bowel complaint or intermittent fever in the plains below becomes a different being, regaining health, strength and restless energy of an English child." **Education in the hills became a popular phenomenon leading to substantial modification of the hill environment.** Breeks Memorial School in Ootacamund, Bishop Cotton School affiliated to Calcutta University in Simla; Saint Paul's School, St. Joseph's and Loretto Convent in Darjeeling and Sherwood School in Nainital were set up.

**Schools in the churches**

We thus find that the environment of mountains was so modified that the facts of European dominance tended to be inscribed into both the social structure and the physical environment.

**Check Your Progress-2**

1) Write ten lines on how Simla became a prominent hill station?

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2) How was the architecture a symbol of power in the mountains?

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## **27.5 DISPLACEMENT OF THE INDIGENOUS COMMUNITIES**

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Indian hills were host to a number of indigenous hill tribes. They lived in close proximity to the nature. Their livelihood was based on the forest produce. In the course of their interaction with the forests, they developed certain value systems and cultivated traditions to protect the hill ecology from disabuse. Number of shrines and the sacred spaces instilled the sense of soil conservation in the traditional world-view. Todas in Ootacamund, Lepchas in Darjeeling and Sikkim, Doms in Kumaun region etc were considered the original inhabitants of the region. All of them had affinity with nature. Many of them followed traditional "Jhoom" cultivation (or shifting agriculture). They lived in small, isolated hamlets.

**The original hill communities**

At many places, such as Garhwal and Ootacamund, well cultivated and terraced agricultural fields were noticed by the travellers. In Ootacamund migrant Badagar introduced agriculture and the Nepalese did the same in Darjeeling.



In general, all through the mountain region, there was absence of sharp inequalities in ownership. Ramachandra Guha, in his study of Tehri Garhwal and Kumaun division observed a strong sense of solidarity within the village community. The institutional expression of this solidarity was the village Panchayat. Reverential attitudes towards the forests formed a sort of protective ring around forests, which were also their main resource.

However, all this was gradually eroded with the intrusion of the repressive colonial State. This disruption is clearly evident in the following extract :

"Of late years, as the hills have been stripped off their timber by the European tea-planters and the pushing Nepalese agriculturists, while the forest department has set its face against primitive methods of cultivation, the tribe is on the way to be pushed out".

The extract refers to the plight of the Lepchas, but it could well apply to the conditions elsewhere.

Scientific forest management and the 'reserve forests' curtailed the activities of these indigenous inhabitants. Their harmony with nature was eroded and gradually marginalised. These forest dwellers were pushed deeper into the interior. Finally, they were reduced to doing odd jobs under the colonial set up as they lost their traditional livelihood. The reservation of large tracts of forests meant an effective loss of control for the forest-based communities over their habitat. For commercial forestry, collective ownership was broken to give way to individual ownership. This effectively broke the link between the humans and the forests. Unit 12 of Block 4 has dealt with the impact of the developmental projects on the indigenous hill communities in detail.

### Traditional Practices

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## 27.6 LEISURE AND ENVIRONMENT

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Some of the practices, habits and leisure activities of the colonial settlers brought about significant changes in the environment of the mountains. You have already learnt about how the construction of buildings, creation of new roads and railways, the new architecture and the building of schools and churches inevitably affected the existing landscapes and the environment. The intrusions by the colonial settlers also displaced the local communities. Apart from all this, some of the leisure activities of the British rulers also took their toll on the environment. This was, in some ways, a part of the process of the Indian mountains being developed as full fledged centres of tourism.

### The impact of European intrusion into the mountain

For instance, 'Shikar' and other gamesmanship were the favourite recreation of the adventurous Europeans. Infact, 'the hunt' formed an important part of the activities in all hillstations. Shooting trips were organised for the tourists in the thick mountain forests, inhabited by rich wild life. Pheasant hunting, woodcock, snipe, solitary snipe, quail, pea and spur fowl were chased by the more adventurous and energetic people. As a result, a significant part of the wildlife in the mountains got wiped out.

Similarly, natural scenic beauty of the hills was sought to be replaced by the artificial conservation of the gardens and botanical parks for the touristic interests. Public gardens were laid out. In Ootacamund a gardener from Kew was specially imported to supervise the laying out. Annandale Garden at Simla was carefully cultivated for the orchard plantation. Both Annandale and the Ridge at Simla were out of bounds for the common people. Lloyd Botanical Garden of Darjeeling was cultivated as the breeding hot-house for cryptomaria (introduced from China and Japan), Birch, alders, maple, oaks, rhododendrons, glossy leaved pipli, scarlet blossomed Erythrins, dahlias, lilies, hydrangeas and primrose.

Thus, we find that the provision for the recreational needs of the colonial community, required extensive modifications of the hillstation environment. Horse-racing and polo required the construction of a suitably even plane sports. Cricket required the smoothening of uneven terrain. Sailing and boating (as at Ootacamund, Nainital and Kodaikkanal) needed the creation of a lake or diversion of existing water source. Reading, a favoured pursuit among an educated and leisured elite, meant the provision of well-stocked libraries. Skating rinks and icing rinks were planned out for the winter amusements at Simla, Mussourie and Darjeeling.

Environment was so modified as to give greater access for social interaction and entertainment. Thus, Mall, the centre of social activity during the colonial times, was so carved out, that it typically ran mid-way through the station, giving access to the major institutions of the church, principal hotels, library, club and the few European stores.

## 27.7 ENVIRONMENTAL IMPACT

The picturesque scenery and natural surroundings of the Himalayas and Nilgiris attracted the Europeans. If Indians were stirred by spiritualism at the sight of snow clad mountains, Europeans were inclined towards 'romanticism'.

Yet, the move of the European elite to the hills let loose the chain of events which led to environmental changes in the mountains. This reflects in the constant conflict between the development and the appeal of the picturesque. Large scale construction activities in the hills led to defacement of the hill sides. These hillstations were converted into urban townships once the Imperial administration shifted up. Both for the needs of Imperial administration, and the recreational predilections of the Europeans, extensive developmental programmes were carried out by large scale felling of trees and levelling down of the terrain. Well laid out roads were carved through the virgin terrain; and the forests were exploited for the construction of railways, the large scale use of timber for making railway sleepers. Creation of urban town planning were the material implants of the Imperial rule into the hills. These developments eroded the idyllic, countrified perspective of the 'romantics'.

Local hillmen were found attractive and looked at as the part of the natural beauty of the mountains. Their gaiety and fondness for colourful apparel and love for festivities added the dash of 'Orient' in the eyes of the Europeans. At the same time, the government's aim of civilization and progress with an eye to commercial profit, subjected indigenous communities to numerous rules and restrictions. Their unlimited rights over the forest produce were limited by the scientific forest management techniques and reserved forest policy of the colonial state.

Their activities within the hillstations were also curtailed as large number of areas within the stations were created solely for the Europeans. Modern European conceptions about health and sanitation subjected the indigenous population to rigorous surveillance. Their mobility was artificially restricted.

Over-emphasis on the issue of health and sanitation was aimed at regulating the lifestyle of the indigenous local communities in conformity with the European conception of cleanliness. Previously the unchallenged masters of their mountaineous domain, in harmony with their habitat, these hill communities were subjugated and gradually marginalised.

Extensive modifications and rapid developments of the hillstations also affected the hill environment adversely in different respect as well. These indiscriminate fallings and the mammoth construction works created problems of conservancy. Fast pace of growth, beyond the capacity which a mountain terrain could bear, threatened both the ecological balance and the environment. Pure, fresh mountain air were gradually being replaced by the miasma of the collecting waste and refuse littered by the burgeoning population. Drainage system of the hill terrain was ill-equipped to handle the large scale human onslaught. Environmental degradation became the source of worry by the twentieth century. Refreshing and salubrious environment of the mountains with benefits for the invalids were getting polluted.

Over population, over construction and over crowding led to increasing land slides and soil subsidence in the mountains. In Nainital, a massive landslip occurred in 1880. The report of its occurrences illuminates the grievous environmental impact, which the developments in the hills led to. Reckless cutting up of the hillsides to form the sites for houses, gardens, roads and tennis courts disturbed the slopes of the hills. The construction of roads and quarrying in Nainital required heavy blasting. Almost the whole of the southern face of the station consisted of argillaceous schutes and shale. The whole of this crust of rocky shale and boulders of limestone in its natural state was bound by the luxuriant growth of grasses, shrubs and trees. The rapid development of Nainital, especially, the Sher Ka Danda Hill, led to the problem of drainage. Heavy rainwater which used to previously naturally flow downwards protected by the growth of grass, shrubs and trees, absorbed the impact and the cohesiveness prevented the landslip. However, the large scale cutting up of the hills and the levelling up of the sites for constructing roads and houses ensured that the water remained in the interior of the hills and found its way into the lake where it polluted the lake. Or else, the water which penetrated the hill was unable to escape and was retained, saturating the whole hillside. It caused the general cracking and subsidence of the hills. Since the natural vegetation was eroded, the drainage of rainwater had a tendency to collect in ravines, constantly undercutting the banks of ravines on either side. Either way, it created acute problems of sanitation and conservancy. It clearly reflects upon the harmful environmental impact upon the mountains by the intrusion of the tourist industry with the backing of the capitalist enterprise.

In Ootacamund, the lush and luxuriant sholas were destroyed by the ill-hazards created by the setting up of the gum plantations for the commercial purposes. It also created health hazards from which the hills were largely immune before the onset of rapid developments.

This "culturally modified built environment" created the problems which, as illustrated in the case of Nainital above, disrupted the delicate ecological balance in the mountains. The hills were beset with problems of drainage, woefully inadequate water supply for mushrooming population and the pollution of lakes and natural springs. Fredrick Price in 1908 lamented upon the harmful effects of these developments : "In days long gone by, other than Mr Sullivan, prophesied the most extravagant things regarding Ootacamund, which was to be the centre of a European land of Goshen and an England in the Tropics, without the climatic disadvantages of the old country, a land where Europeans would increase and multiply, raise all manners of farm, dairy and garden produce, and make much money therefrom - in fact an Indian Utopia. These vaticinations have not been in the remotest degree fulfilled and are never likely to be..."

He also observed how "the hunt" gradually decimated the animal Kingdom in the hills. Everything in the shape of 'game', whether winged or four-footed was ruthlessly slain. Sambar disappeared completely from the Dodabetta and Snowdon ranges. Sighting of a brace of Jungle fowl was considered quite an event.

Face of the mountain sides was drastically changed, manifestly material improvement, yet no care was given to the aesthetic and scenic appeal of the hill landscape.

**Check Your Progress-3**

1) How did the leisure activities of the British affect the landscape of the mountains?

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2) Write ten lines on the impact of developmental projects, tourist industry and over-population on the environment of the mountains.

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## 27.8 LET US SUM UP

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This Unit began by sensitising you towards the divergent ways in which the mountains have been perceived ancient times occurs. The traditional Indian perception of the mountains was that of reverence. As a result the mountains developed as centres of pilgrimage. The British arrival in India, however, brought new perceptions of the mountains. On the one hand, there was the romantic adventurist perception which saw the mountains as a source of beauty and mystery. On the other hand, the various beneficial and creative aspects of the mountains were also highlighted. The result of both these perceptions was the development of prominent hill stations like Darjeeling, Simla, Ooty and Nainital. This Unit has discussed the making of these hill stations, in detail.

The development of the hill stations brought more people and new architecture to the mountains. This was also the beginning of hill tourism. This brought about profound change in the landscape of the mountains, life of the local hill communities and the environment of the hills. All these aspects have been dealt with in this Unit.

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## 27.9 ANSWERS TO CHECK YOUR PROGRESS EXCERSISES

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### Check Your Progress - 1

1. You should emphasize the primacy of religious rather than esthetic aspect in the Hindu world view. See Sub. Sec 27.2.1.
2. Your answer should highlight a) The aesthetic and the romantic, b) The curative and the beneficial and c) The strategic and the military aspects of the British perceptions. See Sub Sec.27.2.3.

### Check Your Progress - 2

1. See Sub. Sec.27.3.1.
2. Your answer should include a) how the British architecture represented bureaucratic authority in the hills, b) how the new architecture signified the supremacy of technical, scientific and industrial interventions over the environment of the mountains, and c) how the different official building themselves symbolised the hierarchy of the power structure. See Sec. 27.4

### Check Your Progress - 3

1. Your answer should include a) effect of 'Shikar' on the wildlife of the mountains and b) how the creation of play groups for cricket, horse riding, polo and golf altered the lanscape of the mountains.
2. See Sec. 25.7.

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## SOME USEFUL BOOKS FOR THIS BLOCK

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Mountains

Laeq Futehally

**Our Environment,**  
NBT, New Delhi.

Ramchandra Guha and  
Madhav Gadgil

**This Fissural Land : An Ecological  
History of India,** Oxford University  
Press, New Delhi, 1992.

**Extent, Composition,  
Density, Growing Stock and  
Annual Increment of India's Forest,**  
Forest Survey of India, Ministry of  
Environment and Forests, Government  
of India, 1995.

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## ACTIVITIES FOR THIS BLOCK

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### Activity 1

Treat your tour as a separate Vegetation and wildlife zone. Make a list of the animals, insects, birds, trees and plants which are available in your area.

### Activity 2

Treat the information gathered in Activity 1, as a package of information for attracting tourists. As a tourist guide, develop ways of using this information for inviting tourists to your area.

### Activity 3

Write a note on the pattern of architecture in a hill town. Compare it with the buildings houses, shops etc that dot your own town. Write the differences, if you find any.

### Activity 4

Prepare a note on the environment of a mountain town. Now identify some of these features as incentives for tourism. Also identify those features of the environment which run the risk of being damaged as a result of the disfigurement of the visitor and the tourism industry.



