
UNIT 2 INDIAN LANDSCAPE

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2.0 INTRODUCTION

We have discussed in the preceding Unit the contours of nature-human relationship in the historical context and have found that a detailed understanding of the Indian landscape is an inescapable necessity. We therefore intend to familiarise you, in the present Unit, with the Indian Landscape and discuss in detail the complexity of the relationship that exists between physiographic features of a place and its society. The focus here is on the evolution of settlement patterns in India and the emergence of ecologically sensitive zones.

India is a vast geographical region and assumes the scale of a sub-continent. It has diverse climatic and bio-geographic features sustaining a wide pattern of human settlements. The patterns of living, material culture and consumption behaviour of these settlements differ in response to diverse ecological settings. It is therefore, worthwhile to examine the landscape features in India in relation to patterns of human settlements.

2.1 PHYSICAL FEATURES

A detailed description of the physical features of India will enable you to understand better the visible differences in the topography of the different parts of the country. It will also help you see the underlying environmental factors that also determine the relationship between the physical geography of any region and its settlement patterns. The location and expanse of India's landforms (plains, plateaus, hills and mountains) have played a significant role in influencing her past history. Since associated features such as climate, land-use, means of transportation, distribution of population, etc. directly relate to history the study of physical features in relation to man and his needs is vital.

India can be divided into the following four major physiographic divisions:

- 1 A high mountain barrier formed by the Himalayas in the north and the Eastern Highlands in the east;
- 1 The Plains of Northern India or the Ganga-Yamuna Doab;
- 1 The Plains of Peninsular India, south of the North Indian plains, also known as the Indian Plateau; and
- 1 The Coastal Lowlands fringing the Plateau of Peninsular India.

These four regions are distinctly different from one another in respect of their surface configuration. The Himalayas are young fold mountains with great rise, highly uneven surface, very steep slopes, little level land and young river valleys. Against that Peninsular India is an old shield block having plain areas, relict mountains and old river valleys. The Plains of Northern India are flat and alluvial without much local relief except bluffs of the old banks of the rivers and are of recent origin. The Coastal Lowlands are flat with deltas and land generally rolling.

2.1.1 The Himalayas

The Himalayas form a highly rugged and continuous stretch of high mountainous country, which flanks northern India for a considerable length and runs from the Brahmaputra gorge in the east to the Indus in the west. They cover an area of nearly 2,500 km. in length and 150 to 400 km. in width. Rising abruptly from the plains, the Himalayas rest against Ladakh district of Jammu and Kashmir and the Tibetan Plateau in the form of an arc-like rim. They are one of the youngest fold mountains on the earth. Uplift of the Himalayas, at irregular intervals has helped rejuvenate the rivers. The Himalayas exhibit practically all those land forms which develop when strata is intensely folded. However, intermontane plateaus and large-sized basins are conspicuously absent in these intensely folded mountains. The Vale of Kashmir, about 135 km. long and 40 km. broad, is the only large level strip of land in the Himalayas. In general, the Himalayas consist of three main ranges – the Siwalik Range along the southern margin, the Great Himalaya along the Tibetan border and in between these two is the Lesser Himalaya. Additionally there is a range in the east known as the Eastern Highlands.

The Siwalik Range

This range has low parallel ridges made up mainly of boulder and clay and these ridges are the foot-hills of the Himalayas. From a breadth of nearly 50 km. in the west, it narrows gradually towards east and loses its identity in the Bengal Duars. The height of these ridges usually does not exceed 1,220 metres. Most of these ridges had formed after the formation of the Himalayas, thus they obstructed the courses of the rivers draining to the south and west and created temporary lakes in which debris brought by those rivers was deposited. As the rivers had cut their courses through the Siwalik Range, the lakes were drained leaving behind plains called

Duns. One such plain formed as a result of the draining of lakes is **Dehra Dun** (600 metres above sea-level), in Uttaranchal.

The Lesser Himalaya

These ranges rise north of the Siwalik Range and being deeply cut by rivers are highly rugged and ill defined. They are more clearly defined in their expanse towards west where they are known as the Dhauladhar, the Pir Panjal and Nag Tibba. The Mahabharat Range (Nepal) and the Mussoorie Range (Kumaun Himalayas) are two other ranges of the Lesser Himalaya that run as continuous ranges for long distances. These ranges vary a lot in height but are generally less than 3050 metres above sea-level. Some of their peaks rise to heights of even more than 4570 metres particularly branches closer to the Great Himalaya and are also known as Himachal. The Lesser Himalaya are about 80 km. in breadth.

The Great Himalaya

Also known as *Himadri*, it is the longest continuous range among the Himalayas. It is also the highest range in the world with an average height of 6100 meters. The top of this range, about 25 km. wide, is dotted with numerous snowy peaks. The highest peak of the world, the Mount Everest (8848 metres), is situated at the northern border of Nepal. The other notable peaks in descending order are Kanchenjunga (8598 metres), Makalu (8481 metres), Dhaulagiri (8172 metres) and Nanga Parbat (8126 metres). In the north-west the Great Himalaya ends in Nanga Parbat (8126 metres) whereas in the east it culminates in Namcha Barwa (7756 metres) close to the Brahmaputra in Tibet (Brahmaputra is known as the Dihang, in this section of the Himalayas). The Great Himalaya is snow-bound throughout the year and creates glaciers which descend to a height of 2440 meters above the sea-level in Jammu and Kashmir and about 3960 metres in the east. At their lowest limits, glaciers melt and ensure continuous supply of water to the rivers of North India. During early summer when there is no rain in the plains, the water in these rivers has a particular significance as it is tapped for irrigating the parched land during the dry months.

Being snowbound for larger part of the year, this range is forbidding and can be crossed only by a few passes. These passes also become inaccessible during winters when the range is snow-bound. Journey through these passes is hazardous and strenuous as they are generally higher than 4570 metres above sea-level. Pack animals like mules, yaks and goats were used earlier in the absence of metalled roads for carrying goods across these passes. The Burzil Pass and the Zoji La in Jammu and Kashmir the Bara Lacha La and the Shinki La in Himachal Pradesh, the Thaga La, the Niti Pass and the Lipu Lakh Pass in Uttar Pradesh and the Nathu La and the Jelep La in Sikkim are some of the prominent passes to cross the Great Himalaya. This range has served as a natural barrier between India and Tibet (China). In addition to its being an insurmountable barrier, this range shuts off almost completely the icy cold-winds of inner Asia in winter and confines, again on account of its

formidable height, the moisture laden monsoon winds for the benefit of India.

In the northern part of Jammu and Kashmir there is another high mountain range called the Karakoram. It is a trans-Himalayan range, which runs roughly in the east-west direction. Some of the peaks of this range rise above 4620 metres. The second highest peak in the world, K-2 (8611 metres), which happens to be the highest peak in the territory of India, rises majestically like a cone in the midst of other slightly less high peaks of the Karakoram Mountains. This range merges in the Pamir Knot in the west. This bleak, desolate, lofty mountain waste, snow-covered throughout the year like the Great Himalaya, protects India from the very dry winds of Central Asia.

The Eastern Highlands

These mountains consist of hill ranges which pass through the north-eastern state of Arunachal Pradesh and run in north-south direction in the form of a crescent. To the north lies a high mountainous land called the Dapha Bum (highest point 4578 metres). From the southern end of the Dapha Bum starts the Patkai Bum. It forms the international boundary between India and Burma for some distance southwards and then it merges into the Naga Range. Saramati (3926 metres) is the highest peak of the Naga Range. The Patkai and the Naga ranges form a watershed between India and Burma. Further south, this mountainous belt is called the Manipur Hills (generally less than 2500 metres in elevation) in Manipur State, the Mizo Hills in the state of Mizoram and the Tripura Hills in Tripura State. The ranges are folded and alternate with valleys. This range and valley character of the topography has developed a special drainage pattern known as trellised drainage. Simply speaking it is a type of multichannel drainage which criss-cross to form a lattice pattern. The ranges and the valleys run generally in north-south direction. They are covered with thick forests and are difficult to cross. Passes are very few.

The sources of the three important rivers of India, namely, the Brahmaputra, the Sultej and the Indus have their sources near Lake Manasarowar (Tibet) situated to the north of the Great Himalaya. The source of these rivers varies in height from 4570 to 4875 metres. The Great Himalaya which is about 1.5 km. higher than the level of the river sources is cut across by these rivers to form very deep narrow gorges. According to the view of some geographers and geologists, these rivers are older than the mountains they cross. These rivers began entrenching their courses in these mountains when they began to rise slowly. Gorges deeper than 3 km. are not uncommon. The deepest gorge (5180 metres deep) is found in the course of the Indus where it crosses the Himalayas near Nanga Parbat. A few other rivers such as the Bhagirathi, the Alakananda, the Karnali, the Gandak, the Arun Kosi, the Tista and the Manas have completely cut back their courses in the Great Himalaya and have thus formed very deep gorges. These rivers, for some distance, run

parallel to the mountain ranges before they descend on the Plains of Northern India. Along the river courses at some places occur river terraces, which show that the uplift of the Himalayas at intervals has rejuvenated the rivers.

2.1.2 The Plains of Northern India

These plains stretch in the east-west direction between the Himalayas in the north and the Deccan Plateau of Peninsular India in the south. They form a continuous stretch of alluvium land varying in width from 500 km. (Punjab and northern Rajasthan) to 240 km. (east Bihar Plain). The Sutlej Plain in the west, the Ganga Plain in the middle, and the Ganga Delta and the Brahmaputra Valley in the east constitute these plains. The desert in the west of the Aravalli Range being largely a plain is also included in the Plains of Northern India. These plains continue to the west beyond the Punjab and Rajasthan and converge with the Indus Plain in Pakistan. Measuring about 650,000 square km., these are amongst the largest plains of the world and they account for one-fifth of the area of India. These are primarily level plains without any interruption except for a few outliers of the Aravalli Range. The most prominent of these outliers can be seen in the vicinity of Delhi. They form isolated low hills or ridges and emerge out of the surrounding alluvium as islands. This region was formerly a deep trench, six to eight km. in depth, which was formed as a foredeep when the Himalayas rose as fold-mountains. Uniformity in the level of these plains is mainly due to two facts (a) deposition took place in water and (b) no earth movement disturbed their flatness later. In the drier parts of the western fringe of Haryana and neighbouring parts of Rajasthan, deposition of windblown dust accounts, to some extent, for the formation of these level plains. Numerous ravines turning the fertile alluvial land into unusable lands break the southern fringe of the Ganga Plain, particularly between the Chambal and the Son.

The courses of the rivers in these plains create several meanders. In the rain deficient parts of Punjab, Haryana, and Uttar Pradesh these rivers have been tapped for irrigation without which famines could not have been eliminated from this densely peopled plain tract. Along with canal irrigation, hydroelectric power has also been developed for power supply to industries and for domestic use. The rivers are liable to sudden and disastrous floods during the rainy season. Owing to flatness of the plains and large loops of meanders, the rivers are sluggish and fail to carry away water quickly after heavy continuous rain, which leads to a situation of severe and sudden floods. In some areas of high water-table, the flood waters may stand for a few months and thus impede the sowing of rabi crops. In winter, the volume of water is so small that the rivers appear misfits.

2.1.3 The Indian Plateau

It is also called the Plateau of Peninsular India as it stretches south of

the alluvial Plains of Northern India. It looks like a large triangle with its apex in the south at Kanya Kumari. It is far older than the Himalayan mountain ranges and is formed essentially of the ancient igneous rocks. The earth movements have brought some changes in the landscape of this otherwise stable block of the earth's crust. These movements were vertical and resulted in the formation of faults along which some areas sank forming faulted basins or rift valleys. This occurred sometime during the Gondwana period when drainage of the adjoining area flowed into these basins, deposited sandstones, clays and shales (finely stratified stone) which subsequently turned into sinking of the basins, and formed the coal beds and lay preserved. The valleys of the Damodar, the Mahanadi and the Godavari roughly mark the position of the Gondwana region. The Narmada and the Tapi valleys leading to the Arabian Sea are rift valleys formed long after the Gondwana period. The Narmada Rift valley continues to the north-east and is occupied by the river Son. North of the Narmada-Son is the Malwa Plateau, which extends to the Aravalli Range in the west and Bundelkhand region in the north-east. The Malwa Plateau is inclined towards the north and is formed by horizontally bedded sandstones, limestones and shales laid down during the pre-Gondwana period. It is suggested that during this era the Malwa Plateau was submerged under the sea.

South of the Satpura Range, the peninsula is called the Deccan Plateau. It is believed that large-scale volcanic eruptions took place in the Cretaceous period which spread far and wide over the Indian Plateau covering completely the land forms existing at that time. Repeated flows of melted basalt from fissures built up a basaltic plateau. The basalt so deposited has, however, been eroded away by rivers from a large area and is visible only in Maharashtra, southern Malwa Plateau and large parts of Kathiawar and covers an area of 520,000 square km. at present. The sub-regions of the Indian Plateau are described below.

The Aravalli Range

It runs in the northeast-southwest direction from Delhi to the north-eastern fringe of Gujarat State. Between Delhi and Ajmer, it can be characterised by a chain of detached and discontinuous ridges running also in the northeast-southwest direction and forms basins of inland drainage here and there. The range is almost continuous south of Ajmer. The highest peak of the Aravalli Range is situated in Mount Abu.

The Vindhya Range

The Narmada Valley is flanked in the north by a steep sided escarpment (long steep face of plateau) formed due to presence of the Malwa Plateau. This escarpment, considered wrongly as a mountain sometimes, is known as the Vindhya Range and runs roughly north-eastwards along the northern fringe of the Narmada-Son for about 1200 km. The height of the escarpment generally averages less than 610 metres. The western part of this range is covered with lava. The eastern part of this range, not covered with lava, is known as the Kaimur Hills.

The Satpura Range

It starts from the West Coastal Plain and runs eastwards between the Narmada and the Tapi-Purna rivers and continues up to Amarkantak covering about 900 kms. Its western extremity is known as the Rajpipla Hills and the easternmost part as the Amarkantak Plateau and in the middle we can find the Mahadeo Hills. Throughout its length, the Satpura Range has steep sided plateaus of elevations varying from 600 to 900 metres. The eastern part of the Amarkantak Plateau known as the Maikala Range overlooks the Chhattisgarh Plain. Dhupgarh near Pachmarhi is the highest point of the Satpura Range. The Rajpipla Hills and the Pachmarhi Plateau are deeply dissected with a strong local relief. This range is covered mostly with thick layers of basalt. It has two important gaps; one can be reached by the Bhusawal Khandwa rail section and the other can be reached by Jabalpur Balaghat rail section.

The Chhattisgarh Plain

It is a basin drained by the Upper Mahanadi. It lies to the east of the Maikala Range and low Khairagarh Plateau separates it from the Wainganga Valley. The basin is laid with nearly horizontal beds of limestone and shales and is enclosed by hills or plateaus. It is a large area measuring about 73,000 square km.

The Chota Nagpur Plateau

It lies to the east of the Rihand. It includes the Bihar Plateau and the adjoining eastern fringe of Madhya Pradesh with Purulia district of West Bengal. The Ranchi Plateau in the south, the Hazaribagh Plateau in the north along with the Rajmahal Hills in the north-east constitute important physiographic sections of the Chota Nagpur Plateau. In the same region, the Ranchi Plateau lies to the south of the Damodar. It is in fact a group of plateaus elevated to different heights. The surface of the plateau, which is mostly rolling, is occasionally interrupted by conical hills. Parasnath in the eastern part is the highest point. The north-eastern edge of the Chota Nagpur Plateau is termed as the Rajmahal Hills and it runs in the north-south direction. Consisting mostly of basalt, these hills have been dissected into separate plateaus.

Other Sub-Regions

In addition to the above we can trace the rocks of the Indian Plateau in Meghalaya where it forms a rectangular block known as the Shillong Plateau or the Meghalaya Plateau. The western part of this plateau is called the Garo Hills whereas the central part is known as Khasi-Jaintia Hills and the eastern part as Mikir Hills. The central part of the Khasi Hills is a table-land and Shillong town is situated on it. This table-land is the highest part of the Meghalaya Plateau. Moving to the central India, we can locate Tapi Valley which lies to the south of the Satpura Range. To the south of the Tapi Valley is another east-west range commonly

known as the Ajanta Range, which again is formed of basalt and has an appearance, at the top, of that of a plateau.

The eastern side of the Indian Plateau is bounded by the hills called the Eastern Ghats. Several rivers break these Ghats from the East Coast, namely the Mahanadi, the Godavari, the Krishna and the Penner, before they fall into the Bay of Bengal. The Nallamala Hills between the Penner and the Krishna and Bastar-Orissa Highlands between the Mahanadi and the Godavari are prominent blocks of the region. South of the Krishna, height of the Eastern Ghats is generally less but north of the Godavari, it is higher and rises to 1680 metres near Vishakhapatnam district. Mahendra Giri in Orissa with the height of 1501 metres is the second highest point. The Deccan is fringed in the west by the Western Ghats also known as the Sahyadri, which run from the lower Tapti Valley to the south as a continuous range and merges with the Eastern Ghats in the Nilgiri Hills. The Western Ghats rise abruptly from the western coastal lowlands and rise to an average height of 920 metres in Maharashtra and above 1000 metres in Karnataka State with Doda Betta as the highest peak of the Nilgiri Hills.

As the Deccan plateau slopes gently towards the east consequently the rivers Godavari, Krishna, Penner and Cauvery flow to the east. These rivers and their tributaries have carved broad valleys leaving highlands between them. These highlands form long low ranges particularly in the Deccan region of Maharashtra, Andhra Pradesh and northern Karnataka. The range lying to the north of the upper Godavari valley is called the Ajanta Range whereas one lying between the Bhima-tributary of the Krishna, and the upper Godavari is called the Balaghat Range. These ranges provide in between, broad valley plains extending about 450 metres.

In the extreme south are the Cardamom Hills. These hills are gneisses (Coarse-grained rocks of quartz, mica and felspar) and schists (a foliated rock presenting layers of different minerals) and separated from the Nilgiri by a gap called the Palghat Gap. The Cardamom Hills' prominent peaks are named as the Palni Hills and the Anaimalai Hills to the east. The Anaimalai Hills with Anai Mudi the highest peak at 2695 metres above sea-level are the highest in South India. These hills end almost abruptly in the Plains on either side.

2.1.4 The Coastal Lowlands

The Plateau of Peninsular India is fringed with narrow coastal lowlands. Raised beaches and wave-cut platforms above the high water mark signify that these lowlands are essentially the emerged floors of the seas adjacent to the land. After the emergence of these lowlands, fluctuations in sea-level, though limited to small areas, have brought some changes in the general surface features of the littoral (shore areas). The west and east coastal lowlands are described below:

The physiography of West coastal lowlands is varied. It contains marshes, lagoons, mud-flats, peninsulas, creeks, gulfs and islands. The Rann of Kutch, the peninsulas of Kutch and Kathiawar and the Gujarat Plain are the major physiographic regions.

The Rann of Kutch lies to the north of Kutch. Earlier a gulf and now a vast desolate lowland it was formed due to the deposition of silt brought mainly by the Indus in the past. Its surface is only slightly above sea-level and is interspersed with mudflats, marshes and creeks. It is covered with shallow water during the rainy season and is being continuously filled up by the silt brought by the rivers. There are a few islands in the Rann, with Bela, Khadir and Pachham islands as the only ones of significant size.

Kutch, once an island, lies to the south of the Rann of Kutch. It is an arid area with generally broad sandy terrain along the coast and the Rann of Kutch and bare low rocky ridges in the interior. Kathiawar is located to the south of Kutch. It is hilly in the central part and elsewhere it is a rolling plain. Gorakhnath in the Girnar Hills in Junagadh is the highest peak in Kathiawar. The Gir Hills extending in the east-west direction lie to the south of Kathiawar and are connected with a broad hill-mass lying further north in the central part of Kathiawar which runs north-south forming a low narrow dissected range. In the north-east there is a belt of low country which is marked by Lake Nal and Marshes.

Along with several small rivers, long rivers like, the Tapti, the Narmada, the Mahi and the Sabarmati deposit enormous load of sediments in the Gulf of Cambay leading to siltation of the gulf. This has resulted in the creation of a broad fertile alluvial plain north of Daman extending towards north up to the Aravalli Range and termed as the Gujarat Plain. South of Daman, the coastal lowland narrows to a width of around 50 km, which occasionally broadens by a few kilometres at places where streams have gnawed back into the steeply rising Western Ghats. Between Daman and Goa the western littoral is called the Konkan. Coastal lowlands of Goa and the Konkan, to the south of Bombay are marked with the low hills separated by river courses which form creeks near the sea. The fact that the drowning of the lower courses of the rivers has taken place clearly suggests that there has been some recent submergence, though on a small-scale, of the coast, north of Marmagao.

Coastal plain in the vicinity of the Palghat Gap and in the south of Kerala is relatively broad reaching to a width of 96 km. Off-shore bars have enclosed lagoons which run parallel to the coast in southern Kerala and are known as Kayals. These lagoons receive water of a large number of rivers before discharging that to the sea with which they are connected by narrow openings. Formation of lagoons and off-shore bars indicate

INDIAN LANDSCAPE

Different Colours Indicate Various Landscape features

MOUNTAIN RANGES

INDIAN FORESTS

Different Colours Indicate Various Types of Forests

INDIAN – SOILS

Different Colours Indicate Various Types of Soils

that there has been a slight emergence of southern coastal plain not in the very distant past.

The West coastal lowland south of Surat is drained by several small rivers, which become torrents during the monsoon. In the normal course these torrents should have formed deltas. However, as at this time strong sea-waves also develop due to south-west monsoon winds and these waves having an unusually great scouring power, the mouths of the rivers are desilted and thereby impede the formation of deltas on the west coast. Instead of deltas, long off-shore bars which enclose lagoons, particularly in the south, develop as suggested above.

East Coastal Lowlands

East coastal lowlands is broad compared to the western lowlands and it is broadest in Tamil Nadu where its width ranges from 100 to 120 km. North of the Godavari Delta the coastal lowland is narrow as the Eastern Ghats closes on the sea. At some places it is as narrow as 32 km. in width. Since the Plateau of Penninsular India, especially of the Satpura Range, is tilted to the east, all rivers of the Deccan with the exception of the Tapi flow eastwards and reach the Bay of Bengal. These rivers have spread alluvium over almost whole of this plain and have built large deltas at several places. Sea waves being far less furious than those impinging on the west coast, the sediments brought by large rivers – the Mahanadi, the Godavari, the Krishna and the Kaveri have formed deltas. These deltas being fertile and properly irrigated are densely peopled. At some places spits, lagoons and off-shore bars have also developed along the coast. The coast is fringed at some places with dunes. Mangrove forests grown along the seaward front of the deltas have been a major characteristic. As the sea is shallow near the emerged lowland coasts, deep natural harbours except Bombay and Marmagao are absent along both the coasts.

2.2 VEGETATION

The Indian sub-continent has been witness to a very long period of human activity. During the course of this activity the vegetation cover present in the earliest time has been considerably modified. As a matter of fact, little trace of this vegetation except on the higher reaches of the mountains is to be seen today. If one has to imagine the features of the natural original vegetation, one would most definitely be struck by the fact that it essentially was a tree vegetation or forest cover. Over several millennia of human activity involving clearance and degradation of this forest cover, today only about one fifth of the total area of India is regarded as under the forest, treated as the protected forest. Half of the protected forest area has been designated as the reserved forest where all kinds of degrading activity are prohibited. In any case the least degenerated forests in India have to be found in the Himalayan region

and one of the chief reasons for their preservation is the inaccessible terrain.

The situation described above was not the same in historical past. There is evidence to suggest that central Panjab and the Ganga-Yamuna Doab was covered with vast forest at the time of Alexander's campaign. A notable feature of Indian forest, according to Spate and Learmonth, is that "the floral landscape is rarely marked by an absolute preponderance of one species or even an assemblage of species". Further "(the) nearest approaches to this condition are the Himalayan rhododendron belts (a tree having flowers of blood-red colour), the semi-desert vegetation of the northwest, and bamboos locally in the south and the northwest, usually on old clearing" [O.H.K. Spate & A.T.A. Learmonth, *India and Pakistan: A General and Regional Geography*, Indian Edition, New Delhi, 1984, p.74].

The vegetation cover of India has been classified on the basis of the types of trees present. Accordingly, it has been divided into the following five categories:

- 1 Moist Tropical Types
- 1 Dry Tropical Types
- 1 Montane Subtropical Types
- 1 Montane Temperate Types
- 1 Alpine Types.

This classification is based on the study conducted by H.G. Champion in 1936 and slightly modified subsequently [see *India and Pakistan*, p.77].

Moist Tropical Type

The forest of this type is basically the rain forest that is wet and evergreen or semi-evergreen. It is found in the high rainfall areas where the dry season is short. In places where the dry season is either intermittent or more prolonged the forest becomes semi-evergreen. The tree cover in the forest of this type is very dense and very high. It is found along the Western Ghats to the south of Mumbai and in Assam. Perhaps, in the past, the coastal areas in Orissa and Bengal were also covered with this kind of forest, but have been denuded now.

Dry Tropical Types

This type grows in areas which have moderate rainfall and that too concentrated in a short period of time. The remaining dry season that is fairly prolonged hampers the growth of this type. The area occupied by the forest of this kind extends in central and Peninsular India as also along the Siwaliks in Himachal Pradesh. The trees grow up to a medium height and permit the undergrowth of shrubs and spiny vegetation.

Montane Subtropical Type

The subtropical types are rain forests having a stunted growth. The two main areas where they are found are the Nilgiris and Anaimalai-Palani Hills in the south. It may have covered the Satpura and Maikal Hills and Mount Abu in the past, though most of it has now vanished.

Montane Temperate Type

This type of forest extends in the lower reaches of Himalaya where the rainfall is moderate though regular. The main trees found are oaks, chestnuts and laurels. It also grows pines, cedars, silver firs and spruces. Rhododendrons and some varieties of bamboo are also seen in good numbers in this forest. A notable feature of this type of forest is that it supports exportation of timber wood. It is also prone to frequent fires.

Alpine Type

This type grows in the middle levels of Himalaya. The main types of trees and vegetation are silver firs, juniper, pines, rhododendrons and birches. The forest types in India and their geographical distribution has been depicted in the map appended here.

2.3 SOILS

Soils support vegetation as also agriculture and have therefore been of vital importance in giving Indian landscape a definite view. The traditional classification of the soils in India, as noted by Spate and Learmonth, was in four main categories: alluvium, regur (black cotton soils), red soils and laterite. We have already taken note of heavy alluvium deposits in the Indo-Gangetic plains as a result of erosion and river floods occurring at frequent intervals. An early attempt to classify soil types was made by the Russian scientist Z. J. Schokalskay in 1932. This was essentially an attempt at synthesising the existing knowledge and its value lay in the fact that it prepared ground for systematic soil study. In India a Soil Survey was set up in the year 1956, and it has been working since then to map the soil distribution pattern in India. We have given here a map on the pattern of soil distribution in India but it is based on Schokalskay's study as the Soil Survey of India work has not been completed.

Soil conservation has been an important environmental concern as it sustains vegetation and agriculture both. Many human activities have directly and indirectly resulted in soil erosion in a major way causing in some cases an irreparable loss of the soil for posterity. Since consolidation has to precede conservation, the task becomes more difficult as persuasive measures requiring cooperation on larger scale need to be adopted. Soil fertility and soil productivity are other related issues but they need to be addressed by scientists primarily.

2.4 PERCEPTIONS OF LANDSCAPE

backdrop to examine the social perception of landscape as it evolved since ancient times. The beginning of civilisation in India is traced to the semi-arid region of Sind. The river valleys of the arid region provided suitable conditions for the emergence and growth of a society based on agriculture. At that time the 'technological constraints' forced humans to not venture to the densely forested areas of Ganga-Yamuna Doab and the foothills of the Himalayas. It is only in the early Vedic literature that glimpses of the expansion of human settlement from the north-western India towards the Ganga-Yamuna Doab are provided in ample measure. A shift from the semi-arid region to more wet regions of Ganga-Yamuna Doab was a clear manifestation of the different needs of the settlers. The nomadic character of the new settler necessitated movement towards a greener region and with the 'advent of iron' settlement in the densely forested region became a reality. This was also the beginning of an assault on the forest frontiers. Gradually the agriculture spread, forests shrank and empires began to take shape. The period also witnessed the establishment of republics along with monarchical kingdoms. It is interesting to note that whereas the monarchies were concentrated in the Ganga plain, the republics, most of which pre-dated the monarchies, were ranged round the northern periphery of these kingdoms in the foothills of the Himalayas, perhaps due to the fact, that it was easier to clear the wooded low-lying hills than the marshy jungles of the plain. It also suggests that there had been continuous interaction between the settled agriculture and the adjoining forest areas, a fact substantiated by Kautilya. He visualised forests and mountains as providing effective barrier against the enemies. He also supported management of forests to generate revenue as well. Thus we can suggest that forests and mountains were perceived in terms of their economic and strategic significance.

It should be noted that the landscape was visualised not only in terms of the economic and strategic significance but also its aesthetic value that was appreciated. Ancient literature is full of references where landscape has been eulogised in terms of the bounty it provided and the visual pleasure it offered. In the ancient Tamil poetry, love of man and woman is taken as the ideal expression of 'inner' self as well as outer world. The moods of separation and union are described by borrowing certain attributes from the wider natural world and placed within the rituals of the poetry. There are four kinds of "place"; each is presided over by a deity and named for a flower or tree characteristic of the region:

- 1 *Mullai*, a variety of jasmine, stands for the forests overseen by *Mayon*, the dark-bodied god of herdsmen;
- 1 *Kurinci* (pronounced *Kurinja*), a mountain flower, for the mountains overseen by *Murukan*, the red-speared god of war, youth and beauty;
- 1 *Marutam*, (pronounced *Marudam*), a tree with red flowers growing near the water, for the pastoral region, overseen by *Ventan*, the rain-god; and

- 1 *Neytal* (pronounced *Neydal*), a water flower for the sandy sea shore overseen by the Wind God.

A fifth region, *palai* or desert-waste, is also mentioned. *Palai* is given no specific location, for it is said that any mountain or forest may be parched to a waste land in the heat of summer. It is named for *Palai*, supposedly an ever-green tree unaffected by drought. (A.K. Ramanujan, *The Interior Landscape: Love Poems from a Classical Tamil Anthology*, Delhi, undated).

Information about landscape is also available for the medieval period. A close examination of the Persian sources of the medieval period reveals that the region of Ganga-Yamuna Doab then had a different landscape. During Alauddin's reign, the region between Delhi and Badaun was densely forested unlike the vast expanse of agriculture spanning the area today with only sparsely wooded areas in between. Alauddin had given orders for clearing the forest to make the passage safe for the merchants in particular and travellers in general. However, it seems the vanishing act suffered by the forest here, began in the thirteenth century. Munhta Nainsi, the seventeenth century courtier of the Marwar state, while describing the mountains of Mewar region specially mentions the availability of water on mountains. Similarly, we have information on the political boundary of states defined along the courses of rivers. An interesting landscape detail can be seen in the following example. In the medieval period the territory between the two warring states of Mewar and Marwar were defined according to the cultivation of specific trees. The *anwla* plantation was seen as demarcating the Mewar region whereas Marwar was identified with the *babool* tree, suggesting a broad division of the territory in terms of the semi-arid and wet regions.

Landscape was visualised not only in terms of the kind of agriculture it could sustain, but also in terms of the animal the region could harbour. Historical works of ancient, medieval and even British period carry sufficient references to suggest that certain landscapes were defined in terms of the wild animals found there. Books like *Man-eaters of Kumaon*, tend to project a particular image of the region based on the availability of certain species of animals in the region. Francis Zimmerman, in his seminal work, *Jungle and the Aroma of Meats*, has constructed the details of the landscapes on the basis of the type of animals found in various regions.

The landscape experienced a different kind of change with the beginning of the colonial period. India's biological diversity was scientifically documented by the British. But it is also true that the policies of the colonial rulers greatly altered the character of the Indian landscape. Demand of timber, initially for the ship-industry and later on for making the sleepers for the fast expanding railways, forced an unmanageable demand on the wood. Interior landscapes were penetrated to secure wood. When the impact of this reckless act became imminent, the cutting of

diversified natural forests was compensated by the cultivation of monoculture of commercially viable species. This penetration and promotion of commercial varieties changed the entire landscape of the region. Similarly, propagation of plantation economy in the southern and north-eastern part of the country led to extinction of natural forest cover replaced again by the monoculture of the commercial plants.

It is not only the forest cover, which provides a glaring testimony to the alteration in the landscape of the region. Creation of canal networks in parts of upper India and eastern India led to drastic change in the landscape of these regions. Rohan D'Souza has pointed out the changes in the Orissa delta due to construction of canals in the initial phase and later on railways to protect the imperial interests.

2.5 SUMMARY

The general features of Indian landscape and the changes in these features in the historical period have determined the types of human settlements in different areas and their subsequent growth. Annual deposition of rich alluvial soil in Indus gave rise to civilization and settlements that lasted in that region for nearly two thousand years. It was only when the need for expanding the agricultural base of the settlement was felt that a shift to the forested region of Doab occurred. There was then an expansion in the agricultural frontier and a simultaneous contraction in the forested areas. Unlike this the more settled South India saw the emergence of more clearly demarcated environmental regions in the form of *Mullai*, *Kurinji*, *Neytal* and *Marutam*. In a scenario of this kind the colonial control ushers in a process of major change in the landscape. The priorities change dramatically and development overtakes all other considerations. The landscape changes and often results in irreversible losses of vegetation forms. The lesson for us is: developmental priorities of a democratic country like ours should be decided keeping the concerns of environmental conservation and factors giving rise to degradation in the foreground.

2.6 EXERCISES

- 1) Trace the northern boundary of India and name the passes, which connect India with Tibet along with their location.
- 2) Name the major physiographic divisions of India and give an account of the surface features of the Himalayas. Describe the main surface features and drainage of (i) the Plains of Northern India and (ii) the Indian Plateau.
- 3) How does the surface configuration of the east coastal lowland differ from that of the west coastal lowland?
- 4) Describe the vegetation of India with special reference to the forest.

2.7 SUGGESTED READING

Daniel B. Botkin, *Discordant Harmonies: A New Ecology for the Twenty-first Century*, New York, 1990.

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(We gratefully acknowledge that the source of the maps given in this Unit is O.H.K. Spate and A.T.A. Learmonth, *India and Pakistan: A General and Regional Geography*, Indian Edition, 1984, New Delhi.)