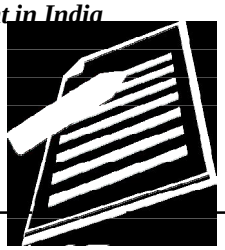


20

LAND, SOIL AND VEGETATION RESOURCES IN INDIA

The nation's strength, be it social, economic *or* political depends mostly on the available resources and their proper utilisation. But what is a resource? In simpler terms, resource is the matter or substance which satisfies human wants at a given time and space. Before any element can be designated as resource three basic pre-conditions must be satisfied. They are the knowledge, technical skills and demand for the material or services produced. If one of these conditions is not satisfied the particular substance remains unutilised. Let us explain it through one example. From time immemorial, water is present on the earth. But it becomes a source of energy when people gained the knowledge and technical skills for hydel power generation. It is therefore human ability and need which create resource value and not their sheer physical presence. So the basic concept of resource is also related to human well-being.

India has rich endowment of resources. An integrated effort is now being made by our country to make the best use of the existing resource potential. It helps to meet the demands of growing population and also provide opportunities for employment. Simultaneously, it acts as indicator for the levels of development. In this lesson we will study three vital resources i.e. land, soil and vegetation.

OBJECTIVES

After studying this lesson, you will be able to :

- recognise the significance of land as a resource;
- identify the main uses of land;
- explain some of the problems in land resource and their solutions;
- recognise the significance of soil as a resource; .
- recall the main characteristics of each major soil type in India;

Notes

- locate major soil regions on the map of India;
- identify different factors that are responsible for the soil erosion in different parts of India;
- explain the problems created as a result of soil erosion;
- establish the relationship between measures adopted for soil conservation with types of erosion in different parts of India.
- identify major constituents of vegetation;
- recognise major vegetation types;

20.1 LAND RESOURCE

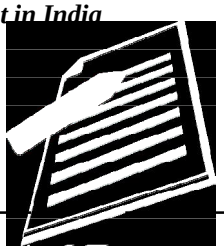
Land is our basic resource. Throughout history, we have drawn most of our sustenance and much of our fuel, clothing and shelter from the land. It is useful to us as a source of food, as a place to live, work and play. It has different roles. It is a productive economic factor in agriculture, forestry, grazing, fishing and mining. It is considered as a foundation for social prestige and is the basis of wealth and political power. It has many physical forms like mountains, hills, plains, lowlands and valleys. It is characterised by climate from hot to cold and from humid to dry. Similarly, land supports many kinds of vegetation. In a wider sense, land includes soil and topography along with the physical features of a given location. It is in this context that land is identified closely with natural environment. However, it is also regarded as space, situation, factor of production in economic processes, consumption goods, property and capital.

Availability of Arable Land

India is well endowed with cultivable land which has long been a key factor in the country's socio-economic development. In terms of area, India ranks seventh in the world, while in terms of population it ranks second. Arable land includes net sown area, current fallow, other fallow and land under tree crops. Arable land covers a total area of 167 million hectares which is 51 % of the total area of the country.

However, the arable land-man ratio is' not as favourable as in many other countries like Australia, Canada, Argentina, the USA, Chile, Denmark and Mexico. Conversely, the land-man ratio is more favourable in India than Japan, the Netherlands, Egypt, United Kingdom, Israel and China. What is the land-man ratio? Land-man ratio is defined as the ratio between the habitable area and the total population of a country.

The physical features in India are diverse and complex. There are mountains, hills, plateaus and plains which produce varied human response to the use of land resources. About 30% of India's surface area is covered by hills and mountains. These are either too steep or too cold for cultivation. About 25% of this land is topographically usable which is scattered across the country. Plateaus



constitute 28% of the total surface area but only a quarter of this is fit for cultivation. The plains cover 43% of the total area and nearly 95% of it is suitable for cultivation. Considering the differences in proportion of surface area, this allows us to conclude that taking the country as a whole, about two-third of it is usable. Moreover, soils, topography, moisture and temperature determine the limits of cultivability and the quality of arable land is determined by these factors. As a result of this, half of the surface area is cultivated. This proportion is one of the highest in the world.

- Land includes both soil and topography with the physical features of a given location. It is also regarded as space, factor of production in economic processes, consumption goods, situation, property and capital.
- Land-man ratio is defined as the ratio between the habitable area and the total population of a country.
- Land-man ratio in India is not as favourable as in many countries like Australia, Canada, Argentina, USA, Chile, Denmark and Mexico. Conversely, the land-man ratio is more favourable in India than in Japan, the Netherlands, Egypt, U.K., Israel and China.

INTEXT QUESTIONS 20.1

1. Define land-man ratio.

   _____

2. Name four countries where land-man ratio is much more favourable than in India.

   (i)_____(ii)_____ (iii)_____ (iv)_____

3. Name four countries where land-man ratio is less favourable than in India.

   (i)_____(ii)_____ (iii)_____ (iv)_____

20.2 LAND USE

Out of the total geographical area (328 million hectares), land utilisation statistics are available for 305 million hectares only. The balance 23 million hectares remains unsurveyed and inaccessible. The relevant statistic are given in Table 20.1. The significant features of land utilisation are :

(a) high percentage of area suitable for cultivation;

(b) limited scope for further extension of cultivation and

(c) small area under pastures despite a large bovine population.

Table 20.1 Land Utilisation in India

Category		Area in M. Ha	% of total reporting area
1.	Net sown area	142.40	46.30
2.	Current fallow	13.70	4.20
3.	Other fallow	9.70	3.00
4.	Pastures and groves	15.40	5.00
5.	Cultivable waste	15.00	4.70
6.	Not available for Cultivation		
	(a) Barren and uncultivable land	19.60	6.20
	(b) Land under non-arable use	21.20	8.60
7.	Forest	68.00	22.00
	Total	**305.0**	**100.0**

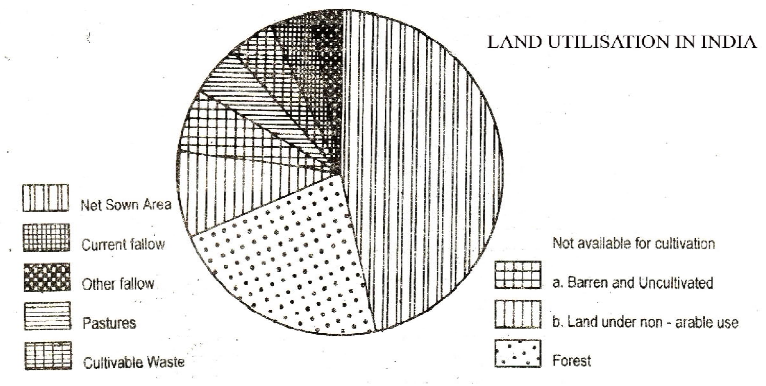
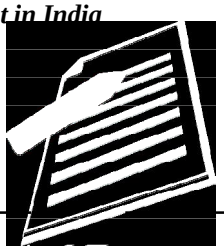


Fig. 20.1 Land utilisation in India

Presently, a little more than 40 million hectares of land is not available for cultivation. Area under this category has shown a decline from 50.7 million hectares in 1960-61 to 40.8 million hectares in 1990-91. There has been a marginal decline in fallow land from 9.9% in 1950-51 to 7.5% in 1990-91. Cultivable wastelands also witnessed an appreciable decline of 34% between 1950-51 and 1990-91. During 1950-51 and 1990-91, the net sown area has witnessed notable increase of about 20%. This area in 1950-51 was 118.7 million hectares which increased



to 142.4 million hectares in 1990-91. Only 14% of the net sown area or 41.7 million hectares produced two or more crops in 90-91. Surprisingly, only 5% of the land is under permanent pastures and grazing in a country with the largest bovine population of the world. Land under non-agricultural use has increased with the accelerated growth in economy. The process of industrialisation and urbanisation demands more land under roads, railways, airports, human settlements and industries not excluding huge multi-purpose dams. Essentially, on the limited total area all the cultural uses of land must be accommodated. Obviously, it can be realised mainly at the cost of land under agriculture. In 1950-51, the total area under non-agricultural use was 9.3 million hectares which increased to 21.2 million hectares in 1990-91. Contrary to general belief, the percentage of land under forest is one of the lowest in the world. Forests occupy not more than 22% of the total geographical area of the country, while the world average is 30%. According to land use statistics, area under forests has increased from 40 million hectares in 1950-51 to 68 million hectares in 1990-91. It is much below the desired national goal of one third of the total area.

Thus, land use is a dynamic process. It changes over time due to a number of factors, including increasing population, changes in cropping system and technology. As the various sectors of the economy develop, there may be a shift in the pattern of land use. However, the bulk of the land continues to be used for raising crops. With unabated population growth, the pressure of population on arable land is bound to grow. Indeed, it should be a matter of great national concern.

20.3 LAND PROBLEMS

Out of the total land area, as many as 175 million hectares suffer from degradation. Land degradation is caused largely by soil erosion, but also by water logging and excessive salinity. The most serious threat to the soil is posed by deforestation. Heavy railfall during monsoon damages the soils. Steep slopes encourage rapid runoff leading to soil erosion especially on the southern slopes of the Himalayas and the western slopes of the Western Ghats. Major portions of the Himalayas are prone to landslides and erosion. Wind erosion is prevalent in Rajasthan, gully erosion in Chambal Valley, Chotanagpur, Gujarat, Submontane Punjab Himalaya. Water logging and salinisation which constitute the second major threat to soil have already consumed 13 million hectares and threaten many more. The lands affected are mostly situated in canal irrigated areas. They have suffered because of the absence of adequate drainage. Land is also degraded due to mining operations in many parts of the country. The total land area affected is about 80 thousand hectares by mining. Urban encroachment on good quality agricultural land is another problem by which the amount of land used for agriculture is steadily declining. In other words, there is a tough competition between agriculture, urban and industrial development. There are social conflicts that are arising out of the rights to occupy and transfer of land. The tenant cultivators face major disincentives such as the fear of eviction, the insecurity of tenure, high rents and inadequate surplus to invest. Land ceiling laws have not been implemented with adequate strictness.

Notes

20.4 SOLUTION OF LAND PROBLEMS

To deal with these problems, the country has adopted a two-fold approach; physical and social. Physical reclamation of land is achieved through chemical treatment of water-logged soils and is followed with scientific rotation of crops. Similarly, land rendered useless by river action and river floods are also reclaimed after necessary freatment to restore their fertility and texture. Physical reclamation of desert lands calls for more sustained efforts. It requires introduction of suitable natural vegetation and canal or well irrigation or even both. It helps to raise water table. Social approach on the other hand is reflected through state legislation aiming at overall rural reconstruction, promoting agriculture and its productivity in particular. Consolidation of land holdings is one measure among many. It provides necessary motivation and empowerment of a tiller by confirming on him the rights of land tenure/ownership. Elements of social exploitation are promptly. removed e.g. absentee landlords. Thus legislation is used to ensure social justice.

Remote sensing data have shown that about 200 square kilometres of the Gulf of Kuchchh have been covered by sedimentation. The National Remote Sensing Agency has estimated 53 million hactares (16%) as wasteland in the country. Among the states, the highest incidence of wastelands is recorded in Jammu and Kashmir (60%) followed by Rajasthan (38%), Sikkim and Himachal Pradesh (37% each) and Gujarat (17%). The Government of India constituted the National Wasteland Development Board in 1985 with a view to enhancing productivity of wastelands. It includes the programe of afforestation of 5 million hectares per year.

India does not have shortage of land. But, land reform policies need to be reoreinted for further increase in food production.

- Land use is a dynamic process. It changes over time due to a number of factors including increasing population, changes in cropping system and technology. As various sectors of the economy develop, there may be a shift in the pattern of land use.
- The major land problems include land degradation due to soil erosion, water logging, salinisation, mining operations and urban encroachment on good quality agricultural land.
- India has adopted two ways to develop land:

  (a) physical (reclamation of land) and (b) social (land reforms)

INTEXT QUESTIONS 20.2

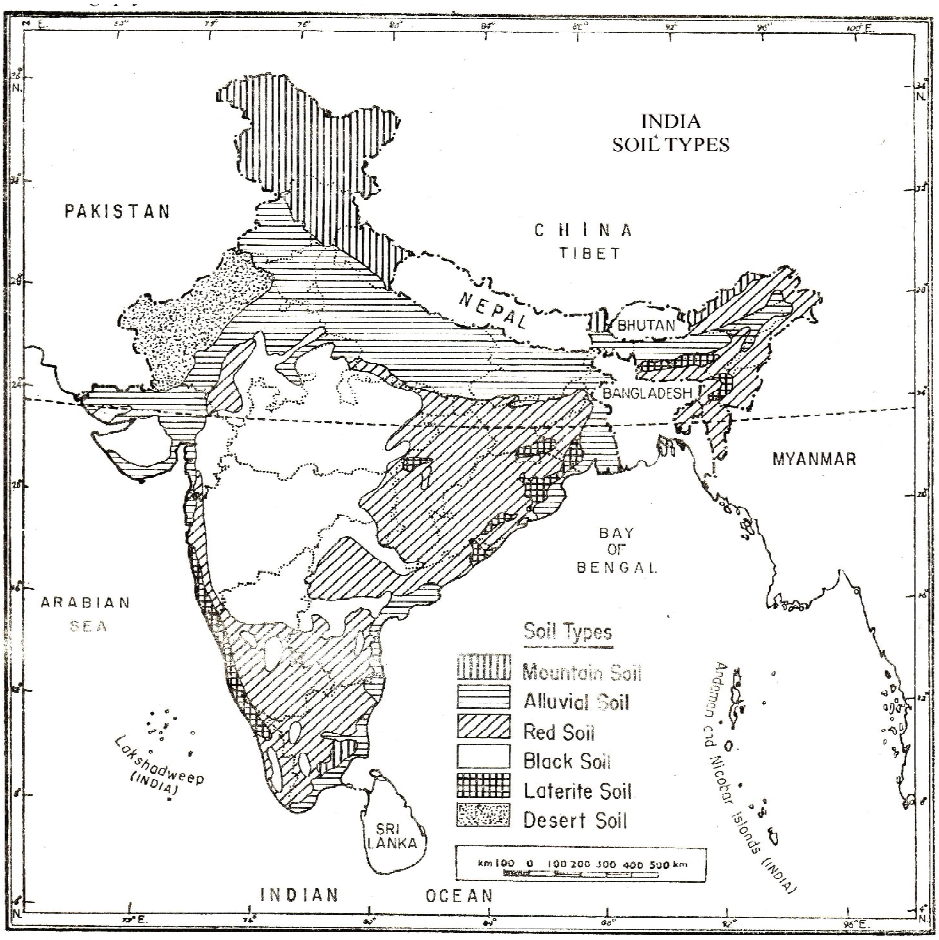
1. Name three areas where gully erosion is much more prominent.
   (i)_____ (ii)_____(iii)_____
2. What is the most serious threat posed to the soil?

   _____

3. Name two methods adopted to develop land.
   (i)_____ (ii)_____
4. Which is the area where wind erosion is more prominent?
   _____

20.5 SOIL RESOURCES

Soil is defined as upper layer of the earth composed of loose surface material. It is a mixture of many substances including endless variety of minerals, remnants of plants and animals, water and air. It is the end product of continuing interaction between the parent material, local climate, plant and animal organisms and elevation of land. Since each of the elements varies over space, soils also differ from place to place. Soil is an important segment of our ecosystem, as it serves an anchorage for plants and source of nutrients. Thus, soil is the seat, the medium and fundamental raw material for plant growth. Through its relative fertility, it affects man's economic activities and shapes the destiny of our country. When the soil is lost, property and culture are also lost. Therefore, it is a valuable national and fundamental earth resources of the country.



Based upon Survey of India outline map printed in 1979.
The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.
The boundary of Meghalaya shown on this map is as interpreted from the North-Eastern Areas (Reorganisation) Act, 1971, but has yet to be verified.

Fig. 20.2 : Soil types

Notes

20.6 MAJOR SOIL TYPES

The soils of India are broadly divided into following six types:

1. Alluvial Soils

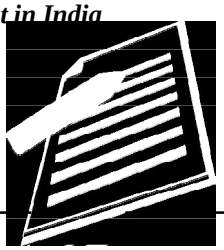
Alluvial soil is the most important soil type of India. It covers the vast valley areas of the Sutlej, Ganga and Brahmaputra and the fringes of the southern peninsula. It is thin near the fringe of the plateau. The alluvial soils occupy 64 million hectares of the most fertile land. The soils vary from sandy loam to clay in texture and are rich in potash but deficient in nitrogen and organic matter. Generally, the colour varies from grey to reddish brown. These soil are formed of deposits of silt and sand brought down by the rivers flowing from the Himalayas and the Great Indian plateau. Being young, the soils lack profile development. Being extremely productive, these soils are most important from the point of view of Indian agriculture. Based on geographical considerations, this soil can be subdivided into two divisions: newer alluvium (khadar) and older alluvium (bangar). Both are different in texture, chemical composition, drainage capacity and fertility. The newer alluvium is a light friable loam with a mixture of sand and silt. It is found in river valley, the floodplains and deltas. On the other hand, the older alluvium lies on the inter fluves. The higher proportion of clay makes the soil sticky and drainage is often poor. Almost all crops are grown on these soils.

2. Black Soils (Regur)

The black soils are found mainly on the Deccan lava region covering large parts of Maharashtra, some parts of Gujarat and Madhya Pradesh and small parts of Karnataka, Andhra Pradesh and Tamil Nadu. The soils are formed by disintegration of volcanic basaltic lava. The colour of the soil is generally black due to presence of compounds of aluminium and iron. The soil is locally known as regur which extends roughly to 64 million hectares. It is generally clayey deep and has low permeability and impregnable. But it's depth varies from place to place. It is very thick in lowlands but very thin on highlands. The most important characteristics of this soil are its ability to retain moisture even during the dry season. The soils form wide cracks during summer due to moisture loss and swell and become sticky when saturated. Thus, the soil is aerated and oxidised to deep levels which contribute to maintain its fertility. This continued fertility is favourable in the area of low rainfall for cotton cultivation even without irrigation. Other than cotton, this soil is favourable for the cultivation of crops like sugarcane, wheat, onion and fruits.

3. Red Soils

Red soils cover large part of the Peninsular upland in Tamil Nadu, Karnataka, Goa, South east Maharashtra, Andhra Pradesh, Orissa, Chotanagpur Plateau and Meghalaya Plateau. They encircle the black cotton soil zone. They have developed on the crystalline rocks like granite, gneisses and cover roughly



72 million hectares of the arable land. Iron compounds are abundant making the soil reddish in colour but they are deficient in organic matter. The red soils are generally less fertile and are not as important agriculturally as the black and alluvial soils. But the productive capacity can be raised through irrigation and use of fertilizers. This soil is suitable for rice, millet, maize, groundnut, tobacco and fruits.

4. Laterite Soils

The laterite soils are commonly found in area of high altitude and heavy rainfall in Karnataka, Tamil Nadu, Madhya Pradesh, Jharkhand, Orissa, Assam and Meghalaya extending over 13 million hectares. They generally form under hot and humid climatic conditions. The lateritic soils are particularly found on high flat erosion surfaces in areas of high and seasonal rainfall. Loss of nutrients by accelerated leaching is the most common feature which renders the soil infertile. The pebbly crust is the important feature of laterites which is formed due to alteration of wet and dry periods. As a result of weathering, laterite becomes extremely hard. Thus, their characteristics include complete chemical decomposition of the parent rock, complete leaching of silica, a reddish brown colour given by the oxides of aluminium and iron and lack of humus. The crops which are generally grown are rice, millets, sugarcane on lowland and tropical plantation such as rubber, coffee and tea on uplands.

5. Desert Soils

The desert soils occur in western Rajasthan, Saurashtra, Kutchchh, western Haryana and southern Punjab. The occurance of these soils is related to desert and semi-desertic conditions and is defined by the absence of water availability for six months. The soil is sandy to gravelly with poor organic matter, low humus contents, infrequent rainfall, low moisture and long drought season. The soils exhibit poorly developed horizons. Plants are widely spaced. Chemical weathering is limited. The colour of the soil is either red or light brown. Generally, these soils lack the basic requirements for agriculture, but when water is available, variety of crops like cotton, rice, wheat etc. can be grown with proper dose of fertilizers.

6. Mountain Soils

The mountain soils are complex and extremely varied. The soils vary from deep alluvium in the river basins and lower slopes to highly immature residual gravelly on higher altitudes. Because of complex topographic, geologic, vegetation and climatic conditions, no large areas of homogenous soil groups are found. Areas of steep relief are mostly devoid of soil. Various types of crops are grown in different regions like rice in valley, orchards on slopes and potato in almost all areas.

20.7 SOIL EROSION

Soil erosion is described as the carrying away of soil. It is the theft of the soil by

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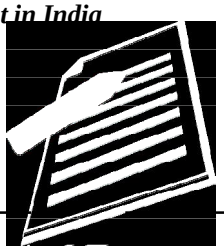
natural elements like water, wind, glacier and wave. Gravity tends to move soil down slope either very slowly as in soil creep or very rapidly as in landslides. The present shape of land has been carved through thousands of years. Soil erosion has become now one of the major environmental problems and a serious constraint for agricultural production. There are many physical and social factors which determine the extent and severity of soil erosion. The principal physical factors are erosivity of rainfall, erodibility of soil, severity of periodic floods, length and steepness of the slope. The important social factors are deforestation, overgrazing, nature of land use and methods of cultivation. Ravines, gullies and landslides are most serious and highly visible forms of land erosion. On the other hand, sheet erosion caused by rains and erosion due to winds are least visible but equally serious as they too take a heavy toll of our precious top soils. Soil erosion by ravines and gullies is widespread in India, It has been estimated that 3.67 million hectares of soil surface is damaged. There are four major areas of ravines and gullies in India. They are (1) Yumuna-Chambal ravine zone, (2) Gujarat ravine zone, (3) The Punjab Siwalik foothills zone and (4) Chhotanagpur zone. There are other areas of substantial ravine erosion in the Mahanadi valley, upper Son valley, upper Narmada and Tapi valleys, Siwalik and Bhabar tract of the western Himalayan foothills and edges of Ganga Khadar in western Uttar Pradesh. The relatively less affected areas are whole of Deccan south of the Godavari, the Ganga-Brahmputra plains, east of Varanasi, Kutchchh and western Rajasthan. Sheet erosion is widespread over sloping deforested terrain, unterraced uplands of Peninsular region, Sutlej-Ganga plains, Coastal plains, Western Ghats and North-Eastern hills.

The occurrence of landslides is common in earthquake sensitive belts, particularly the Siwaliks. Heavy rainfall and cutting of slopes for roads, buildings and mining activities trigger landslides. In the last 50 years, the Rajasthan desert has encroached upon 13000 hectares of land in Rajasthan, Gujarat, Haryana and Uttar Pradesh. Glacial erosion is limited to high Himalayas and sea erosion is confined to coasal areas only. Soil erosion and soil exhaustion due to loss of soil nutrients pose serious threats to our efforts of increasing the productivity of soil faster than the population growth.

20.8 SOIL CONSERVATION

Methods by which soil is prevented from being eroded consitute soil conservation. If the soil is wasted or blown away, it is not easy to replenish it. Therefore, the most important step of soil convservation is to hold the soil in place. This is possible by improved agricultural practices in different regions. Contour ploughing and terracing are generally practised on the hill slopes. They are the simplest conservation methods. Rows of trees or shelter belts are planted to protect the fields in desert regions from wind erosion. Afforestation of the catchment areas and slopes in the Himalayas, the Upper Damodar valley in Jharkhand and the Nilgiri hills in the south has been implemented. It reduces the surface runoff and binds the soil. Ravines are noted for their enormous size and depth with vertical sides. The Central



Soil Conservation Board has established 3 research stations: (1) Kota in Rajasthan, (2) Agra in Uttar Pradesh and (3) Valsad in Gujarat to suggest methods of reclamation of ravine lands. Overgrazing by sheep, goat and other livestock has been partly responsible for soil erosion. Erosion due to these factor has been reported from Jammu & Kashmir, Himachal Pradesh, Rajasthan and Karnataka. Soil exhaustion can be prevented by the application of manure and fertilisers.

- The six major types of soil found in India are alluvial, black, red, laterite, desert and mountain soil.
- Both physical and social factors cause soil erosion. The physical factors are erosivity of rainfall, erodibility of soil, severity of periodic floods and length and steepness of the slope. The social factors are deforestation, overgrazing, nature of land use and methods of cultivation.
- Major forms of soil erosion are ravines, gullies, landslides and sheet erosion.
- Contour ploughing, terracing, planting of shelter belt afforestation checking of overgrazing and application of manures and fertilizers are the methods of soil conservation.

INTEXT QUESTION 20.3

1. (a) Name the two important regions of alluvial soils.

   (i)_____ (ii)_____

   (b) Which element are responsible for red colour in red soils?

   _____

2. (a) Name three major types of soil erosion:

   (i) _____ (ii) _____ (iii) _____

   (b) Name four methods of soil conservation adopted for preventing soil erosion.

   (i) _____ (ii) _____ (iii) _____ (iv) _____

20.9 NATURAL VEGETATION IN INDIA

The assemblage of plant species, e.g. trees, shrubs, grasses, creepers and climbers and the like living in association with one another in a given environment is known as natural vegetation. Contrary to this, a forest denotes a large tract covered by trees and shrubs which has an economic significance for us. Thus, a forest has a different connotation than what the Natural Vegetation has.

Notes

The variations in climatic conditions in India have resulted in having various types of natural vegetation in different parts of the country. It is so because each plant needs a definite range of temperature and precipitation for its growth. This justifies the growth of tropical evergreen vegetation confined mainly to the Western Ghats, on account of hot and wet climatic conditions. The same is true for temperate evergreen vegetation of northeast India and thorny or arid or semi-arid vegetation of Rajasthan desert and adjoining areas. Deciduous vegetation grows in central parts of India owing to moderate climatic conditions prevailing over there.

MAJOR VEGETATION TYPES

Natural vegetation cover in India is generally divided under the following heads:

i) Moist Tropical Evergreen and Semi–evergreen Vegetation

ii) Moist Tropical Deciduous Vegetation

iii) Dry Tropical Vegetation

iv) Tidal Vegetation and

v) Mountain Vegetation.

1. Moist Tropical Evergreen Vegetation

These are the tropical rain forests which are further divided into two sub-types on the basis of their characteristics as under:

(a) **The Wet Tropical Evergreen Vegetation** is found in regions of very high annual rainfall exceeding 300 cms. with a very brief dry season. Southern parts of Western Ghat of Kerala and Karnataka are very wet. Northeastern Hills are known for this type of vegetation. It resembles the equatorial vegetation. This type of vegetal cover has been badly depleted due to over cutting of trees. The major characteristics of this type of vegetation are:

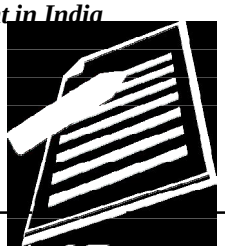
(i) These forests are dense and have lofty evergreen trees, often as high as 60 metres and above.

(ii) The number of vegetal species per unit area is too large to exploit them commercially.

(iii) Mahogony, cinchona, bamboos and palms are typical species of plants found in these forests. Undergrowth is very dense and thick. Grass is almost absent.

(iv) The wood of these trees is very hard and heavy to work with.

(b) **Moist Tropical Semi-evergreen Vegetation** is found between wet evergreen vegetation and moist temperate deciduous vegetation. This type of vegetation is found on the Meghalaya plateau, Sahyadris and Andaman and



Nicobar Islands. This vegetation is confined to areas receiving an annual rainfall of about 250 to 300 cms. Its important characteristics are:

(i) The vegetation cover is less dense than the wet evergreen forests.

(ii) Timber of these forests is fine textured and of good quality.

(iii) Rosewood, aini and telsur are important trees in Sahyadris, champa. joon and gurjan in Assam and Meghalaya and ironwood, ebony and laurel grew in other regions.

(iv) Shifting agriculture and over exploitation of forests have depleted this vegetal cover to a great extent.

2. Moist Tropical Deciduous Vegetation

This is the most wide spread vegetal cover of India. This type of vegetation is found in areas receiving annual rainfall of 100 to 200 cms. These include the Sahyadris, the northeastern plateau of the peninsula, the Himalayan foot hills in the Siwaliks, the bhabars and terai. The important characteristics of this vegetation are:

(i) The trees shed their leaves once in a year in dry season.

(ii) This is a typical monsoon vegetation consisting of larger number of commercially important species than the evergreen forests.

(iii) Teak, sal, sandalwood, shisham, cane and bamboo are important trees of these forests.

(iv) Large scale cutting of trees for timber has depleted these forests hopelessly.

3. Dry Tropical Vegetation

This type of vegetation is divided into two groups as under:

(a) **Dry Tropical Deciduous Vegetation** is found in regions receiving annual rainfall between 70 to 100 cms. These regions include parts of Uttar Pradesh, northern and western Madhya Pradesh, parts of Gujarat, Maharashtra, Andhra Pradesh, Karnataka and Tamil Nadu. These areas experience a long dry season and a moderate rainfall limited at best to four months. The important characteristics of this vegetation are :

(i) Stretches of open grass are most common between group of trees. Teak is the dominant tree of this type of vegetation. .

(ii) The trees shed their leaves during the long dry season.

(b) **Dry Tropical Thorny Vegetation** is found in areas receiving annual rainfall less than 70 cms. These areas include north and northwestern parts of

Notes

India and leeward side of the Sahyadris. The important characteristics of this type of vegetation are:

(i) Vast, poor and coarse grasslands are interspersed with widely spaced trees and bushes.

(ii) Acacia, euphorbias, cactus etc. are true representatives of this type of vegetation. Wild palm and spiny and thorny varieties are also found here and there.

4. Tidal Vegetation

This type of vegetation grows mainly in the deltaic regions of the Ganga, Mahanadi, Godavari and Krishna which are flooded by tides and high sea waves. Mangrove is the representative of this type of vegetation. Sundari is the typical tree of tidal forests. It is found in abundance in the lower Ganga delta of West Bengal. This is the reason why it is popularly known as Sunderban. It is known for its hard and durable timber.

5. The Mountain Vegetation

Due to the difference in temperature and other weather conditions of northern and peninsular mountain ranges, there exists difference in the vegetal cover of these two groups of mountain ranges. Hence, the mountain vegetation can be classified as the mountain vegetation of Peninsular plateau and the mountain vegetation of the Himalayan ranges.

(a) The Mountain Vegetation of Peninsular Plateau: The high altitude area of the plateau region include Nilgiri, Annamalai and Palni hills, Mahabaleshwar in Western Ghats, Satpura and Maikal hills. The important characteristics of vegetation of this region are:

(i) Stretches of open rolling grass plains with undeveloped forests or bushes are found.

(ii) The wet temperate forests below 1500 metres are less dense than those found above this height.

(iii) The forests have thick undergrowth, epiphytes, mosses and ferns.

(iv) Magnolia, laurel, elm are common trees.

(v) Cinchona and eucalyptus have been introduced from outside the country.

(b) The Mountain Vegetation of the Himalayan Ranges: In the Himalayan mountain region, the vegetation is different at increasing altitudes. This can be divided into following types:

1. Moist Tropical Deciduous forests are found along the foot hills in the Siwaliks, upto the height of 1000 metres. We have already learnt about these forests.

2. The Wet Temperate Evergreen forests are found in the areas lying between 1000 to 3000 metres. The important characteristics of these forests are:

(i) These are very thick forests of lofty trees.

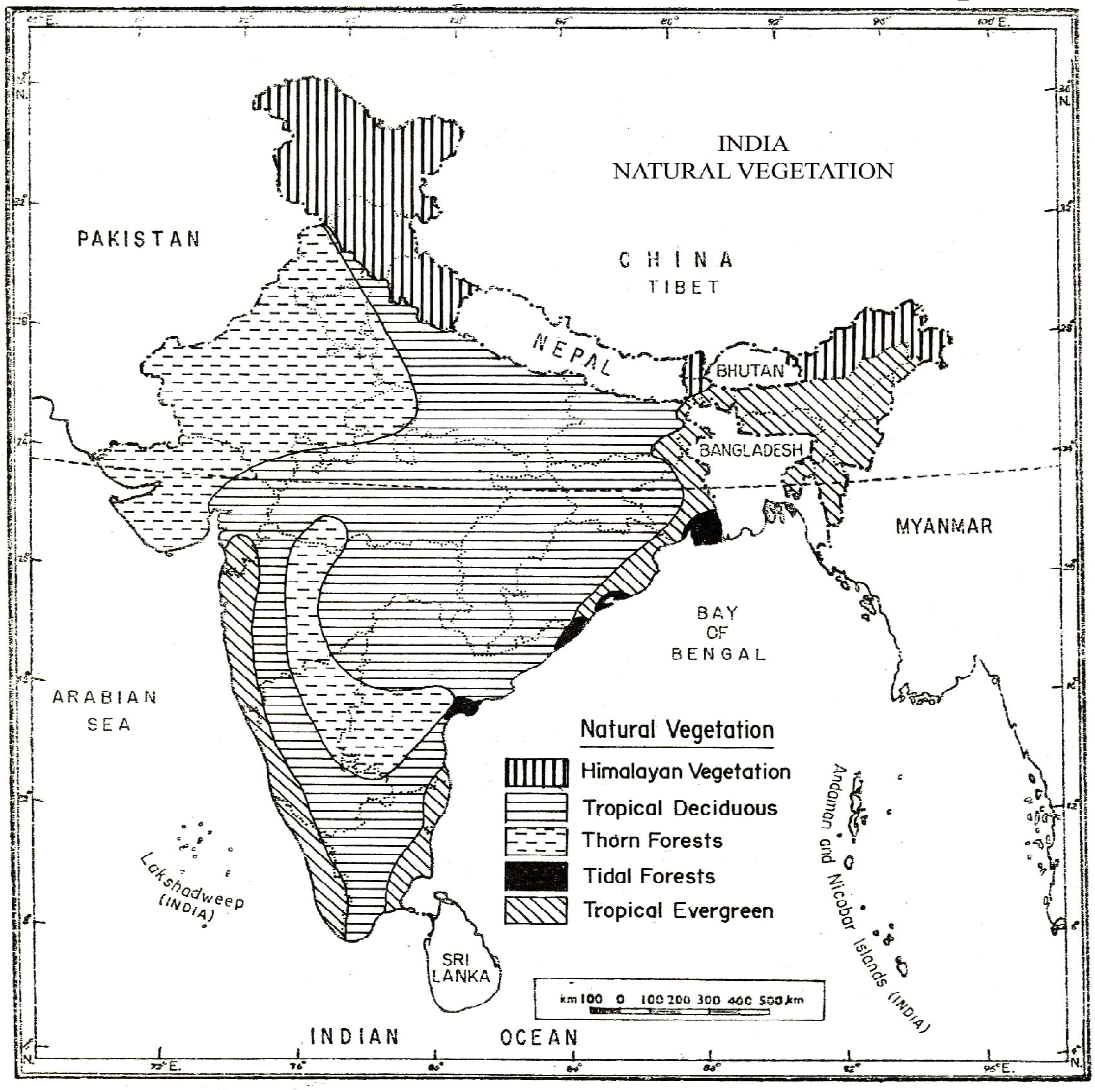
(ii) Oak and chestnut are the predominant trees of the eastern Himalayan region while chir and pine are in the western part.

(iii) Sal is the important tree in lower altitudes.

(iv) Deodar, silver fir and spruce are predominant trees between the height of 2000 and 3000 metres. These forests are less dense as compared to the forests at lesser elevations.

(v) These forests are of great economic importance to the local population.

3. Dry Temperate Vegetation is found on the higher hilly slopes of this mountain region which has moderate temperatures and rainfall between 70 cms and 100 cms. Important characteristics of this type of vegetation are:



Based upon Survey of India outline map printed in 1979.

The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.

The boundary of Meghalaya shown on this map is as interpreted from the North-Eastern Areas (Reorganisation) Act, 1971, but has yet to be verified.

Fig. 20.3 Natural Vegetation in India

(i) This vegetation resembles the Mediterranean vegetation.

(ii) Wild olives, acacia are important trees along with hard, coarse and thick savanna grass.

(iii) Oak and deodar are found here and there.

4. Alpine Vegetation is found between the altitude 3000 and 4000 metres. The important characteristics of these forests are:

(i) These are far less dense,

(ii) Silver fir, juniper, birch, pine and rhododendron are important trees of these forests. However, all of them have only a stunted growth.

(iii) Alpine pastures are found at still higher altitudes.

(iv) The trees get progressively stunted as they approach the snow line.

- Natural vegetation is the assemblage of plant species living in association with one another in a given environment.
- Variations in temperature and rainfall conditions have a clear impact on vegetation of different regions.
- The major vegetation belts include the moist tropical evergreen, the moist tropical deciduous, dry deciduous, the tidal and the mountain vegetation. Mountain vegetation spans almost from the tropical to Alpin types.

INTEXT QUESTIONS 20.4

1. Give suitable technical terms for the following statements:

(a) The assemblage of plant species living in association with one another in a given environment_____.

(b) A large area densly covered by trees and shrubs generally with a common crown or canopy_____.

2. Classify the following species of trees into the types of vegetation given below :Mahogony, Ebony, Shisham, Cinchona, Sal, Palm, Rosewood

(i) Moist Tropical Evergreen_____.

(ii) Moist Tropical Deciduous_____.

(iii) Moist Tropical Semi-evergreen_____.

3. Name the type of vegetation found in the regions of annual rainfall

(i) exceeding 300 cms._____.

(ii) between 200 and 300 cms._____.

(iii) between 100 and 200 cms. _____.

4. Give two most important characteristics of the moist tropical deciduous vegetation.

(a) _____ (b)_____

WHAT YOU HAVE LEARNT

Land is our basic resource. It has different roles like productive economic factor, foundation for social prestige and is the basis of wealth and political power. India is well endowed with cultivable land. It has favourable land-man ratio than Japan, and Netherlands, whereas it is not as favourable as it is in Australia, Canada and the U.S.A. Land use is a dynamic process. It changes over time due to a number of factors including increasing population and changes in cropping pattern and technology. However, bulk of land continues to be used for raising crops. India faces a lot of problems related to land. They are land degradation, tenure or ownership of land and deforestation. India has adopted two broad measures, land reclamation and land reforms to solve these problems. Soil is defined as upper layer of the earth composed of loose surface material. The soils of India are broadly divided into six groups. They are alluvial, regur or black, red, laterite, desert and mountain soils. Like land, soil also has problems such as soil erosion and soil exhaustion. Various soil conservation methods like contour ploughing terracing, shelter belt formation and afforestation are adopted in India. Natural vegetation implies the assemblage of plant species living in association with one another in a given environment. Diversity in climatic conditions has resulted into a marked diversity in natural vegetation. The important vegetation types in India include the moist tropical evergreen, the moist tropical deciduous, the dry deciduous, the tidal forests and the mountain vegetation.

TERMINAL QUESTIONS

1. What are the significant features of land utilization in India?
2. Give a brief description of various types of land use in India.
3. Write two main characteristics of each soil type of India.
4. Describe various measures undertaken for conservation of soils.
5. Differentiate between these:
   (a) Laterite soil and red soil
   (b) Soil erosion and soil conservation
   (c) New alluvium and old alluvium
6. Define natural vegetation. How is a forest different from it?
7. Distinguish between Tidal vegetation and Mountain vegetation.
8. Give reasons:
   (i) The Himalayan vegetation belt are defined altitudinally and not horizontally.
   (ii) The dry regions are covered with thorny frees and bushes.
9. Locate and label the following on an outline map of India::
   (i) Alluvial soil.
   (ii) Laterite soil.
   (iii) Desert soil.
   (iv) Tidal forests and tropical thorn forest.

Notes

ANSWER TO INTEXT QUESTIONS

20.1

1. Land-man ratio is defined as the ratio between the habitable area and the total population of a country.
2. Australia, Canada, Argentina, USA, Chile, Denmark and Mexico (Any four)
3. Japan, Netherland, Egypt, U.K., Israel and China. (Any four)

20.2

1. Chambal valley, Chotanagpur, Gujarat, Submountane Punjab Himalaya (Any four)
2. Deforestation
3. (i) Physical (land reclamation), (ii) Social (land reforms)
4. Rajasthan

20.3

1. (i) Valley areas of Sutlej, Ganga, Brahmaputra, (ii) Fringes of the southern peninsula.
   (b) Compounds of Iron
2. (a) gully erosion, sheet erosion, landslides, ravine erosion (any three)
   (b) contour ploughing, terracing, shelter belt formation, afforestation.

20.4

1. (a) Natural vegetation, (b) Forest
2. (i) Mahogony, cinochona and plam
   (ii) Sal and Shisham
   (iii) Ebony and Rosewood
3. (i) Moist Tropical Evergreen
   (ii) Moist Tropical semi-evergreen
   (iii) Moist Tropical Deciduous
4. (i) The trees shed their leaves once in a year in dry season
   (ii) This belt consists of a number of commercially important species of trees such as teak, sal, shisham, bamboos and sandalwood.

HINTS OF TERMINAL QUESTIONS

1. Refer to 20.1
2. Refer to 20.2
3. Refer to 20.6
4. Refer to 20.8
5. (i) Refer to 20.6
   (ii) Refer to 20.7 and 20.8
   (iii) Refer to 20.6
6. Refer to 20.9
7. Refer to 20.9
8. (i) Refer to 20.9 (5)
   (ii) Refer to 20.9 (3)
9. With the helps of maps given in the book as well as with the help of atlas locate the given soils and forests on the outline map of India.