CHAPTER -6

Regional Geography of India

6.01 : Introduction of India

India is an important country situated in the northern hemisphere of the world. It is one of the largest democratic nations of the world falling within the continent of Asia. The country is full of diversities. Such diversities are apparent due to variations in its climate, physical environment and socio-economic conditions. As against the very cold climates found over the snow-covered Himalayas, there are also very hot climates in the dry sandy desert regions of Rajasthan. Floods occur in certain regions of the country due to heavy rainfall, whereas drought takes place in some other regions due to scanty rainfall. There are regions of tall trees with broad-leaf, while there are other regions covered with thorny bushes. The variations in climate and vegetation types found in the regions ranging from the high mountains to the low lying plains are noticeable. The landmass of the Indian sub-continent is full of diversities with varied landforms like mountains, hills, plateaus, plains, floodplains etc. Such physical diversities have also brought about social and economic diversities in the country. As against the backward tribal societies there are also some modern urban societies in certain areas. The country is the home of many human groups having their different languages, religions, customs and traditions, dress and food habits. Such diversities are the main characteristics of Indian society and culture. But it is important to note that in spite of such diversities our India is a united sovereign country. Unity and integration are the tradition of this country.

The long continued strong cultural base, similar physical conditions shaped by monsoon climate and modern transport and communication, trade and commerce along with unified administration grown in recent years have all contributed to a sense of unity among all the Indians.

Location and size :

India is situated in the southern part of the world's largest continent of Asia. In its north there are the Himalayas and China, in the south the Indian Ocean and Sri Lanka, in the east the Bay of Bengal and Myanmar and in the west the Arabian sea and Pakistan (Figure 6.01). The Indian landmass extends in the north-South direction from Kashmir to Kanyakumari and in the east-west direction from Arunachal Pradesh to Saurastra. The country stands between 8°4'28" N and 37°17'53" N lines of latitudes and 68°7'33" E and 97°24'47" E lines of longitudes. It is noteworthy that the 23°30' N line of latitude or the Tropic of Cancer runs midway the country and this line divides the country into northern and southern halves. Of these the southern half is situated between the Bay of Bengal on the east and the Arabian sea on the west. The country has its maximum north-south extension of about 3,214 km. and east-west extension of about 2,933 km. It has a total of about 6,100 km. long coastal boundaries with the Bay of Bengal on the east, the Arabian Sea on the west and the Indian ocean on the south. A good number of ports are located along the coast. Like the coast lines the country has also land frontiers with its neighbouring countries. The total land boundary of India with Pakistan on the west, China, Nepal and Bhutan on the north, China on the east and Myanmar and Bangladesh on the south-east is about 15,200 km.

India is a vast country. In size it ranks seventh among the countries of the world. This country is 13 times larger than the United Kingdom and 4 times larger than Japan. Its total geographical area is 3,287,263 km^2. The country covers 2.2% of the total area of the world. India is also called a sub-continent

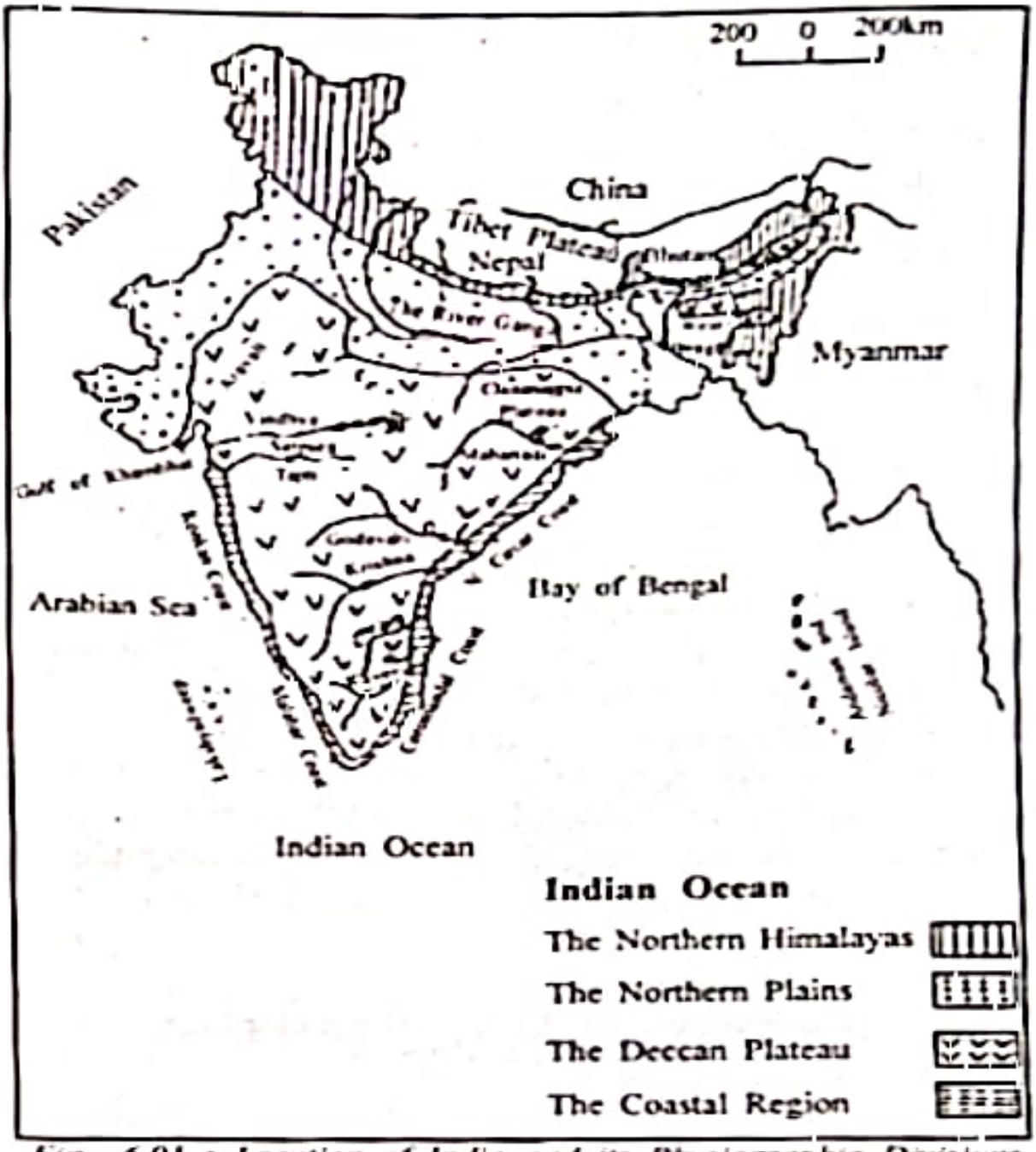

Fig.- 6.01 : Location of India and its Physiographic Divisions

in view of its vast size and extension. It is a large democratic country with 28 states and 7 union territories .

6.02 Physiography

India is a country of much physiographic diversities. Almost all kinds of landforms are found in this country. The physiographic environment of the country is characterised by the primary land

forms like mountains, hills, plateaus, plains etc. and other secondary landforms that have developed over them. Approximately 10.7 % of India's total land area is covered by mountains, 18.6 % by hills and hillocks, 27.7 % by plateaus and 43.3 % by plains. The entire northern and north eastern sides of the country are bounded by the high Himalayas and its branches. In these mountains there are landforms like higher peaks, glaciers, deep gorges, waterfalls etc. The foothill belt of the Himalayas is covered by a series of hill ranges of low height. Like the Himalayas and its branches in northern India, there are also some important mountain ranges like Aravallis, Vindhya, Satpura, Mahadev, Mahakal, Eastern Ghats, Western Ghats etc. in southern India. An extensive plateau region having height lower than the mountains is located in southern hemisphere. This plateau is known as the Deccan plateau. Extensive plains are also there in India. The rivers flowing from the northern Himalayas have created large plains. Such a large plain created by the major rivers of Indus, Ganges and Brahmaputra and their many tributaries is the extensive alluvial plain called the Indus-Ganges-Brahmaputra plain. Again on the west the Rajasthan plain is situated. This plain is, however, dry and sandy. It is known as the Thar Desert. Beside these, there are narrow coastal plains located along the east and west coasts of India.

India has less number of lakes. The major lakes of the country are the Ular in Kasmir, the Puskar and Samber in Rajputana, Chilka in Orissa, the Kolar and Policot in Tamil Nadu and Loktak in Manipur. However, India is famous for its large number of rivers. It is known as the land of rivers. India has a number of large rivers including the Ganges and the Brahmaputra. The Ganges and the Brahmaputra are the two largest rivers of northern India. On the other hand, the major rivers of southern India include Narmada, Tapti, Mahanadi, Godavari, Krishna and Kaveri. However, some notable differences between the northern

and southern groups of rivers of India are observed. These differences are mentioned below :

(a) The north Indian rivers have their water flows throughout the year as they are coming out of the snow-covered high mountains. But the rivers of south india generally originate from the mountains and plateaus of comparatively low height and so they get dried out during winter.

(b) The three courses of the river -upper course, middle course and lower course are distinctly seen in the north Indian rivers, but these are not so distinct in the case of the south Indian rivers.

(c) The valleys of the north Indian rivers are wide and as these rivers have their long course in the plains, they flow slowly and hence these are navigable. But the valleys of the south Indian rivers are comparatively narrow and the rivers are flowing rapidly. Hence they are not navigable .

(d) The rivers of south India are older in and they are flowing in a difinite course over the hard rocks of Deccan plateau. So, these rivers do not change their channels frequently and their floodplains are also narrow.On the other hand, the rivers of north India are relatively younger in age and these change their channels frequently. So, their floodplains are also wide.

(e) The north Indian rivers are not swift-flowing rivers and they carry high sediment load. So, these rivers are not suitable for hydropower generation. But the south Indian rivers are swift-flowing rivers and they carry less amout of sediment load, hence these rivers are very suitable for hydropower generation.

(f) The north Indian rivers have their fertile valleys and so, these are densely populated, whereas the south Indian river valleys are comparatively less fertile and hence population density is not so high there.

(g) As the rivers of north India are navigable, many cities have grown up on their banks. On the other hand, the rivers of

south India are not navigable and so, not many large cities are found to grow up on their banks.

(h) The north Indian rivers are generally long and large deltas are formed at their mouths. But the south Indian rivers are comparatively short and only few rivers have deltas at their mouths

However, the rivers of north India and south India with their different characteristics have been continuously changing the physiography of the country. The effects of the erosional, transportational and depositional activities of the rivers are very much prominent on land form development .

It has already been mentioned that India's physiography is most diversified. In order to understand the characteristics of its physiography, there is the need to divide India into physiographic units. Based on the structure and characteristics of physiography, India can be divided into four physiographic divisions, such as

(a) The northern Himalayas, (b) The northern plains, (c) The Deccan plateau, and (d) The Coastal region(Figure 6.02). Besides these four regions, the Indian islands of the Bay of Bengal and the Arabian sea may also be regarded as another physiographic unit of the country.

(a) The Northern Himalayas :

The Himalayas are the highest mountains of the world. It has many branches. The Himalayas with its all branches are altogether known as the Himalayan mountain system. This mountain system extends over India, Nepal, Bhutan and China. Here, the Himalayan mountain system falling in India only will be discussed.

The Himalayan region of India lies in the northern part of the country. It extends from the Nanga Parbat of Kashmir to the easternmost border of Arunachal Pradesh in east -west direction. The mountainous region with a length of about 2,500 km and width ranging from about 240 km to 500 km covers a total

area of about 5,00,000 km². Its height from the mean sea level is more than 8,000m.

The geologists have confirmed that the Himalayas were formed during the Tertiary period. The place where the present Himalayas are standing was occupied by a sea millions of years ago. The name of the sea is the Tethys sea. There were two ancient landmasses on the north and south of this sea. The northern landmass is known as the Angaraland, while the southern landmass is known as the Gondwanaland. The sediments eroded from these two landmasses got deposited on the bottom of the Tethys sea. In due course of time, the heavily deposited sediments put pressure downward, and as a result the northern and southern edges of the sea came closer. In other words, the northern landmass moved southward and the southern landmass moved northward. This caused the sediments to squeeze out and later on turned into mountain folds after solidification. The Himalayas are belived to have born through this process. The squeezing out sediments took wavy forms creating folded mountain ranges and hence Himalayas are called folded mountains. However, it is important to note that the Himalayan ranges were not formed at a time. These mountain ranges had developed during several mountain building phases of the past. Thus, the geologists have opined that the Himalayas have acquired its present shape, size and height during the mountain building processes continued for about the last 7 million years. The Himalayan ranges are composed of easily erodible rocks of the Tertiary period. So, the rivers coming out of the Himalayas carry enormous amount of sediments. The higher peaks of the Himalayas are covered by snows. The glaciers originate from these snow deposits. There are many such glaciers in the Himalayan region.

Most of the glaciers have their lengths from 3 to 5 Kms. These glaciers are the main sources of the numerous rivers coming out of the Himalayas.

In east-west direction the Himalayas can be divided into three parallel ranges, viz. the higher Himalayas, the lesser Himalayas and the outer Himalayas. Among these the Higher Himalayas having east west extension are the northern most ranges. These snow covered ranges attain an average height of about 6,000 m.

These are very steep ranges and they gradually go on sloping towards north and finally merge with the Tibetan plateau of China. Just on the south of the Greater Himalayas, there stands the lesser Himalayas. Its average height is 4,000 m. Its width varies from 60 to 80 km. Its adjacent ranges towards south are the outer Himalayas. These ranges are comparatively lower in height and their average height is 1,000 m. The height of the ranges gradually decreases southwards and they finally merge with the Ganga-Brahmaputra plains. With a width of 15 km. to 50 km. the outer Himalayas ranges also cover the foothill region. It is also known as Siwaliks in some places.

The eastern and southern parts of the North-Eastern region are also covered by the hills and mountain ranges. As these ranges are attached with the Himalayas, they may also be included in the Himalayan Region.

(b) The northern plains :

The northern plain region lies between the Himalayan ranges in the north and the Deccan plateau in the south. It extends from Assam in the east to the Indo-Pakistan border in the west with a total length of 2,400 km. This physiagraphic unit is mainly known as the Indo-Ganga-Brahmaputra plain. This vast plain has its different widths at differnt places. The indo-Ganga plain has width ranging from 240 km. to 320 km. and the Brahmaputra plain has an average width of 80 km. The entire northern plain region covers a total area of about 7,00,000 km^2.

The vast northern plain region consists of five plains. These five plains are the western plain, Punjab-Haryana plain.

Ganga plain, North Bengal plain and Brahmaputra plain. The western plain includes the dry areas of Punjab and Haryana. The Punjab-Haryana plain has been created by the sutlej, Beas and Ravi rivers. The Ganga plain covering the plain areas of Uttar Pradesh, Bihar and west Bengal has been created by the rivers Ganga and Jamuna. The rivers of the northern Himalayas have created the North Bengal plain. Similarly, the Brahmaputra and its large number of tributaries have created the Brahmaputra plain of Assam.

The three principal Himalayan rivers, the Indus, the Ganges and the Brahmaputra with their innumerable tributaries have altogether created the vast northern plain. The tributaries of the Indus, viz. Sutlej, Beas and Ravi are carrying alluvial sediments which are deposited on the eastern parts of Punjab and Haryana, thereby creating the fertile plain. This plain is sloping towards south and, as it is very feritile it has high density of population. This plain region covers an area of 1.75 lakh km^2. On the other hand, the river Ganges and its many tributaries coming out of the Himalayas have created the Ganga plain. The river Ganges originates from the Gongotri glacier of Higher Himalayas. It has its course through Uttar Pradesh, Bihar and West Bengal and then through Bangladesh. It finally runs to the Bay of Bengal. While flowing through the plains of Uttar Pradesh, Bihar and West Bengal, the Ganga river takes its differnt tributaries like Alakananda, Jamuna, Ram Ganga, Gomti, Ghagra, Gandak, Son, Koshi etc. The Ganga and its many tributaries have been carrying enormous sediments from the northern Himalayas, thereby creating the Ganga plain. This plain covers a total area of 3,57,000 km^2 of Uttar Pradesh, Bihar and West Bengal. It is densely populated and agriculturally advanced due to is fertile soils and good transport facilities.

The other principal Himalayan river -Brahmaputra and its tributaries have created the Brahmaputra plain of Assam. The Brahmaputra originates from the glacier called Chema-yu-Dung

located in Tibetan plateau of China. This river enters India in Arunachal Pradesh and then flows through Assam and Bangladesh. It meets the river Ganga before it finally falls into the Bay of Bengal. The 700 km. long course of the Brahmaputra through Assam receives a large number of tributaries from the northern and southern sides. Among the north bank tributaries the Subansiri, Jia Bharali, Dhansiri (north), Puthimari, Pagladia, Manas, Champabati are important. The important south bank tributaries include the Burhi Dihing, Disang, Dikhow, Dhansiri (south),Kapili and Krishnai. The Brahmaputra plain has formed due to deposition of sediments carried by the Brahmaputra and its tributaries from the Himalayan region. The plain with an average width of 80 km. is sloping from north-east to south west. This plain characterised by fertile alluvial soils and favourable physiography is comparatively more developed than the other regions of North-East India. But many parts of the plain get inundated by floods during summer.

To the west of the fertile Indo-Ganga Brahmaputra plain of India, the dry, desertic plain of Rajasthan is located. It is a part of the Thar Desert. Most of its areas are dry and sandy.

(c) The Deccan plateau :

The Deccan plateau is situated on the south of the north Indian plain.This plateau is composed of old hard rocks. This vast plateau region includes Malwa plateau and Vindhya mountain in the north and Chotanagpur plateau on the north-east. The Vindhya, Satpura, Mahadev and Mahakal mountains have divided this plateau into northern and southern parts. The northern part is relatively less extensive and the Malwa and Chotanagpur plateaus are located here. But, the southern part is more extensive. This part extends from the Satpura, Mahadev and Mahakal mountains to the Cape Comorin. It is bordered by the western Ghats on the west and the Eastern Ghats on the east. The Deccan plateau as a whole is higher towards the western Ghats and sloping towards the Eastern Ghats. According to such slope, almost all

the south Indian rivers are flowing from west to east towards the Bay of Bangal. Among these rivers, the Mahanadi, Godavari, Krishna, Pennar and Kaveri are important. But the region lying between the Satpura and Vindhya mountains has its slope from east to west, and so the two major rivers -Narmada and Tapti are flowing towards west and they finally pour into the Gulf of Cambay.

(d) The Coastal Region :

The coastal region of india is situated on the eastern and western boundary of the country along the Bay of Bengal and the Arabian Sea. It has generally a height between 30 m and 50 m from the mean sea level. It is long and narrow. It can be divided into eastern and western coastal regions. The eastern coastal region is situated between the Eastern Ghats and the Bay of Bengal. It extends from the mouth of the Ganges to the Cape Comorin. It is about 1,100 km. long with an average width of 120 km. It is made up of the coastal plains and deltas created by the major rivers of the Deccan plateau. So, it is relatively more wider and fertile than the western coast. In this coastal region the Chilka, Kolar and Pulicat lakes are located. The northern and southern parts of the eastern coast are known by their differnt names. The northern coast extending from the Godavari river mouth to the Ganges river mouth is known as North Circars and the southern coast extending from the mouth of the Godavari to the Cape Comorin is known as the Coromandal Coast.

Indias west coastal region is located between the Arabian sea and the western Ghats. It extends from the Gulf of Cambay in the north to the Cape Comorin in the south. This coastal region is long but narrow. Its length is about 1,500 km and width ranges between 10 km and 15 km. Like the east coat, this coast is also known by two names for its two parts. The northern part lying between Mumbai and Mangalore is known as the Konkan Coast. Again the southern part lying between Mangalore and Cape Comorin is called the Malabar coast.

Besides the four major physiographic units discussed above, the Indian islands may also be considered as a separate physiographic division. Indian islands can be included in two groups. One group is known as Lakshadweep and the other is known as the Andaman and Nicobar islands. These two island groups are the union territories of India. The capitals of Lakshadweep and the Andaman -Nicobar island are respectively Kavaratti and Port Blair. The Lakshadweep is situated in the Arabian sea just west of the Malabar coast. It consists mainly of three major islands-Lakshadweep, Mi and there are all total 25 small and large islands associated with this island group. These islands have their average height of 3-5 m from the mean sea level. As a union territory Lakshadweep has a total area of 32km^2. On the other hand, the Andaman-Nicobar islands are located in the Bay of Bengal far away from the Coromandal Coast. The Andaman includes 204 numbers of islands and the Nicobar includes 11 numbers of islands, thereby the Andaman-Nicobar island group consists of a total of 215 numbers of islands of different sizes. This island group is extending for a length of about 590 km and for a width of about 58 km. Its total area is 8,249 km^2. Its height from sea level is not more than 5 m. The physiography, climate, vegetations and life styles and socio-economic conditions of the people are different in these island groups than that of the other physiographic divisions of the country due to their maritime locations and environments.

6.03 Climate :

India is a vast country. Its physiography is also diversified. Region-wise there are variations in the major climatic elements like temperature, wind, atmospheric pressure and humidity in the country. The climate of India varies and depends mainly on the factors like vastness of the country, distance from the equator

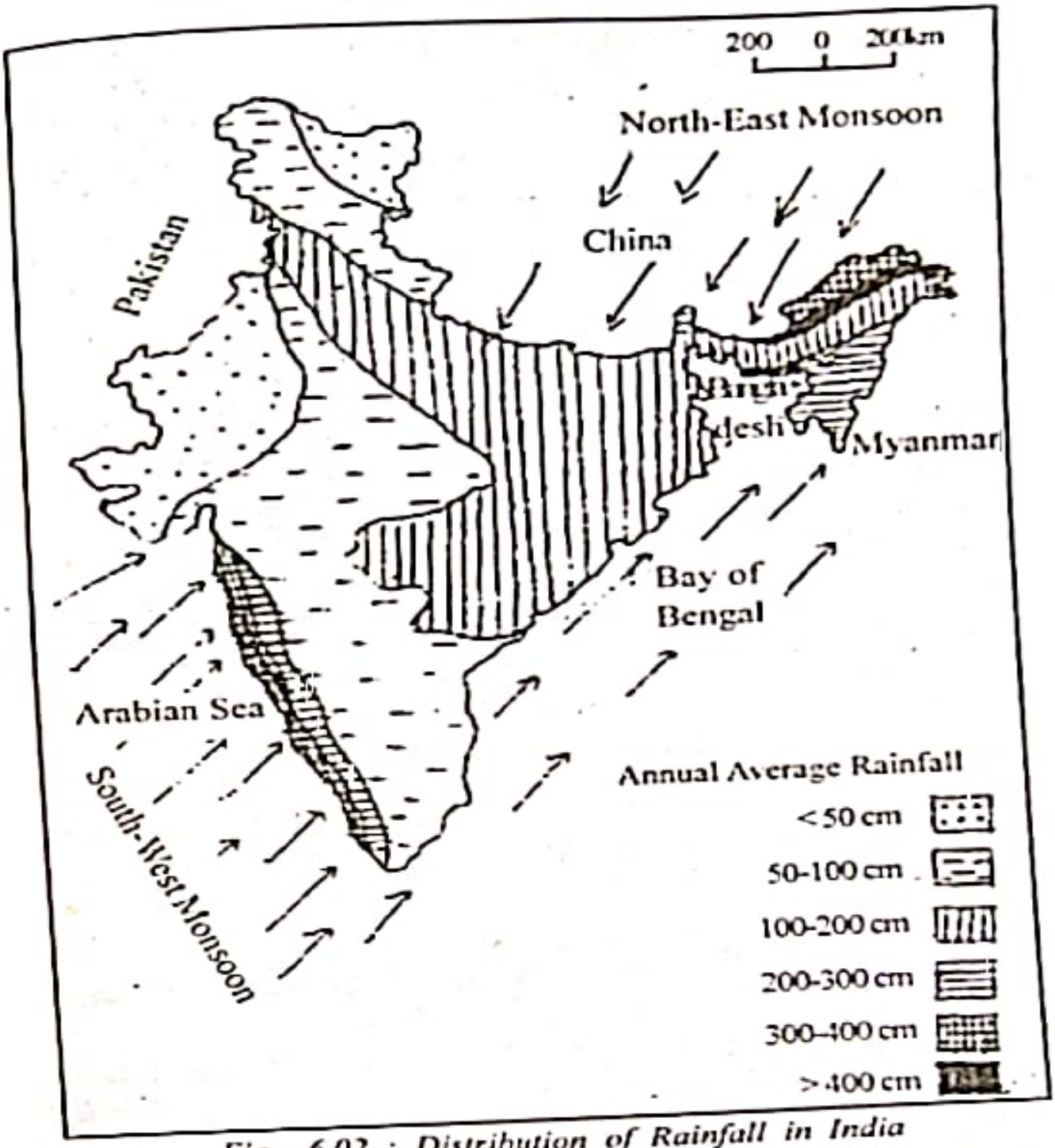

Fig.- 6.02 : Distribution of Rainfall in India

(latitudes), varied physiography,differences in elevation, distance from the sea and impact of the monsoons.

We have already come to know that the latitudinal extension of India ranges from 8°4′28″ N line of latitude to 37°17′53″ N line of latitude. The climate varies due to temperature variations

in different latitudes. The Tropic of Cancer running across the middle of the country has divided it into northern and southern parts. The northern part falls in the temperate climatic zone while the southern part falls in the tropical climatic zone. So, the southern part of India is relatively warmer than the northern part.

The Indian landmass is characterised by different types of physical features like hills and mountains, plateaus, deserts and plains. These physical features have their different elevations. Therefore, the places having same latitudes may enjoy different variations in temperature, pressure, rainfall, humidity etc. and so also the different types of climate. For example, Agra and Darjeeling enjoy different types of climate because of their variations in elevations, although they are located in the same latitudes. On the other hand, the high Himalayas protect India from the cold winds blowing from the north and so, the northern India has not experienced so much cold. Again, although the Deccan plateau falls in the tropical climatic zone, its climate is not so much hot because of its plateau character. The nearness to sea may also cause the climate of a place to be moderate. In places located near the sea, the variation in summer and winter temperature is not so high. Mumbai enjoys a pleasant climate because of its location near the sea.

Monsoons :

The impact of monsoons on Indian climate is significant. Monsoons blow in different seasons of the year, especially during summer and winter. In summer the south-west Monsoons blow and in winter the north-east Monsoons blow. The south-west Monsoons enter India after blowing over the Arabian sea. As this wind comes from the south-western side, it is called south-west Monsoons. This wind carries enormous amount of moisture from the Arabian sea and hits the Western Ghats. Then it rises up and on getting cold rain occurs. In this way, the western coasts such as the Konkan and the Malabar coasts receive more than 300 cm of rainfall annually. This wind after crossing the western

Ghats flows over the Bay of Bengal. While flowing over the Bay of Bengal the wind again takes enormous amount of moisture and then advances towards Assam and and North-East. It hits the Meghalaya plateau, and as a result high rainfall takes place on the southern slope of the plateau. The Cherrapunji area of the Meghalaya plateau receives about 1250 cm of rainfall annually. This wind then crosses the Meghalaya plateau and enters into Assam. It then moves further north and gets obstructed by the foothills of the Himalayas. In this way, Assam and the foothills of the Himalayas also receive heavy rainfall due to the south-west monsoons during summer.

The north-east monsoons, on the other hand blow during winter. This cold wind flows from the Central Asia and enters India from north east direction. This is why, it is called the north-east monsoon. The northern Himalayas mountains stand as a barrier to this cold wind, and so the northern India is not affected by severe coldness due to this wind. However, a portion of this wind comes across the Himalayas and enters into India. As it comes from the land areas of Central Asia, it is dry and it cannot produce rainfall. But, when this wind flows over the Bay of Bengal, it carries some amount of moisture. This moisture-carrying wind then gets obstructed with the Eastern Ghats and thus rainfall takes place on the east coast, especially along the Coromandal coast.

Rainfall :

The Monsoons have their direct impact on Indian agriculture. Due to rainfall caused by the Monsoons, crops grow well and crop production also increases. In this regard, the impact of south-west Monsoons is more important than that of the north-east monsoons. Because, more rainfall takes place during the south-west Monsoons. But the remarkable point is that rainfall is not uniformly distributed over all the places of the country (Fig 6.02)

If we look at the map (Fig-6.02) showing the average annual rainfall distribution in India, it can be seen that heavy

rainfall) more than 300 cm on annual average) occurs along the Himalayas foothills of the North-Eastern region, southern parts of the Meghalaya plateau and the western slopes of the Western Ghats. Of course, highest amount of rainfall takes place along the outer Himalayas ranges of Arunachal Pradesh. In this region there occurs more than 400 cm of average annual rainfall. On the other hand, less than 50 cm of average annual rainfall takes place in the Thar desert and its neighbouring areas. In the Thar desert there are some areas which receive even less than 20 cm of rainfall. The northern and western parts of the Deccan plateau and the areas in and around Gujarat also receive less amount of rainfall. In these areas rainfall occurs in between 50 cm and 100 cm.But rainfall of medium range between 100 cm and 200 cm on average annual basis is found to occur in the northern plains of India including the Brahmaputra plain.

Seasons :

The elements of weather like temperature, rainfall, pressure, winds and humidity do not remain same all the year round. Their amount and intensity vary in different times of the year. Due to such variations in weather elements we find different seasons in a year. In India four seasons are observed in a year. These are (a) pre-Monsoon (b) Monsoon (c) Pre-winter and (d) winter. The period covering the monsoon and some portions of the pre-monsoon season may also be called summer season.

During all the seasons, there are significant variations in temperature and rainfall. In the pre-monsoon season both temperature and rainfall start increasing. When temperature increases the air pressure decreases and there occurs disturbances in the atmosphere. As a result heavy rains, strong winds and thunderstorms etc. take place. The thunderstorm occuring in Assam during the pre-monsoon season is locally called Bordoichila.

After the pre-monsoon, the Monsoon season starts and naturally temperature and monsoonal rains also start increasing. Of course, due to rains the temperature becomes somewhat less in this season. As the Monsoon season ends, the pre-winter season starts and rainfall also starts decreasing. During the winter season rainfall further decreases and severe cold is experienced. According to the Indian Meteorological Department, the pre-monsoon season extends from middle of March to May, Monsoon season from June to September, pre-winter season from october to mid -December and winter season from mid - December to mid-March.

6.04 : Soils :

Soil is one of the principal elements of physical environment. It is an important natural resource. Soil quality determines the vegetation types and crop production. Different types of soils are found in different places of India. In fact, compositon of soil depends on climate and rock types. As there are various types of climates and rock types found in India, various types of soils are found in India.

Although many types of soils occur in India the soils of the country can be broadly divided into six types, such as mountain soils, soils of the Indo-Ganga-Brahmaputra plains, desert soils, lava soils (black soils), soils of the Deccan plateau and the coastal soils .

Mountain soils : Mountain soils are characterised by the locations and elevations of hills and mountains. The glaciers of the mountains normally carry sediments which are deposited in regions below the snow line and then soils are formed. Such soils are called glacial soils.Coniferous forests grow on these soils. Leaves and seeds fallen from the trees get decomposed and mixed with soils, and soils become acidic. Then it is called podzol.This soil is not so fertile. Rocky soils are found in the foothills of the mountains. Vegetation can grow over the rock soils as they have thin layers of fertile top soils.

Soils of the Indo-Ganga-Brahmaputra plain :

This vast plain generally contains alluvial soils. However, sandy soils also occur in certain areas. The alluvial soils of the plain is of two types such as new alluvial soils and old alluvial soils.

The new alluvial soils are generally soft and fertile. Such soils are commonly found on the floodplains as well as river banks. The soils are free from salts and fertile due to humus content. Most of the soils of the river valleys belong to new alluvial types. These soils are suitable for agriculture and so, the river valleys have become favourable sites for agricultrual activities and dense human settlements. The river valleys of Punjab, Haryana, Uttar Pradesh, Bihar, Orissa, West Bengal and Assam contain such soils.

On the other hand, the old alluvial soils are relatively hard. After getting affected by long continued rainfall from time to time, the chemical materials of these soils get removed or dissolved. As a result soil fertility decreases. So, the use of chemical fertilizers becomes necessary to retain fertility of the soils. These soils are found in the plains of Punjab, Uttar Pradesh and Assam.

Desert Soils :

Desert soils are found in the Thar desert region, Rajasthan, Saurastra and Rann of Kutch. Desert soils are formed due to weathering processes occuring in arid regions. These soils are basically composed of mixures of sand and rock materials and contents of nitrogen and organic matters are less in amount. So, these soils are not fertile. However, the salt free desert soils are used for cultivation of wheat, barley etc. with the help of irrigation.

Lava soils :

The soils formed out of lava deposits are known as lava soils. Lava soils are also called black soils. The black soils originate due to weathering of the lava deposits localised in Maharashtra, western parts of Madhya Pradesh, Gujarat and neighbouring areas of Andhra Pradesh. These Black,

clayey and sticky type of soils can retain moisture and hence suitable for agriculture. Such soils are especially suitable for cotton cultivation and so, this type of soil is also known as cotton soil.

Soils of Deccan plateau :

Besides the black soils of the lava region, other types of soils are also found in the Deccan plateau. The soils formed as a result of weathering of the old Archaean and Cambrian rocks of the Deccan plateau are of residual type.Such soils develop due to long continued effects of weathering and rainfall. This type of soil is generally red loamy where sand content is more. As such soils are normally porous, they are unable to retain water. In this case, the soils are made suitable through irrigation.

Besides, a hard and reddish type of soil is found in regions along the hills and plateaus. These soils are called laterite. In such soils the content of iron and aluminium is more. Lateritic soils are found in the Malabar coast and the eastern parts of Chotanagpur plateau. On the other hand, lateritic soils with good humus content are available on the slopes of the Nilgiri hills and western Ghats, where tea and coffee cultivations are successfully done. These soils are therefore, locally known as coffee soils.

Coastal soils :

Region wise differences in coastal soil formation are quite apparent. Generally riverine soils are found in the delta regions of the east coast of India. The sea waves normally deposit sand-clay materials along the coastal regions and thus soils are formed. At places these soils become saline. Unlike the east coast, the soils of the west coast are not of riverine type. Some alluvial soils are found to occur in the Konkan coast. Coastal soils are generally sandy soils. But, red lateritic soils are found in the coastal regions of Kerala and Karnataka.

6.05 : Vegetations :

Vegetation is another important element of the physical environment. If we observe carefully then we can see that there

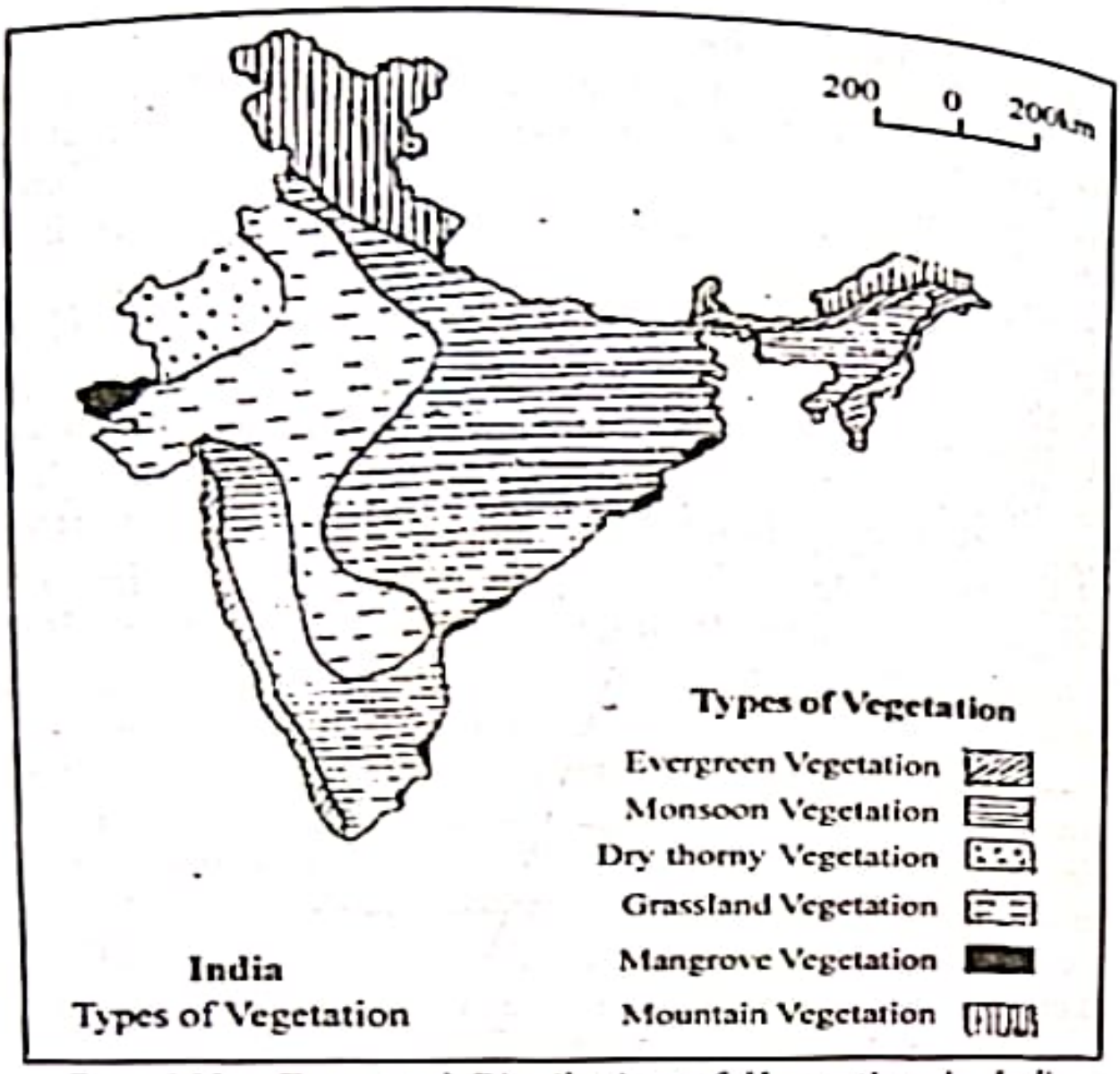

Fig.- 6.03 : Types and Distribution of Vegetation in India

are various types of vegetaions ranging from the big and tall trees to short grasses and algaes in our environment. But, these types of vegetations vary from place to place. What is the reason then? We know that there are different types of climate in different physiogaphic environments over the surface of the earth. Such differences in climate cause variations in soil types. Again different soil types support different types of vegetations. So, it can be said that the types of vegetations, their growth and distribution mainly depend on climate, physiography and soil.

Types of physiography, climate and soils differ from place to place in India. So also the types and distribution of vegetations vary within the country. The vegetations of the country can be broadly classified into six types. Evergreen vegetations, Monsoonal vegetations, Dry thorny vegetations, Grassland vegetations, Mangrove vegetations and Mountain vegetations (Fig. 6.04). These vegetations have been briefly described below.

(a) Evergreen vegetation :

The evergreen vegetations are found to grow in regions having average annual rainfall of more than 200 cm and temperature between 25° c and 27° c. These vegetaions generally include tall and big trees and they form thick forests. The trees are tall upto 45m. Besides tall trees, cane, bamboo, ferns and creepers of

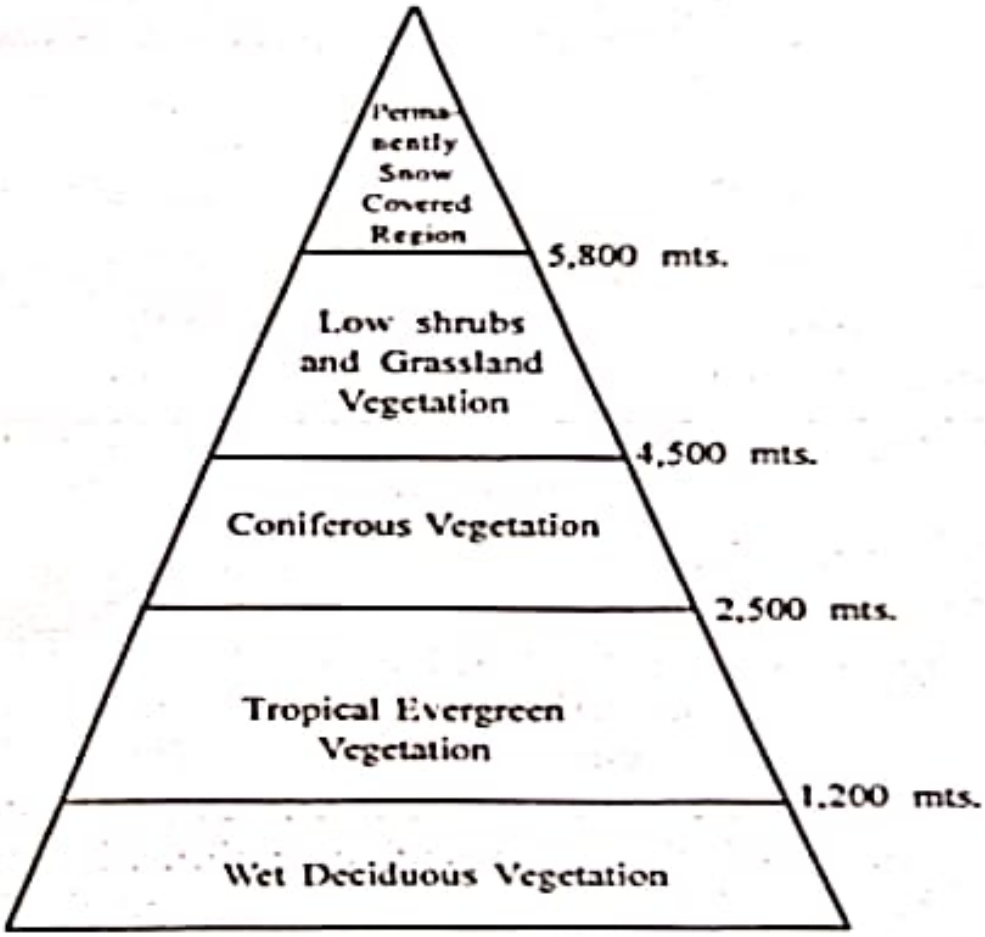

Fig.- 6.04: Types of Vegetation in Himalayan Region based on altitude

various kinds are also found as undergrowth on the ground. The trees do not shed their leaves in any season of the year and so, they are called evergreen forest. The valuable trees which grow in the evergreen forest are shisham, sandal, rubber etc. Evergreen vegetations are mainly found in the western slopes of the Western Ghats, Himalayan foothills of Arunachal Pradesh, Upper Assam region, and the hills of Manipur and Mizoram and also in the Andaman islands.

(b) Monsoonal Vegetations :

Monsoonal vegetation generally grow in most of the regions of India. These vegetations are found in the regions having average annual rainfall between 100 cm and 200 cm and temperature of about 27°c. Monsoonal vegetaions are dependent on rainfall occuring during the monsoon season. As rainfall and temperature decrease in winter, the soils become dry and the trees shed their leaves during winter. The sal, teak, siris, sisu, simul and varieties of bamboos are the major trees of Monsoonal forests. Assam, West Bengal, Bihar, Uttar Pradesh, Himachal Pradesh, some parts of Haryana, Madhya Pradesh, Tamil Nadu, Western Ghats, Eastern Ghats and the eastern parts of the Deccan plateau and the humid areas of the south Indian states are the regions where Monsoonal vegetations grow. These vegetations are also found in the Andaman and Nicobar islands.

(c) Dry thorny vegetation :

Dry thorny vegetations generally grow in the regions where average annual rainfall is less than 50 cm. and temperature is usually high. The soil is sandy and the water content in soil is less. So, the vegetaions have their thorny leaves instead of broad-leaf to check evapotranspiration. This type of vegetation is found in the western part of the Thar desert of Rajasthan and south-western part of Punjab. Acacia, different varieties of cactus, date, palm etc. are the major trees of drylands and deserts.

(d) Grassland vegetation :

It is remarkable that extensive grasslands like Prairie of North America and Savanna of Africa are not found in India. But, some grassland vegetations are found to grow in the areas having average annual rainfall between 50 cm and 100 cm. The grassland vegetations include short grasses and thorny bushes. Such vegetations are distributed in Punjab, eastern part of Rajasthan and plains of Uttar Pradesh in northern India and also in the central parts of Andhra Pradesh, Karnataka and some parts of Maharashtra of the Deccan plateau. Moreover, the wet and waterlogged environment of the Terai region of the Himalayan foothills also favour the growth of grassland vegetation like thatches, canes, reeds etc. Among these there also grow trees like khoir, simul etc.

(e) Mangrove vegetation :

Mangrove vegetations are found in the coastal delta regions. In spite of salty sea water, the sediments carried and deposited by the tides and rivers suport these peculiar kinds of vegetations in the coast. These vegetaions grow mainly in the coastal areas of the gulf of kutch, the delta region of the Ganga-Brahmaputra, i.e. the Sundarbans and also in the deltas of the Mahanadi, Godavari, Krishna and Kaveri rivers. Among the mangrove vegetations, the sundari, date palm, coconut and bushy plants are the major trees.

(f) Mountain vegetations :

Altitude has its much impact on the types and distribution of vegetations. Because there are variations in rainfall, temperature and soil qualities depending on variations in altitudes and hill slopes. So, we find different kinds of vegetations at different altitudes of mountains and hills. There are also varieties of vegetations at different altitudes of the Himalayas (Fig-6.04).

The Outer Himalayas including the Siwalik ranges attaining an average elevation of about 1000 m. are the low hills covered

by the thick monsoonal forests. These forests include sal and other valuable trees. Bamboos are also abundantly found here. To the north of these monsoonal vegetations, forests of evergreen trees like oak and other coniferous trees are found in altitude ranging between 1000 m. and 2000 m. Coniferous forests are abundantly found in the North Eastern hill regions. Besides in the Himalayan mountain regions of Kashmir, Himachal Pradesh, Uttar Pradesh, Darjeeling and Sikkim in the altitudes between 1600 m. and 3000 m. the deodar and other varied species of coniferous trees are found. Above such height of mountainous regions only the Alpine types of forests grow.

Vegetation is a valuable natural resource. India is rich in vegetational and other forest resources. In the forests of India most of the plants have their medicinal values. Plants are essential for protection of natural environment. Plants help to retain water in soil and also check soil erosion. Plant-cover thus increases the fertility of soil. Many environmental problems arise when forest cover is lost. So, it is very much necessary to conserve forest resources not only for economic development but also for the protection of our environment.

6.06 : Population growth, distribution and density :

India is the second largest populous country in the world. In the case of population its position is next to China. The entire population of the country is composed of various human groups and societies, and so its population structure is notably important. Mainly the Austro Asiatic, Mongoloid, Aryan and Dravidian groups of people have been living in India since time immemorial. Social relations among the people have grown up as different communities and social groups have been living together in the country. Because of such relations grown through mixing of different communities and social groups, the vast and diversed Indian society has emerged.

It has been already said that India is the second largest populous country in the world. According to the census of 2001

the country's population stands at 1,02,70,15,289. This population size accounts for about 16 % of the world's total pupulation. Population is not static. It changes from time to time. Increase or decrease of population is called changes in population. India's population is also changing. It has increased by several times (Table-1) since the beginning by the 20th century to the beginning of the present century, i.e. from 1901 to 2001. In the year 1901 India's population was 23.84 crores and this population rapidly increased to 102.7 crores in 2001. However, it is seen from the table -1 that the population of the country decreased slightly during the decade 1911-21 instead of its increase. The main causes of population increase or decrease are the rates of birth and death and migration. Population increases when birth rate exceeds death rate. Similary, population also increases due to migration of population to the country concerned. Because of these two reasons, India's population is increasing. Especially after the Independence, India's population is growing fast and therefore, India has become the second largest populous country in the world. The country's economic development is getting affected as a result of more population. The present day problems like food problem, agricultural land problem, housing problem, educational problem, employment problem and many other complex problems have emerged in the country due to increasing population. It is now necessary for the welfare of the country to take up effective plans to check population growth. The developing country like India will be able to achieve economic development only when its high growth of population can be checked.

In the case of the distribution of population of India it is seen that settlements are not uniformly distributed throughout the country. Settlements are densely distributed in certain places or regions and hence, population is high. Again settlements are sparsely distributed in some other regions and population is less there. The regions with dense settlement have high density of

Table : 1
Population Growth in India (1901-2001)

Years	Population (Crores)
1901	23.84
1911	25.21
1921	25.13
1941	31.86
1951	36.11
1961	43.92
1971	54.82
1981	68.33
1991	84.63
2001	102.70

populations. Similarly, population density is low in regions where settlements are sparsely distributed. According to the census of 2001, the average density of population per km^2 is 324, i.e on an average 324 persons of India live in per km^2 of area. Population distribution in India is not uniform and hence population density also varies. Generally, the regions which have adverse environmental conditions, or which are less developed in terms of economy and transportation are characterised by sparse settlements and low density of population. The dry, desert region of Rajasthan in the western part of India has very low density of population due to its incongenial situation for human settlements. Similary, the snow-covered Himalayan region in the north and central and southern parts of the Western Ghats in south India support very low density of population because of their harsh physical enviroument. In contrary to this, the fertile plains having convenient transport and communnication system and good opportunities for agriculture support high density of population. That is why, the river valleys of India including the fertile Ganga-Brahmaputra valley are very densely populated. In these river valleys, the people can easily reap the benefits offered especially

by the fertile plains, easy transport system and the developed economic conditions. Because of these reasons, the fertile plains of the river valleys are densely settled and thereby population density has also increased.

Density of population is also found to be high in the towns and cities of the country. Easy transportation system, rapid industrial development and urbanization provide more opportunities to the people and, thus the towns and cities favour high concentration of population. The urban population of India (1991) was 25.7 % of the total population of the country. In other words, 25.7 % of India's population live in towns and cities, whereas the remaining 74.3 % of population live in rural areas. It is important to note that urban population in India has been rapidly increasing annually, thereby leading to increase in the number of towns and cities. In 1981, India's urban towns and cities were 3,245 in numbers and in 1991 this number has gone up to 3,768. Among these urban centres the number of big cities with one million population or more is 23. But among these big cities, Mumbai, Kolkata, Delhi and Chennai are the highly populous cities in India. The first ten big cities of India in terms of their population sizes are listed in following table—

Table : 2 : The first ten cities of India Based on population size.

	Cities	Population as per 1991 census
1.	Mumbai	125.71
2.	Kolkota	109.16
3.	Delhi	83.75
4.	Chennai	53.61
5.	Hyderabad	42.80
6.	Bangalore	40.86
7.	Ahmedabad	32.97
8.	Pune	24.85
9.	Kanpur	21.11
10.	Nagpur	16.61

It is clear from the table that Mumbai is the largest city of India in terms of population size; Kolkata, Delhi and Chennai come after Mumbai respectively. On the other hand, urban population in the states of the country are also increasing and thus the towns and cities are growing in numbers. For example, Assam in 1981 had 62 towns and in 1991 this number had gone up to 87. Guwahati is the largest town (city) of Assam. As a state capital this city has become an important center of administration and trade and commerce. So, people from different states of India have also come to the city. According to 1991 census, the total population of Guwahati was 5.84 lakhs. Importantly about 23.5 % of the total urban population of Assam live in Guwahati city.

It is noticeable in the case of population distribution of the country that population also widely varies state wise. The states which are developed in transport and communication, trade and commerce and industries are generally densely populated. According to the census of 2001, Delhi records highest density of population among all the states of India. On the average 6,352 persons live in per km^2 of area of Delhi. Against this Arunachal Pradesh has the lowest density of population among the Indian states being only 13 persons per km^2 of area. But on the basis of total population, Uttar Pradesh is the most populous state in India with a population size of about 16.6 crores. Against this, the union territory of Lakshadweep has only 60 thousand population, thereby being the lowest populous region in the country.

6.07 Agriculture Regions of India :

India is a country of agricultural base. The vast plains, fertile soils and favourable climate are all suitable for agriculture of the country. So, agriculture happens to be the primary occupation of the Indians. Indian economy is basically based on agriculture. About two thirds of the country's population have been leading their life taking agriculture as the chief means of livelihood.

Agriculture has also contributed significantly to the national income of the country. Besides providing the growing population with food-crops, agriculture also supplies raw materials to the industries. Moreover, a large number of unemployed persons find employment in the agro-based industries of the country. India has also been earning foreign money from the export of various agricultural products. Alongwith the growth of agricultural sector, the other sectors like industrial sector, transport sector, commercial sector etc. have also grown. That is why, agriculture can be well considered as the main basis of India economy.

Agriculture does not mean the production of crops alone. In broad sense, agriculture also includes the activities related to animal husbandry, pisciculture etc. Almost all types of food-crops, vegetables, fruits and fiber crops are grown in India due to favourable environmental conditions essential for agriculture. Crops are mainly grown in India in two seasons. The crops which are grown during monsoon or summer season are known as kharif crops. Rice, wheat, groundnut, jute, cotton are the principal kharif crops. On the other hand, the crops grown during winter season are called rabi crops. Wheat, gram, mustard and various kinds of oil seeds are the major rabi crops.

A wide variety of crops are cultivated using different methods of agriculture in different climatic regions of the vast country like India. However, some crops are dominantly cultivated in some particular regions of the country. The regions where homogeneous crops are grown with uniform methods of cultivation can be identified as agricultural regions. In this way India can be divided into seven major agricultural regions. These regions are briefly described below.

(a) Fruits and Vegetables Regions :

This region extends from Kashmir to North East India. Its north -western part receives average annual rainfall of 60 cm and the eastern part receives upto 200 cm of rainfall. In the

western Himalayas region most of the temperate fruits like apple, peach, cherries, plum, apricot etc. are grown . In eastern Himalayas fruits mostly oranges and vegetables like potatoes, chillies and others are produced.

(b) Rice-Jute-Tea Region :

This region includes Assam, Arunachal Pradesh, Tripura, Meghalaya, West Bengal, Orissa, Northern and Eastern Bihar and terai region of Uttar Pradesh. It has vast lowland areas, river deltas and valley where fertile alluvial soils are available. Rainfall ranges from about 180 cm to 250 cm. Most of the rain takes place during south-west monsoon season. In this region rice is abundantly produced due to fertile soils, sufficient rainfall and suitable amount of summer temperature. Tea cultivation is largely done in Upper Brahmaputra valley of Assam, Tripura and North Bengal. Similarly jute cultivation is mostly carried out in Assam, Ganga plain and delta region and eastern coastal region of the country. Although this entire agricultural region is famous for cultivation of rice, jute and tea, other crops like, mustard, pulses and fruits like coconut, jackfruit, pineapple, mango, orange etc. are also grown.

(c) Wheat and Sugarcane Region :

The northern part of Bihar, Uttar Pradesh, Punjab, Haryana, western part of Madhya Pradesh and northern part of Rajasthan come under this agricultural region. Besides the fertile alluvial soils, black and red soils are also found here and there in the region. Although moderate rainfalls occur in some places, the arid regions are brought under cultivation with the help of irrigation. The major crops of this region are wheat and sugarcane. Rice is also grown here. Wheat and sugarcane are the principal crops in Uttar Pradesh, plains of Bihar and northern bank of the Ganges. Wheat is widely cultivated in Ganga-Yamuna's doab region, plains of Punjab, Haryana and northern Rajasthan. Besides wheat and sugarcane, the other crops mostly grown in this region are maize and pulses.

(d) Millets and Oilseeds Region :

This agricultural region includes Karnataka plateau, parts of Tamil Nadu, southern part of Andhra Pradesh and eastern part of Kerala. This region is relatively less fertile and characterised by broken topography. Rainfall is usually scanty ranging from about 75 cm to 125 cm annually. Among the millets grown, bajra, ragi and jowar are important.On the other hand, the oil seeds grown in the region include groundnut, mustard and other pulses. Moreover, mangoes and bananas are also largely grown in the region.

(e) Maize and Coarse Crop Region :

This agricultrual region includes western Rajasthan, the semi arid regions of Gujarat and the desert areas of western India. The eastern part contains some pockets of alluvial soils, while the western part is sandy and dry. Annual rainfall is less than 50 cm. Agriculture is done with the help of irrigation. Although wheat and ragi crops are grown in Mewar plateau, maize is mainly grown here. On the other hand, cotton, sugarcane and also rice are grown on the western part of the region. Bajra is also cultivated more or less throughout the region.

(f) Cotton Region :

The north -western region of the Deccan plateau is famous for cotton cultivation. The river valleys of the region are covered by black soil which is very suitable for cotton cultivation. This agricultural region spans over parts of Gujarat and Maharashra. It is, in fact a rainshadow region where annual rainfall varies from 75 cm to 100 cm. Although the region is known as cotton belt, other crops like jowar, bajra, gram, sugarcane, wheat etc. are also cultivated here and there.

(g) Spices and Plantation Crop Region :

This region covers coastal plains of the east and west, Andaman and Nicobar islands and Lakshadweep. It is a region of heavy rainfall amounting to average annual rainfall of more

than 250 cm. The spices and plantation crops produced in the region mainly include coffee, rubber, tapioca, pepper and cardamom. In some parts of the region rice is also cultivated.

6.08 Industrial Regions of India :

Although India is basically an agricultural country it has recently made notable progress in the field of industries. In fact, Indian industries have developed based on agricultural sector. The development in the country's agricultural sector has directly helped the industries to make progress. On the other hand, the industrial development has in turn helped the agricultural sector technologically; and as a result, agriculture has acquired the gradual process of development. So, it is seen that agriculture and industry are both complementary to each other. The economic development of the country can be achieved only when there is a good co-ordination in the development planning of agriculture and industry.

India has a long tradition of industries especially the small scale industries in the form of handicrafts. The handicraft industries include mainly the pottery, jewellery, bamboo and cane works, handloom and textiles and metal industries based on the locally available resources. These small scale industries were running only to meet the needs of the common people. But, these have become weak in course of time when they started facing competition with the foreign industries . Thus there is a need to modernise these industries so as to enable them to meet the needs of the growing population. Accordingly the modernisation of Indian industries started with the establishment of the first cotton textile industry in Mumbai in 1854. After this, a jute industry was established in the Hoogly valley near Kolkota in 1855. In this way, the modern industrial development had its beginning only after the later part of the 19th century. In subsequent years India started its industrial development gradually especially after the first and second world wars with rapid developments in iron and steel, sugar, cement and chemical industries. After India's

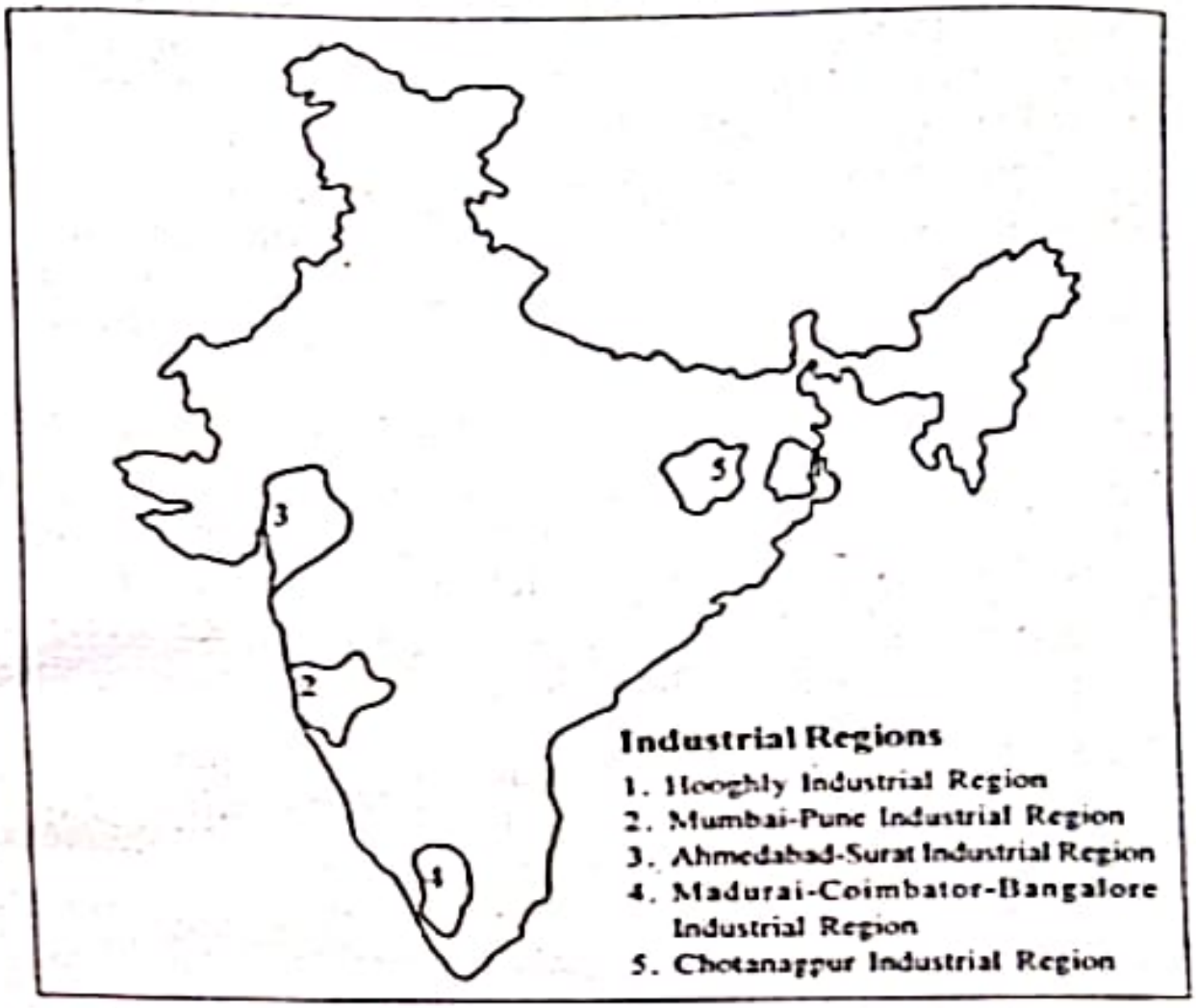

Fig.- 6.05 : Major Industrial Regions of India

independence the industrial development has been given due importance in the five-year plans of the country. In recent year India has made much progress in industries. However India is still lagging behind in industrial development as compared to other developed countries of the world.

All the regions of India are not equally advanced in industries. The distributional pattern of industrial activities indicates that some industries have grown up in certains areas. Any such region where some special industries are localised is called industrial region. In India such five industrial regions can be delineated like (a) Hooghly industrial region (b) Mumbai -Pune industrial region, (c) Ahmedabad Surat industrial region (d) Madurai-Coimbatore -

Bangalore industrial region and (e) Chotanagpur industrial region (Figure 6.05) These industrial regions are briefly described below.

(a) Hooghly industrial region :

Hooghly industrial belt has grown up on the bank of the river Hooghly. It includes Kolkata city and its adjoining Howrah urban centre. The major industrial centres here are Naihati, Jagatdal, Shamnagar, Tribeni, Belur, Liluah, Andul etc. This region took its origin from the British period. The jute and engineering industries are the old industries of the region. This region faced great crises due to partition which led to shortage of raw materials. Besides, the industries here have not developed upto the level of expectation due to the problems like labour unrest, power supply problem and lack of capital etc.

(b) Mumbai -Pune industrial region :

This region has flourished as an important cotton textile centre, like -Mumbai, Vile Parle, Thane, Bhandup and Pune. The region had to face a set back after partition for the non availablity of raw cotton. But as the region is having petroleum in and around, some diversified industries like petrochemical, synthetic fibre etc. have grown up. Pune has become a major chemical and machinery producing city. Some diversified industries have developed in the region as there is no problem of capital and labour.

(c) Ahmedabad -Surat Industrial Region :

This industrial region is now fast growing region of the country. The major industries localised in the region are petro chemical, fertiliser, synthetic fibre, textile and other chemicals producing industries. Initially the region grew with cotton textile industries and subsequently it shifted to focus on the establishment of a variety of chemical industries due to availablity of natural oil and gas.

(d) Madurai-Coimbatore-Bangalore Industrial Region :

This industrial region is also famous for cotton textile

industries. In addition to these industries, a good number of government controlled industries like machine tools industry, Indian Telephone industry, aeronautic industry etc. have grown up.

(e) Chotanagpur Industrial Region :

The industries of this region have mainly grown up based on the minerals found in the Chotanagpur plateau. Mining and metal industries, engineering and chemical industries are the major industries of this region.

Besides the above mentioned industrial regions of the country, many industries are also found to have grown up in different regions. So, there are a number of small industrial areas here and there in the country besides these five major industrial belts. The small industrial areas alongwith the major ones have contributed much towards the field of industrialisation.

Questions

1. Give a brief introduction to India.
2. Discuss the characteristics relating to India's location and size.
3. Into how many physiographic divisions India can be divided? Discuss with diagrams.
4. Describe the physiographic divisions of India
5. Describe briefly the climatic characteristics of India.
6. Explain how the monsoons affect the climate of India.
7. What are the major soil types found in India? Give short description of each type of soil.
8. What are the different vegetation types found in India? Mention them in a map.
9. Describe the types of vegetation of India.
10. Write a short note on the growth of population in India?
11. "Population distribution is not uniform in all places of India"— Explain.
12. Discuss how population density varies in India.

13. Give a description of urban population of India and also present data on urban population growth in some major cities of the country.
14. Describe the characteristics of the major agricultural regions of India.
15. Locate the major industrial regions of India on a map and describe each of them briefly.
16. Write short notes on the following–
    (a) The north Indian plain region.
    (b) Importance of agriculture on Indian economy.
    (c) Monsoon Vegetations.
    (d) Monsoons and rainfall in India.
    (e) Causes of population growth in India.
    (f) Causes resposible for uneven distribution of population in India.
    (g) Lava soils.
    (h) Hooghly industrial region.
    (i) Characteristics of the north Indian rivers.
    (j) Characteristics of the South Indian rivers.
    (k) Indian islands.
    (l) The Himalayan mountain region.

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