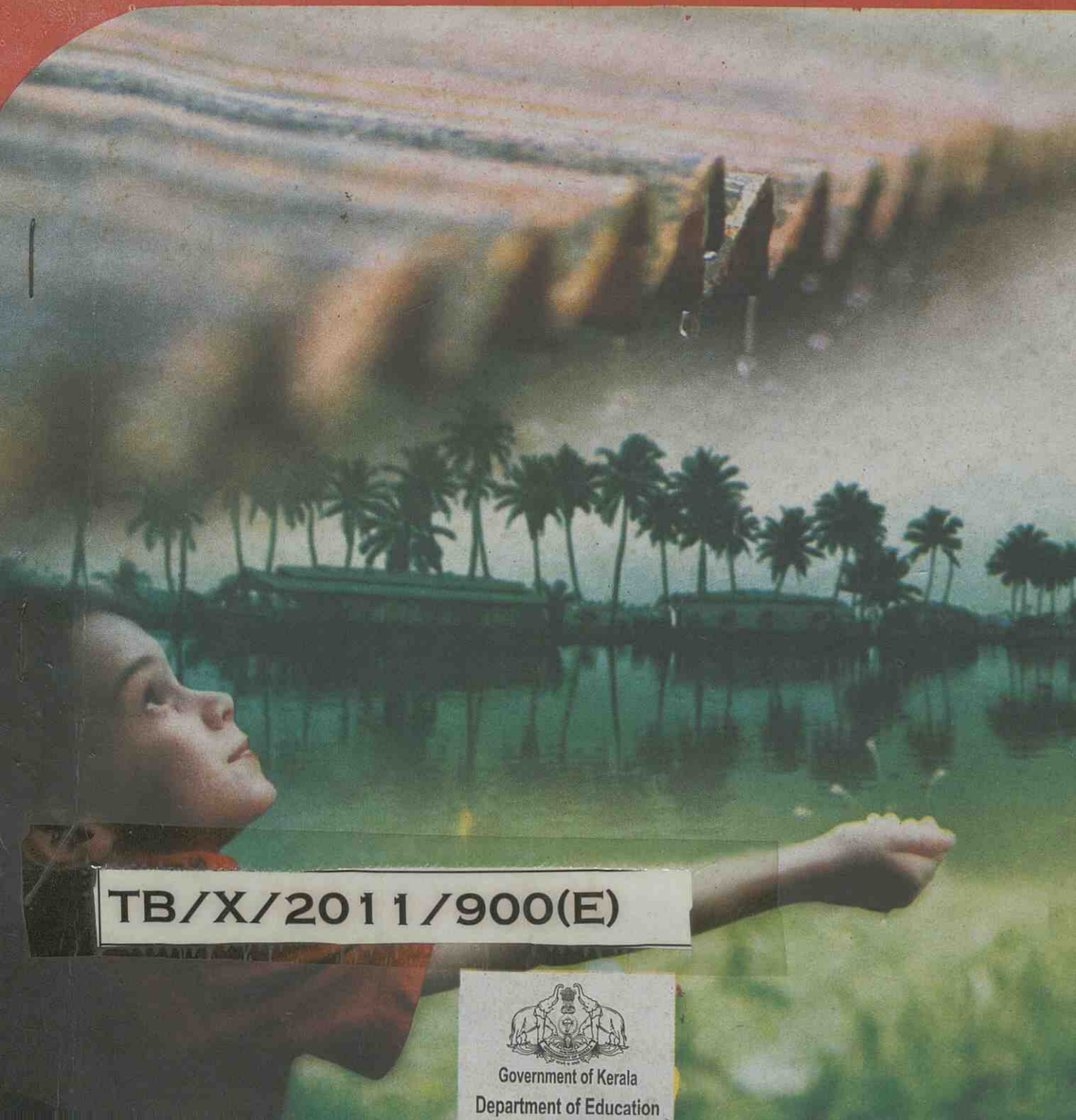
Standard X

Social Science - II



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Government of Kerala
Department of Education

Social Science II

Standard X

Government of Kerala
Department of Education

Prepared by

State Council of Educational Research and Training (SCERT), Kerala
2011

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THE NATIONAL ANTHEM

Jana-gana-mana adhinayaka, jaya he
Bharatha-bhagya-vidhata.
Punjab-Sindh-Gujarat-Maratha
Dravida-Utkala-Banga
Vindhya-Himachala-Yamuna-Ganga
Uchchala-Jaladhi-taranga
Tava subha name jage,
Tava subha asisa mage,
Gahe tava jaya gatha.
Jana-gana-mangala-dayaka jaya he
Bharatha-bhagya-vidhata.
Jaya he, jaya he, jaya he,
Jaya jaya jaya, jaya he!

PLEDGE

India is my country. All Indians are my brothers and sisters.

I love my country, and I am proud of its rich and varied heritage. I shall always strive to be worthy of it.

I shall give respect to my parents, teachers and all elders and treat everyone with courtesy.

I pledge my devotion to my country and my people. In their well-being and prosperity alone lies my happiness.

Prepared by

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Dear Children,

Even now there is a notion that a textbook of Social Science is full of lengthy descriptions and narrations of facts. Books containing long sentences full of a large number of details and to be read in a single breath is a burden to children. But our aim is a textbook of Social Science where there is scope for children to intervene and which leads them to new avenues of thought.

The study of Social Science becomes meaningful when the earth that we live in and the human life and culture that pervades it are transformed into the power and energy to shape the future of society. It is hoped that this textbook will be a guide to enable you for that through participatory education.

With love and regards,

Prof. M.A. Khader
Director, SCERT

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Contents

CONSTITUTION OF INDIA

Part IV A

Fundamental Duties of Citizens

ARTICLE 51 A

Fundamental Duties- It shall be the duty of every citizen of India:

(a) to abide by the Constitution and respect its ideals and Institutions, the National Flag and the National Anthem;

(b) to cherish and follow the noble ideals which inspired our national struggle for freedom;

(c) to uphold and protect the sovereignty, unity and integrity of India;

(d) to defend the country and render national service when called upon to do so;

(e) to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities; to renounce practices derogatory to the dignity of women;

(f) to value and preserve the rich heritage of our composite culture;

(g) to protect and improve the natural environment including forests, lakes, rivers, wildlife and to have compassion for living creatures;

(h) to develop the scientific temper, humanism and the spirit of inquiry and reform;

(i) to safeguard public property and to abjure violence;

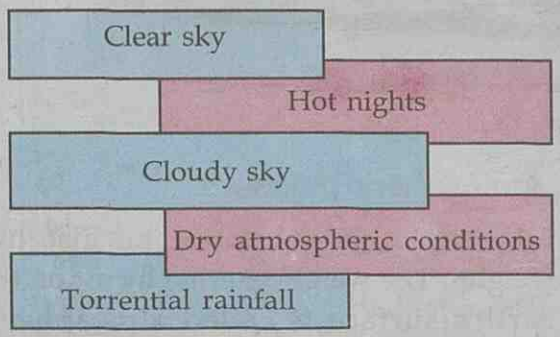
(j) to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievements.

(k) who is a parent or guardian to provide opportunities for education to his child or, as the case may be, ward between age of six and fourteen years.

1

ATMOSPHERIC PHENOMENA

You must have understood about the structure of the atmosphere, atmospheric composition and the manner in which atmosphere heats up.



The above terms are commonly used by us to refer to the atmospheric conditions. Should we not know how these conditions are formed in the atmosphere?

Troposphere is the atmospheric layer in which climatic phenomena such as rain, snow and wind are experienced.

Weather and climate

The atmospheric condition experienced over a region in a short time span is known as weather. All places do not experience the same weather. Not all regions experience atmospheric phenomena such as rainfall, snow, wind, cyclone and thunder and lightning in the same manner.

The climate of a region is determined on the basis of the average of atmospheric temperature, atmospheric pressure, humidity, rainfall, velocity of wind and direction of wind over a period of about 35 years. It means that the average weather experienced by a region over a long period is its climate.

A part of the solar radiation is absorbed by the earth's surface and the atmosphere. The heat absorbed in this manner is gradually released later. You have understood from the earlier classes that the terrestrial radiation of long wavelength returning from the earth's suface to the atmosphere heats up the atmosphere. The process of maintaining balance in the atmospheric temperature is shown in the above diagram (Fig.1.1).

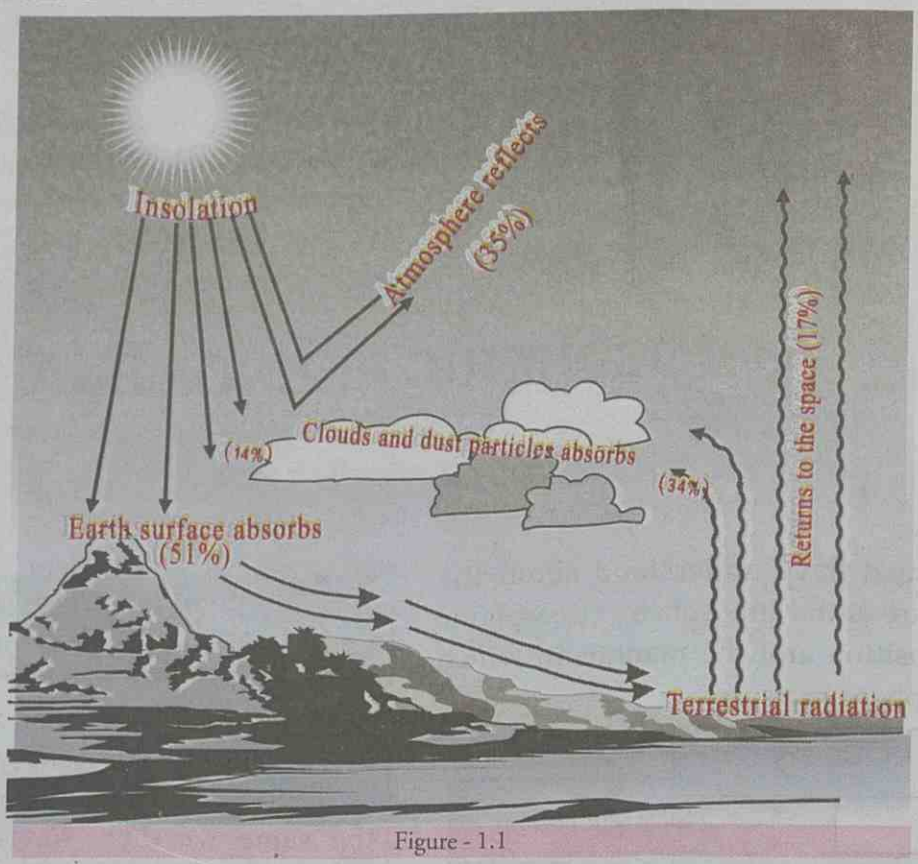


Figure - 1.1

If the total radiation from the sun reaching the earth is considered to be 100 per cent, 35 per cent of it returns to the outer space after getting reflected from different regions of the atmosphere. Clouds and dust particles in the atmosphere absorb 14 per cent. Only the remaining 51 per cent reaches the earth's surface. This heats the surface following which it returns to the outer space as long wave terrestrial radiation.

Apart from temperature the other factors influencing the atmospheric condition are atmospheric pressure and humidity. Let us find out the effect of each of these on the atmosphere.

Atmospheric pressure

Like any other substance, air also has weight. The weight exerted by air on the earth's surface is called atmospheric pressure. It is because of gravitational attraction that air remains on the earth. This air exerts weight on the earth. This has been estimated as 1034 grams per square centimetre at the sea level.

The instrument used for the measurement of atmospheric pressure is the mercury barometer. Apart from the mercury barometer, the aneroid barometer is also used for the measurement of atmospheric pressure.

The figure (Fig. 1.2) shows a mercury barometer. It can be seen that the mercury level is standing at 76 cm in the barometer. A mercury level of 76 cm indicates an atmospheric pressure of 1013 hPa.

Figure - 1.2

Hecto Pascal (hPa) is the unit used for the measurement of atmospheric pressure. It has been estimated that the average atmospheric pressure at the sea level is 1013.2 hPa.

Atmospheric pressure experienced is not uniform everywhere on the earth. Atmosphere may experience increase or decrease in pressure. If the pressure in a region is more than that of its surroundings, then we say that it is high pressure there and if it is less, we say that it is low pressure.

Atmospheric pressure is represented in maps using flow lines. These imaginary lines drawn on maps connecting points of equal atmospheric pressure are called Isobars.

Observe the Isobars represented in the figure (Fig. 1.3).

Is atmospheric pressure experienced in the same manner everywhere on the earth? Find out from the Fig. (1.3).

Have you not visited the places Ooty and Kodaikanal which are over 2000 m above the sea level? Do you not experience clogging of ears and slight breathing

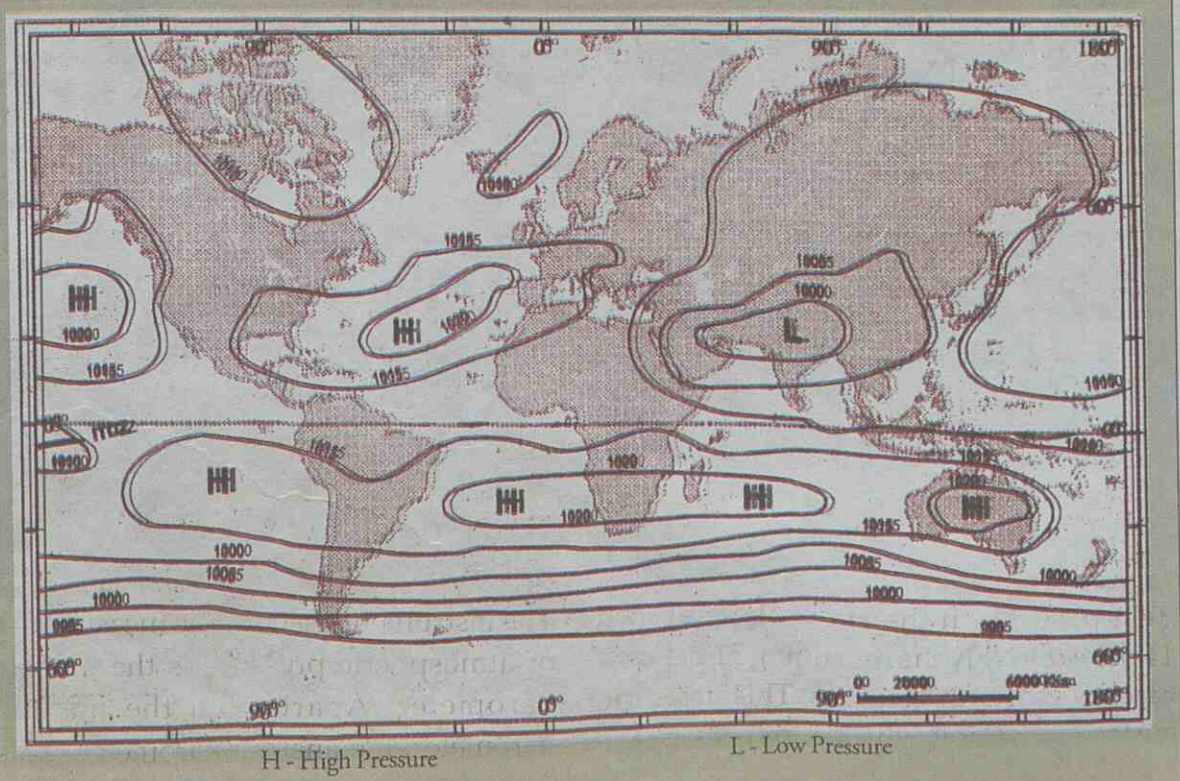


Figure - 1.3

difficulty as you travel up from the foot of the mountains?

It takes some time for the human body to adjust to the differences in atmospheric pressure. Due to this we experience discomfort such as clogging of ears and breathing difficulty.

The factors responsible for changes in atmospheric pressure are:

- Temperature
- Altitude of a place
- Humidity

Temperature and atmospheric pressure

In places where more solar energy is received, the air gets heated up. The heated air loses its density as a result of which it expands and rises up. This results in a lowering of pressure. As air becomes cooler, it becomes denser. Since dense colder air sinks down an increase in pressure is felt. As temperature increases pressure becomes low and as temperature decreases, pressure becomes high.

- In what way would Equatorial regions and Polar regions experience atmospheric pressure?

Let us find out what changes occur in atmospheric pressure as a result of varying altitude. Observe the figure (Fig. 1.4). The figure shows atmospheric pressure differences in regions up to 10 kilometres height above the sea level.

- From the picture find out the region which experiences maximum pressure.

Figure - 1.4

Did you not understand that as we go up pressure decreases? This is because of the decrease in the density of air with increase in height.

Humidity and atmospheric pressure

The content of water vapour in atmospheric air is called humidity. Water vapour reaches the atmosphere through evaporation. Increase in the content of water vapour in air leads to a decrease in the atmospheric pressure.

- Air in coastal regions would show a higher humidity in comparison with that in inland areas. What could be the reason for this?

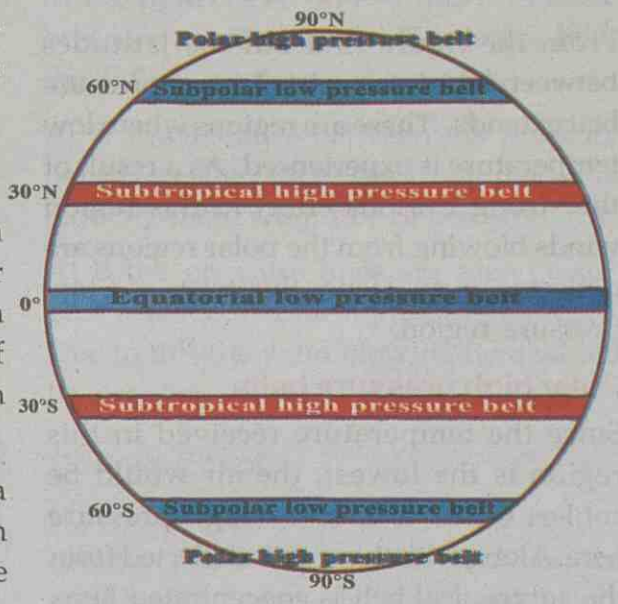


Figure - 1.5 - Global pressure belts

Global pressure belts

Generally the earth experiences the same atmospheric pressure between certain latitudes. These latitudinal zones are called global pressure belts.

Differences in the amount of solar radiation experienced over different parts of the earth cause the formation of different pressure belts.

Following are the different pressure belts of the earth.

1. Equatorial low pressure belt
2. Subtropical high pressure belt (Northern Hemisphere)
3. Subpolar low pressure belt (Northern Hemisphere)
4. Polar high pressure belt (Northern Hemisphere)
5. Subtropical high pressure belt (Southern Hemisphere)
6. Subpolar low pressure belt (Southern Hemisphere)
7. Polar high pressure belt (Southern Hemisphere)

Examine the figure (Fig 1.5) and understand the position of the pressure belts.

Equatorial low pressure belt

This pressure belt extends upto about 5° to 10° on either sides of the equator. Here high temperature is experienced throughout the year. Haven't you understood that as temperature rises pressure decreases? It means that as a result of the higher temperature here the air expands and rises vertically. This is the reason for the formation of low pressure in this region. This low pressure region characterised by a low horizontal movement of air is called doldrum.

Subtropical high pressure belts

Subtropical high pressure belts extend approximately over 30° north and south latitudes (Fig. 1.5.) High pressure belts develop over here as the hot air that rises up from the equatorial regions gets deflected due to the Coriolis effect and concentrates in these regions.

Subpolar low pressure belts

From the figure find out the latitudes between which the subpolar low pressure belt extends. These are regions where low temperature is experienced. As a result of the strong Coriolis effect in this region winds blowing from the polar regions are deflected away. Hence this exists as a low pressure region.

Polar high pressure belts

Since the temperature received in this region is the lowest, the air would be cooler. Cold air exerts a high pressure here. Along with this the air deflected from the subtropical belt is concentrated here. This is the reason why polar regions have developed into high pressure belts.

Changes in the position of the global pressure belts

According to the changing seasons the position of the pressure belts in the northern and southern hemispheres changes 10° to the north or 10° to the south. On March 21st and September 23rd the sun's rays fall vertically over the equator. During these days the equatorial low pressure belts would be spread upto 5° on either sides of the equator. Subtropical high pressure belts would be in 30° latitudes in these hemispheres.

After 21st March the sun's transit would be in the northern hemisphere. On June 21st the sun's rays fall vertically over the Tropic of Cancer. During this period all pressure belts move 5° to 10° northwards from their original positions. On September 23rd the sun's rays fall vertically over the equator. Along with that all pressure belts reach their original positions. After 23rd September the sun passes into the southern hemisphere and on December 22nd the sun's rays fall vertically over the Tropic of Capricorn. In this period all pressure belts move 5° to 10° southwards from their original positions. You can understand the position of the pressure belts during different seasons from the Figure (Fig. 1.6).

Atmospheric pressure and winds

Haven't you understood that atmospheric pressure is not the same everywhere? Rise and fall in the pressure causes the horizontal movement of air in the atmosphere. The horizontal movements of air from high pressure regions to low pressure regions are called winds.

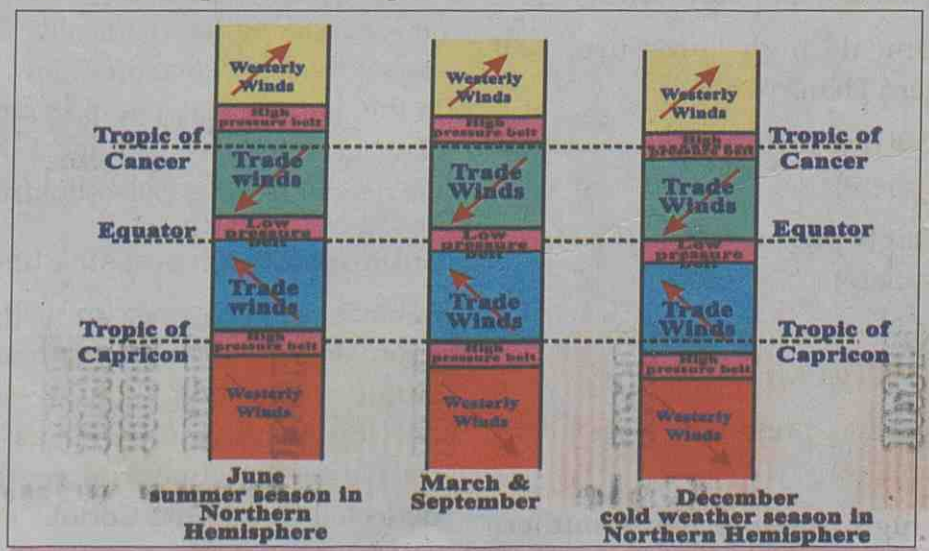


Figure - 1.6

The movement of air in a vertical direction is called air current.

Take a look at some of the general characteristics of winds.

- Names are given to winds mostly on the basis of the direction from which they blow.
- For example the wind blowing from the land is called land breeze and the wind blowing in a south easterly direction is called South easterly winds.
- As the winds from the oceans are saturated with water vapour they give rain. The wind free of water vapour would be dry.
- Due to the earth's rotation a change in the direction of winds occurs.

The factors that influence the speed and direction of winds are:

- Pressure gradient force
- Coriolis effect
- Friction

In the figure (Fig. 1.7) A and B indicate pressure gradient force. Let us see how this influences the force of wind.

At A the distance between the pressure lines is greater. Because of that the wind blowing there would be of less strength.

At B the pressure lines are seen closer. This leads to a vertical pressure gradient. Due to this the wind blowing here would be stronger.

Coriolis Effect

It is observed that due to the earth's rotation any freely moving body on the earth's surface gets deflected to the right of its direction of movement in the northern hemisphere and to the left of its direction in the southern hemisphere. The reason for this deflection in the movement is known as the Coriolis effect.

Admiral Ferrell was an American scientist who studied the Coriolis effect. The law formulated by Ferrell on the deflection of winds under the influence of the Coriolis effect as indicated above is known as the Ferrell's Law.

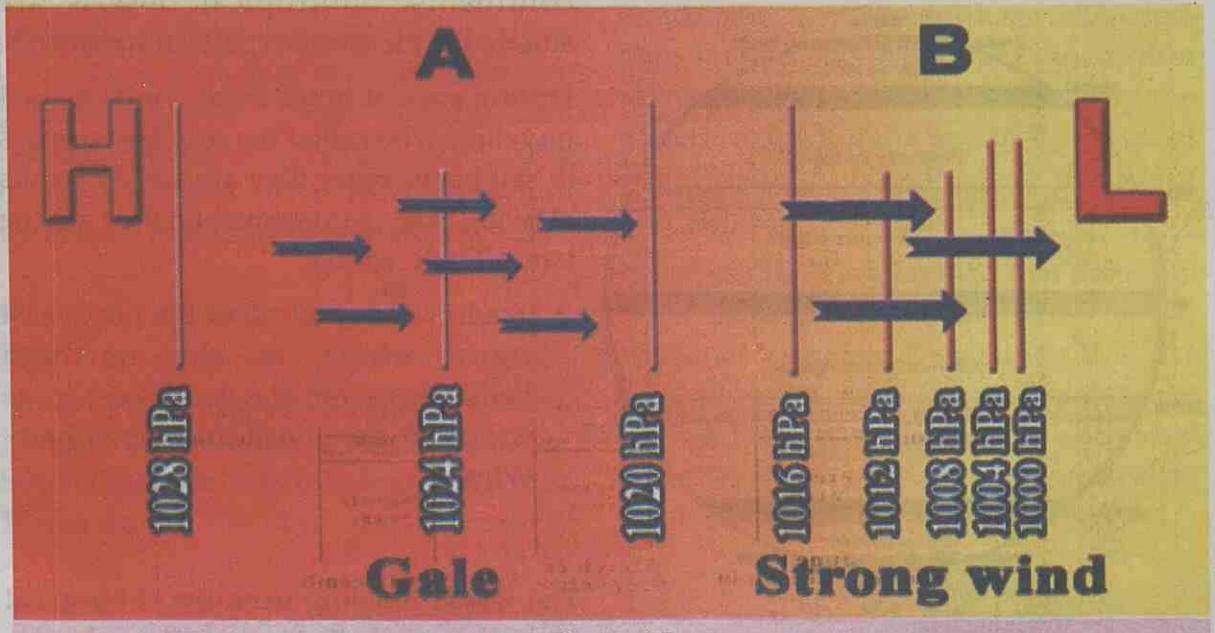


Figure - 1.7

Friction

Wind blows at high speeds over parts of the earth's surface that are flat. The reason for this is that in flat portions of the earth's surface wind undergoes only less friction. In irregular surfaces wind is subjected to greater friction. Due to this the velocity of wind decreases.

Different types of winds blow on the earth's surface. They can be classified in the following manner:

- Planetary winds or permanent winds
- Periodic winds or seasonal winds
- Local winds
- Variable winds

Permanent winds blow in the same direction throughout the year. Winds that result from the uneven heating and cooling of vast lands and water bodies are called periodic winds. Local winds form as a result of the heating or cooling of the air over a particular region.

Permanent winds

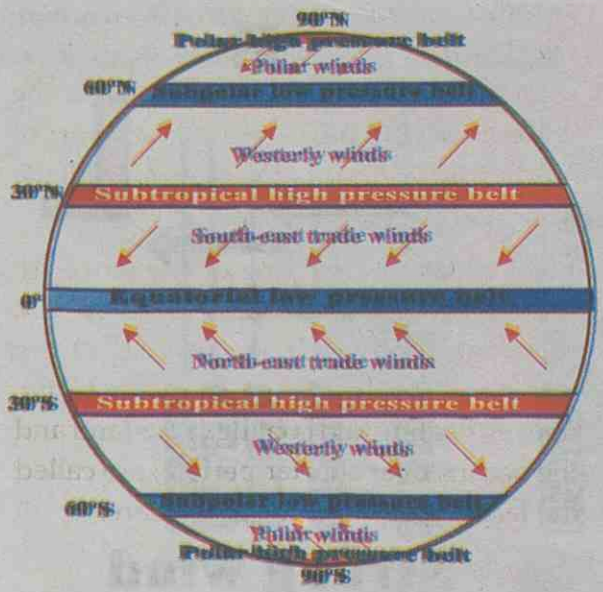


Figure - 1.8

The winds blowing approximately in the same direction between specific pressure belts permanently are called permanent winds. Trade winds, Westerly winds and Polar winds are permanent winds.

Global pressure belts are the basis for permanent winds. From the given figure (Fig 1.8) find out the permanent winds and the pressure belts between which they blow.

Trade winds

Trade winds are winds blowing from the subtropical high pressure belts to the equatorial low pressure belts. These winds blow as the north east winds in the northern hemisphere and the south east winds in the southern hemisphere. These are winds which blow in the same direction with the same velocity throughout the year, especially in the oceanic regions. Trade winds which carry water vapour from the oceans cause rainfall in the eastern coasts of the continents. As it moves towards the west it loses water vapour and hence doesn't cause rainfall in the western coasts of the continents. Subtropical deserts are situated in the western parts of continents.

During ancient times these winds helped travellers who sailed the seas for business in sail boats. Since they are steady winds blowing in the same direction they got the name Trade winds.

- Trade winds are called the north east trade winds in the northern hemisphere and the south east trade winds in the southern hemisphere. Why?

Westerly winds

The winds blowing from the subtropical high pressure belts towards the subpolar

low pressure belts are called the westerly winds. In the northern hemisphere the westerly winds blow from the south western direction to the north eastern direction. But in the southern hemisphere they blow from the north western direction to the south eastern direction (Fig 1.8). Since they blow from the western direction, they are called the westerly winds.

In the southern hemisphere as we go southwards the westly winds blow strongly. This is due to the absence of big continents and the pressure of vast oceans. The ancient sailors gave the names 'Roaring forties', 'Furious fifties' and 'Screaming sixties' to these winds.

Polar winds

These are winds blowing from the polar high pressure belts to the subpolar low pressure belts. The polar winds are colder and stronger. These winds are also called easterly winds. From the figure (Fig. 1.8) find out why they are called so.

Periodic winds

In certain regions winds blow in a particular direction over short periods or throughout particular seasons. These are periodic winds. These winds form because of the uneven heating and cooling of the land and the oceans. Monsoon winds are examples for periodic winds.

Monsoon winds

The term monsoon has derived from the Arabic word 'Mausim' meaning seasons. Monsoonal winds blow over South Asia, South East Asia, Australia and East Africa. It was during the time when monsoonal winds became active that merchants used to travel by sail boats for trade purposes in the Indian Ocean.

Since during summer time continental regions are heated up faster in comparison with adjoining oceans, low pressure develops there. During summer, low pressure develops in southern and south eastern Asia in this manner. However, in comparison with land region the Indian Ocean experiences a high pressure. This pressure difference causes winds to blow from the Indian Ocean to the continent. As the wind which blows in a south east direction in the southern hemisphere crosses the equator, it changes its direction to the south west due to the Coriolis effect. These are the south west monsoon winds.

During winter the land regions of the northern hemisphere cool down. In relation to the oceans of the southern hemisphere where the sun's rays fall vertically, the land regions of the northern hemisphere become cooler and as a result a high pressure region. This difference causes winds to blow from the land to the ocean. In the northern hemisphere these winds blow from the north east direction. Due to this it is called the north east monsoon. This wind causes rain in the eastern coast of India and in the states of Tamil Nadu, Andhra Pradesh, Karnataka and Kerala.

You must have understood that monsoon winds are formed according to the seasonal changes. The winds that are formed in the coastal regions due to the uneven heating and cooling of the land and the oceans over shorter periods are called the land breeze and the sea breeze.

Land breeze and Sea breeze

The land and the sea do not heat or cool in the same manner. During the day time the land gets heated quickly and at night time it cools very fast. On the other hand, the ocean water gets heated and cooled very slowly.

It is this uneven heating and cooling that causes the land and the sea breezes.

Figure - 1.9 A

Figure - 1.9 B

Based on the figures (Figs. 1.9 A and 1.9 B) fill up the table given below

	Fig 1.9A	Fig. 1.9B
Higher temperature being felt	In the sea	On land
Higher pressure being experienced		
Low pressure being experienced		
Wind blowing (From where to where)		
Wind being known as (Based on the direction from which it blows)		

Variable winds

Variable winds are winds which have quite different characteristics from the ones you have studied till now. The direction and the extent of such winds have a variable nature. Cyclones and anticyclones are variable winds.

Cyclones

The heating up of the atmospheric air of a region increasingly in relation to its surrounding regions causes sudden pressure changes. This pressure difference creates cyclones.

Cyclones have low pressure at the central part and high pressure in the surrounding regions.

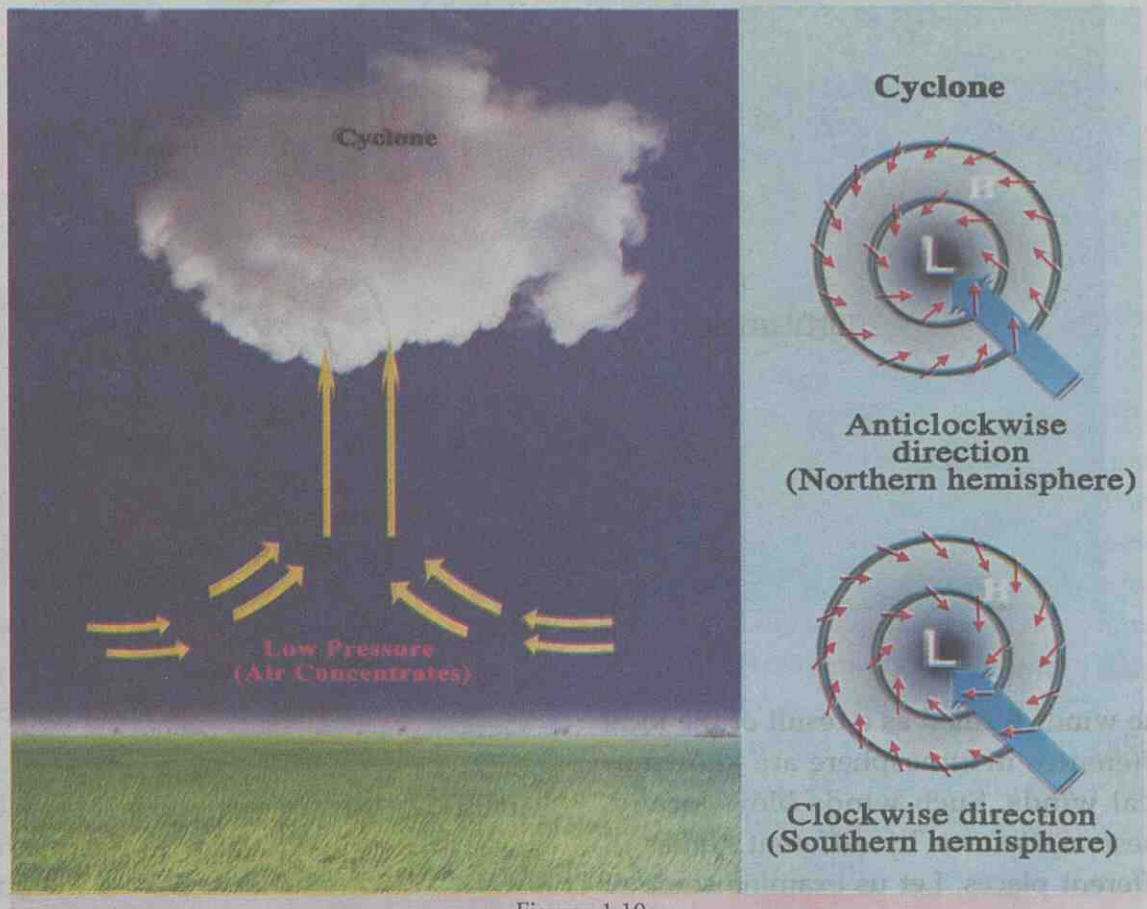


Figure - 1.10

Anticyclones

Another type of variable wind that forms in the atmosphere is called anticyclone. Answer the questions below examining the figure (Fig. 1.11).

- What are the conditions under which anticyclones are formed?
- How does the wind direction in anticyclones in both hemispheres differ from that of cyclones?

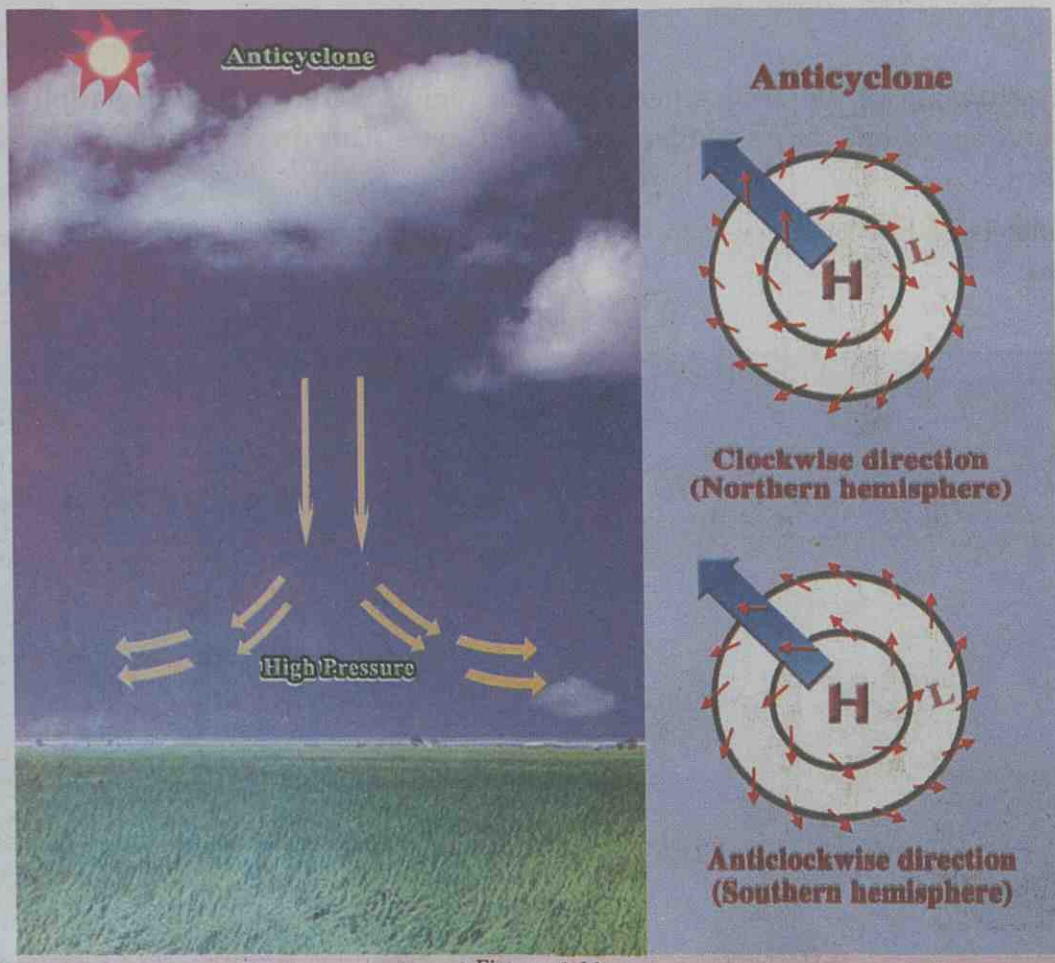


Figure - 1.11

Local winds

The winds formed as a result of the local differences in atmosphere are known as local winds. Such winds blow locally. These are known by different names in different places. Let us examine some of the important local winds and their peculiarities.

Loo : Hot dry winds that blow in the afternoons over the northern plains of India during the months of May and June

Chinook : The hot and dry winds that blow over the eastern slopes of the Rocky mountain chain of North America are called chinook. This wind which blows during the winter time causes the melting of the snow in the Prairies region.

Mistral : The cold winds that blow in the southern slopes of the Alps mountains of Europe are called mistral. The influence of mistral is considerable in Southern France.

Foehn : The hot dry winds that blow over the northern slopes of the Alps mountains are called Foehn. This wind results in the melting of the snow in the eastern slopes and the growth of grass there. This helps cattle rearing in this region.

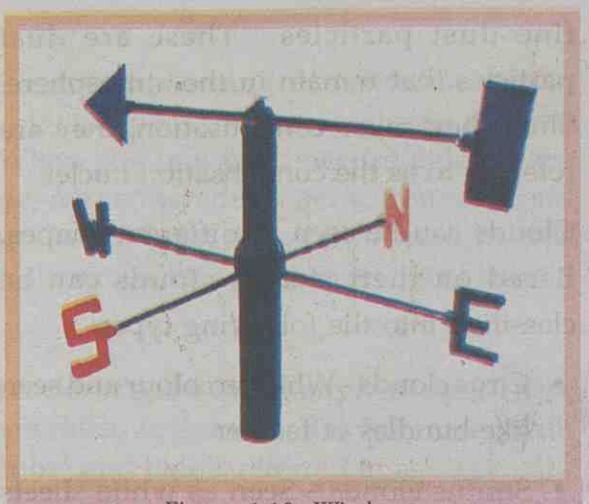


Figure - 1.12 - Wind vane
Instrument used for the determination of wind direction

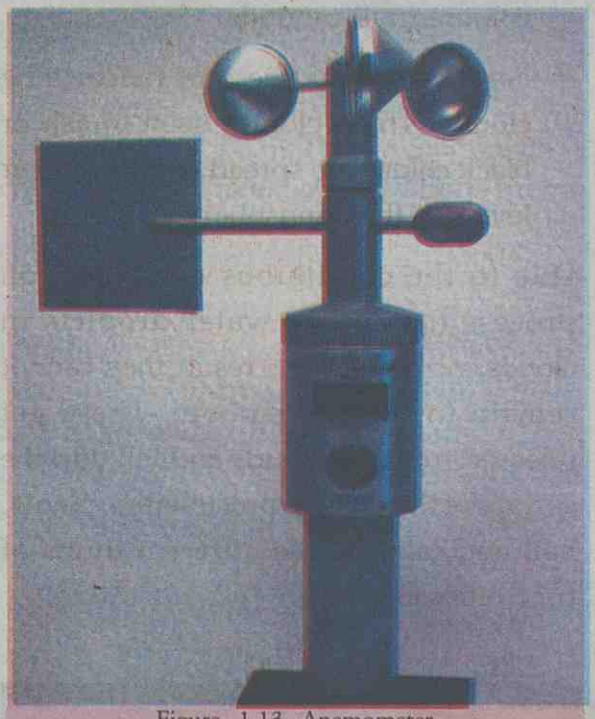


Figure - 1.13 - Anemometer
Instrument used for the determination of wind velocity

By now you must have understood about the factors which affect the atmospheric conditions such as the atmospheric temperature and atmospheric pressure. Like these factors, humidity is another important factor which affects the atmospheric condition. Let us find out what humidity is and how it affects the atmospheric conditions.

Humidity

The content of water vapour in the atmosphere is called humidity. Humidity is not the same in all places and during all times. Differences in places and time create variations in humidity. Water vapour reaches the atmosphere through the process of evaporation. The factors that influence evaporation are:

- Availability of water: In places of greater water availability, the rate of evaporation would be relatively high.
- Temperature: Rise in temperature increases evaporation.
- Nature of air : Dry air can accommodate more water vapour.

The air at a particular temperature is able to absorb a fixed amount of water vapour. This measure is called the saturation point. When air is saturated with water vapour and it cools down below a certain limit, the water vapour begins to condense. The process of conversion of water vapour that reaches the atmosphere by evaporation into water droplets is called condensation. The temperature at which air gets fully saturated with water vapour is called dew point.

The ratio between the amount of water vapour that the atmospheric air can hold at a particular temperature and the amount of water vapour present in the atmospheric air at a particular time is called the relative humidity.

Different forms of condensation

Dew:

When air saturated with vapour comes into contact with cold surfaces, the water

vapour in it condenses into water droplets on the surfaces to form dew. We can see this on grasses in the morning after very cold nights.

Mist:

When water vapour condenses and remains in the air above the earth's surface, it is known as mist. This can be seen close to the earth's surface like clouds in the atmosphere. Mist is common in mountainous regions. Mist can be seen spread out in vast open regions.

Fog:

Like mist, fog also occurs near the earth's surface due to the condensation of water vapour. Fog can be seen commonly over water bodies.

In places covered by fog, visibility would be very low. This is denser than mist.

Clouds:

The water saturated air that rises up due to heating, if gets cooled down to below the dew point, condenses to form clouds. An important factor in cloud formation is fine dust particles. These are dust particles that remain in the atmosphere. Since they cause condensation, they are referred to as the condensation nuclei.

Clouds can be seen in different shapes. Based on their shapes clouds can be classified into the following types:

- Cirus clouds - White in colour and seen like bundles of feather
- Stratus clouds - Seen as white sheets in horizontal planes
- Cumulus clouds - Seen like ash coloured tall mounds
- Nimbus clouds - These are rain bearing clouds. These clouds, seen in ash or black colour are spread over the lower levels of the atmosphere.

Due to the continuous condensation process the size of water droplets in clouds increases. As a result they cannot remain in the atmosphere. These get released from the clouds and fall into the surface of the earth as precipitation. Snow, hail and rain are the different forms of precipitation.

Snow

Snow is the form of precipitation seen in colder regions and mountainous regions. When condensation occurs below zero degree centigrade, water vapour assumes granular form. Grains formed in this fashion combine to form layers of snow.

Hail

Blocks of snow fall along with rain. These are called hail stones. Rainfall mixed with snow and hail is referred to as sleet.

Rainfall

As a result of the continuous condensation in clouds, the size of water droplets increases. Large water droplets cannot remain suspended in the air and they fall on the earth as rain. On the basis of the formation of rain, it can be mainly classified into three. Let us examine them.

Convectional rainfall

The surface air that is heated up rises in the atmosphere along with water vapour. At higher altitudes they become cooler and condense to fall down as rain. This type of rainfall is called Convectional rainfall (Fig. 1.15). This rainfall which occurs normally in the afternoons along with lightning and thunder is also referred to as torrential rainfall.

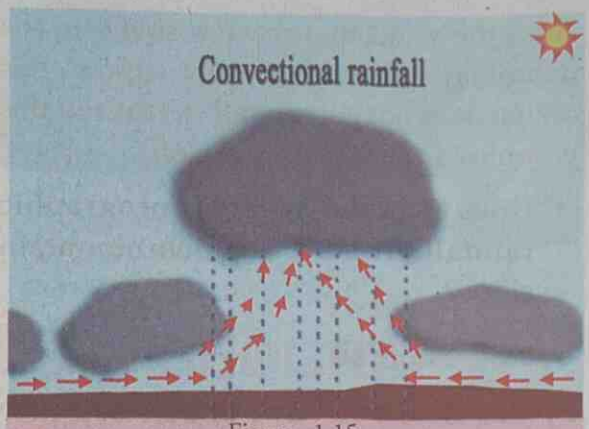


Figure - 1.15

- Convectional rainfall is generally common in equatorial regions. Why?
- Does torrential rainfall occur in Kerala?

Orographic rainfall

In the given figure (Fig. 1.16) it can be seen that on the mountain side marked as A the air saturated with water vapour coming from sea rises up after hitting the mountain. The air which rises up becomes cooler and condenses to fall as rain on the mountain slope facing the wind direction. This is called orographic rainfall.

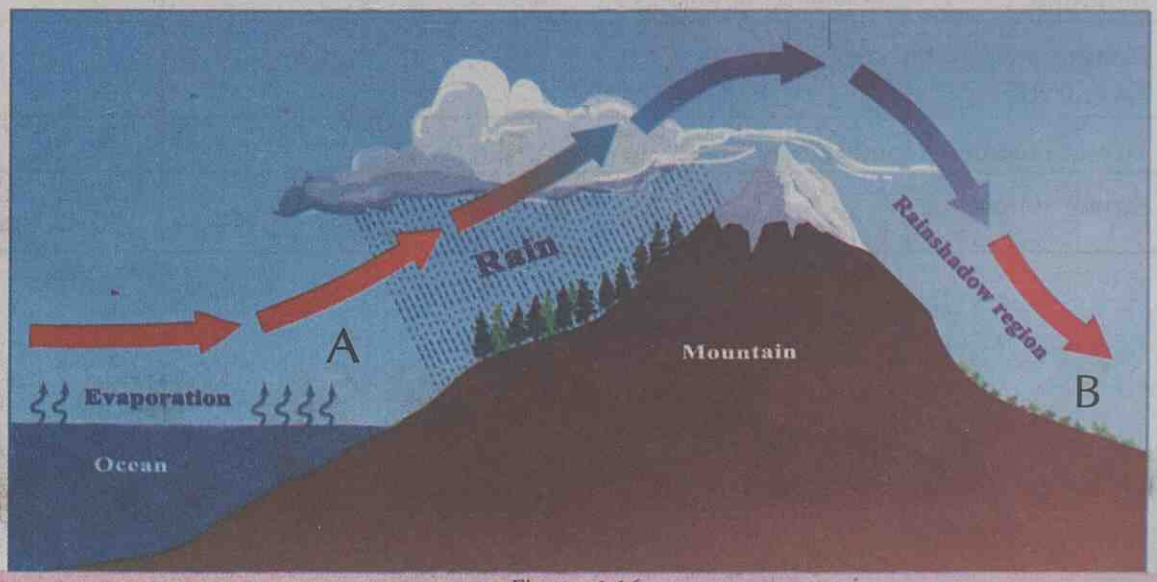


Figure - 1.16

Since the wind that reaches side B of the mountain is devoid of water vapour, this region does not get rainfall. As a result this becomes a rain shadow region.

- Does Kerala receive orographic rainfall? If so, on which mountain slope?

Cyclonic rainfall

By this time you have understood how cyclones are formed. Rainfall associated with cyclones is called cyclonic rainfall.

Hot air and cold air meet in the central region of cyclones. During this time the cold air pushes up the hot air. When the air rises up the water vapour in it condenses and falls down as rain.

Have you not understood the various factors that affect the atmospheric conditions, the manner in which they affect and the nature of changes?

Now you must be able to say why the atmospheric condition is not the same on all days.

Follow up activities

1. How does the change in the position of the equatorial low pressure belt affect the climate of India?
2. Observe the changes in the atmospheric condition from June to May. Give your findings in the table below:

Atmospheric condition	Experienced months	Time		
		Morning time	During the entire day	Evening time
Snow				
Rain with thunder and lightning				
Continuous rainfall for several days				
Dry atmospheric condition				
Strong winds				

2

MODERN TECHNIQUES IN GEOGRAPHY

Our ancestors used to collect information about the earth's surface of their nearby areas by climbing up trees and mountain tops. Such collection of information helped them in gathering food and protecting themselves from enemies. When the need arose to understand more about the earth they used to travel for collecting information about different regions and convert the information into maps. Maps were constructed in this manner during olden days and it used to take a long time for the collection of information and preparation of maps. It was not possible to collect information about isolated and inaccessible regions.

Collection of information and the analysis of information are two major activities of the map making process. With the development of technology, these became faster. Moreover, it became possible to obtain information about places where we couldn't reach easily. As computers began to be used for the analysis of information collected through various means and to illustrate them in maps, geographical studies achieved more efficiency. Let us know more about these geographic techniques which help in the collection and analysis of information.

Salient portions of the news report relating to the 'Operation Nallamalai'

The search operation carried out in connection with the accident of the helicopter in which the Andhra Pradesh Chief Minister Y.S. Rajasekhara Reddy and team travelled was named as the 'Operation Nallamalai'. It was a difficult operation to search the vast Nallamalai forest region that spreads over six districts.

From the given press reports, you must have understood the hurdles faced by the Operation Nallamalai. Realising that the use of technology alone would help to overcome these difficulties, the authorities decided to resort to on the three methods, viz satellite mapping, aerial mapping and ground searches. It became possible to locate the place quickly with the help of aerial mapping. Following this, air force commandos reached Rudrakonda Hills near the Sreesailam region of Nallamalai in a helicopter.

There are isolated as well as inaccessible places on the earth where one cannot reach easily. Today collection of information about these places is possible using the remote sensing technology.

Remote sensing

The method of collecting information about an object or a phenomenon with the help of distantly placed sensors without touching is known as remote sensing. Could you understand from the figure (Fig 2.1) the collection of information about the earth's surface from different levels?

The information is collected with the help of either cameras or sensors. The surface where the sensor or camera is placed for collecting information by remote sensing is called the platform. Sensors can be placed on aircrafts, satellites or balloons. Based on the type of platform used,

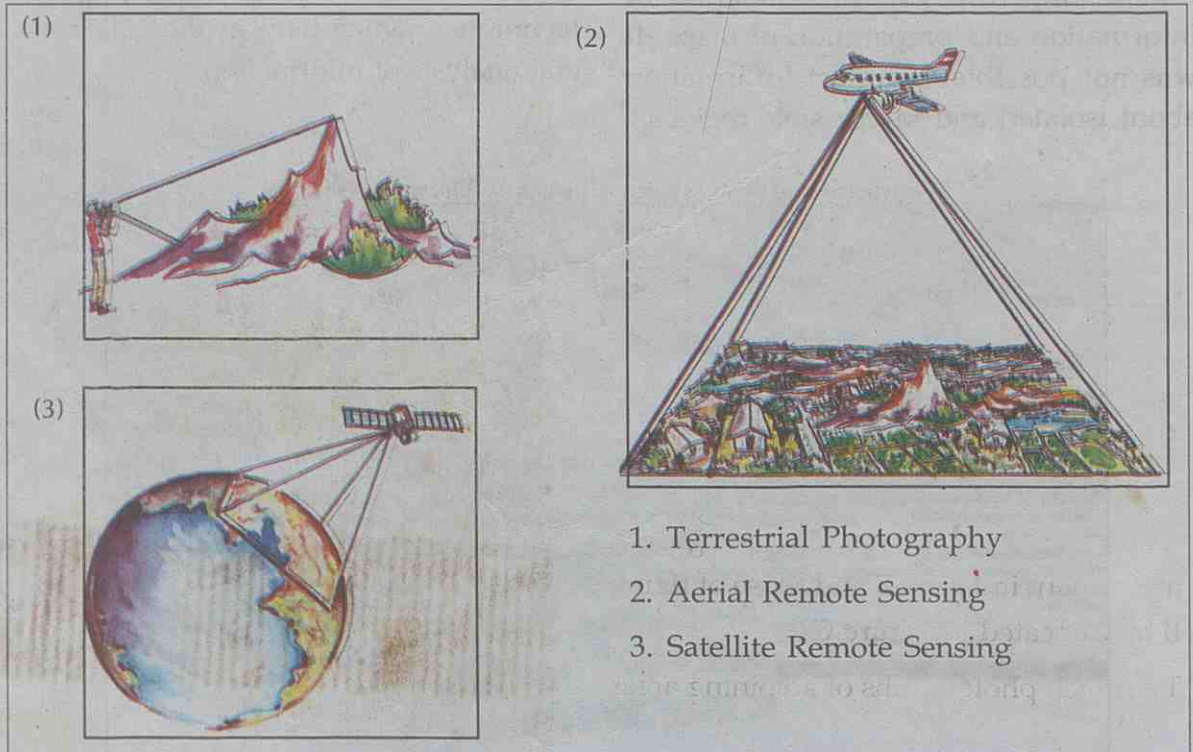


Figure - 2.1

remote sensing has been divided into three.

1. Terrestrial Photography
2. Aerial Remote Sensing
3. Satellite Remote Sensing

Taking photographs of the earth's surface from the terrain or from high elevations is called terrestrial photography. Don't we take photographs of the scenery when we go on picnic? This is an example for terrestrial photography.

The process of taking photographs of the earth's surface continuously with the help of cameras fixed on aircraft is called aerial remote sensing. It is usually used for collecting information about small regions. The advantage is that we can collect information about any place in this way.

Overlap in aerial photographs

Overlap is needed in aerial photographs in order to maintain continuity and also to ensure three dimensional view using stereoscopes. For this purpose each aerial photograph covers about 60 percent area of the adjacent photographs also. This is called overlap of aerial photographs.

In the given figure (Fig. 2.2) it can be seen that each photograph shows as much as 60 percent area as repetition. Don't you see that the majority of areas of the figure A are present in figure B and those of figure B are repeated in Figure C?

Two such photographs of adjoining areas are called a stereo pair (Fig. 2.3). Stereo vision is possible only in photos having overlap. The instrument used for obtaining three dimensional view from the stereo pairs is called stereoscope (Fig. 2.4).

By placing stereoscopes over aerial photos and by viewing them after adjusting the distance between the lenses, we get a three dimensional view of that region. This is called 'stereoscopic vision'.

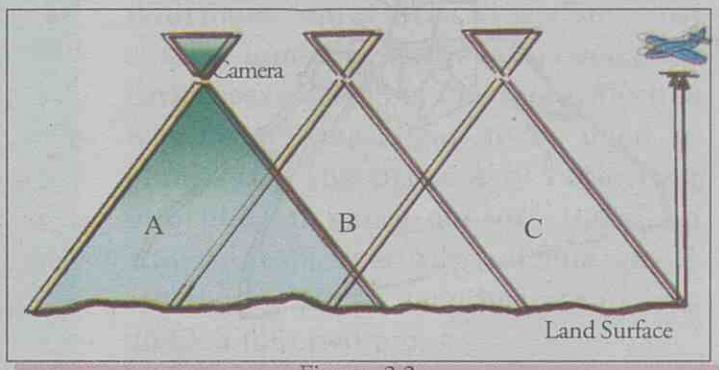


Figure - 2.2

Since aerial photographs are highly useful for viewing a region as a whole and for distinguishing the heights and

Figure - 2.3

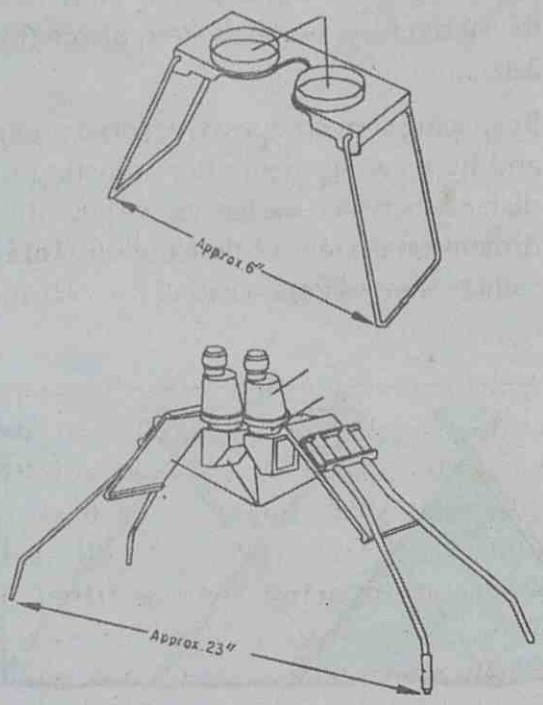


Figure - 2.4

depressions of the earth's surface aerial photographs were widely used during and after the Second World War.

Aerial photography is ideal for the precise maping of the earth's surface. Aerial photographs are widely used for the preparation of topographic maps.

A glimpse into the history of remote sensing

Remote sensing technology transformed itself into advanced technology through several periods of experiments and observations. Let us examine the progress in remote sensing technology over different periods.

First phase - Before 1925

- It is being said that during earlier times photographs of Paris City were taken using cameras tied to domestic pigeons.
- Photographs taken in this manner did not have a precise continuation or control.
- Afterwards, balloons began to be used for this.
- In 1858 Gespard Felix took a photograph of a place called Beaver in France using balloon.
- In 1860 James Wallace Blank took a photograph of Boston city using balloon.
- When the variations in the direction and speed of wind created difficulties for photography using balloons, aircraft began to be used for the phototography.
- It was in the American Civil War of 1862 that aerial photographs began to be used for purposes of war.
- Even in the First World War aerial photographs were used for understanding about enemy camps, arms storage facilities and troop movements.

Second phase - 1925 to 1945

- The use of aerial photographs for collecting information about the earth's surface became more widespread.
- Camera lenses were used effectively.
- Advanced aircraft began to be used.
- Aerial photographs were used greatly in the Second World War.

Third phase - 1945 to 1960

- Aerial photographs began to be used in different fields.
- Such photographs were used widely for theme based studies.

Fourth phase - 1960 to 1972

- Satellite remote sensing was started.
- Earth observation from the outer space started.

Fifth phase - After 1972

- Apart from war related purposes, satellites were launched for the collection of information about the earth.
- America successfully launched the Landsat series (1-7) of satellites.
- Several other countries acquired the satellite remote sensing technology.
- Our country successfully launched several satellites such as Cartosat, Resourcesat and Oceansat.

Aerial photography started in India after the attainment of Independence. The responsibility of aerial survey in India has been given to three agencies, namely the Indian Air Force, the Kolkota based Indian Aerospace Company and the National Remote Sensing Centre. Though there are several advantages for aerial surveys, certain limitations have also been noticed. These are:

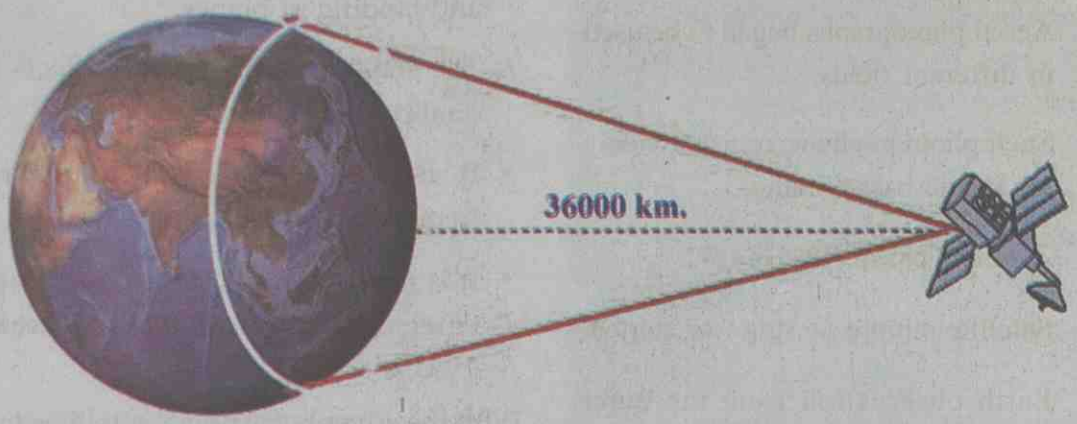
- Open space is needed for the take off and landing of planes.
- The shaking of the aircraft affects the quality of photographs.
- It is costly to land the aircraft frequently for refuelling
- It is not practical to take photographs of regions of the earth that are vast and extensive.

With the advent of artificial satellites most of these limitations have been overcome. Earth observation became more effective when satellites began to be used as platforms. The process of collecting information using sensors fitted on artificial satellites is called satellite remote sensing. Artificial satellites are mainly divided into two types:

- Geostationary Satellites
- Sun synchronous Satellites

Geostationary Satellites

These satellites orbit the earth at a height of about 36000 km with the same orbital velocity and direction as that of the earth. Since the orbits of these satellites are at great heights, they can bring one third of the globe under their observational limit. Since they move according to the orbital movement of the earth they always face the same region of the earth. Because of this, constant data collection of any one part of the earth is possible through them. These satellites are used for understanding the differences in weather conditions and for telecommunications. The INSAT satellites of India are good examples for this.



Insat - Figure - 2.5

Sun Synchronous Satellites

In comparison with the geostationary satellites, sun synchronous satellites move at very low heights. As shown in the figure (Fig.2.6) such satellites move by traversing the north and the south poles. The position of the sun synchronous satellites is approximately between 800 km and 950 km from the earth's surface. Since these satellites come over a particular region at a fixed interval of days, continuous collection of information about that region is possible. Satellites such as IRS and Landsat are examples for sun synchronous satellites.

Figure - 2.6

Apart from platforms another important component of remote sensing is the sensor.

Sensors

The instrument used for recording information about the earth's surface is called sensor. In order to record information, cameras on the earth's surface and in aircraft and scanners in satellites serve as sensors (fig. 2.1).

Active remote sensing, Passive remote sensing

An energy source is essential for remote sensing. This can be solar energy containing electromagnetic radiations or artificial sources of light. Remote sensing has been made possible by utilising the sunlight reflected from various objects. Based on the source of light or energy, remote sensing can be divided into two, namely active remote sensing and passive remote sensing.

Remote sensing based on an artificial source of light or energy source is called active remote sensing. A fine example for this is the taking of pictures using a camera flash. Here camera is the sensor and the flash coming from the camera is the artificial energy source.

Remote sensing based on the energy from the sun is called passive remote sensing. This is made possible only through the help of a sensor fitted on a distant surface.

In general, we can say that the technology utilizes the electromagnetic energy reflected and radiated by objects.

Spectral Signature

Every object on the earth's surface reflects electromagnetic radiation in different measures. This difference in the amount of reflection is because of the variations in the physical properties of objects. The measure of reflected energy by each object is called the spectral signature of that object.

For example, the spectral signature of plants is different from that of the water bodies.

The sensors on artificial satellites distinguish objects on the earth's surface and transmit that information digitally to terrestrial stations. This is interpreted with the help of computers and converted into picture formats. These are called satellite imageries.

Spatial Resolution

The sensors fixed on satellites cannot distinguish objects of all sizes on the earth's surface. Earlier sensors were able to distinguish only large objects. But today sensors that can distinguish even small objects are being used.

Spatial resolution of a sensor is the size of the smallest object on the earth's surface that it can distinguish. A one metre spatial resolution for a satellite imagery means, it can represent an area of the earth's surface of one square metre or 1 m x 1m area. Even houses and vehicles can be seen clearly in such satellite imageries. There are sensors today that can even represent information of less than one metre. Sensors having high spatial resolution can represent objects with greater clarity. You have understood the scientific aspects of remote sensing technology. Let us now look at its uses.

Uses of remote sensing technology

- For collecting information about the extent of crops and pest attacks and for understanding about the periodic growth of crops and the spread of pest infections
- For finding out forest fires in inaccessible areas and for taking control measures by monitoring their spread
- For finding out drought affected and flood affected areas

- For exploring the oceans
- For understanding about the land use in a region
- For locating mineral resources
- For finding out places having greater ground water availability
- For oil exploration.

Achievements of remote sensing technology

- Concise maps of large areas can be obtained within a short time.
- Helps to understand the changes during different periods
- Gives authentic information about objects or phenomena being observed
- From a single data source itself analytical studies about a number of subjects can be done.
- Images from satellites are received repeatedly at regular intervals.
- Information can be collected within a very short time.

Remote Sensing in Kerala

Various central and state departments in Kerala now make use of remote sensing data for information about the earth and for efficient map making. Apart from the Kerala State Remote Sensing and Environment Centre (KSREC), Centre for Earth Science Studies (CESS), Centre for Water Resources Development and Management (CWRDM), Kerala Forest Research Institute (KFRI), Kerala State Land Use Board (KSLUB), Geological Survey of India (GSI), Central Ground Water Board (CGWB), Central Marine Fisheries Research Institute (CMFRI), Department of Mining and Geology, State Ground Water Department, Mahatma Gandhi University and Kerala University, various private companies also use remote sensing data.

You have understood that a large amount of information about the earth is received through remote sensing technology. Computer based technology helps in the finding of scientific answers to our enquiries by the analysis of the information obtained through the method of remote sensing and other means.

Geographic Information System

Reliable data increases the quality of inferences arrived at through Geographic Information System. Remote sensing data, maps, tables and the data obtained through other types of surveys can be used as the basic data for analysis. The data obtained through these sources are stored in a computer based Geographic Information System. These data can be subjected to various analyses using Geographic Information System softwares.

Figure (2.7) depicts the Geographic Information System. Entering basic data into computers using data input devices such as CDs and scanners is the first step. The collected data can be transformed into various layers using Geographic Information System softwares. They can also be subjected to several analytical studies. The analysed data can be converted, according to our needs, into products in condensed tabular format, in digital form or as maps.

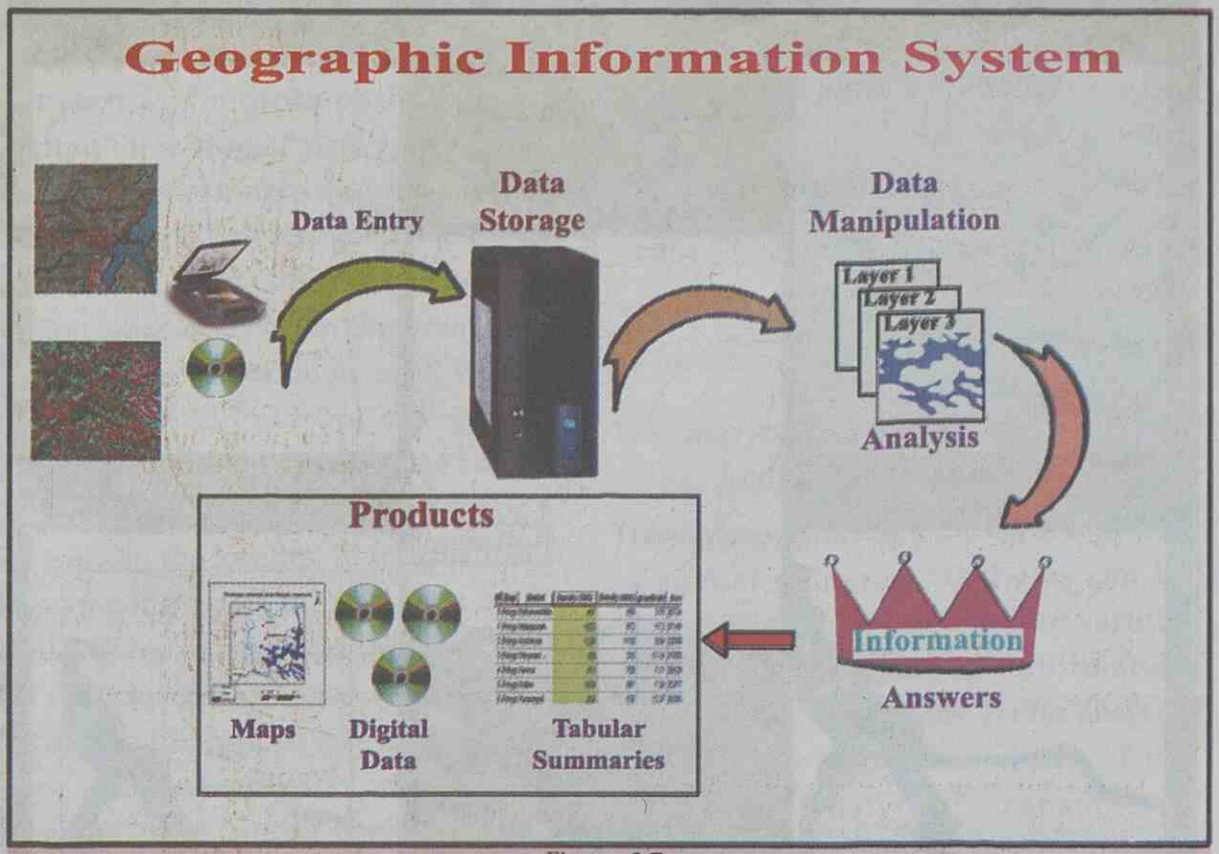


Figure - 2.7

Geographic Information System is a computer based information management system for the storage, retrieval and analysis of spatial data and their peculiarities and also for displaying them in the form of maps, tables and graphs.

Layers

With the help of Geographic Information System softwares, spatial data can be stored as different layers. Observe the part of a topographic map shown in the figure (2.8). Can we separate the items of the spatial data one by one from that to make separate maps. This is possible through the GIS softwares. For example, you can see that in the figure (2.8) water courses, roads etc are separately shown. We can call them layers. In this manner we can create layers out of every theme on the earth's surface. If the earth's surface features are represented as different layers, their spatial relationship can be easily understood. Try to compare the layers of roads and the water courses shown in the figure. You can see that most of the roads have been constructed by avoiding water courses. If we construct roads along places having water courses, bridges have to be constructed over them. We could easily understand the spatial relation between roads and water courses through this example. In this way we can analyse the spatial data of different layers for our different purposes.

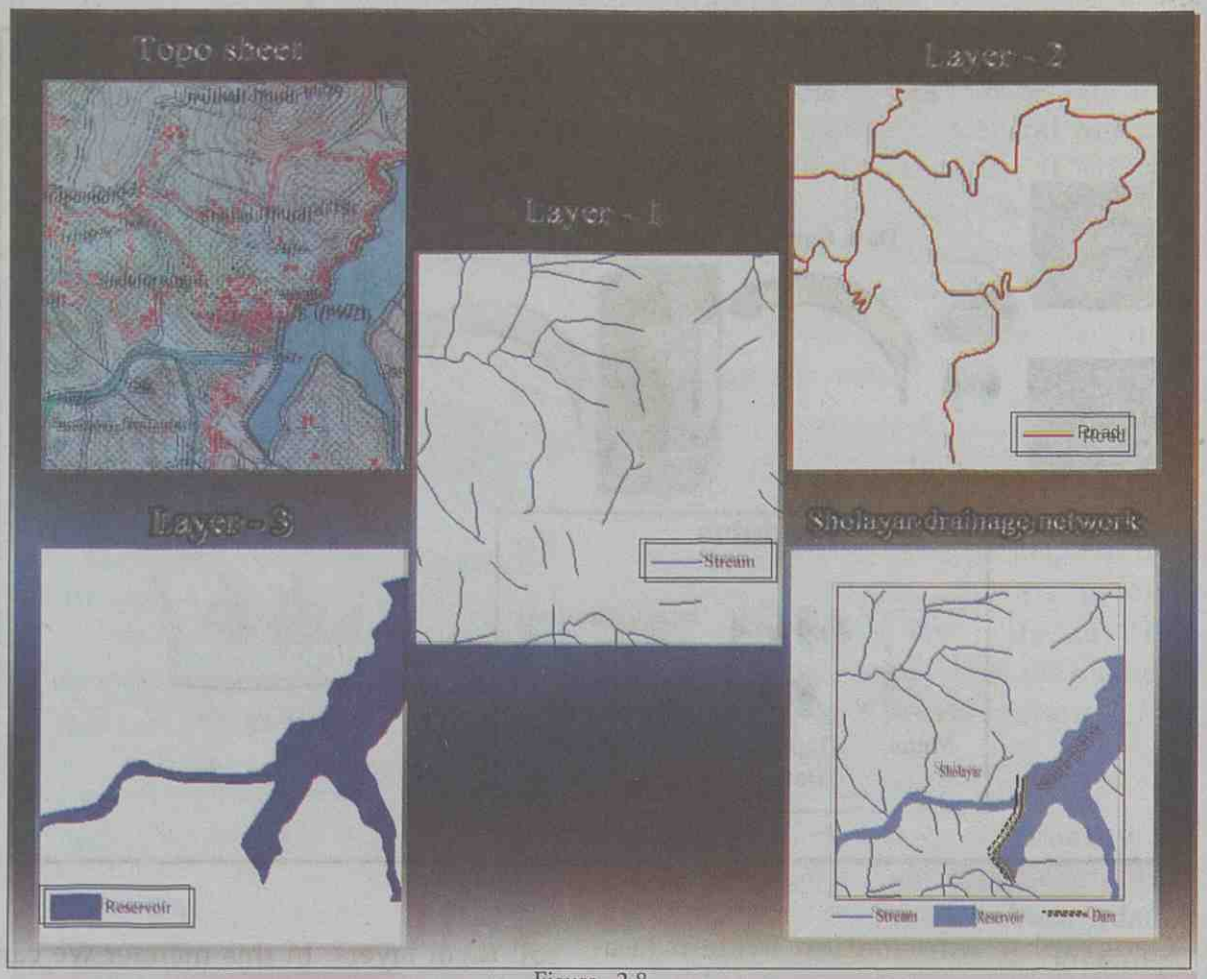


Figure - 2.8

In the given figure (Fig. 2.8) parts of drainage network near a reservoir are shown. Can you find out the different layers that have been used here?

Can you find out the other features that can be converted into layers from the given topographic map?

Spatial Data and Attributes

Each feature on the earth's surface has a location of its own. Such features that relate to the earth's surface and have a specific location are known as spatial data. For example, among the countries of the world the location of India is between north latitudes 8°4' and 37°6' and east longitudes 68°7' and 97°25'. Each place on the earth has a specific location.

The characteristics of spatial data can be recorded with the help of their attributes. For example when you find out the location of the well in your house, it forms

spatial data. We can also collect information about the characteristics of the well such as the depth of the well and whether there is a platform and retaining wall. These are attribute data. Such attributes can be combined with their spatial data using GIS softwares. In this fashion you can collect information about the location and attributes of all wells in your locality and prepare a geographic information system of wells. Based on this we can answer various queries relating to the wells in the locality. In this manner if we can collect and include data of the spatial characteristics and their attributes, the GIS can give precise and scientific answers to the various queries about that place. The data stored in computers are not as anologue, but are stored in a digital format with the help of GIS softwares. The data can be analysed in different ways for various purposes. As you might be aware it is not possible to do such types of analyses and generate need based models based on ordinary maps.

The uses of Geographic Information System

- For carrying out theme based studies
- For separating required data from spatial databases
- For analysing data based on their spatial relations
- To display the spatial characteristics
- For modifying and periodically updating data in a fast and cheap manner
- To model future phenomena and processes based on data stored in Geographic Information System
- For making maps, graphs and tables for specific needs

The analytical capabilities of Geographic Information System

The surface features of the earth collected as spatial data and attributes can be subjected to analyses for our various needs using Geographic Information System. Overlay analysis, buffer analysis and network analysis are some of the important analytical capabilities. Geographic Information System softwares are developed by combining a large number of such analytical capabilities. Let us now understand some of the analyses of Geographic Information System.

Overlay Analysis

Overlay analysis is used for understanding the mutual relationships between and the changes undergone by the various features of the earth's surface. A study report by the Centre for Earth Science Studies (CESS) discusses the land use changes in the Manickal Panchayath of Thiruvananthapuram district. The periodic changes that took place in the

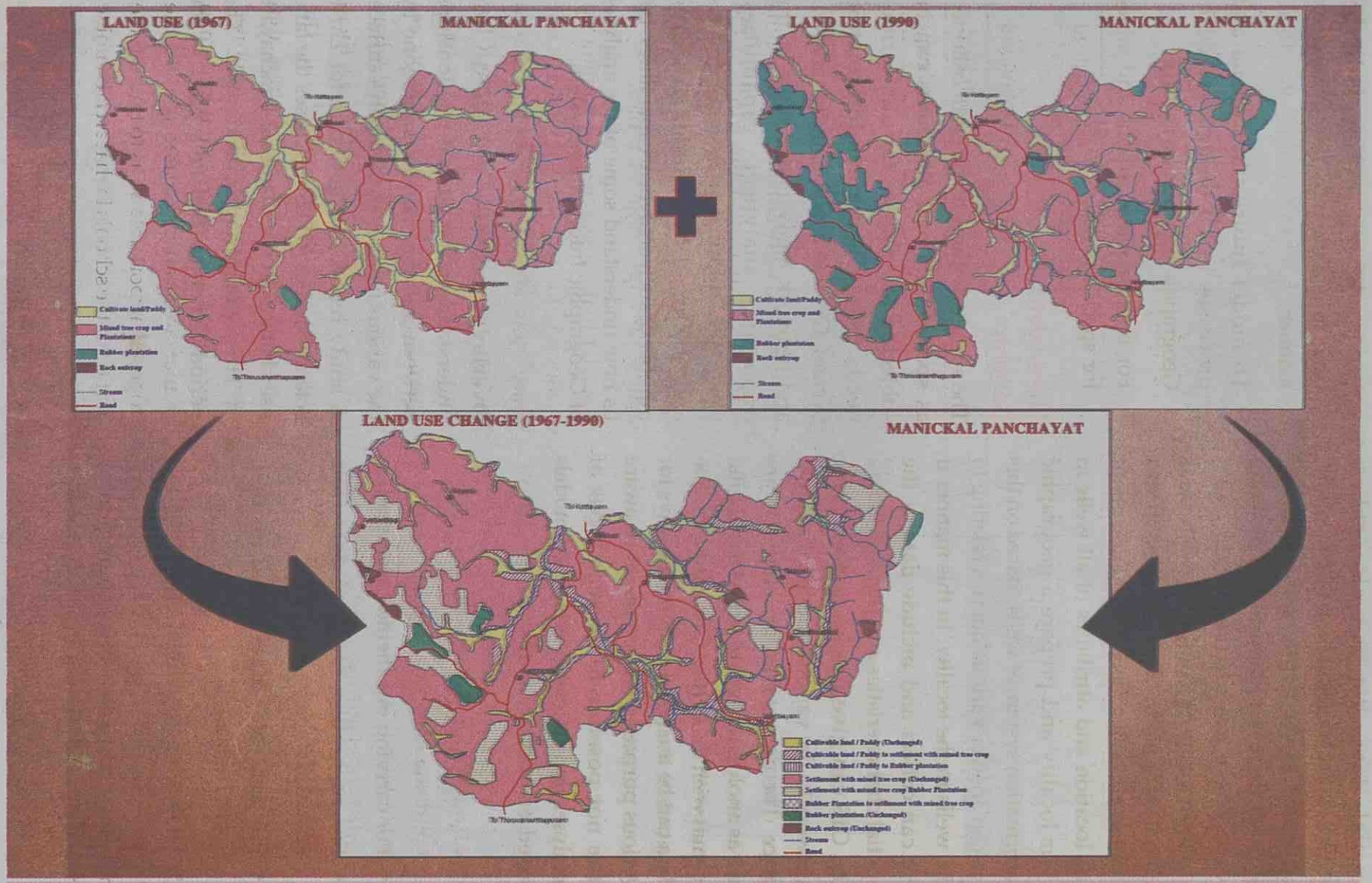

LAND USE (1967)
MANICKAL PANCHAYAT
LAND USE (1990)
MANICKAL PANCHAYAT
LAND USE CHANGE (1967-1990)
MANICKAL PANCHAYAT

Figure - 2.9

land use in Manickal Panchayath could be easily understood by the overlay analysis. Haven't you noticed the land use models of 1967 and 1990 represented in the form of two maps? By comparing the date of 1967 and 1997, the land use changes that took

Different Types of Land Uses	1967 Areal extent (%)	1990 Areal extent (%)	Changes in Land Use (%) (1967-1990)	Changes within 23 years
Paddy fileds	16.09	9.23	-6.86	Decreased
Mixed trees and other plantation crops	81.65	75.69	-5.96	Decreased
Rubber plantations	1.66	14.48	12.82	Increased
Rock outcrop	0.6	0.6	-	No Change
Total	100	100	-	

place during this period have been represented in the form of a map (Fig. 2.9). In the given map (Fig. 2.9) examine the condition of the paddy fields. By the year 1990, the extent of land area under paddy fields decreased considerably from that present during 1967. What about the extent of rubber cultivation? By these ways we can understand about the land uses that changed and that didn't. Based on the map and the table compare the changes in the land use that took place in 23 years. If needed, the land use can be compared with the landforms of an area with the help of overlay analysis. The capability of overlay analysis can be used for various analytical purposes.

Buffer Analysis

In buffer analysis a circular region is created around a point or a corridor like region around a linear feature. The radius of the circle created or the width of the corridor is determined by analytical experts. Let us understand about buffer analysis through some examples.

Consider that a new airport is coming up in your region. Imagine that there is a law which bans schools near airports due to the high noise levels. For example if the limit is a radius of 2.5 km, it has to be determined as to how many schools are there in an area within 2.5 km and where they are located. In such situations there is a considerable potential for the application of buffer analysis. If the spatial data of the nearby schools is incorporated into a geographic information system, a circular area can be created around the proposed airport area so as to find out the location of the schools in that area.Examine the figure (Fig. 2.10).

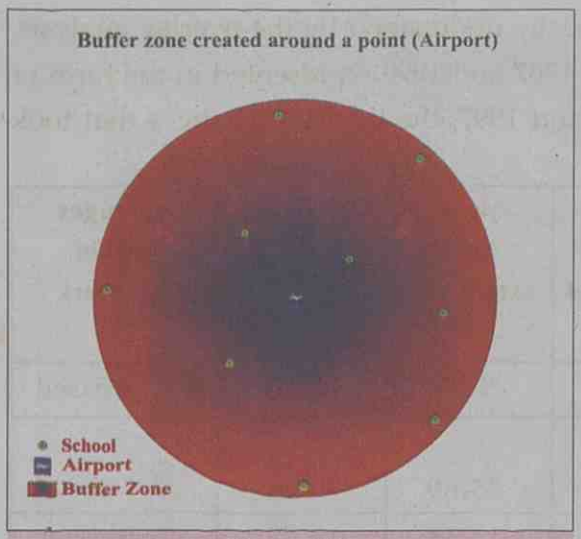


Figure - 2.10

From the given figure (Fig. 2.10) haven't you understood the application of buffer analysis in the determination of a circular region around a point? Consider another example regarding the case of a linear feature.

Let us consider that the width of a road in your region is increased from 10m to 20m as per a government decision. In this situation the detailed information regarding the people living in that region and their land assets has to be collected. If buffer analysis is applied to the geographic information system containing the comprehensive data about that region, it can be easily determined as to how much land belonging to local people has to be acquired and how many people will become homeless. Besides, this can provide answers to many questions the government authorities would be having (Fig. 2.11).

- For example, how many people would lose land if the width of the road is increased by 5 m on either side?
- If the width of the road is increased only on the left hand side by 10m, how much land has to be acquired and how many will become homeless?
- Will more people become homeless, if the road is widened only on the right side?

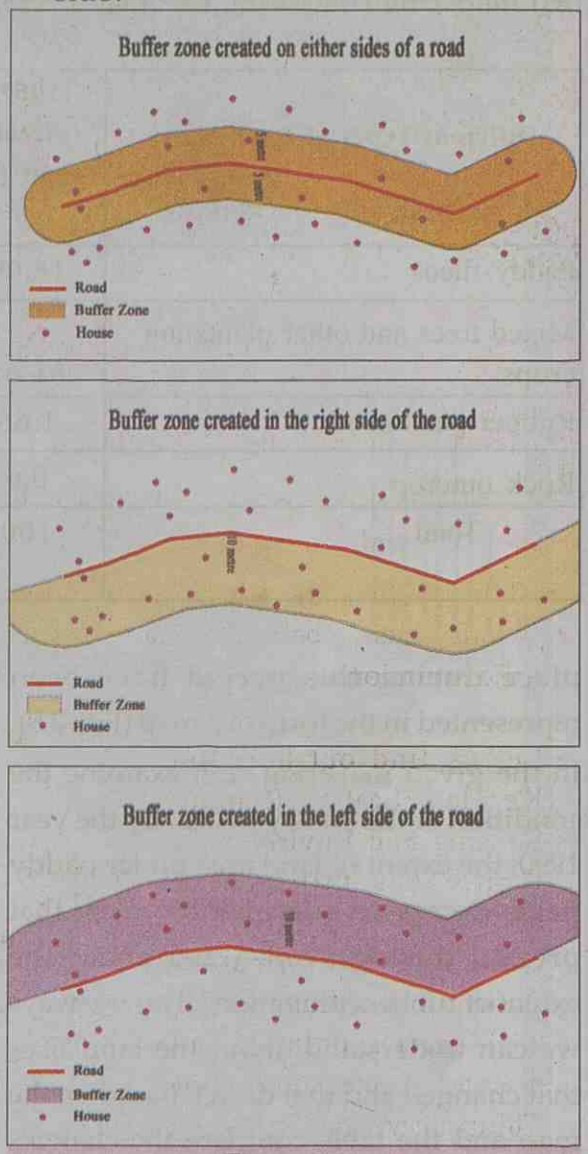


Figure - 2.11

Network Analysis

In contrast to the other two types of analyses, the network analysis deals only with linear features on a map. Linear features such as roads, railway line and rivers are included here. For example, a dairy entrepreneur wants to reach a milk procurement centre by collecting milk in a region within a radius of 5 km along the easiest road in the shortest possible time. If the roads in the geographic information

system are subjected to network analysis, the easiest road that would take the shortest time can be found out. Similarly, when there is traffic congestion on a road, the easiest and less congested roads can be determined as alternative paths using network analysis.

The possibilities of road network analysis can be used in the planning of the following:

- Helps to find out the nearest and less congested roads
- Travel time and costs are reduced.
- Roads having less accident rate can be determined.
- The hospital to which an accident victim has to be taken depending on the situation
- Planning maximum number of attractive destinations for tourists in the available time.

Practical applications of Geographic Information System

- Planning and decision making becomes more efficient.
- Gives efficiency in data handling and distribution.
- Data redundancy is reduced.
- The ability to integrate data from different sources
- Gives new information based on complex analyses of geographic data

Let us find out how the Kerala State Remote Sensing and Environment Centre has utilised the analytical capability of Geographic Information System in the health sector. The spatial data of the malaria affected regions of Thiruvananthapuram district has been shown with the help of map. The spread of the malarial disease during 2004 is shown in blue colour and the red colour shows the spread of the disease during 2003. As these data have been represented spatially the places of maximum spread of the disease can be easily determined from the map. Besides, when we click on each point by using mouse on geographic information system, the detailed information regarding the persons affected can be obtained. If the spatial data about such communicable and noncommunicable diseases can be represented in a map, we can understand about their spread and the possible areas into which they could spread more.

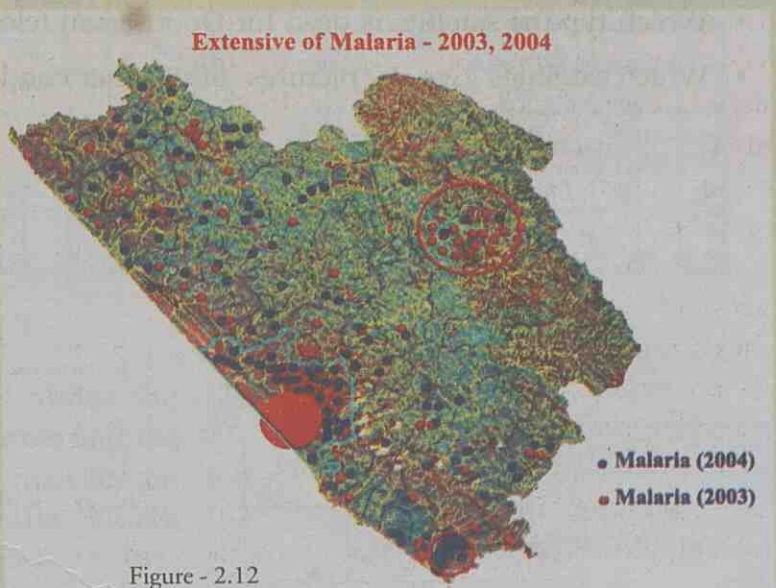


Figure - 2.12

Global Positioning System (GPS)

Global Positioning System (GPS) is an instrument used for the determination of the positions of the objects on the earth's surface. A group of 24 satellites that orbit around the earth in 6 different orbits at heights from 20000 to 20,200 km is what helps in the determination of positions. GPS is an instrument that is used for carrying out surveys in a simple manner. It works using signals received from the artificial satellites. A GPS receiver should receive signals from at least four satellites in the network to be able to display the latitude, longitude, height and time of the place. GPS is of immense help in several activities including map making and transportation. Try to collect information about the use of GPS.

Follow up activities

- Prepare an article on the theme 'The role of remote sensing in the development of India'.
- Which type of satellite is used for Doordarsan telecasts?
- Which satellites give us pictures of weather conditions?

3

CONTINENTS

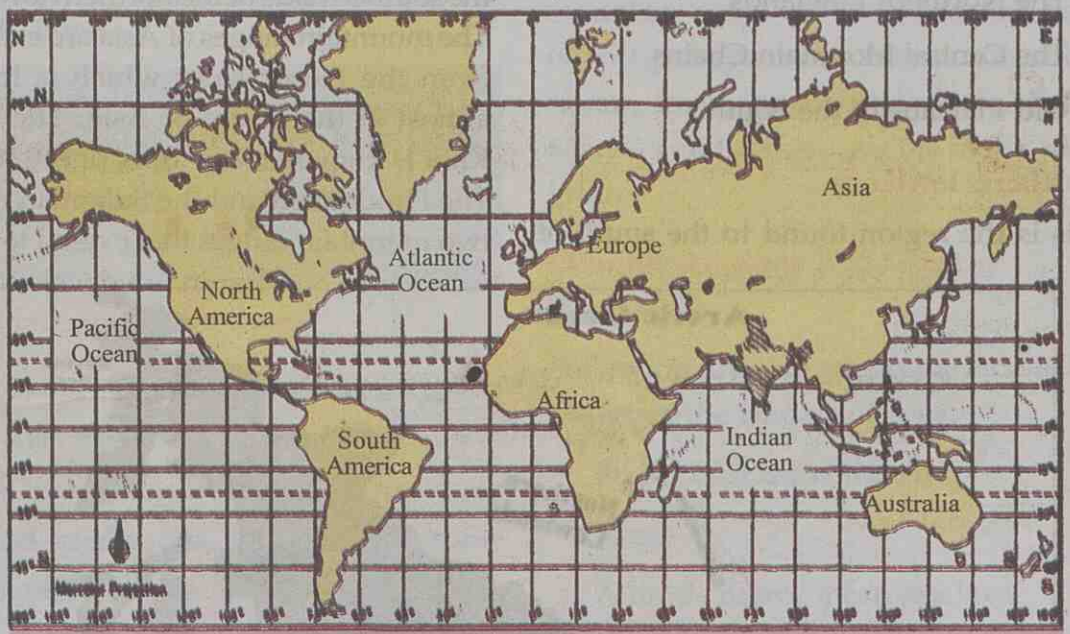


Figure - 3.1

You have already learned about the physiography, climate, resources and the factors that influence the human life on the continents like Australia, North America, and South America.

- Which are the continents that you have to get acquainted with?
- Which is the largest continent?

ASIA

Asia is the continent that has one third of the total land area of the world.

Location

	Latitude	Longitude
Asia	10°11′ South 81°12′ North	26°2′ East 169°40′ West

Observe the world map and find out the major latitudes that pass through the continent of Asia.

With the help of an atlas answer the following.

- The canal that separates the continents of Asia and Africa

- The largest country in Asia
- The oceans that surround Asia
- The Asian countries that share their boundaries with India
- The strait that separates North America from Asia

Physiographic Divisions

Asia is divided into the following physiographic divisions.

- The Northern Lowlands
- The Central Mountain Chains
- Old Plateaus of the South

Northern lowlands

This is the region found to the south of the Arctic Ocean covering the majority of Siberia. Even though they are lowlands they are not plains. They have mountains and plateaus. The Ural Mountains found on the western side of the northern lowlands separate Asia from Europe.

Find out the location of the Ural Mountains with help of an atlas.

The Central Mountain Chains

This physiographic division is found on the southern side of the northern lowlands. The mountain ranges of Asia are extended from the Pamir Knot which is located almost at the centre of Asia. The Pamir Knot is known as the 'Roof of the World'. The Hindukush and the Sulaiman are the two mountain ranges that extend towards

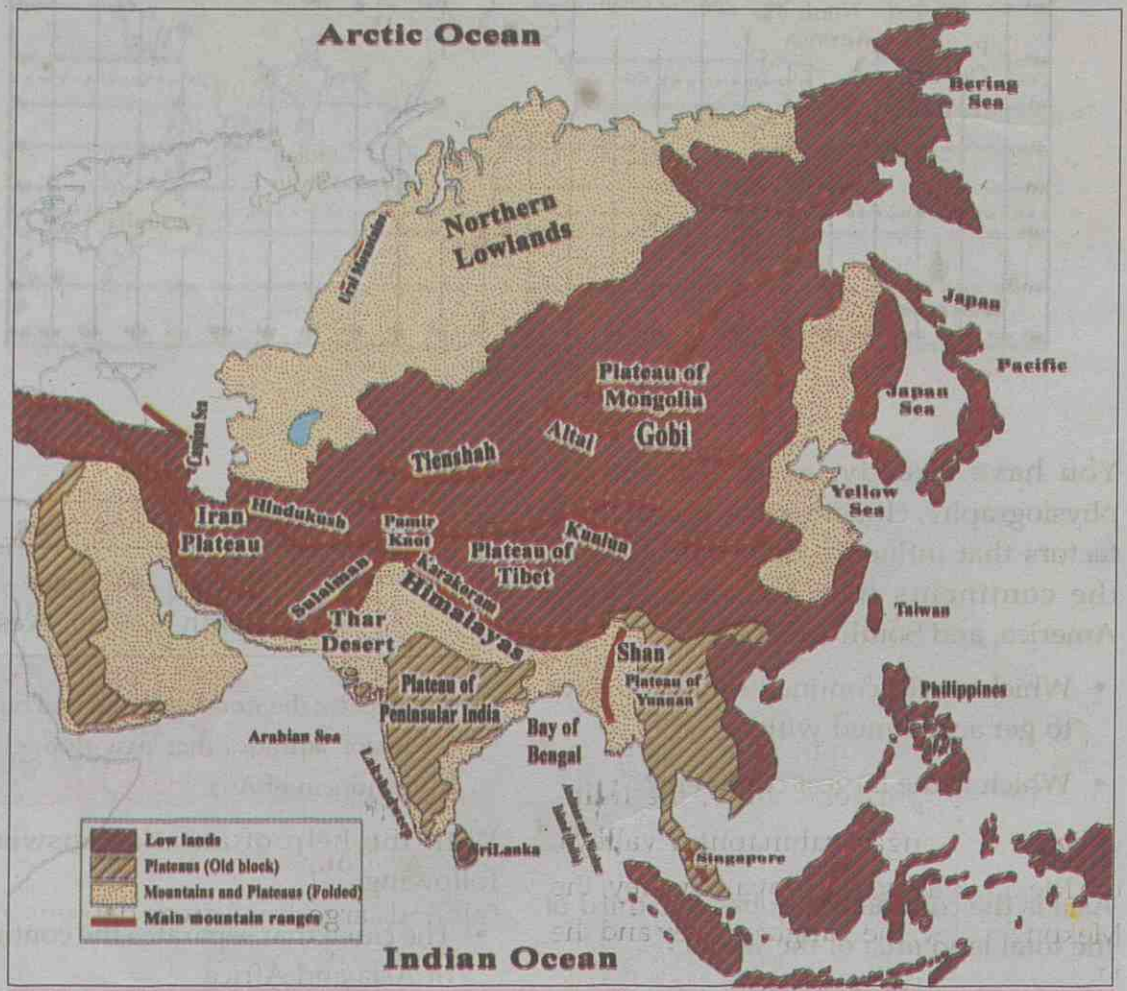


Figure - 3.2

the west of the Pamir Knot. Four mountain ranges are seen towards the east of the Pamir Knot. The most important among them is the Himalayas. The Kunlun and the Altin are the mountain ranges situated on the north of the Himalayas. Arakanyoma is a large mountain range that runs first towards the southwest from the eastern tip of the Himalayas and then turns towards the south. The central mountain chain contains many peaks including the highest peak in the world - the Mt. Everest.

With the help of an atlas prepare a table showing the major peaks of the central mountain chains, their height and the countries to which they belong.

Old Plateaus of the South

This physiographic division includes three major plateaus, Arabia, Deccan and Indo-China. They are formed of relatively old and hard rocks. Though it has some rivers, this is mostly a dry region and lies between the Red Sea and the River Tigris with a west to east slope.

With the help of an atlas find out the deserts and countries in old plateau region.

The Great River Valleys

These are fertile alluvial lowlands. This region comprises eight valleys namely, the Tigris-Euphrates valleys, the Indus valley, the Ganga-Brahmaputra valleys, the Menam valley, the Iravathi valley, the Mekong valley, the Yangtze valley and the Hwanho valley. This highly fertile region is one of the most thickly populated regions of the world.

With the help of an atlas prepare a table showing the major rivers of Asia and the countries through which they flow.

The Island Groups

Most of the islands are the elevated portions of mountain ranges found in the oceans which are the continuation of mountain ranges of the mainland. Some island groups have many volcanoes. Japan, Philippines, Indonesia, Kurile Islands and Formosa are the major island groups.

Climatic Regions and Natural Vegetation

Following are the important factors that influence the climate of Asia.

- Location of the continent
- Area
- Altitude above mean sea level
- Nearness to ocean
- Location of mountains
- The course of the monsoon

Get to know about the climatic regions, their peculiarities, the places where they are experienced and the natural vegetation of Asia from the given table.

Asia: Resources and Distribution of Population

Forest Resources

Tall and large trees grow densely in the equatorial regions of Asia. The type of vegetation varies depending upon the

variations in rainfall. Evergreen and semi evergreen forests grow in regions which have the influence of monsoons and cactus type of vegetation grows in the desert regions. Observe table 3.1 and prepare a note on the various types of vegetation of Asia.

Asia: Climatic Characteristics and Natural Vegetation

Climatic Regions	Climatic Characteristics	Places Experiencing	Vegetation
Tropical Climate	• High temperature throughout the year • Convectional rainfall with thunder	East Indian Islands, Malaysia and Indonesia	Rubber, Mahagony, Rosewood
Monsoon Climate	• Cold and dry winter • Summer with intermittent heat and rainfall	India, Myanmar and South China	Teak, Sandal wood, Peepal, Bamboo
Desert Climate	• Low rainfall ,dry climate with high and low temperatures	Middle Asia, Arabia and Thar desert of India	Grasses and Cactuses
Temperate Grass lands	• Moderate rainfall, high temperature and cold	Central Asian Deserts, their north and north western regions	Oak, Camphor
Moderate cool Climate	• Winter season with high cold and less rainfall	Northern Asia	Grasses
Tundra Climate	• Excessive cold and covered with snow throughout the year	Northern most regions of Asia	Algae
Mediterranean Climate	• Mild temperatures, and winter with a fair amount of rainfall • Summer with high temperature	Israel, Turkey, Jordan, Syria and western Asia	Fruits like orange and grapes and olive

Table 3.1

Agriculture

This continent having mountains, plateaus, deserts and dense forests, experiences water scarcity in many regions. Most of the people of Asia depend on agriculture for livelihood. China, the largest producer of rice in the world is in the continent of Asia. Various crops like wheat, pulses, oil seeds, cotton, jute, rubber, tea, coffee etc. are cultivated in different parts of Asia.

Mineral Resources

Asia is a storehouse of various minerals. Hence mining is a major occupation in Asia. About 90% of mica produced in the world is mined from Asia. In addition to this, minerals such as monazite, tin, tungsten, iron ore, manganese, bauxite, gold, silver etc. are also mined in Asia. Asia also has large deposits of coal and petroleum.

Distribution of Population

Asia, the largest continent in the world is also the continent with the highest population. About 60% of the world's population lives in Asia. It is also a continent with diverse distribution of population. The Ganga Valley, the Yangtze -Tsikiang Valley, Java Island of Indonesia, Singapore,Japan etc. are regions with a high density of population. Moderate population is found in the coastal regions of Turkey, Southeast Asia and in some Arabian countries. But population is sparse in the central Asian deserts, southwest Asia and northern Russia.

A Continent with Diversities

Asia is a continent marked by diverse geographical characteristics. Find out the following.

- The highest peak in the world
- The lake found in the highest place on the earth.
- Region found below the sea level
- The place that receives the highest amount of rainfall in the world

Identify more diversities and prepare a note on the topic, 'Asia: A Continent of Diversities'

Europe

The continent got its name from 'Europa', the name of the daughter of Prince Phoenix of the Greek story. What could be the reasons for this?

- Large scale trade
- High density of population
- Absence of hot deserts
-

Location

Europe is a continent located fully in the northern hemisphere. It is situated between 34°51' N and 81°47' N latitudes and 24°33'W and 69°03' E longitudes.

Locate Europe on the world map and mark its latitudes and longitudes.

The total area of Europe, which is surrounded by oceans on three sides, is 10,49,8000 sq.km. As a common region Europe and Asia are together known as 'Eurasia'.

Find out the answers for the following with the help of an atlas.

- Which is the mountain range located on the eastern side of Europe?
- Which is the ocean located on the western side of Europe?
- Which are the five countries known as the 'Scandinavian Countries'?

Physiography

Europe is a continent with many mountains and vast plains. More than half of Europe lies at an average height of 200m above the sea level.

Europe has been divided into the following physiographic divisions.

- The North Western Mountain Region
- The North European Plains
- The Central Uplands
- The Alpine System

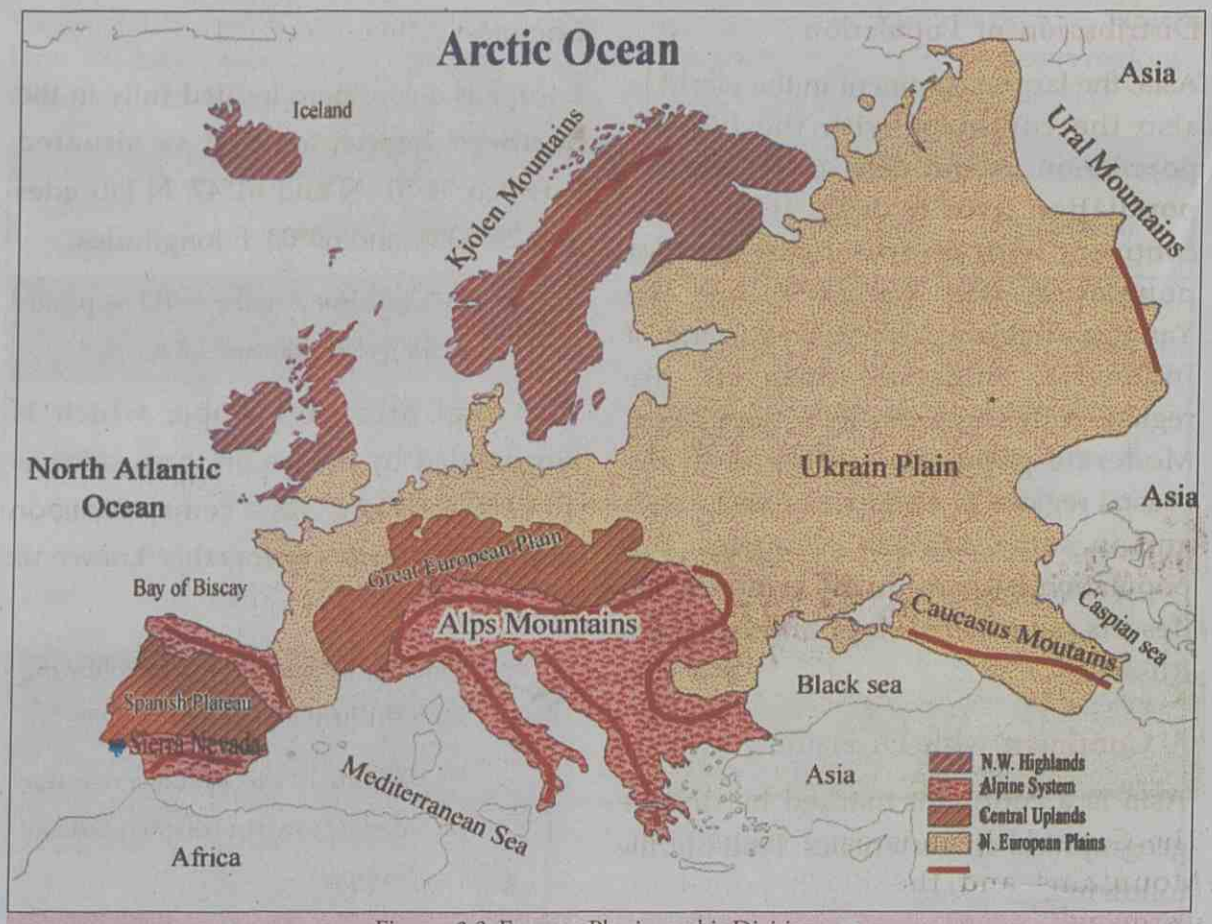


Figure - 3.3: Europe - Physiographic Division

The North Western Mountain Region

The region extends from Finland to Sweden, Norway, the British Isles comprising Britain and Ireland and Iceland. The topography of this region as seen today is the result of the process of weathering and erosion by glaciers over a long period of time. The oldest mountains of Europe are found in this region. The north western mountain region which is rich in mineral resources has limited deposits of coal and petroleum.

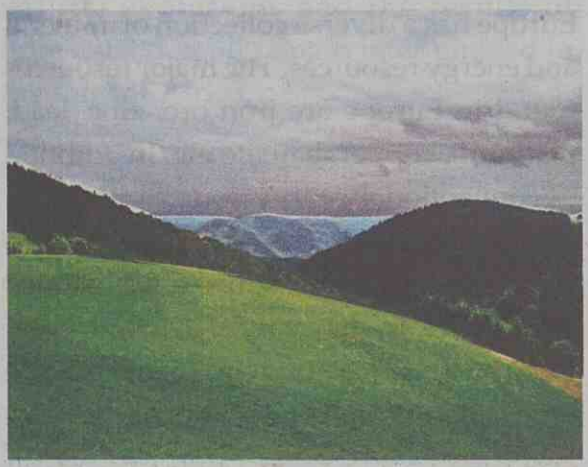
The North European Plains

This is a vast plain which covers almost half of Europe. It extends from the Atlantic coast in the west to Ural Mountains in the east. These plains are formed by the deposits of rivers. Holland, Belgium, Denmark, western France, northern Germany and Poland are the major countries situated in the Northern European Plains.

With the help of an atlas identify the major rivers flowing through this region.

The Central Uplands

This region includes the mountains, hills and plains lying between the North European Plains and the Alps Mountain ranges. The mountains in this region have an average altitude of 1600 m above the sea level.



The Central Uplands include the Ural Mountains and the Black Forest of Germany.

The Alpine System

The Alpine System includes mountain ranges extending from the Atlantic Ocean in the west to the Caspian Sea in the east. Parallel fold mountains are the peculiarities of this region.

Climate

The following are the major factors controlling the climate of Europe.

- Physiography
- Nearness to oceans
- Planetary winds
- Ocean Currents

Europe has been classified into the following five climatic divisions.

- West European Type
- Continental Type
- Mediterranean Type
- Taiga Type
- Tundra Type

West European Type

This is the climatic type of western coastal regions. This includes countries like Ireland, Britain, Denmark, Holland, Belgium and northern Spain.

Planetary winds and ocean currents are the factors that control the climate of this region. Identify them and prepare a note.

Continental Type

This type of climate is experienced in East-Central Europe. Since this region is located far away from the oceans, winters are very cold here. A low amount of rainfall is received during the summer season.

Mediterranean Type

This type of climate is experienced around the Mediterranean Sea in the southern Europe. Countries experiencing mediterranean type of climate are Portugal, Spain, southern France, Italy, and Greece. Since it is a moderate climate, it is highly suitable for the cultivation of fruits. Olives, oranges and lemons grow abundantly here.

Taiga Type

The Taiga type of climate experienced in northern Europe extends from 50° N latitude to the Arctic Circle. Countries like Norway, Sweden, and Finland come under this region. This region where trees like pine and fir grow is utilized by Eurpoe for the requirement of timber.

Tundra Type

This type of climate is found in the extreme north of Europe. This region is covered with snow throughout the year. Because of the severe cold only plants which can withstand this could survive in this region.

Resources

Agriculture

Only one third of the total geographical area is used for cultivation. A small portion of the people of Europe are engaged directly or indirectly in agriculture. Different types of food crops, fruits and flowers are cultivated here. Many crops like wheat, barley, oats, sugar cane etc. are grown here. Cattle rearing is one of the main occupations of the people in different parts of Europe.

Fishing

Europe is a continent which has the most favourable geographical conditions for fishing. The following are the some of them.

- A lot of bays
- Confluence of ocean currents
- Presence of planktons

All these help in fishing. One fourth of the fish produced in the world is from Europe. Fishing is done using modern machinery. Dogger Bank, Norway, Sweden, Denmark, France, Britain, Germany, Holland etc. are the major fishing centres of Europe.

Mineral Resources

Europe has a diverse collection of mineral and energy resources. The major resources found in Europe are iron ore, zinc, lead, platinum, copper, bauxite etc. In addition to conventional energy sources like coal, petroleum and natural gas, non-conventional energy sources like atomic and hydel energy are also used here. Europe is far ahead in terms of the production of non-conventional energy.

Industries

Europe has many industries. Iron and steel industry, wool industry, technological industries like automobile manufacturing, ship building, chemical industries, paper manufacturing etc. are widespread in Europe. Ruhr Basin in Germany, which has the fifth position in the world in the production of iron and steel, is in Europe.

Human Life

Europe has the third position in the world in terms of total population and the first position in terms of population density. Rhine Valley, Holland, Belgium, Britain etc. are densely populated regions. Norway, Sweden etc. are countries with very low density of population.

Africa

"Nile is an epic poetry."

Evolutionary history right from the period of creation lies entangled on both the banks of the 4000 mile long Nile River. Exciting remains of ancient civilizations, achievements of modern civilization, natural evolutions and the results of human labour, all remain intermingled in the soils of Africa.

This huge river embraces deep forests where the sun's rays do not penetrate to the surface, vast stretches of scorching desert land, islands of grass and modern cities on its way to the Mediterranean Sea. There is no other river valley in the world which represents such diversities in human race and animal wealth.... When viewed from the banks of the River Nile, the sunset on the red hills beyond the grey grasslands is an unforgettable sight."

The portion given above is the description of the beauty of the River Nile in the travelogue 'Nile Diary' by S.K. Pottakkad.

Let us examine the peculiarities of Africa through which flows the longest river in the world (6738 km). The River Nile is described as the 'Life blood of Egypt."

Africa has the second position in the world in terms of its area. Almost all the sides of Africa are covered with oceans and seas. Africa is the continent having the largest number of countries, with about 59 countries including the Madagascar Island. Till the end of last century the interior of the African continent was a mystery to the outside world. Hence Africa is known as the 'Dark Continent'.

Location

Africa spreads on both the hemispheres. It is located between 34°52' S to 37°31' N latitude and 25°11 W to 51°24' E longitude. The equator divides this continent into two equal halves. The area of African continent is 3033500 sq. km.

Answer the following with the help of the world map and an atlas.

- Which is the strait that separates Africa from Europe?
- Which are the major latitudes that pass through Africa?
- Which is the ocean on the western side of Africa?
- Which is the largest lake in Africa?
- The desert seen on the northern side of Africa?
- Which is the canal that separates the African continent from the Asian continent?

Physiography

The physiography of Africa is classified as follows.

- Plateaus
- Mountains
- Deserts
- Rift Valleys

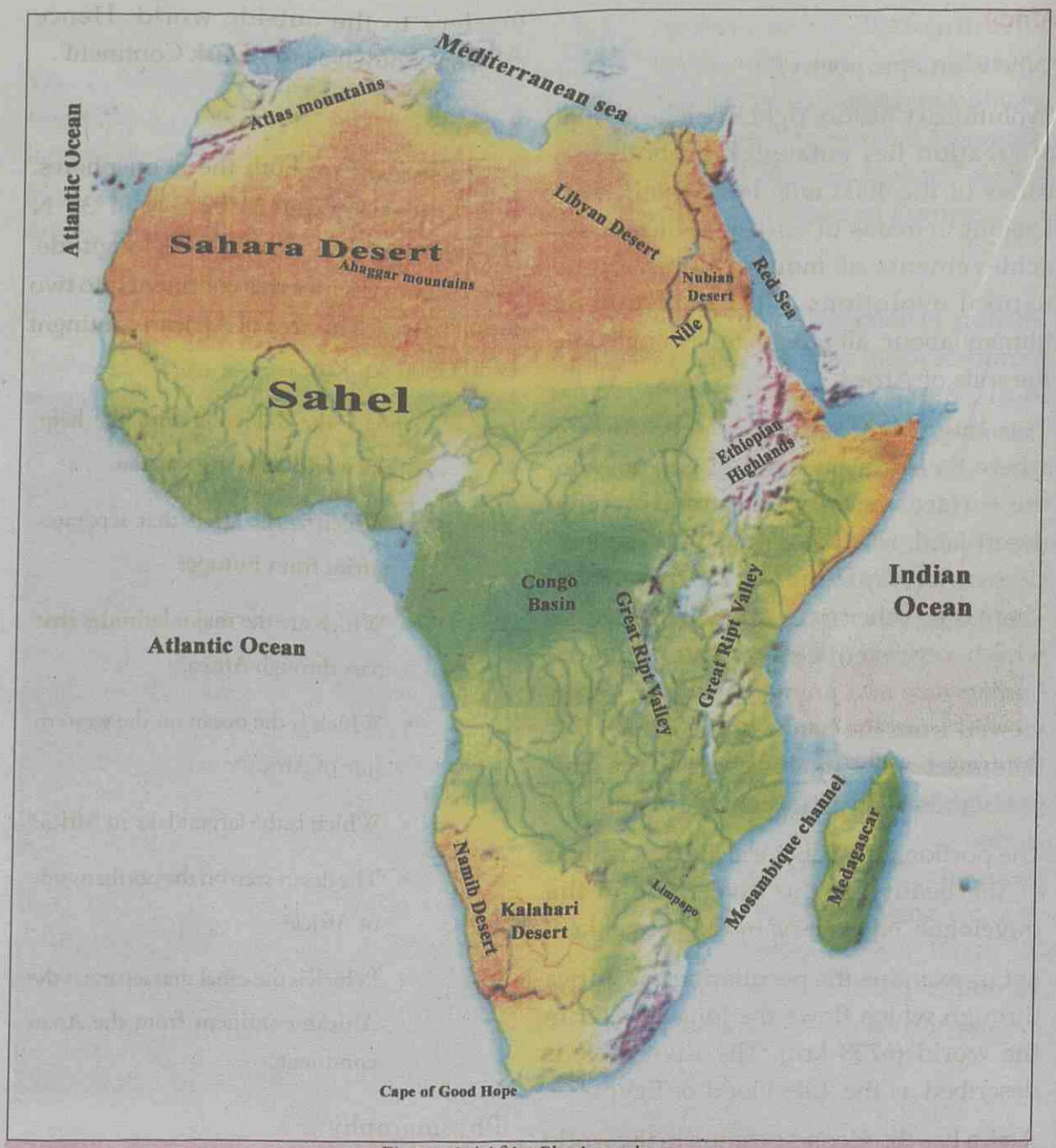


Figure - 3.4 Africa Physiography

Plateaus

Generally Africa consists of plateaus made up of hard rocks and narrow coastal plains. The average height of the plateaus is over 600 m above the sea level. It can be seen that the altitude of the plateaus decreases from south to north.

With the help of an atlas prepare a table showing the plateaus of Africa.

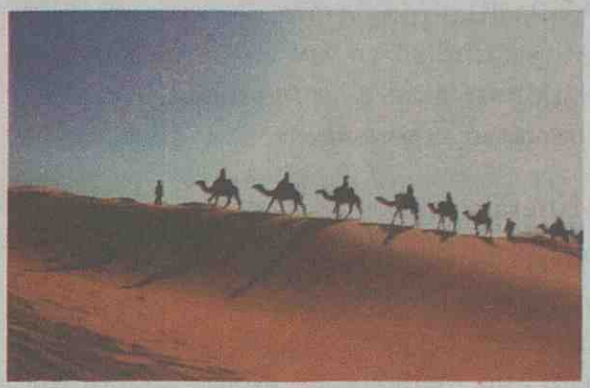
Mountains

Mountains are relatively few in the continent of Africa. Some important mountains are found in the plateaus and

deserts. The highest peak in Africa is Mt. Kilimanjaro. This is situated in Tanzania of East Africa. In addition to this, Atlas, Kenya, Ruwanzari etc. are other major mountain ranges of Africa. Ruwanzari is also the source of the Nile River.

Deserts

Deserts are seen on the northern and southern sides of Africa. One third of



Africa is covered with deserts.

Prepare a table showing the major deserts of Africa and the countries in which they are situated.

Rift Valleys

Another major landform in Africa is the Rift Valleys. Rift valleys are formed when the region in between two fault zones subsides. The Great Rift Valley is a major rift valley in Africa.

Rivers

The longest river in the world, River Nile originates from the tropical rainforests of Africa. In addition to the River Nile, the River Congo which has many tributaries flows through the middle of Africa.

With the help of an atlas identify the countries through which the River Congo flows.

Climate and Natural Vegetation

Hot climate is generaly experienced in the continent except in its north and south ends. When the countries in the northern hemisphere of the African continent experience a cold climate, most of the countries of Africa in the southern hemisphere experience a hot climate.

Africa is divided into the following climatic regions.

Equatorial Climate

This climate is experienced in the places on both sides of the equator. These regions experience hot and humid climate throughout the year. Mahogany, rosewood, and ebony are the major trees found in this region.

Savanna Climate

This climatic region known as tropical grasslands has hot and humid climate during summer and cold and dry climate during winter. These grasslands containing tall grasses is known the 'Velds'.

Desert Climate

This climate is experienced in places where the evaporation is more than the rainfall. The places situated in the high pressure areas on both the hemispheres have dry climate throughout the year.

Midlatitude Temperate Grassland Climate

This region, which experiences summer and winter alternatively, receives relatively less rainfall. This type of climate occurs in the southeastern portions of the South African plateau.

Mediterranean Climate

This climate with rainfall in winter and drought in summer is experienced in the north and southwestern parts of Africa. Trees like olive, mulberry, cork etc. grow abundantly in this region.

Mountain or Highland Climate

This type of climate is experienced in the mountainous regions in the eastern portion of the African continent and in Ethiopia.

China Type Climate

This type of climate is found in the south eastern part of Africa. Summers are very hot and humid and winters are dry.

Resources

Forest Resources

One fourth area of the African continent is dense forest. Dense forests containing many types of trees and wild animals are the peculiarity of Africa.

Agriculture

Since most of the places in Africa are deserts or dense forests, areas suitable for agriculture are very less here. But available agricultural land is utilized to the maximum. Old agricultural practices are followed mostly. Agriculture using modern machinery is practiced in South Africa, the Nile Delta of Egypt and in the coastal areas. Africa produces many crops like rice, wheat, cotton, coffee, tea etc. Fruits like pineapple, lemon, orange, grapes and olive are cultivated in the regions where Mediterranean type of climate is experienced.

Minerals

Africa is blessed with many types of minerals. The major minerals mined in Africa are copper, gold, platinum, iron ore, lead and manganese. About 25% of the uranium and copper produced in the world is from African countries like Zambia, Zimbabwe and Zaire. The African continent is the leading mining centre of diamonds in the world. The Kimberly region of Africa has the first position in diamond mining.

Population Distribution

Even though Africa has one fifth of the total geographical area of the world, its population is comparatively less. One tenth of the world's population live in Africa. Since most of the places in Africa are deserts or thick forests, the population here is less. Population is more in the coastal areas, river valleys, mining centres and the elevated regions of east Africa.

ANTARCTICA

Antarctica known as the 'White Continent' is the only continent in the world where there are no permanent inhabitants. The area of Antarctica, which has the fifth position in terms of its size, is about 14000000 km. The highest peak in this continent is the 'Vinson Massif'.

Physical Characteristics

Most of Antarctica lies 2100-2400 m above the sea level. Antarctica is divided into two - East Antarctica and West Antarctica. East Antarctica is a snow covered plateau. But the comparatively small West Antarctica is seen as broken up into thousands of snow covered islands. East and West parts of Antarctica are covered with ice slabs of about 2000 m thickness. Even though they are snow covered, active volcanoes are found in the Scotia Islands of Antarctica.

Climate

The climate of Antarctica has many peculiarities. Very cold blizzards and the 'white deserts' covered with closely spaced snow hillocks are the characteristics worth mentioning. Temperature in Antarctica falls as low as -85°C during winter seasons. This has given Antarctica the, title, 'the coldest continent of the earth'. The temperature of -89.2°C, recorded at the Russian observation centre Vostok on 21st July 1983, remains the lowest ever recorded temperature on the surface of the earth. Only the observation centres of various countries working in Antarctica record temperature continuously on all seasons. Antarctica experiences long days and nights. The average temperature of Antarctica is -49°C

- Which is the period when the length of day time is more in Antarctica? Why is it so?
- Which is the period when the length of night time is more in Antarctica? Why is it so?

Flora and Fauna

Antarctica has only a few species of plants which can withstand very high cold condition. Long nights and very tough winters act as hindrance to photosynthesis. The soils of Antarctica are not fertile. But they are not barren. Green mosses and algae are found in Antarctica. More than 200 species of mosses and 700 species of algae have been identified in Antarctica. Diverse marine organisms and rare species of birds are also found in Antarctica. Penguins, skewva, and petrel are the major birds found abundantly in Antarctica and the neighbouring islands. Marine organisms are the food for the birds. The Antarctic Ocean is the store house of planktons which are the primary source of food for marine organisms. Hence most species of whales, seals, fishes and sea birds are found in the Antarctic Ocean.

Resources

The presence of abundant ocean resources is the reason for drawing human attention to Antarctica. Seals were hunted for leather and whales for oil. Now whale hunting has been banned in all the oceans south of Australia. Fishing has been increasing in the oceans around Antarctica for the past thirty years. Besides marine resources mineral deposits are also found in Antarctica. Deposits of iron ore, chromium, copper, gold, nickel, coal etc. are found here.

Human Life

Unlike in other continents there are no permanent human settlements in Antarctica. Permanent stations for research purpose have been established here by many countries. Tourists have been visiting Antarctica in specially designed ships during summer season since 1950. Adventurous pilots also reach here. The absence of settlements and ports have been a hindrance to the development of tourism.

India's Explorations

India became part of Antarctic explorations in 1979. India has established two research centres, Dakshina Gangotri and Maitri in Antarctica. For facilitating communication among the scientists, India in 1988 established the first post office outside India in Antarctica in 1988. This functions under Goa Postal Division. Research activities focusing on various aspects of Antarctica such as its geography, biology and climate are being carried out by the research stations of India.

Follow up activities

1. Prepare a note on Asia, Europe, Africa and Antarctica. The note can include
   - Countries in the continent
   - Their capitals
   - Their currency
   - Cultivated crops
   - Mineral resources
   - Language
   - Industries
   - Tourism
2. Analyse how suitable is the title 'The Continent of Diversities' and arrive at your conclusion as to how far this title is suitable for Asia.
3. Write a description on the role of physiography of Europe in its growth in the fields of science and technology, and industry.
4. Analyse the relationship between the physiography and the development of Africa and note down your findings.
5. Collect information and pictures about the continent Antarctica, known as the 'White Continent', its distinct climatic features, India's Antarctic explorations etc. and conduct a seminar in your class.
6. Compared to Africa Europe's potential for fishing is higher. What could be the reason for this?
7. What influence has the latitudinal location of Antarctica exerted on its climate, flora and fauna? Explain.

4

INDIA - PHYSICAL GEOGRAPHY

Haven't you understood that India is a nation known for its cultural diversity. In what cultural aspects can these diversities be seen?

- Language
- Architecture
- Dress
- Crops and farming
- Festivals
-

What could be the reason for these wide cultural diversities? Let us have a look at the cultural diversities of India and its reasons.

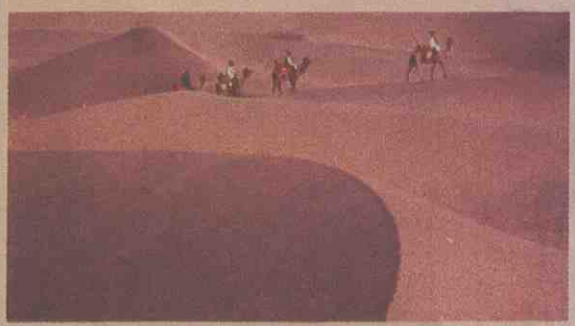
Jammu & Kashmir

People wear thick woollen clothes during day and night. Houses with provisions for fire places, people with the habit of consuming faty food to regulate the body temperature. High altitudinal places with less rainfall are covered with thick snow because of heavy snowfall.

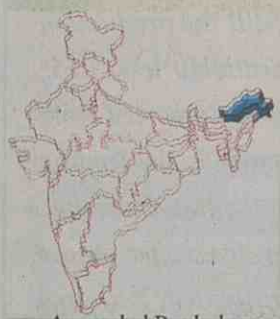
This is the picture of the life of the people in the Ladakh region of Jammu & Kashmir, which is known as 'Cold Desert'. The day temperature in summer in this mountainous region is 0°C to -5°C and the night temperature is less than -30°C. But in winter it will always be below -40°C. People here rear yak and sheep for milk and meat. Beans, turnip, barley, potato etc are grown in summer. Since winter is very harsh they use this time for festivals and rituals. Apple, apricot, walnut etc are grown in many parts of Ladakh. The main occupations in Ladakh which has many mountains, valleys, grass lands and glaciers, are cattle rearing and tourism.

Rajasthan

Sand spreads over distances that human eye cannot see. The fast blowing loo winds. Day temperature above 45°C. People cover their faces with thin cotton shawls to escape from these. The rural folk travel with



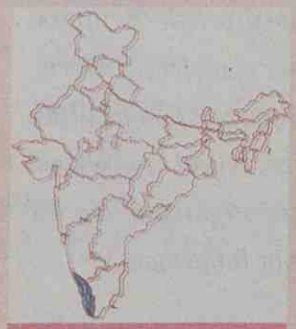
more than one pot for long distances to collect drinking water. They live in flat roofed houses with small windows and thick walls to escape from the scorching heat during day time and biting cold during night. These are the scenes of the deserts of Rajasthan. Bush and thorny vegetation like cactus grow in these areas characterised with hot summer, cold winter and low rainfall. Camels are the main vehicles for gypsy people Banjjars. Oasis is the main source of water in deserts. As a result of providing irrigation facilities crops like bajra, maize, wheat, pulses, oil seeds, cotton, tobacco, sugarcane etc are grown in many parts of Rajasthan.



Arunachal Pradesh

The state where around fifteen regional languages like Monpa, Aka etc exist. The state with two third of its area under forest has a population density of thirteen people per square kilometre. The majority of the population of the state characterised by mountains and hills are aborigines. There are more than 20 aboriginal tribes in this state and each of these tribes has their own dialects, customs, festivals, cultures and life style.Jhumming is a form of cultivation of this state where the main stay of economy is agriculture. This is a practice where the forest is

cleared and cultivated for two or three years and then people leave that place in search of new areas for cultivation. Rice, wheat, maize etc are grown in different parts of the state. Hunting and gathering of forest resources are other major occupations. These are the characteristics of Arunachal Pradesh which is qualified as 'Land of rising sun'.



Kerala

This state which has less land area, and the density of population more than the national average, stands 12th in population. Leading producer of rubber and spices. Fertile soil and ample rainfall help in the luxuriant growth of vegetation. Has a distinct physiographic division into Highland, Midland and Lowland and blessed with a pleasant climate. The State known as 'Land of Biodiversity' has many backwaters and estuaries in the coastal areas, waterfalls, hill resorts, forests and wild life sanctuaries in the highland. In a state where tourism is one of the sources of income, many of the world's famous tourist attractions are found. This tropical area has a moderate climate due to its nearness to sea. Forty four rivers flow through this state. These are the peculiarities of our state known as 'Land of Coconut Trees' and 'God's Own Country'. Agriculture has got much significance in the economy of Kerala. Still the production of food grains is comparatively less. Rice, which is the staple food, is imported from neighbouring states. Kerala is the leading producer of rubber in India. Coconut, tapioca, plantain, ginger, tea, coffee etc are the other major crops cultivated. Hundred percent literacy, low infant mortality rate and high life expectancy are the other peculiarities of Kerala.

You might have noticed four states of different parts of India and the life of the people there.

- Do such diverse lifestyles exist in other parts of India?
- Let us see the reasons for the formation of varied lifestyles and cultures in these States.
  - Location
  - Physiography
  - Rivers
  - Soil
  - Vegetation
  - Climate

These diversities in physical features result in local variations in the lifestyle and culture. Shall we have an enquiry into India's physical diversity and its impact on the lifestyle of people?

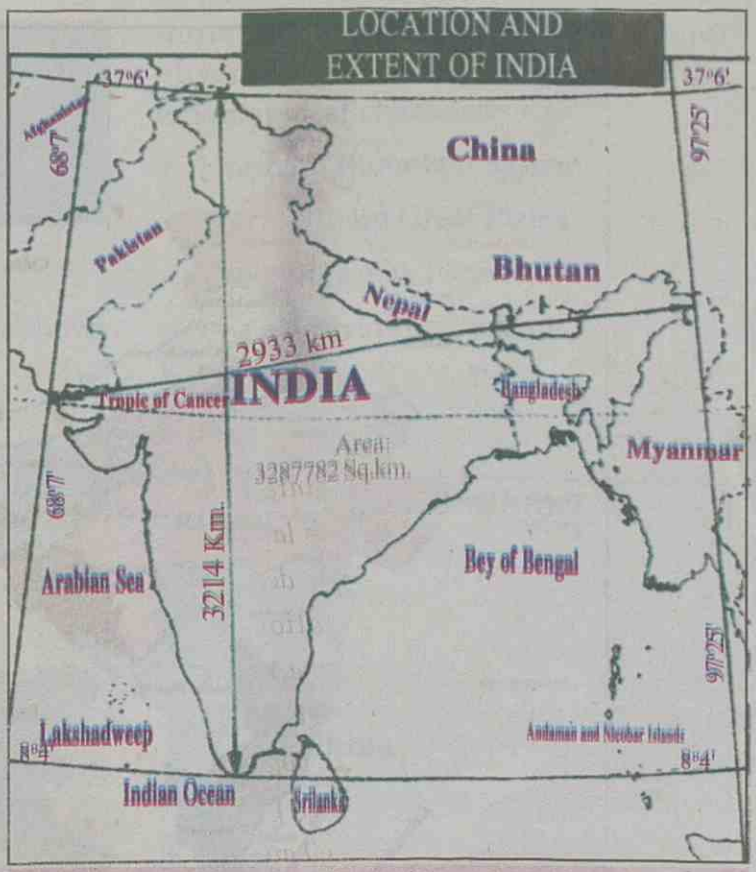


Figure - 4.1

India: Location

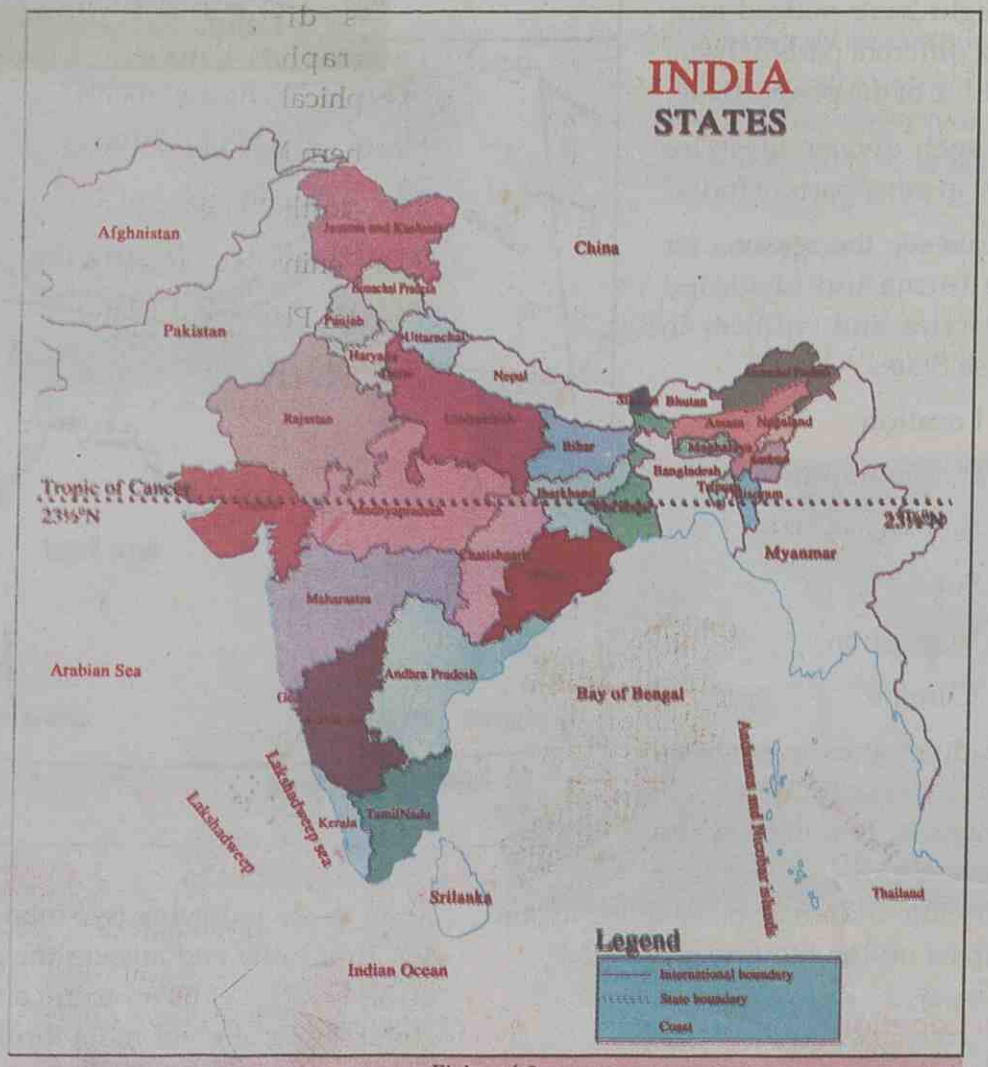
You might have understood from the earlier unit as to which continent India to belongs to. Find out the hemisphere where India is located and other countries in the Indian sub-continent.

Sub-Continent

Sub-Continent is the land area separated from the main land with distinct geographical characteristics. The sub-continent's physiography, climate, people's culture etc will be different from that of the main land.

Analyze the following two maps (Fig. 4.1 & 4.2) of India and answer the questions given below. Let us try to get a clear idea about the location of India through this.

- Latitudinal and longitudinal extent of India
- Total area of India
- North-South and East-west distances of India
- The important latitude that passes through India and the states through which it passes
- India's neighbouring countries (Countries which share land frontiers and in the ocean)
- Oceans that surround India
- The strait that separates India and Sri Lanka
- States which have the international boundary



Figire - 4.2

- States which have ocean frontiers
- States which have only state boundaries

Peninsula

Peninsula is the land area covered with ocean on three sides. Peninsula is also defined as the land area protruding towards the ocean from continents. The Indian Peninsula is the land area protruding towards the Indian Ocean from the south side of the Indian Sub-Continent. The portion of the Indian Ocean on the east of the peninsula is called Arabian Sea and the west is called Bay of Bengal.

The land frontier of India which has the 7th position in the world in terms of its length is 15200 km and the ocean frontier has a length of 6083 km. If the coastlines of islands are also included, the length of the coastline of India would be 7517 km. India is divided into 28 States and 6 Union Territories for administrative convenience, based on languages and cultures. In addition to this Delhi has been given the status of the National Capital Territory.

Prepare a table showing the States and Union Territories of India and their capitals with the help of maps (Fig. 4.1) and atlases.

India - Physiography

Look at the given map (Fig. 4.3). It shows the physiography of India.

India is divided into four major physiographic zones based on the topographical characteristics.

- Northern Mountain System
- The Northern Great Plains
- The Peninsular Plateau
- Coastal Plains and Islands.

Figure - 4.3

Northern Mountain System

The Northern Mountain System is a physiographic zone which has a great influence on the Indian Peninsula and its people. Containing tall snow covered peaks, beautiful valleys and rivers, this region is a traveller's paradise.

Find out with the help of maps (Fig. 4.2, 4.3) the location of the Northern Mountain System and the States where it lies.

Let us see how the Northern Mountain System greatly influences the culture and lifestyle of the people of India.

- The world's highest mountain system, the Himalayas which conspicuously separates the Indian Sub-Continent from the Asian Continent, helped India from foreign invasion and the development of its own culture.
- Protects the north Indian States from severe cold by preventing the cold winds blowing from north Asian regions. Moreover, it enables more rainfall in the sub-continent by obstructing the monsoon winds.
- Covered with large glaciers and ice fields it is a major source of water throughout the year due to many perennial rivers. Indo-Gangetic Plains formed by the alluvial deposits of these rivers is one of the most densely populated places in the world.
- Many forest products are obtained from the forests found in the hill slopes. Many rare species of animals are also found in these forests.
- The Northern Mountain System with tall peaks and beautiful natural scenery attracts many foreign tourists and mountaineers. Tourism is an important source of the income of this region where many tourist places are located.
-

The Northern Mountain System is further divided into three based on the mountain ranges present there.

1. **The Himalayan Ranges**
2. **The Trans-Himalayan Ranges**
3. **The Eastern Hills**

Identify the major mountain ranges of Northern Mountain System from the given map (Fig. 4.4)

The Himalayas

From the mountain ranges you have found out, the Himalayas are the region which includes Himadri /Greater Himalayas, Himachal / Middle or Lesser Himalayas, and Siwalik / Outer Himalayas. These three parallel fold mountains lie in an arch shape in the east-west direction for a distance of about 2400 km. Covering an area of about 5 lakh sq.km and containing many of the world's highest peaks, this

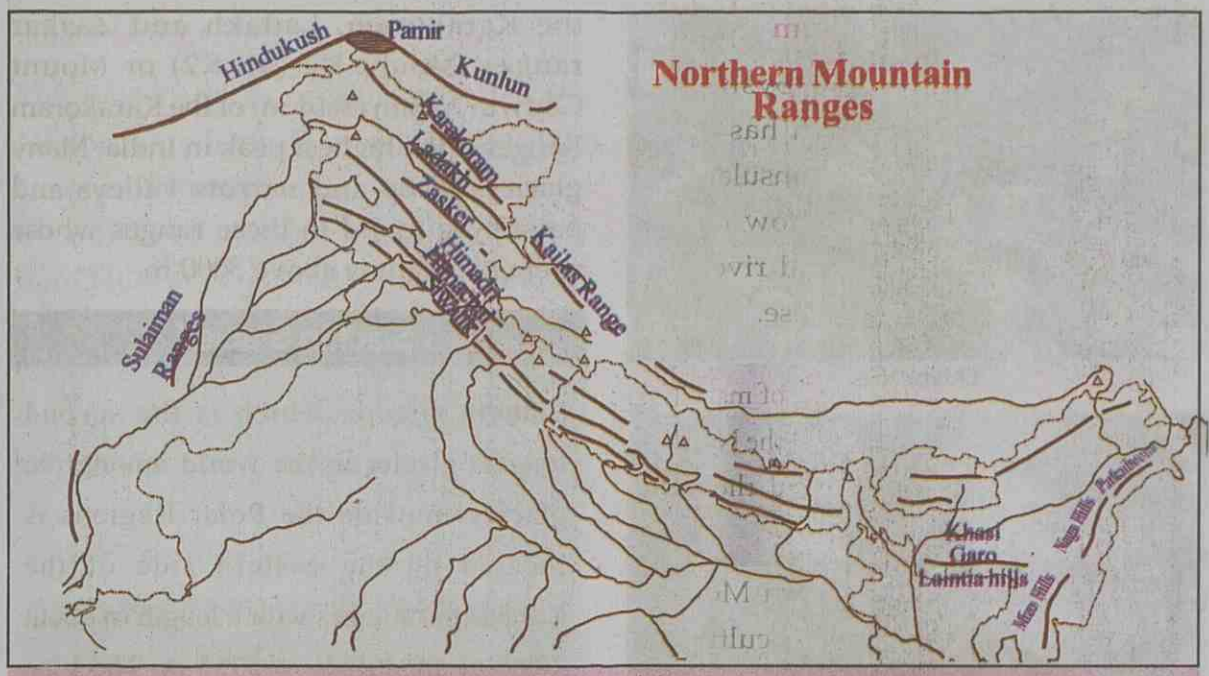


Figure - 4.4

region has a width of 400 km in Kashmir. But in Arunachal Pradesh it has only 150 km. width. Let us see the characteristics of Himadri, Himachal and Siwalik Ranges.

The Himadri

They are the highest mountain ranges in the Himalayas and can be described as the 'Backbone of Himalayas'. It is always covered with snow throughout the year since the average altitude of this range is over 6000 m. It is inhospitable because of the severe cold throughout the year. Kanchen Junga (8595 m) and Nanga Parbat (8216 m) are some of the major peaks in this range. The presence of many natural passes which enables to traverse the mountains is the peculiarity of this region.

The Himachal

The Himachal is the mountain range lying between Himadri and Siwalik with lesser height than Himadri (average height 3000m). The beautiful valleys Kashmir, Kulu and Kangra and hill resorts like Mussourie, Shimla, Nainital, Darjeeling and Almora are located here. People from the plains come to these places to get relief from severe heat during the summer season. Rohtang Pass in Himachal

Passes

The natural gaps in the mountain ranges which help to traverse the mountain without much difficulty are known as Passes. The major Passes in the Northern Mountain System are Karakorum Pass (Jammu & Kashmir), Zojila Pass (Jammu & Kashmir) Shipkila Pass (Himachal Pradesh), Bodila Pass (Arunachal Pradesh), Nathula Pass (Sikkim) and Jhelepla Pass (Sikkim). In addition to this, the Khyber Pass which connects Pakistan and Afghanistan and the Bolan Pass in Pakistan are important passes in the Indian sub-continent.

Deodar Trees

Pine Trees

Pradesh is the main pass in this region. Trees like oak, pine and deodar are found in the thick forests of the Himachal Ranges. Since climate is favourable for agriculture, fruits like apple, apricot etc and tea are cultivated here.

The Siwalik

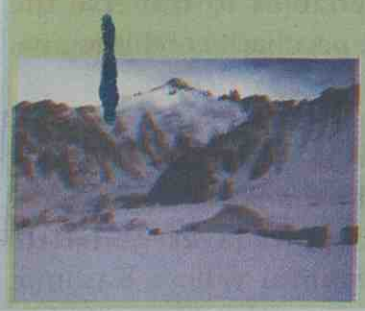
The Siwalik ranges are the southernmost ranges of the Himalayas with less height. Thick forests and many wild lives are found on the slopes of the Siwalik ranges. Rice, potato and maize are cultivated in many places of Siwalik whose average height is only 1220 m. Terraced cultivation is the peculiarity of this region. Cattle rearing is also another occupation of the people here. Long and broad valleys are seen across these ranges. They are known as 'Dunes'.

The Trans-Himalayan Ranges

The Trans-Himalayan ranges are situated on the north and north east portion of Jammu & Kashmir. This region comprises the Karakoram, Ladakh and Zaskar ranges. Mount K2 (Mt.K2) or Mount Godwin Austin (8661 m) of the Karakoram Ranges is the highest peak in India. Many glaciers, deep and narrow valleys and passes are found in these ranges whose average height is above 3000 m.

Siachin Glacier

Siachin Glacier which is the second longest glacier in the world among the glaciers outside the Polar Regions is located on the eastern side of the Karakoram Ranges with a length of about 70km at an altitude of 5753 m. The Line of Control between India and Pakistan is on the east of this glacier and the Pass Indira Col is found in the north. Siachin, which is also known as 'Third Pole', has the world's highest helipad, that is constructed by India. 'Sia' in Balti language means rose, and 'Chun' means abundance. In Siachin, which means 'Abundance of Roses', the world's highest Battle Field is found. All the parts of Siachin Glacier are under the control of India. 'Nubra' is the river originating from the Siachin Glacier. It joins the river Shyok which is a tributary of the river Indus. Studies have shown that recently Siachin Glacier melts unprecedently due to the impact of global warming.



The Eastern Hills

The Eastern Hills or 'Purvachal' of the Northern Mountain System include Khasi, Garo, and Jainthiya Hills of Meghalaya, Mizo Hills of Mizoram, Naga and Patkai Bum Hills of Nagaland. They are known as hills because the average height of this region is only less than 900 m. This is a region of undulating topography and thick forests. Many streams originate from this region which receives the highest amount of rainfall in the world.

Regional Division of the Himalayas

Sir Sydney Bernard divided the Himalayas into four, based on the drainage basins.

- The Punjab Himalayas: the region between the River Indus and the River Sutlej (About 500 km. long)
- The Kumaon Himalayas: the region between the River Sutlej and the River Kali (About 320 km long)
- The Nepal Himalayas: the region between the River Kali and the River Tista (About 800 km long)
- The Assam Himalayas: the region between the River Tista and the River Brahmaputra. (About 750km long)

Prepare a flow chart showing the divisions and peaks of the Northern Mountain System

Soil Types of the Northern Mountain System

'Mountain soil' is the major type of soil found in the Himalayan and the Trans-Himalayan regions. This soil contains rich humus content and its colour varies from dark brown to black. Since weathering is high in steep upper slopes of mountains, the soil depth is shallow while the valleys have comparatively deep rich fertile soils. This soil is suitable for the cultivation of wheat, barley, maize, spices, tea, coffee and fruits like apple, apricot etc. In addition to this the Eastern Hills also have red soils and laterite soils.

Rivers of the Northern Mountain System

Rivers have played a major role in shaping India's culture. Rivers originating from the Northern Mountain System are known as Himalayan Rivers.

Find out from the given map (Fig. 4.5) the rivers originating from the Himalayas.

- Indus
- Sutlej
-

The Indus, the Ganga and the Brahmaputra are the major Himalayan rivers that you have found out. Let us see the characteristics of Himalayan Rivers.

- They are perennial since they receive water from rainfall and snow and have an extensive catchment area.
- Since they flow through areas with steep slopes and most part of the

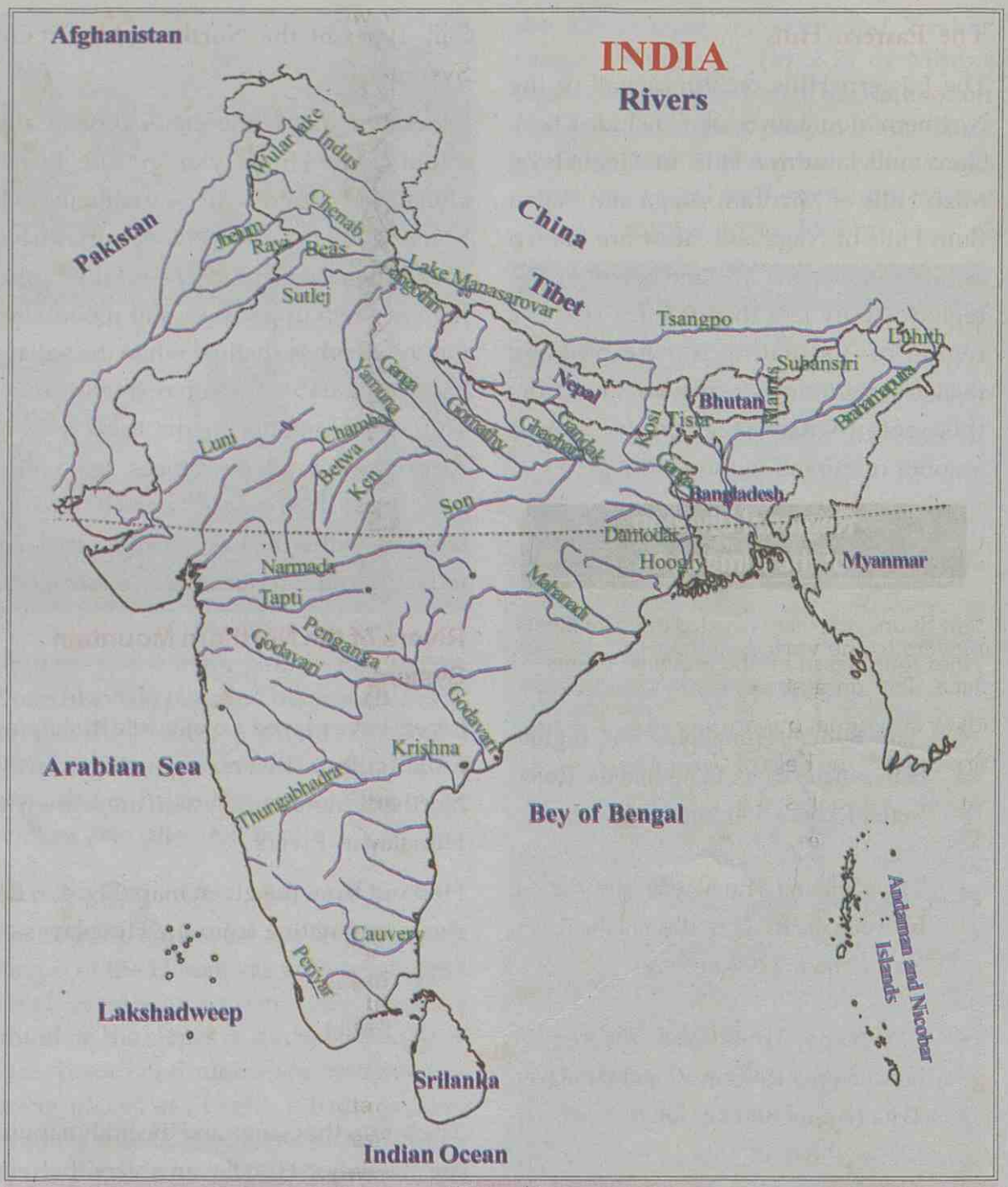


Figure - 4.5

Himalayas have sedimentary rocks, erosion is more and as a result, these rivers develop deep narrow valleys.

- They have huge potential for inland navigation in plain areas.
-

River Indus

The Indus is one of the largest rivers of the world. It originates at an altitude of 5180 m from the glacier in the Kailas Ranges near the Manasarovar Lake in Tibet. It has a length of about 2880 km. of which only 709 km is in India.

Find out the countries through which the River Indus flows from the given map (fig. 4,5) and identify the country through which the major portion of the river flows.

The Indus River

It flows in a north-west direction from its source through Tibet and enters India through the south-east part of Jammu & Kashmir. The river flows through the Ladakh and Zaskar Ranges and creates deep gorges when it reaches Gilgith crossing Ladakh and Baltistan of Jammu & Kashmir. The river which has a great influence on the culture and lifestyle of the people of Jammu & Kashmir, turns south near Chillar in Jammu & Kashmir and enters Pakistan. It flows through the Attock hill region of Pakistan and reaches the plains. Its major tributaries Jhelum, Chenab, Ravi, Beas and Sutlej join the Indus at these plains. Flowing through the broad plain areas of Pakistan, it creates a huge delta in the south part of Karachi and enters Arabian Sea through many distributaries.

River Ganga

The Ganga Plain is the most densely populated place in India. Many towns developed on the banks of this river. The river Ganga is formed when the rivers Bhagirathi originating from the 'Gaimukh' caves of Gangotri Glacier in Uttarkasi District of Uttaranchal State, and Alakananda originating from Alakapuri Glacier join together at Devaprayag. The river which gushes through the mountain regions enters the plain near Haridwar and its velocity decreases.

With the help of the map (fig. 4.2, 4.6) find out the states through which the River Ganga flows.

- Analyze the map (fig. 4.6) and find out the major tributaries of the River Ganga.

The river which has a length of about 2500 km, enters Bangladesh at a place called Faraka in West Bengal. One of the major tributaries of Ganga, the river Hugly flows towards south in West Bengal and joins the Bay of Bengal. The famous city of Kolkata is situated on the banks of this river. The

The Ganga River

river Ganga known as the river Padma in Bangladesh joins the River Brahmaputra at a place called Chandpu in Bangladesh. The river later known as the Jamuna and the Meghna creates the world's largest delta known as 'Sudarbans' before joining the Bay of Bengal.

River Brahmaputra:

The river Brahmaputra originates from the 'Chemayungdung' glacier of the Kailas Ranges on the eastern side of Lake Manasraovar in Tibet. This river is known as the river Tsangpo in Tibet. The river which has a length of about 2900 km reaches India after flowing for about 1200 km parallel to the Himalayas in Tibet. It enters India at the west of Sadya town in Arunachal Pradesh. It gets the name Brahmaputra when it reaches Arunachal Pradesh. Later it flows to Assam and creates a fertile valley there and then flows

The Bhramaputhra River

to Bangladesh. The length of the Brahmaputra in India is only 725 km and it has many tributaries such as Tista, Manas, Luhit, Subansiri etc.

Complete the following table by finding out the place of origin of rivers, tributaries, the States through which they flow and the place where they enter the sea, based on the description given about the rivers and the map (Fig.4.6).

River	Place of Origin	Tributaries	States through which it flows	Place where it enters the sea
• Sindhu	•	•	•	•
• Ganga	•	•	•	•
• Brahmaputhra	•	•	•	•

Table 4.1

The Northern Great Plain

Find out from the map (Fig. 4.3) the region lying between the Northern Mountain System and the Peninsular Plateau.

The Northern Great Plains are the fertile plains formed by the alluvial deposits of the Rivers Ganga, Indus and Brahmaputra and their tributaries. Let us see the characteristics of the largest alluvial plain of the world.

- Most of the food grains and sugarcane in India are produced from these fertile plains.
- It is one of the densely populated areas of the world where many cities and industrial centres are found.
- Well connected roads and railway network help to easily transport the food crops to other parts of the country.
- The Great Plains are divided into two based on the rivers which help them to form with their depositional processes.
-

Find out the sub divisions of the Northern Great Plains by observing the map (fig.4.6)

The Saraswati River

The 'Saraswathy' was a river that originated from the Himalaya mountains in Himachal Pradesh and flowed towards south and then in a southwest direction through Rajasthan. It disappeared as a result of the mountain bulding processes of the Himalayas. Studies conducted with the help of satellite images indicate that the River Saraswathy still flows underground. The Marusthali-Bhagar regions of Rajasthan are the plains formed as a result of the deposition of the River Luni and the disappeared River Saraswathy.

Complete the table by analyzing the maps (fig. 4.5, 4.6) and find out the rivers whose depositional process forms these plains.

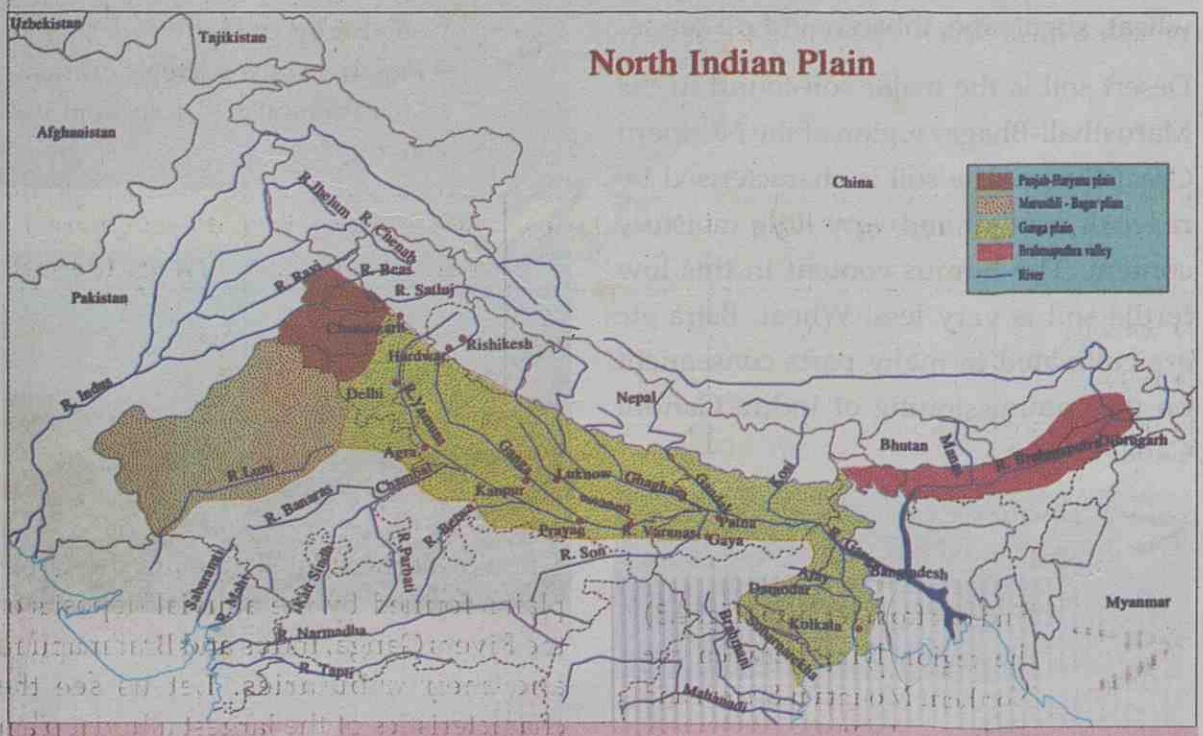


Figure - 4.6

Plains	Rivers that helped in its formation
• Punjab-Haryana Plain	• ?
• Marusthali-Bagar region of Rajasthan	• ?
• Ganga Plain	• ?
• Brahmaputra valley of Assam	• ?

Table-4.2

Soils of the Northern Great Plains

Alluvial soils are the major type of soil in the Punjab-Haryana Plain, Ganga Plain and Brahmaputra Valley of the Northern Great Plains. The newly deposited soils of this plain are known as 'Khadar" and the older deposits are known as 'Bhangar'. Alluvial soils found on the banks of rivers and deltas are highly fertile. This soil is most suitable for the cultivation of rice, wheat, sugarcane, tobacco and oil seeds.

Desert soil is the major soil found in the Marusthali-Bhagar region of the Northern Great Plains. The soil is characterised by rich salt content and very little moisture content. The humus content in this low fertile soil is very less. Wheat, Bajra etc are cultivated in many parts consequent on the commissioning of Indira Gandhi Canal Project.

Discuss the reasons for the formation of alluvial soil in the Northern Great Plains based on topography and rivers.

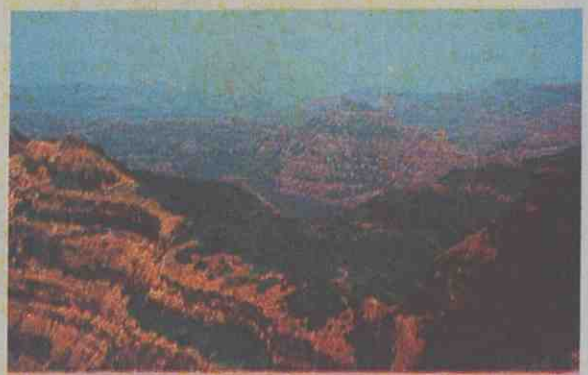
The Peninsular Plateau

Analyze the maps (fig. 4.3, 4.7) and find out the location of the Peninsular Plateau.

Let us see the characteristics of the Peninsular Plateau.

- Since it is the oldest terrain it contains many mineral deposits and hence many mineral based industries are developed here.
- The Western Ghats and the western plateau sections of this region contain thick forests and valuable forest produces are obtained from them.
- Anamudi in Kerala is the highest peak (2005 m) in this region.
- With an area of about 15 lakh sq. km these diverse plateaus have an altitude of more than 400 m.
-

Complete the table by identifying the 9 important physiographic divisions of the Peninsular Plateau from the map (fig.4.7).



Decan Plateau

The Deccan Plateau is one of the largest plateaus of the world. The north-western portion of this plateau is formed by the solidification of lava from the volcanic erruptions occured before millions of years. This region is made up of igneous rocks and is known as 'Deccan Trap Region'.

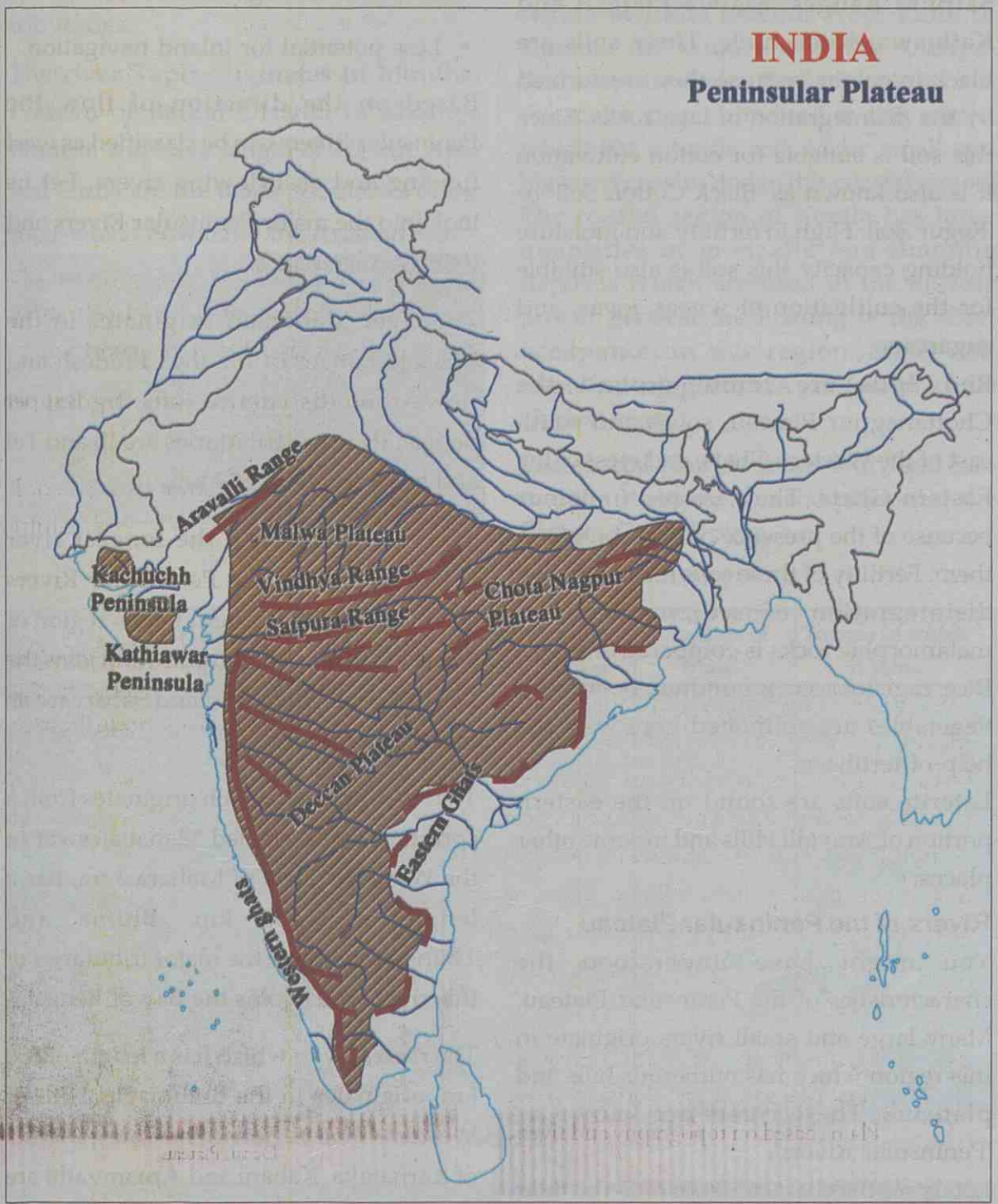


Figure - 4.7

Soils of the Peninsular Plateau

Black soil is the major type of soil found in the sub divisions of Peninsular Plateau which are the Deccan Plateau, Vindhya-Satpura Ranges, Malwa Plateau and Kathiawar-Kuchch etc. These soils are black in colour because they are formed by the disintegration of lava rocks. Since this soil is suitable for cotton cultivation it is also known as 'Black Cotton Soil' or 'Regur' soil. High in fertility and moisture holding capacity this soil is also suitable for the cultivation of wheat, jovar, and sugarcane.

Red Soils are found around the Chottanagpur Plateau, south and south east of the Western Ghats, and west of the Eastern Ghats. They are red in colour because of the presence of iron content in them. Fertility of these soils formed by the disintegration of sedimentary and metamorphic rocks is comparatively less. Rice, ragi, tobacco, groundnut, potato and vegetables are cultivated here with the help of fertilizers.

Laterite soils are found on the eastern portion of Aravalli Hills and in some other places.

Rivers of the Peninsular Plateau

You might have understood the characteristics of the Peninsular Plateau. Many large and small rivers originate in this region which has numerous hills and plateaus. These rivers are known as 'Peninsular Rivers'..

Let us see the characteristics of Peninsular Rivers.

- Catchment area is comparatively less in extent.
- Rainfed rivers.
- Intensity of errosion is less.
- Deep valleys are not formed because they flow through hard rocks.
- Less potential for inland navigation.

Based on the direction of flow the Peninsular Rivers can be classified as west flowing and east flowing rivers. Let us look into the major Peninsular Rivers and their characteristics.

The river Mahanadi originates in the Maikala Ranges of Madhya Pradesh and flows towards east to join the Bay of Bengal. Its major tributaries are Ib and Tel and has a length of 837 km.

The river Godavari, the longest river (1485km) among the Peninsular Rivers originates in the Western Ghats region of Nasik District in Maharashtra and joins the Bay of Bengal. Indravati and Sabari are its major tributaries.

The river Krishna which originates from a spring at a place called Mahabaleswar in the Western Ghats of Maharashtra, has a length of 1400 km. Bhima and Thungabhadra are the major tributaries of this river which joins the Bay of Bengal.

The river Kaveri which has a length of 800 km, originates in the Brahmagiri Hills of Western Ghats region in the Coorg District of Karnataka. Kabani and Amaravathi are its major tributaries and it flows into the Bay of Bengal.

The river Narmada which originates in the Maikala Ranges of Chhattisgarh travels for a distance of 1312 km and joins the Arabian Sea. Hiran and Baljan are its major tributaries.

The river Tapti originates in Munthai Plateau of Baikal District in Madhya Pradesh and has a length of 724 km. Agar and Girna are the major tributaries of the river which flows into the Arabian Sea.

Complete the following table by finding out the place of origin of the rivers of Peninsular Plateau, their tributaries, the states through which they flow and the sea in which they join based on the description given about rivers and map (Fig.4.2, 4.6) and atlases.

Coasts and Islands

Analyze the maps (fig 4.2, 4.3) and find out the coastal regions of India and the states in which they are found. The coastal region of India extends from Rann of Kuchch in Gujarat to the Ganga-Brahmaputra Delta (Sudarbans). Rice is the major crop cultivated in this region which has a fertile soil. Many small and big ports are situated in this coastal region. The coastal region of Kerala has large quantities of monazite and ilmonite deposits which are used in the nuclear power generation. Fishing is the chief occupation in this region. Many salt manufacturing centres are found in the Gujarat coast .

The coastal plain of India is divided into two-the Western Coastal plain and the Eastern Coastal plain.

River	Place of Origin	Tributaries	States through which it flows	Direction of flow	The sea in which it joins
• Narmada	•	•	•	•	•
• Godavari	•	•	•	•	•
• Krishna	•	•	•	•	•
• Kaveri	•	•	•	•	•
• Tapti	•	•	•	•	•

Table - 4.3

Prepare a table showing the comparative characteristics of the Himalayan Rivers and the Peninsular Rivers.

Eastern Coastal Plain	Western Coastal Plain
• Extends from Sundarbans to Kanyakumari	• Extends from Kuchch to Kanyakumari
• Lies between the Eastern Ghats and the Bay of Bengal	• Lies between the Western Ghats and the Arabian Sea.
• This extensive coastal plain has a breadth of 80-100 km	• Narrow strip with only 64 km breadth
• Deltas formed by the Mahanadi, the Godavari, the Krishna, and the Kaveri are the peculiarities of this coastal plain	• Beautiful backwaters and estuaries are the specialities of this coast.
• Influence of North-East monsoon is more.	• Influence of South-West monsoon is more.
• This coast is classified into two as Coromondal Coast (between Tamil Nadu Coast and the southern part of Andhra Coast), North Sircars Coast (northern portion of Andhra coast, Orissa and West Bengal Coast)	• This coast is classified into three as Gujarat Coast (coastal area of Gujarat), Konkan Coast (coasts of Maharashtra, Goa and northern portion of Karnataka coast)and Malabar Coast (Southern portion of Karnataka coast and Kerala coast)

Table - 4.4

Find out the characteristics of Eastern Coastal Plain and Western Coastal Plain from the table 4.4.

Soils of Coastal Plains

Brown soil, laterite soil, alluvial soil and red soil are the major soil types found in the Coastal Plains. Laterite is the major soil type in North Malabar and Konkan coasts and alluvial soil is the major type in Coromondal Coast. Red soil is found more in the southern coast of Kerala and in the Maharashtra coast. Laterite soil is formed in the regions having monsoon climate, with alternate rainy and summer season. Laterite which is a mixture of clay and red sandstone is comparatively harder. In some places they are very hard. Hence they are cut in large blocks and used for construction purposes. Coffee, tea, rubber, coconut, arecanut, cashew etc are grown in this less fertile soil in Karnataka and Kerala by applying fertilizers and providing irrigation.

Islands

Analyze the map (Fig 4.3) and find out the islands that are parts of India in the Bay of Bengal and the Arabian Sea.

In addition to these islands numerous islands which are part of India are found in the Gulf of Mannar between India and

Srilanka. Let us examine the geographical characteristics and lifestyle of people in those islands which are the Union Territories of India.

Lakshadweep

Let us have a closer look at the lifestyle of the people of this beautiful island group which is located near Kerala and where Malayalam is the official language.

An Island in Lakshadweep

There are no dogs and snakes in these islands and crows are rare. They appear as a green dot from the air, with 36 islands, of which only 11 are inhabited. Fishing is the major occupation in Lakshadweep which is formed by coral reefs and is known as 'Tropical Paradise'. Tuna fish is largely exported from here. According to 2001 Census the population of Lakshadweep is 60652 and the most populated island is Androth and the least populated is Bangaru. The other inhabited islands of Lakshadweep are Minicoy, Kalpeni, Agathi, Kavarathi, Amini, Kadamath, Keelthan, Chethilath and Bithra. Water and air transport are the major means to reach Lakshadweep. The nearest island from Kochi is 220 km away and the farthest island is 440 km away. Kavarathi, which has the second position in terms of population, is the capital of Lakshadweep and has an area of 32 sq. km. Coconut, plantain, yam, drumstick, jack, bread fruit etc. are the major are the major crops cultivated in this smallest Union territory of India. Cattle rearing and poultry farming are also practiced by the islanders. Cool breeze, green terrain, shallow seas near the coast, and beautiful coral reefs in the shallow zones make this islands a major tourists attraction. Most of the tourists arrive here during the period from September to May.

There are no rivers in these islands which lie flat parallel to the coast. Seawater is used for drinking in these islands where potable drinking water is rare. The Central Government has implemented many projects here for the cheap purification of seawater.

Andaman Nicobar Islands

It is a Union Territory situated in the Bay of Bengal. It has two groups of islands, the Andaman and the Nicobar. These are the upper portions of underwater mountain ranges which are a continuation of the continent. There are 203 islands in this archipelago and they are classified as North Andaman, Middle Andaman and South Andaman. Islands seen just south of Andaman Islands are the Nicobar

Andaman Islands

Islands. The portion of the sea which separates these two groups of islands is popularly known as 10° Channel. The Nicobar islands which have about 7 major and 12 minor islands are grouped as Kar Nicobar, Little Nicobar, and Great Nicobar. The southernmost tip of the Nicobar Islands is known as 'Indira Point'. Consequent on the tsunami of December 26, 2004 huge waves destroyed most of the coastal regions of the Nicobar Islands. Port Blair in South Andaman is the capital of the Andaman Islands. The only volcanoe in India, the 'Barren' is found in the Narcondam Island north of Port Blair.

India - Soils

- The map given below (Fig. 4.8) shows the distribution of soil types in India. Find out from the map the major soil types.

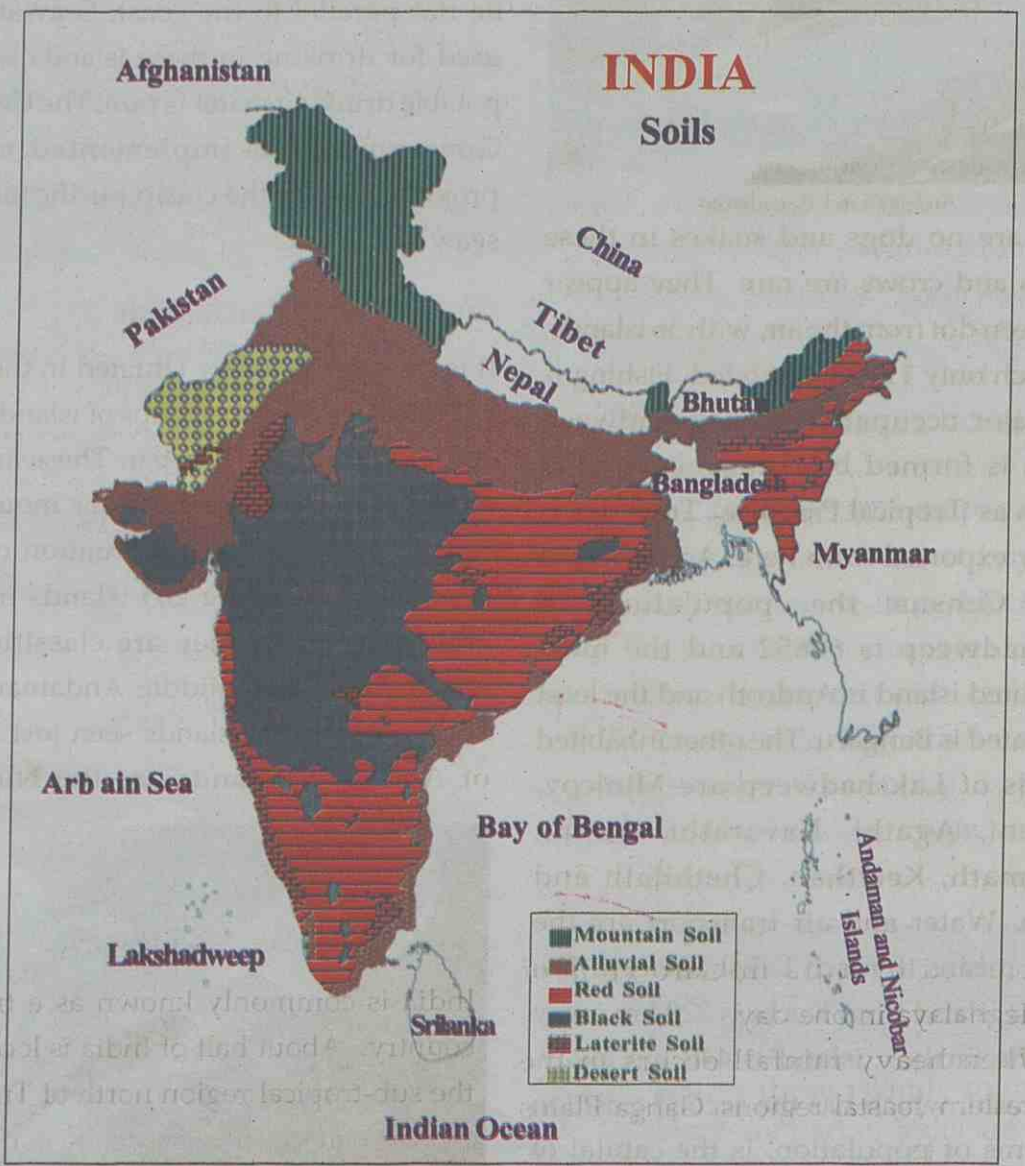


Figure - 4.8

You must have understood the various types of soils found in different physiographic zones. Complete the following table (Table 4.5) based on this and with the help of the map (Fig. 4.12).

Soil Type	Characteristics	Physiographic zones	Suitable Crops
• Alluvial soil	•	•	•
•	•	•	•
•	•	•	•
•	•	•	•

Table-4.5

India - Climate

Extensive land area, long coastlines and varied topography have created regional variations in the climate of India. Let us examine these variations.

- When the day temperature in Barmer in Rajasthan is 45°C to 50°C , the temperature at Gulmarg in Jammu & Kashmir on the same day would be less than 20°C.
- When the night temperature in the month of December in Kargil and Drass in Jammu & Kashmir is -40°C it would be 20°C to 22°C in Thiruvananthapuram and Chennai on the same day.
- When the annual rainfall in Cherrapunji and Mowsinram in Meghalaya is more than 1080 cm it is less than 12 cm in Jaisalmer in Rajasthan. The amount of rainfall received in Jaisalmer in ten years is received by Tura in Garo Hills of Meghalaya in one day.
- When heavy rainfall occurs in the western coastal regions, Ganga Plains and in the Orissa coast during the months of June, July and August, the Coromondal Coast in the east experiences drought condition.
- Interior portions of India experience severe summer and winter while the coastal regions experience a milder climate throughout the year.
-

You might have understood from the above given facts that different weather conditions prevail over various parts of India. Let us examine the reasons for the variations of climate in India.

- Latitudinal location
- Himalayan Mountains
- Nearness to oceans
- Winds
- Distance from ocean
- Topography
- Altitude above the sea level

India is commonly known as a tropical country. About half of India is located in the sub-tropical region north of Tropic of Cancer. But the presence of the Himalayas and the Indian Ocean helps India to

remain a tropical country. The Himalayas block the monsoon winds and helps to get rainfall all over the country and prevent the cold winds from the north entering India.

Even though there are lots of regional variations in the climate of India, it is commonly known as 'Monsoon Climate'.

The seasons of India are classified into four based on the atmospheric temperature and rainfall.

- **Cold Weather Season**
- **Hot Weather Season**
- **South-West Monsoon Season**
- **North-East Monsoon / Retreating Monsoon Season**

Let us try to know about the seasons of India and the months in which they are experienced from the following explanations.

Cold Weather Season

Cold weather season is experienced in India from December to February. Since this is the period when the sun is over the southern hemisphere, the intensity of sun's rays in the northern hemisphere is less. During this time the North India experiences mild day time temperature and severe cold in the night. Places such as Shimla, Darjeeling, Manali, Mussourie etc which are far away from oceans and located at higher altitudes experience snowfall during this period. But the Peninsular India (South India) does not experience intense winter season. Since the atmospheric temperature is less during these months, high pressure area is developed over the Northern Great Plains and light wind blows from this region towards south.

Pleasant weather conditions with clear skies, mild temperature, mild breeze and less rainfall are the characteristics of this season. Low pressure systems developing over the Mediterranean Sea travel towards east with the help of high speed jet streams over the troposphere and reach India through the Sulaiman Pass in Pakistan. These winds, popularly known as 'Western Disturbances', cause heavy snowfall in the Himalayas. They also result in winter rainfall over Northern Great Plains, especially in Punjab. This is most suitable for the cultivation of rabi crops like wheat and barley.

North eastern winds produced as a result of the high pressure areas formed over the north eastern part of India during the winter season, blow towards the Bay of Bengal and result in rainfall in the eastern coast, especially in Tamil Nadu coast.

Summer Season

Summer season in India is during the months of Mach, April and May. India experiences summer season when the sun is vertically overhead in the northern hemisphere. During this time the temperature rises to over 48°C in the north western part of India and low pressure areas are developed over Thar Desert and Chottanagpur Plateau. Due to this low pressure, dry winds known as 'Loo' blow over the north Indian plains and this results in the rise of day time temperature further. Thundershowers and hailstorms

due to convection are formed during this period in the north Indian States. The local wind known as 'mango showers', blows over south India during summer and gives rainfall in the Kerala and Karnataka coast. Thundershowers and hailstorms in West Bengal and Assam caused by the local wind 'Kal Baisakhi' are also the peculiarity of this season.

Southwest Monsoon Season

Analyze the map (Fig. 4.9) and understand the direction of southwest monsoon winds.

Southwest monsoon season is experienced in India during the months of June, July, August and September. The low pressure area formed over northwestern India attracts the monsoon winds from the Indian Ocean towards the interiors of India. The Peninsular India bifurcates the monsoon winds blowing from the southwestern direction. The Arabian Sea branch causes widespread rainfall in the west coast of India and the Bay of Bengal branch causes rainfall in the eastern coastal plains and the northern Great Plains.

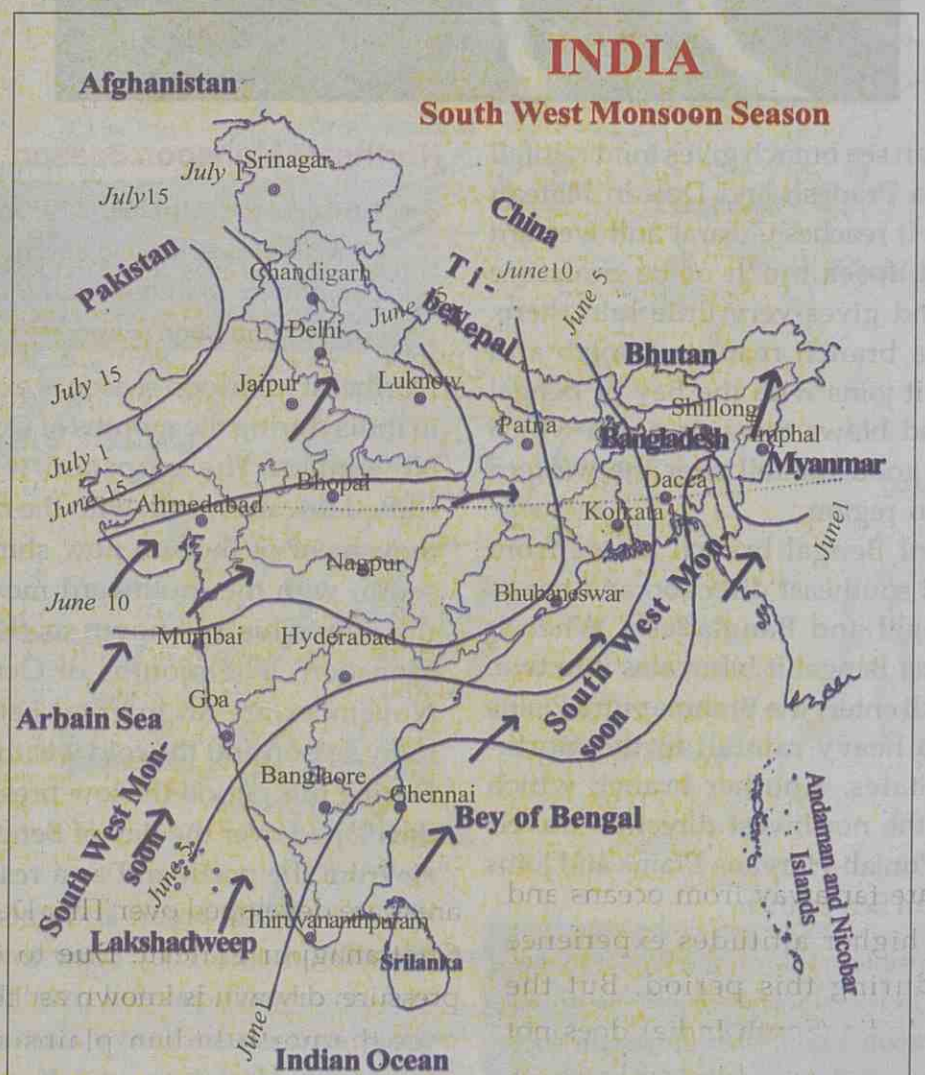


Figure - 4.9

The Arabian sea branch gives mild rainfall in Madhya Pradesh and Deccan Plateau and when it reaches Gujarat and western Rajasthan, loses much of its moisture content and gives very little rain there. When this branch reaches Punjab and Haryana, it joins with the Bay of Bengal branch and blows towards north which results in good rainfall over the western Himalayan region.

The Bay of Bengal branch blows from south and southeast direction and enters West Bengal and Bangladesh. When it enters West Bengal it bifurcates into two. One branch enters the Brahmaputra Plains and gives heavy rainfall in the North-Eastern States. Another branch which blows in the northwest direction travels over the Punjab-Haryana Plains and joins the Arabian Sea branch.

The western side of the Western Ghats gets heavy rainfall during the southwest monsoon season, while the eastern slopes get very little rainfall. What is the reason for this?

Northeast Monsoon Season

Analyze the map (Fig. 4.10) and find out the differences in wind direction between southwest monsoon season and north eastern monsoon season.

Northeast Monsoon season is experienced in India during the months of October and November. The monsoon winds that shifted towards north with the northward movement of the sun now shift towards south with the southward movement of the sun. This is known as 'Retreating Monsoon'. The months of October and November are an interval between the rainy season and the cold weather season. During this period the low pressure areas developed over the Bay of Bengal attracts air from the north and as a result the air blows over the ocean and gets moisture from the ocean. They blow towards east and give heavy rainfall over the eastern coast and cause heavy damage in the Godavari, Krishna and Kaveri Delta regions.

The influence of this rainfall is felt in Karnataka, Kerala and Tamil Nadu. The high temperature and humidity makes the day very sultry. This phenomenon is called 'October Heat'. By the middle of October the temperature dips suddenly and the winter season begins in North India.

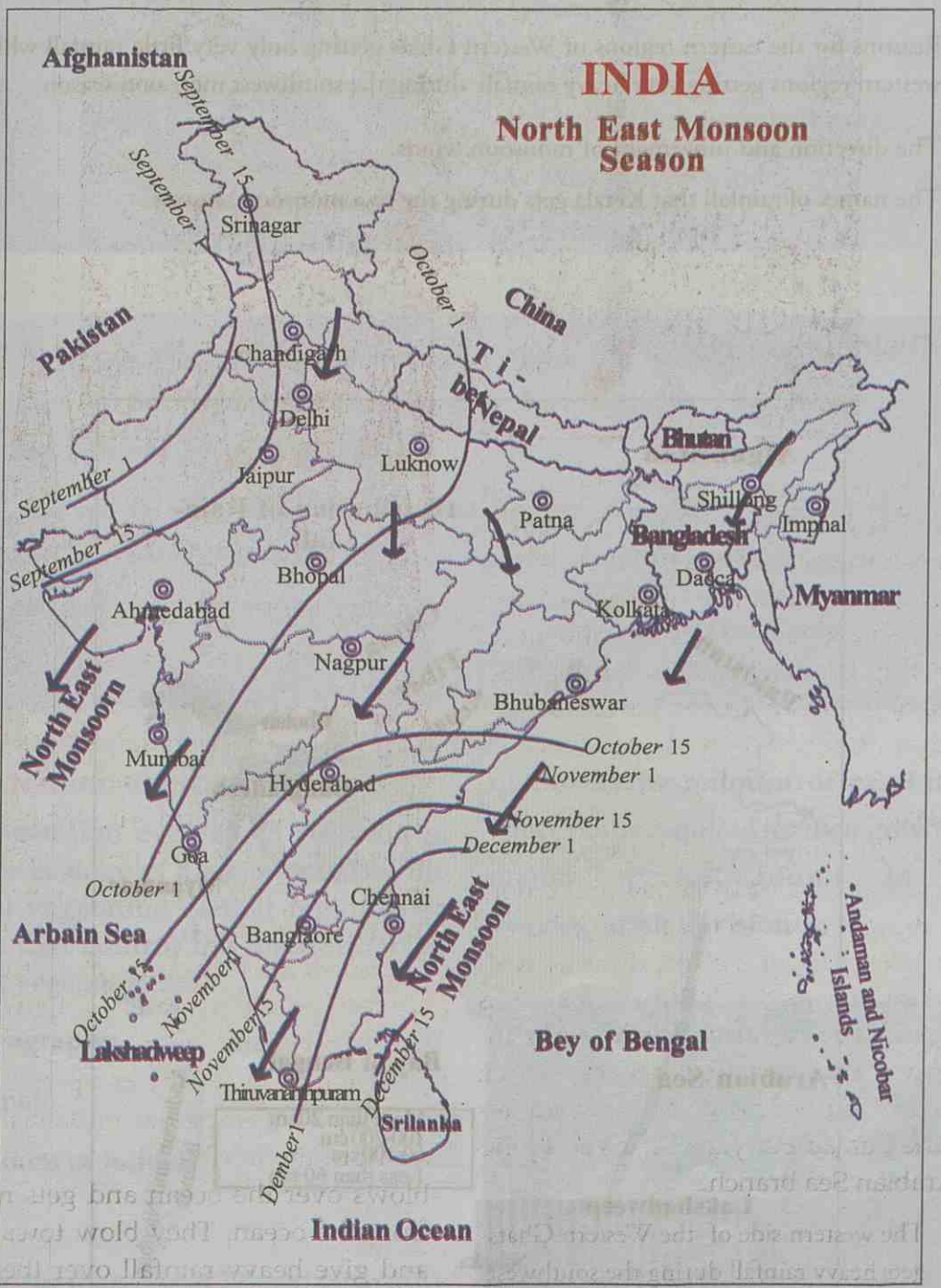


Figure - 4.10

Let us discuss in the class the seasons in India. Inferences to be arrived at.

- The sun's position during the winter and the summer seasons.
- The relationship between the sun's apparent movement and Indian seasons.
- Reasons for winter not so severe in Kerala and other south Indian states.
- Reasons for the eastern regions of Western Ghats getting only very little rainfall while the western regions getting very heavy rainfall during the southwest monsoon season.
- The direction and movement of monsoon winds.
- The names of rainfall that Kerala gets during the two monsoon seasons.

India - Distribution of Rainfall

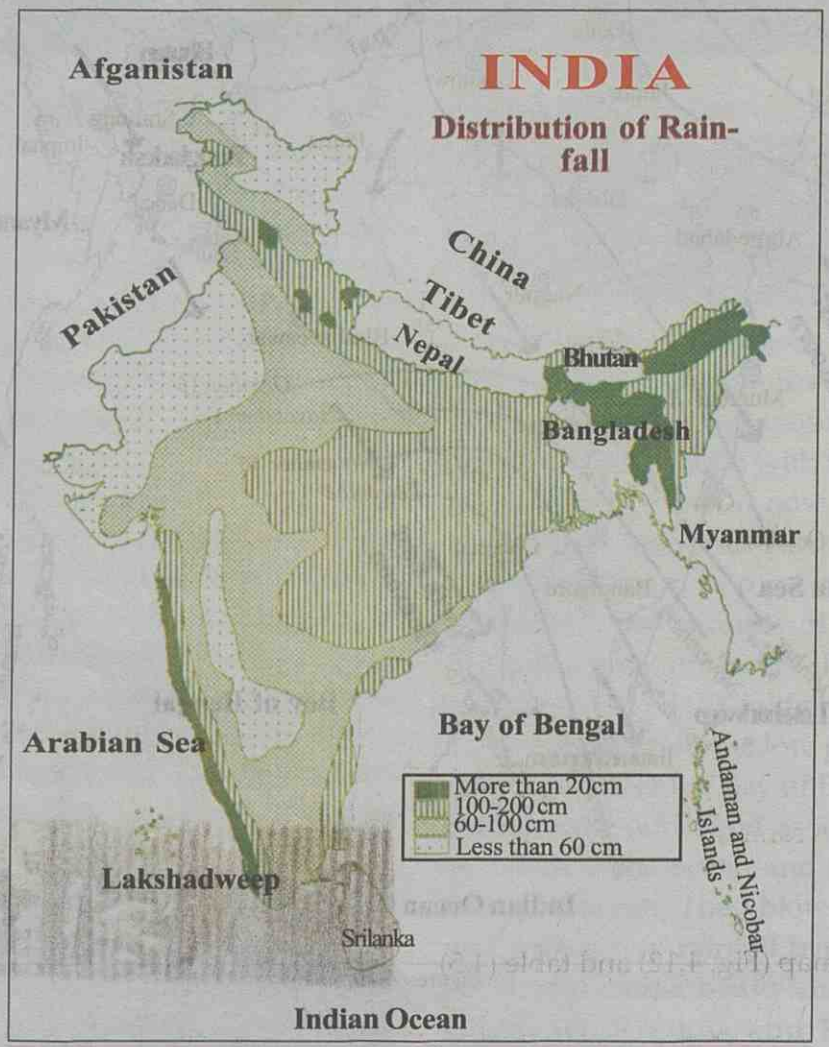


Figure - 4.11

- You must have understood that the amount of rainfall received is not uniform all over India. Find out the reasons for the variations in the distribution of rainfall.

Even though most of India gets monsoon rainfall there is wide variations in its distribution locally. When the northeastern states get abundant rainfall the northwestern states get only little rainfall. Likewise, when Kerala receives very heavy rainfall during the southwest monsoon season the neighbouring Tamil Nadu gets only very little. When the rainfall is high in the coastal regions the peninsular interiors and in northwestern regions it is very low. The reasons for this regional variations in the distribution of rainfall?

- Nearness to oceans
- Distance from oceans
- Location of mountain ranges.
- Direction of wind
- Extent of land

Analyze the maps showing physiographic divisions (Fig. 4.3), the distribution of rainfall (fig.4.11) and the wind directions (Fig. 4.9, 4.10) to find out the reasons for the variations in the distribution of rainfall and present it.

Through this analysis find out the regions that receive very heavy rainfall (more than 200 cm), heavy rainfall (100-200 cm), moderate rainfall (60-100 cm) and low rainfall (< 50 cm) and explain the reasons for this.

India - Natural Vegetation

The vegetation evolved in accordance with the ecology of a region is called the natural vegetation of that region. The factors that control the distribution of natural vegetation are

- Topography
- Climate
- Amount of rainfall
- Soil

Analyze the map (Fig. 4.12) and table (4.5) and find out the major natural vegetation of India, the amount of rainfall and temperature required for their growth, and major species found in each physiographic division.

Tropical Rain Forest

Natural Vegetation	Rainfall	Major Species
Tropical Rain Forests	Above 200 cm	Rosewood, Mahogany, Ebony. Tune
Tropical Deciduous Forests	70-200 cm	Teak, Sal, Sandalwood, Bamboo, Semul
Thorny and Shrub Vegetations	< 60 cm	Dates, Banduri, Acacia, Khair, Babul, Kikar, Coarse grasses
Mangrove Forests	> 200 cm	Sundari, Agar, Bendi (Mangrove plants)
Mountain Forests	< 60 cm	Oak, Chestnut, Silver Fir, Pine, Juniper, Birch, Deoder

Table - 4.5

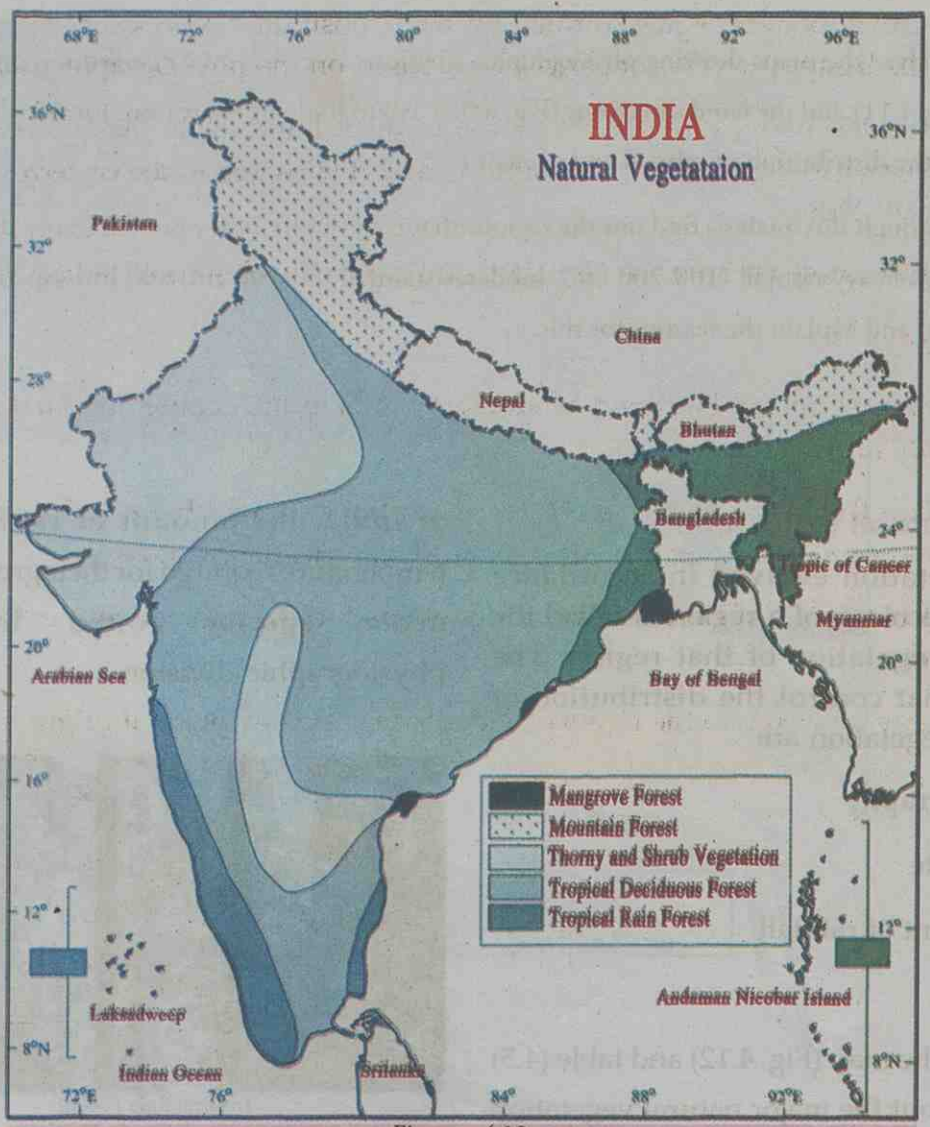


Figure - 4.12

You have gained a general information on India's physical features like physiography, soil types, rivers, climate, rainfall and natural vegetation from this chapter. Haven't you understood the reasons for the regional variations in the life style of people in the states of India.

Prepare and present a seminar topic on the subject 'The role of Physical Features in the Lifestyle of People of India' based on the information you acquired from this chapter.

Follow up Activities

- Discuss and prepare a note on the reasons for the formation of desert soils in the Marusthali-Bhagar region, formed by the depositional process of the river Luni and the disappeared River Saraswathy, based on the physiography and climate.
- Discuss the reasons for the formation of more laterites in the Eastern Hills of Northern Mountain System, Western Coastal Plains and in the eastern portion of Aravalli Hills.
- Prepare a note on how the Himalayas influence the climate of India.

Questions

- Explain the role of Northern Mountain System in the culture and lifestyle of the people of India.
- Explain the plain regions and their characteristics, which are transformed into agricultural regions by the Himalayan Rivers and their tributaries.
- Explain the role of the Himalayan Mountains and the Indian Ocean in the climate of India.
- Classify and explain the rivers of India based on their place of origin.

5

INDIA - ECONOMIC GEOGRAPHY

Southwest Monsoon started on June 1st itself. Farmers are happy. Paddy fields are filled with water. Farmers are excited in planting the saplings of paddy. Weeding, applying fertilizers and spraying pesticides are the works to be done. In all the states of India except Kerala, other than paddy, maize, ragi, groundnut and millet are cultivated during this season which extends up to September.

With the beginning of the apparent movement of the sun towards south the temperatures start to dip in North India. Farmers cultivate wheat in the Indus-Ganga Plains during this period. In addition to wheat, groundnut, barley, mustard, sesame etc are also cultivated in North India. In the South Indian States it is the time for the cultivation of second crop of paddy, which extends up to the beginning of summer. In addition to this maize, groundnut, ragi, millet etc are also cultivated here.

By the month of March farmers cultivate different types of vegetables in the South Indian States. Various types of fruits are also cultivated along with vegetables in the North Indian States. These crops are all harvested before the monsoon rains.

- What are the crops mentioned in the above statements?
- Are all the crops cultivated during the same period?
- Which are the months in which the above mentioned crops are cultivated?

You must have understood from the inferences you have arrived at, that there are various agricultural seasons in India. Diverse types of crops that are cultivated all over the world are also cultivated in India. But it is not possible to cultivate all the crops in all the seasons.

Agricultural Seasons

- The period when the cultivation is started by the beginning of monsoons and harvested by the end of monsoons is known as 'Kharif Season'.
- The period when the cultivation is started by the beginning of winter season and harvested by the beginning of summer is the 'Rabi Season'.
- The period when the cultivation is started by the beginning of summer and harvested by the beginning of monsoons is known as 'Zaid Season'.

Let us examine the crops cultivated in India during these three seasons.

Food Crops

All the crop lands in India have common characteristics. Broad paddy fields, the boundary demarcating these fields, flooded paddy fields, tripods made of bamboo to harvest the paddy spikes, processes to remove the chaff from the paddy.....all are the characteristics of the places where paddy is cultivated. More than half of the population of India uses rice as their major source of food. After China, India is the leading producer of rice in the world. About 23% of the total cultivated area in India is used for the cultivation of rice.

Rice is a tropical crop that requires high temperature and high humidity. Places having a mean monthly temperature of 24°C and an annual rainfall of 150 cm are suitable for rice cultivation. Since it requires such high amount of rainfall, it is mainly cultivated during the months from June to September. Rice is also cultivated in places with less rainfall with the help of irrigation. Rice is widely cultivated in

Paddy Cultivation in Terraces

places having fertile clayey soils and alluvial soils of flood plains. In addition to this rice is also cultivated in the Himalayan valleys and the slopes of hills of North-East India. Here rice is cultivated in terraced fields. Planting of saplings, weeding, manuring, etc are the processes highly essential for the cultivation of paddy. More attention and labour of farmers is required right from the period of planting to harvesting. Paddy is mainly cultivated in the States of West Bengal, Punjab, Uttar Pradesh, Andhra Pradesh, Tamil Nadu, Haryana and Kerala.

Observe the picture 5.1. Areas of paddy cultivation are illustrated there. Compare this with the map showing the distribution of rainfall. Can you find out the areas which are more dependent on irrigation for the cultivation?

Of the total cropped area in India, wheat is the food crop having the second position after rice, in terms of its area

Wheat

under cultivation. An average temperature of 10°C during planting and 15°C to 20°C during the harvesting is essential for wheat cultivation. Wheat is mainly cultivated in areas which have an annual rainfall of 50-70 cm. It is mainly cultivated during the rabi season when the temperature and the rainfall are less. Wheat can be cultivated in areas where rainfall is even less than 20 cm if irrigation is provided. Well drained and fertile soil is suitable for wheat cultivation. Since the

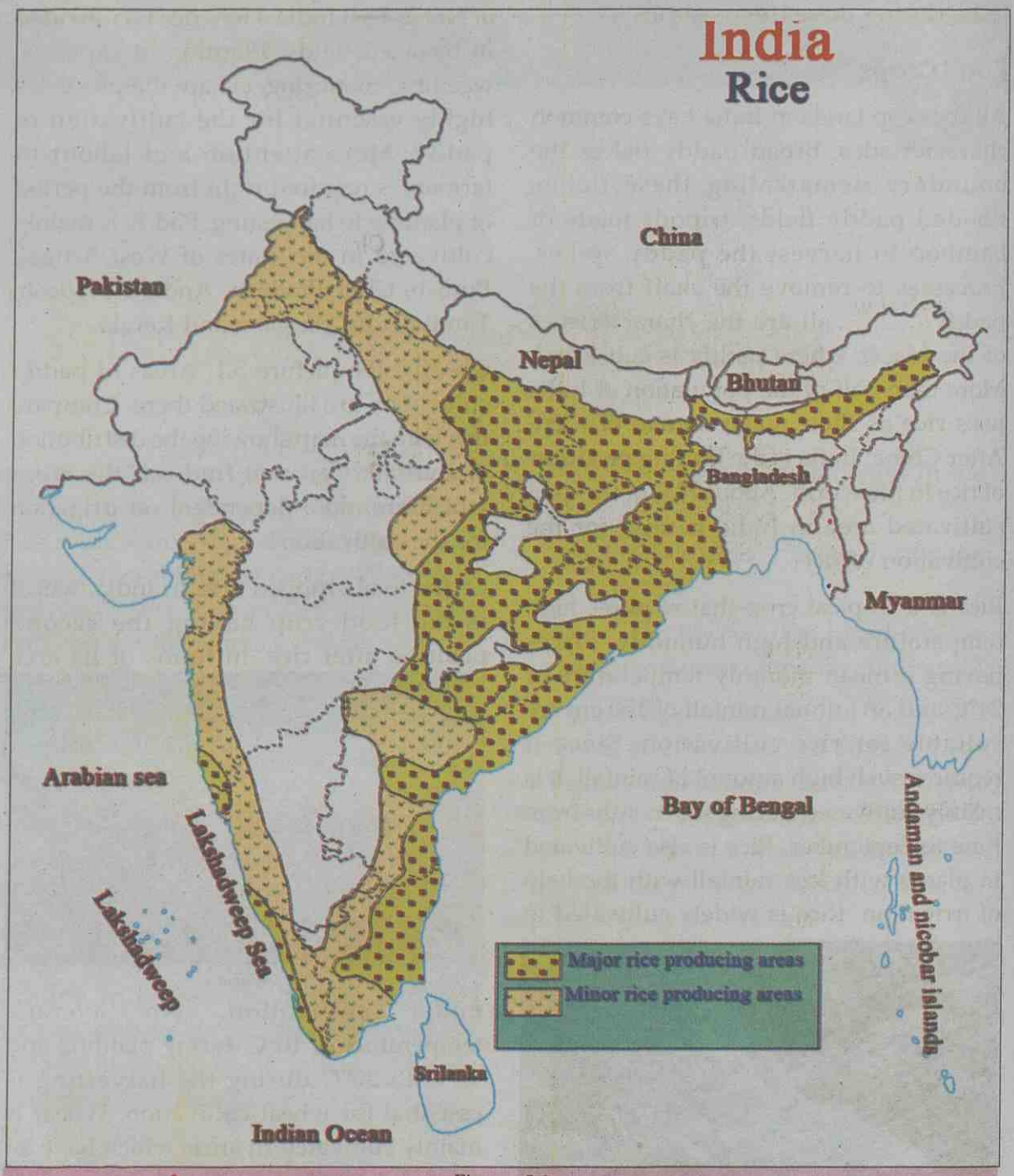


Figure - 5.1

post-harvest work is comparatively less than that of paddy, the number of labourers required for wheat cultivation is less. Wheat is mainly cultivated in the Indus-Ganga Plains and in the Malwa Plateau region. Uttar Pradesh, Punjab, Haryana, Rajasthan and Madhya Pradesh are the major producers of wheat in India.

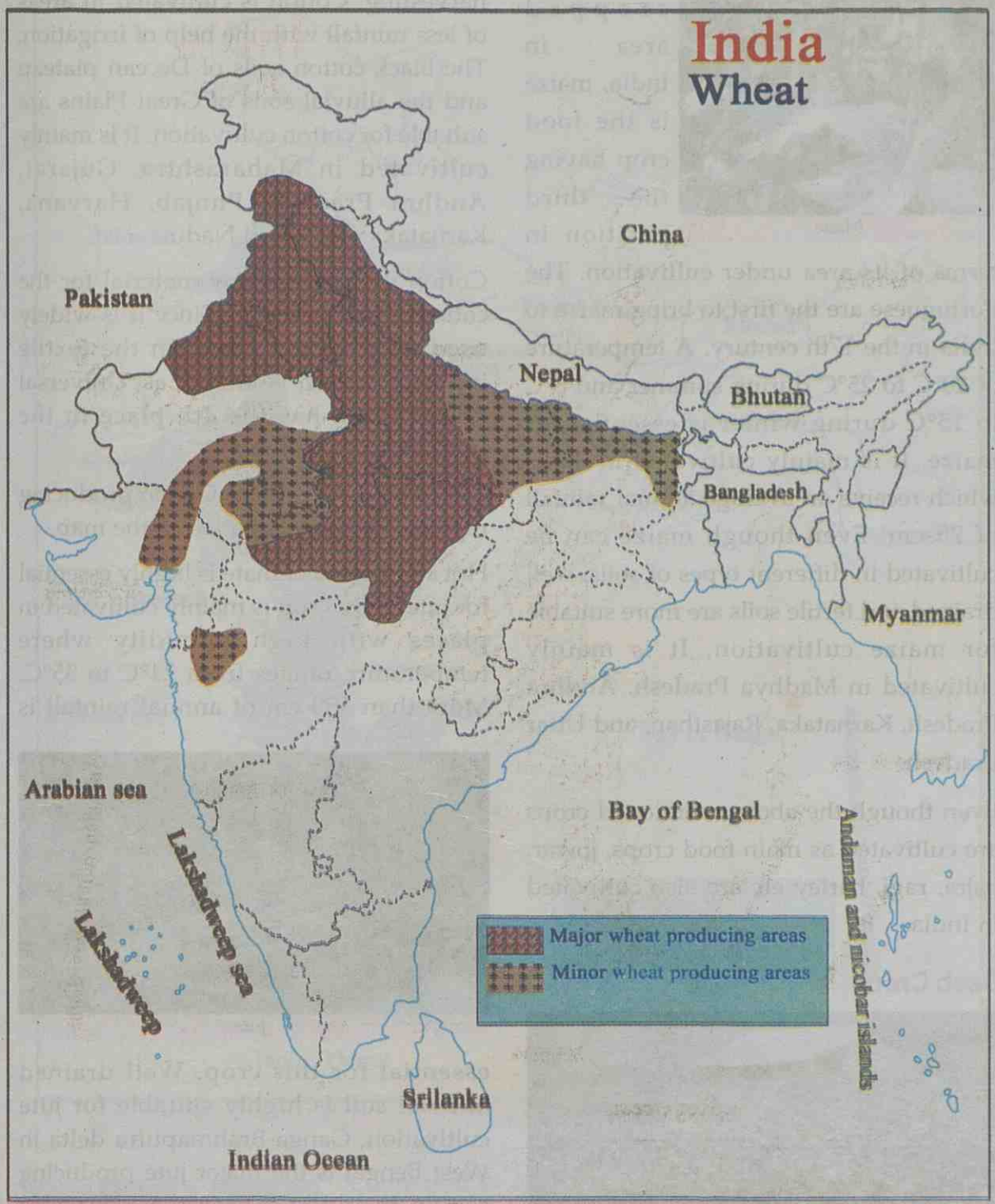


Figure - 5.2

Fig.5.2 shows the areas under wheat cultivation. Compare this with the map showing rainfall distribution.

Why is wheat not cultivated in Kerala? Discuss.


Maize

Of the total cropped area in India, maize is the food crop having the third position in terms of its area under cultivation. The Portuguese are the first to bring maize to India in the 17th century. A temperature of 20°C to 25°C during summer and 8°C to 15°C during winter is essential for maize. It is mainly cultivated in areas which receive an average annual rainfall of 75 cm. Even though maize can be cultivated in different types of soils, well drained and fertile soils are more suitable for maize cultivation. It is mainly cultivated in Madhya Pradesh, Andhra Pradesh, Karnataka, Rajasthan, and Uttar Pradesh.

Even though the above mentioned crops are cultivated as main food crops, jowar, bajra, ragi, barley etc are also cultivated in India.

Cash Crops


Cotton

Cotton, a tropical crop, requires 20°C to 30°C temperature and 65-85 cm of rainfall. It requires at least 200 frost free days during the period from its planting to harvesting. Cotton is cultivated in areas of less rainfall with the help of irrigation. The black cotton soils of Deccan plateau and the alluvial soils of Great Plains are suitable for cotton cultivation. It is mainly cultivated in Maharashtra, Gujarat, Andhra Pradesh, Punjab, Haryana, Karnataka and Tamil Nadu.

Cotton is the basic raw material for the cotton textile industry. Since it is widely used all over the world in the textile industry, cotton is known as 'Universal Fibre'. India has the 4th place in the production of cotton.

Observe Fig. 5.3. Major Cotton producing regions are shown shaded in the map.

Hot and humid climate is highly essential for jute. This crop is mainly cultivated in places with high humidity where temperature ranges from 24°C to 35°C. More than 150 cm of annual rainfall is essential for this crop. Well drained alluvial soil is highly suitable for jute cultivation. Ganga-Brahmaputra delta in West Bengal is the major jute producing region in India. Jute is the basic raw material for jute industry. Jute fibre and jute products are comparatively less costly.


Jute

Observe Fig. 5.4. Major Jute producing regions are shown shaded in the map.

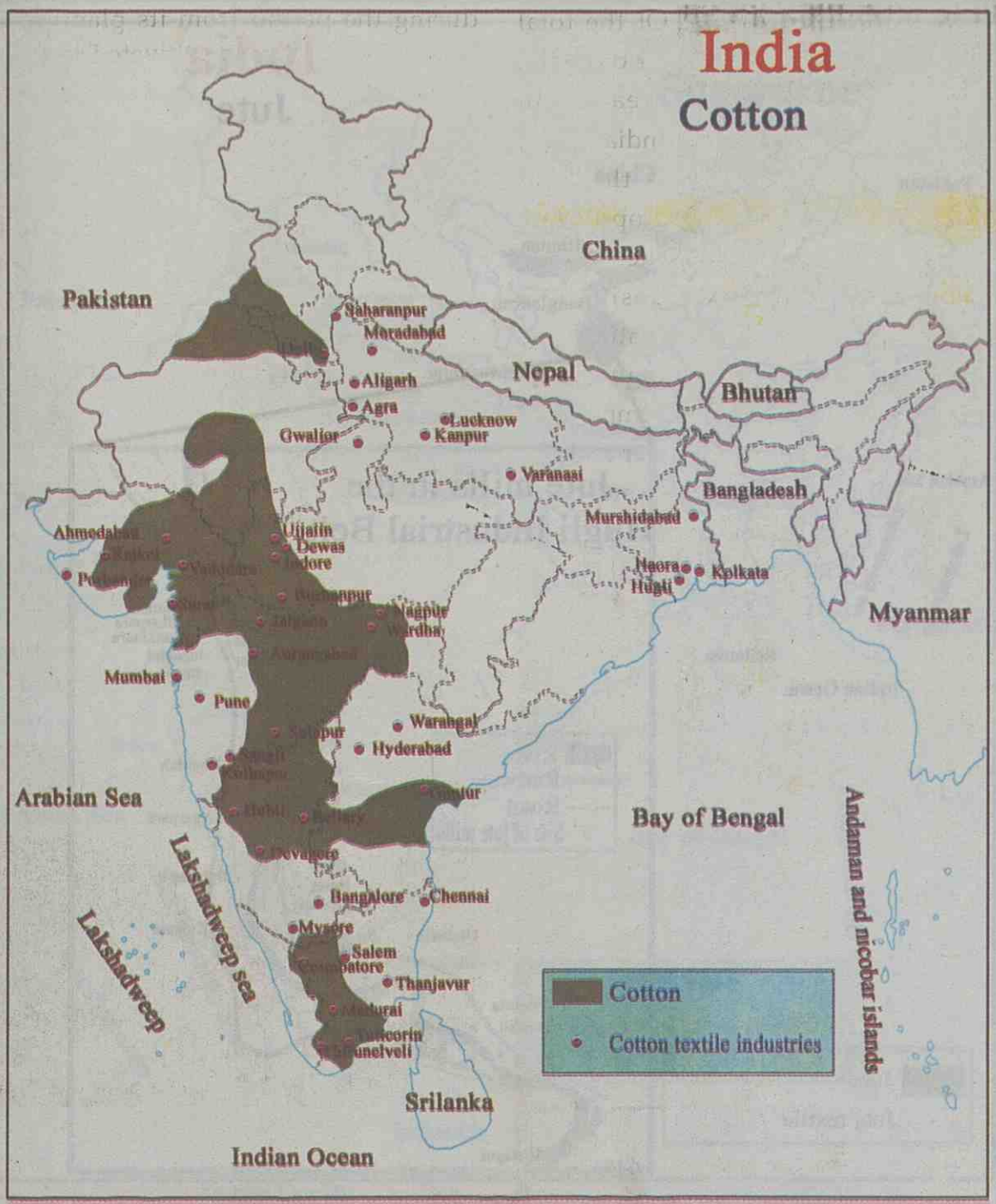


Figure - 5.3

Sugarcane

Compared to other crops sugarcane has a longer period of growth. Sugarcane ripens in 10-12 months. Hot and humid climate is suitable for sugarcane cultivation. A temperature of 20°Cto 30°C is essential for this crop. It is mainly cultivated in areas which receive an annual rainfall of 100-150cm. It can also be cultivated in less rainfall areas if irrigation facilities are provided. Sugarcane is widely cultivated in the Great Plains and in the black cotton soils

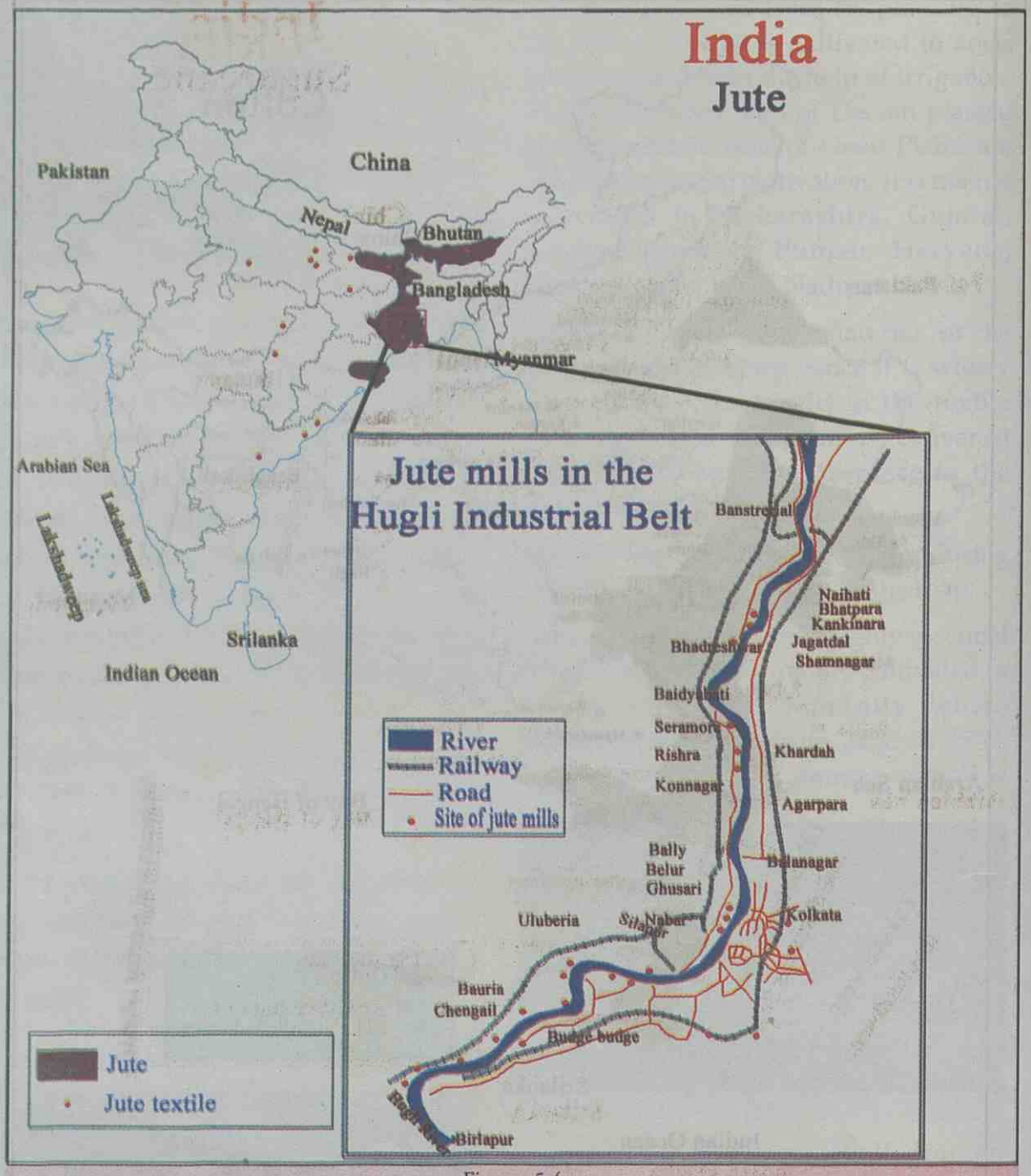


Figure - 5.4

of Deccan plateau. India has the second position in the production of sugarcane. India is known as the birth place of sugarcane. Sugar is produced from sugarcane in India. Jaggerry is another product made from sugarcane juice. The juice is to be extracted immediately after the harvest of sugarcane. Otherwise the quantity of the juice and the amount of sucrose in the juice will be less. Observe Fig. 5.5. Major sugarcane producing regions are shown shaded in the map. Places marked as '.' in the maps show the distribution of cotton, jute and sugarcane, and the areas represented by dot symbols are their respective industrial areas. Why are these industries concentrated in their respective producing centres? Discuss.

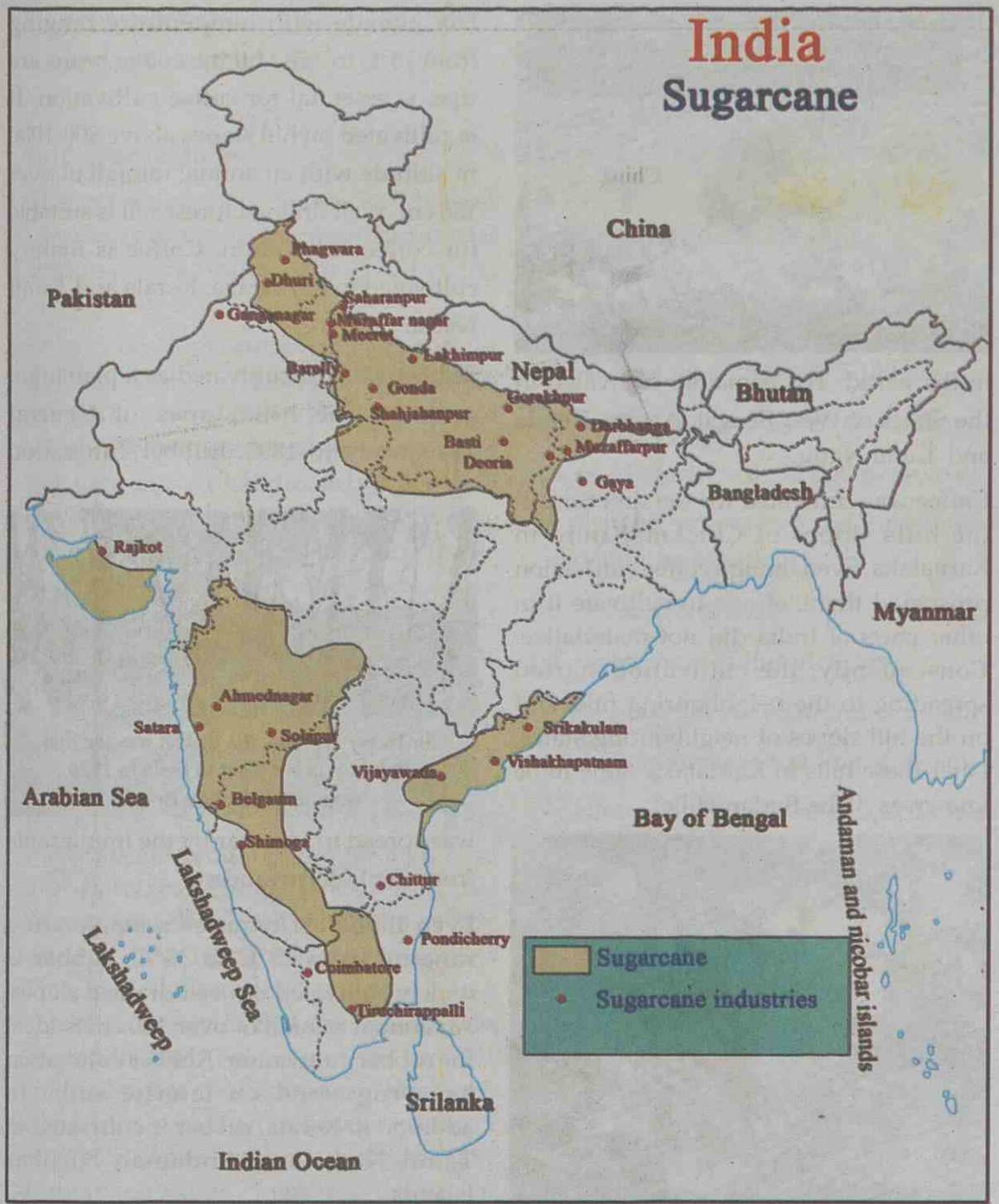
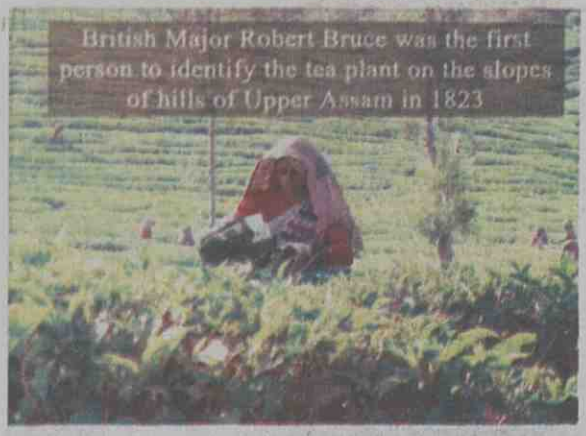


Figure - 5.5

Plantation Crops

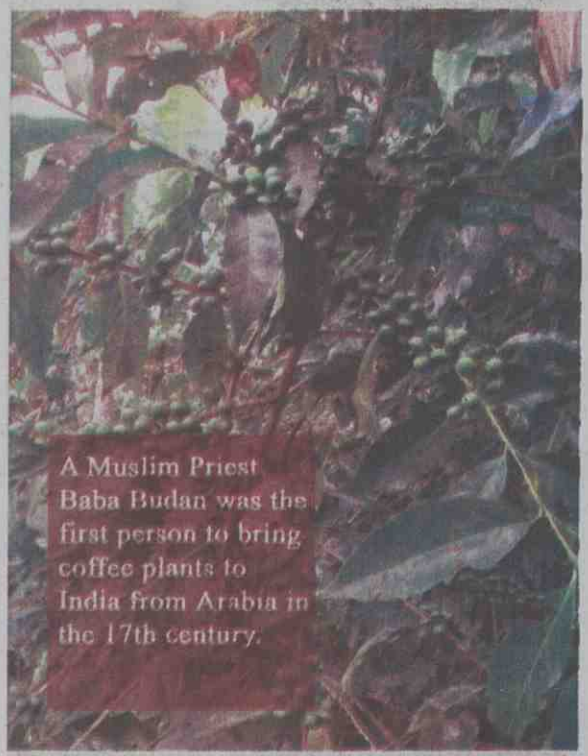
Commercial tea plantations were started in West Bengal and Assam in 1840.

Hill slopes having temperatures ranging from 25°C to 30°C are suitable for tea cultivation. An annual rainfall of 200-250 cm is desirable for the cultivation of this crop. Tea is widely cultivated in well drained soils rich in humus content. It requires a lot of labor for the cultivation of tea. India is the leading producer of tea



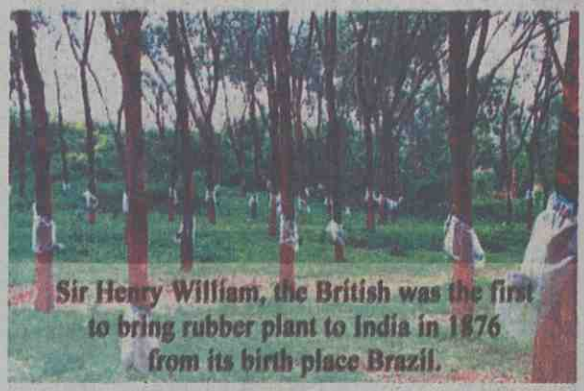
in the world. Tea is mainly cultivated in the States of West Bengal, Assam, Kerala and Tamil Nadu.

Coffee was cultivated for the first time in the hills slopes of Chickmagalore in Karnataka. Even though coffee cultivation prospered there, efforts to cultivate it in other parts of India did not materialize. Consequently, the cultivation started spreading to the neighbouring hills and on the hill slopes of neighbouring states. Later these hills in Karnataka came to be known as 'Baba Budan Hills'.



Dry climate with temperature ranging from 15°C to 25°C till the coffee beans are ripe, is essential for coffee cultivation. It is cultivated on hill slopes above 800-1000 m altitude with an annual rainfall of over 150 cm. Well drained forest soil is suitable for coffee cultivation. Coffee is mainly cultivated in Karnataka, Kerala and Tamil Nadu.

Rubber was fist cultivated as a plantation crop on the hill slopes of Central Travancore in 1895. Rubber cultivation



was spread to Malabar by the immigrants from Central Travancore.

Even though it requires a temperature ranging from 25°C to 35°C, rubber is widely cultivated on well drained slopes. An annual rainfall of over 150 cm is ideal for rubber cultivation. Rubber cultivation has progressed on laterite soils. In addition to Kerala, rubber is cultivated in Tamil Nadu and Andaman Nicobar Islands.

Industries

Agro-based industries, where various agricultural products are helpful in the industrial growth, are seen more in India. Let us examine the reasons for the concentration of these in certain places.

- Raw materials.
- Availability of water.
-

Add your findings.

The presence of minerals has helped certain regions to become industrial regions. Examine the following description.

Bokaro on the confluence of the River Bokaro and the River Damodar in Jharkhand was once an agricultural village. When coal deposits were found out here and in neighbouring Jharia, it paved way for industrial growth. The presence of iron ore in Kiriburu in the neighbouring state of Orissa created a situation for the starting of an iron and steel industry there. Availability of raw materials such as limestone and dolomite in nearby places Palamavu and Bhavanthpur in Jharkhand helped in the starting of this industry. Bokaro Steel Plant is an iron and steel industry. Raw materials are brought here through road and railways. The products from this factory are transported through a nearby canal to River Hugli and then to Kolkata Port. In earlier days coal was used as the source of energy in this plant which was started in 1964. But when the Damodar Valley Project was started, hydroelectricity began to be used as a major source of energy. When the supplementary industries like manufacturing of machines, metal arms etc were started near this center, once an agricultural village Bokaro became an industrial city. Consequently, there was a huge leap in the economy and social progress of this region. It shows that the intervention of man through the effective use of resources can make modifications on a culture.

Find out the conditions favourable for the starting of other iron and steel industries in India. Make use of the following indicators and Fig. 5.6 for this. Prepare a note based on the information you have found out.

- Tata Iron and Steel Company (TISCO), Jamshedpur
  - → Started in 1907
  - → Iron at a radius of 75-100 km
  - → Coal at a radius of 160-316 km
  - → Manganese at 50 km away
- Visweswarayya Iron and Steel Limited, (VISL) Bhadravati
  - → Started in 1923
  - → Iron at a radius of 40 km
  - → Manganese at a radius of 50 km
  - → Limestone at a radius of 25 km
- Hindustan Steel Limited, (HSL) Bhilai
  - → Started in 1957 with the technical collaboration of Russia
  - → Iron at a radius of 80 km
  - → Coal at a radius of 220-720 km
  - → Limestone at a radius of 20 km
- Hindustan Steel Limited, (HSL) Rourkela
  - → Started in 1959 with the technical collaboration of Germany
  - → Iron at a radius of 77 km
  - → Coal at a radius of 169-225 km
  - → Limestone at a radius of 222 km
- Hindustan Steel Limited, (HSL) Durgapur

→ Started in 1959 with the technical collaboration of England

→ Iron at a radius of 320 km

- Indian Iron and Steel Company (IISCO) Kulti, Bernpur, Hirapur

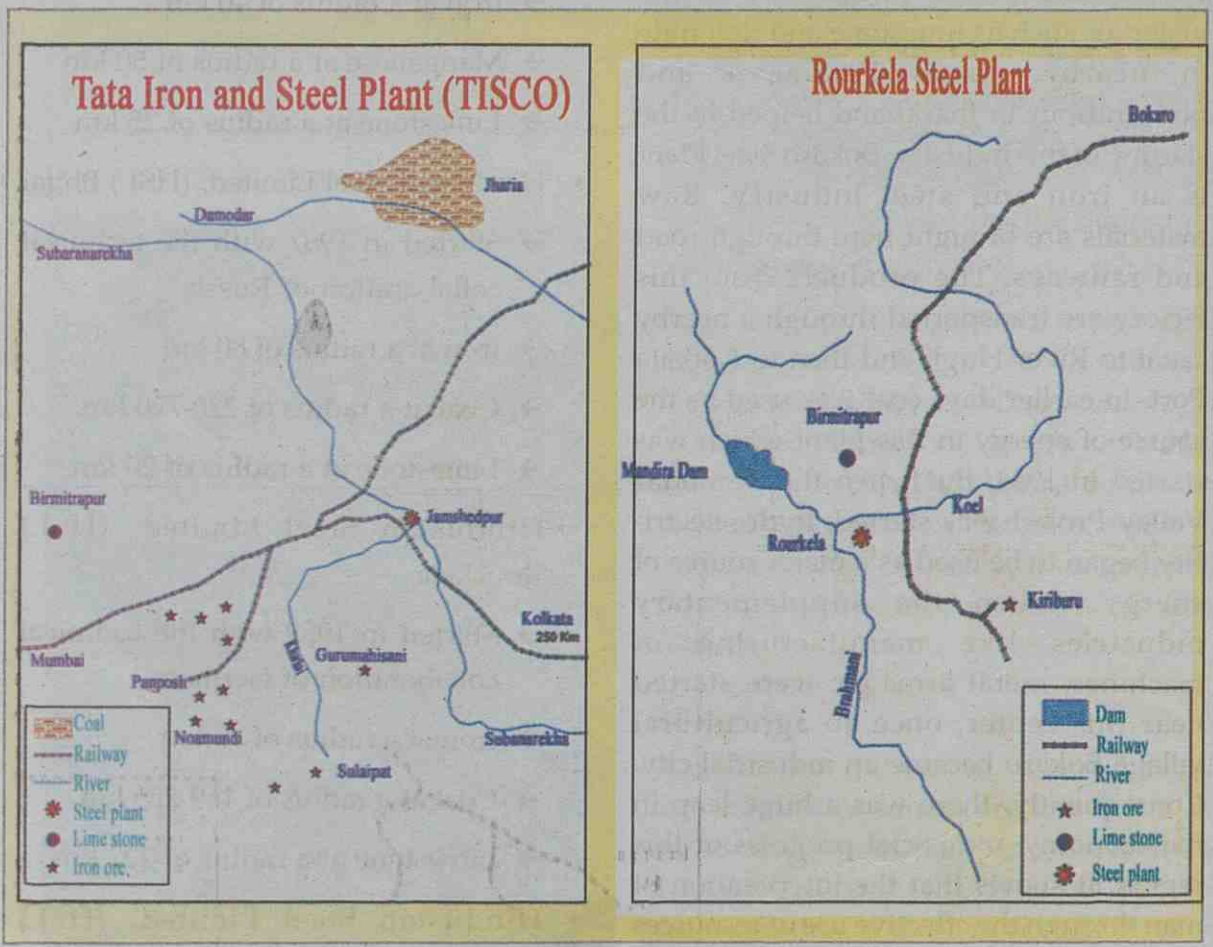
→ Started in 1972

→ Iron at a radius of 285 km

→ Coal at a radius of 137 km

You must have understood the factors influencing the location of iron and steel industries. Why are iron and steel industries not found in Kerala? Discuss.

In addition to agro-based industries and mineral based industries, a number of other industries are also found in India. Forest based industries (timber, paper etc.), chemical Industries (fertilizers, cement etc.), textile industries (wool, silk etc.) leather industries and electronic industries are among them. With the development of information technology, computer industries are also developed. The role of Technoparks and Infoparks in changing the industrial face of Kerala is noticeable. This sector plays a major role in the industrial income of Kerala.



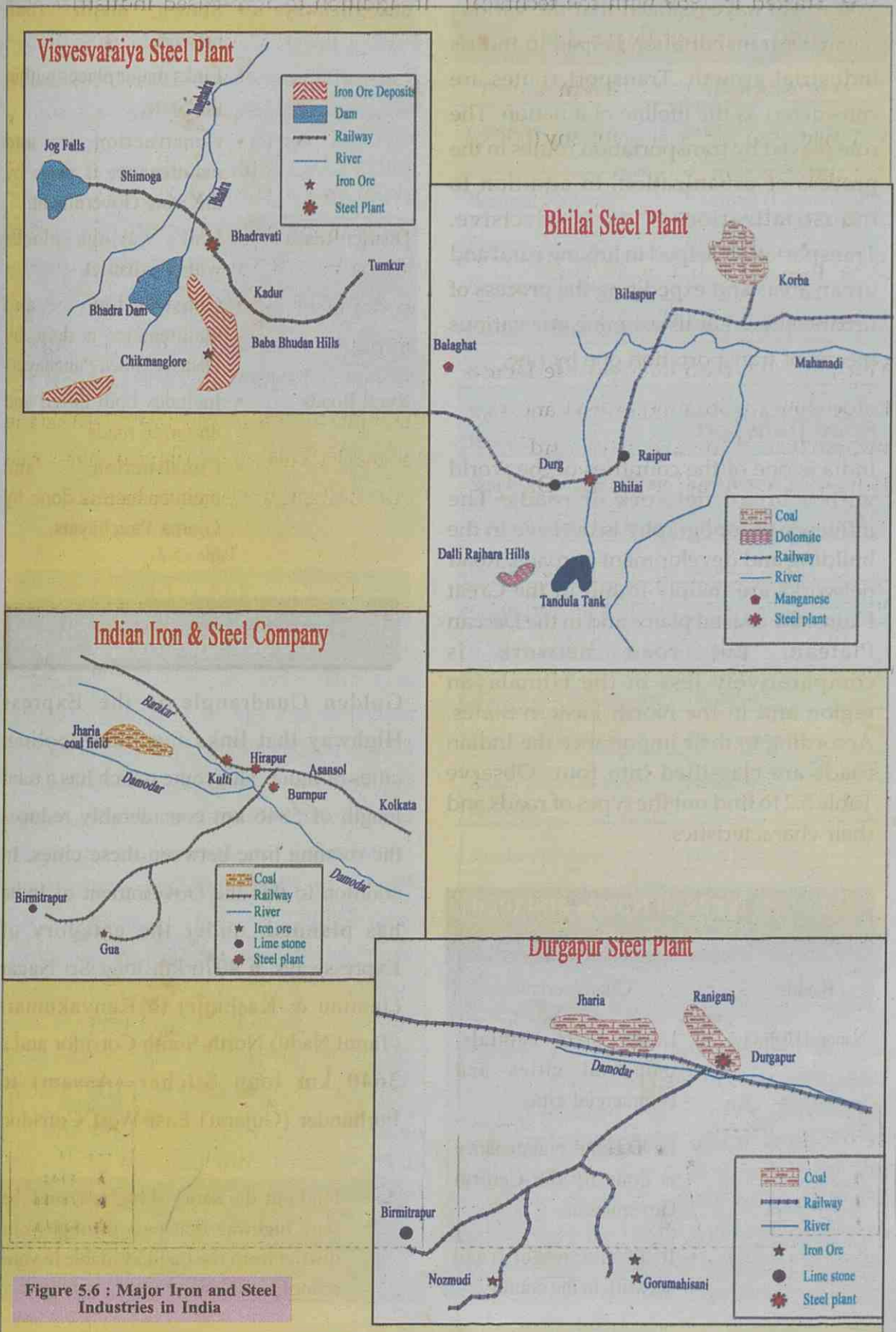


Figure 5.6 : Major Iron and Steel Industries in India

You might have realized that the various means of transportation helped in India's industrial growth. Transport routes are considered as the lifeline of a nation. The role played by transportation routes in the process of urbanization, in addition to industrialization is decisive. Transportation helped in linking rural and urban areas and expediting the process of urbanization. Let us examine our various means of transportation one by one.

Road Transport

India is one of the countries of the world with a broad network of roads. The influence of topography is decisive in the building and development of roads. Road networks are mainly found in the Great Plains, the coastal plains and in the Deccan Plateau. But road network is comparatively less in the Himalayan region and in the North Eastern States. According to their importance the Indian roads are classified into four. Observe Table 5.2 to find out the types of roads and their characteristics.

Different types of Roads and their Characteristics

Roads	Characteristics
National Highways	• Links State capitals, industrial cities and commercial cities. • Laying and maintenance is done by the Central Government. • It is the major road network in the country.
State Highways	• State's major road network. • Links major places within the State. • Construction and maintenance is done by the State Government.
District Roads	• Links various places within a district. • Construction and maintenance is done by District/Block Panchayats
Rural Roads	• Includes both tarred and un-tarred roads. • Construction and maintenance is done by Grama Panchayats.

Table - 5.2

Golden Quadrangle

Golden Quadrangle is the Express Highway that links four metropolitan cities of India. This route which has a total length of 5846 km considerably reduces the running time between these cities. In addition to this the Government of India has planned, under the category of Expressways, a 4076 km long Sri Nagar (Jammu & Kashmir) to Kanyakumari (Tamil Nadu) North-South Corridor and a 3640 km long Silchar (Assam) to Porbunder (Gujarat) East-West Corridor.

Find out the national highway and the state highway that pass through your district from the maps available in your school.

Railways

India has the largest network of railways in Asia. It is the suitable means of transport for long distance travel for both the passenger and heavy cargo. Railway network is seen more in the Great Plains, Gujarat and Tamil Nadu. Rail transport is very less in the north Eastern States of India. In Kerala, there are no railways in the districts of Idukki and Wayanad? Why is it so? Discuss.

Prepare a note on the reasons for the sparse network of roads and railways in the Himalayan region and in the North Eastern States by using the Map of India showing physiography.

Konkan Railway

Traffic through the Konkan Railway was started on 26th January 1998. This task was the toughest challenge that the Indian Railways took after the Independence. This railway line crosses about 146 rivers and streams. There are about 2000 bridges and 91 tunnels in this route. Its longest tunnel has a length of 6.5 km. This is the longest railway tunnel in Asia. This route, extending from Roha in Maharashtra to Mangalore in Karnataka for a distance of 760 km, required 3500 crore rupees for its construction. This route was laid by the Konkan Railway Corporation.

For administrative convenience Indian railway is divided into 16 zones. The following table (5.3) gives these zones and their headquarters.

Railway Zones and their Headquarters

Railway Zones	Headquarters
Central Railway	Mumbai (Sivaji Terminal)
Western Railway	Mumbai (ChurchGate)
Eastern Railway	Kolkata
Northern Railway	New Delhi
North-Eastern Railway	New Delhi
Southern Railway	Chennai
North-Eastern Frontier Railway	Maligav (Guwahati)
South-Eastern Railway	Kolkata
North Central Railway	Allahabad
North Western Railway	Jaipur
South Western Railway	Hubli
East Central Railway	Hajipur
West Central Railway	Jabalpur
East Coast railway	Bhuvaneswar
South East Central Railway	Bilaspur
Konkan Railway	Navi Mumbai

Table - 5.3

Find out the Railway Zone to which Kerala belongs.

Water Transport

The cost of construction and maintenance of water transport route is less compared to that of road and railway networks. Moreover, air pollution and noise pollution are also less. It used for the transportation of heavy cargo. Rivers, canals and 6400 km long coastline increase the possibility of water transport in India.

Water transport is divided into Ocean Water Transport and Inland Water Transport. Transportation through the rivers and lakes inside the land is known as Inland Water Transport. India's inland water transport is concentrated in the River Ganga, River Brahmaputra and in their tributaries, River Godavari, River Krishna and in their canals, in Buckingham Canals of Andhra Pradesh and Tamil Nadu, River Mandovi and River Suvari in Goa, and in the backwaters of Kerala.

The National Water Transport Authority has declared major inland waterways as National Waterways.

- NW - 1 : from Allahabad to Haldia (River Ganga) 1620 km
- NW - 2: from Sadia to Dubri (River Brahmaputra) 891 km
- NW - 3: from Kottapuram near Paravur in Ernakulum to Kollam (West Coast Canal) 205 km

You have learned earlier that India has a long coastline. The west and east coasts of India have immense potential for ocean transport. There are 12 major and about 185 minor ports in these coasts. Major ports, of India which have made their place in the international trade map, have decisive influence on the country's economy.

Which are the major ports of India and on which coast are they located? Which are India's major International Commercial Waterways?

Airways

Airways are the most speedy and the most expensive mode of transportation. In rugged terrain and in places which cannot be reached by roads and railways, airways are the only means of transportation. In earlier days the airways in India was under the control of Public Sector Undertakings like Air India and Indian Airlines. Now many private airlines also operate in India. Public and private companies have partnership in domestic and international air transport. Even though most of the states of India have domestic airports, international airports are comparatively few.

CIAL

Cochin International Airport is the first airport built in India with public participation. This was opened for public on 25th May 1999. Investors from more than 30 countries and about 10000 Indian investors made possible the realization of this airport.

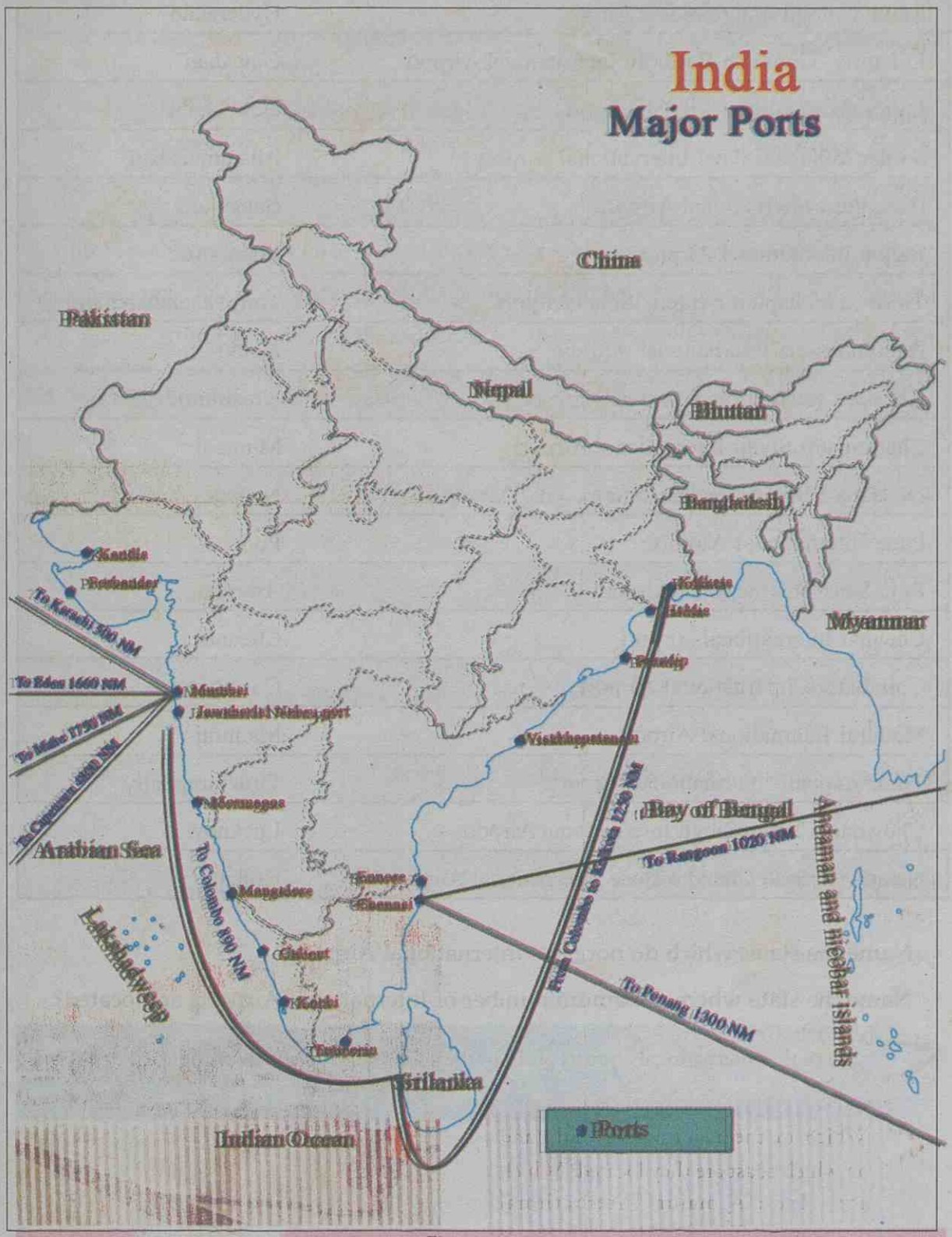

India
Major Ports
China
Pakistan
Nepal
Bhutan
Bangladesh
Myanmar
Kandla
Porbander
To Karachi 360 NM
To Aden 1660 NM
To Jeddah 1730 NM
To Capetown 4840 NM
Mumbai
Jawaharlal Nehru port
Mormugao
Arabian Sea
Mangalore
Lakshadweep
To Colombo 890 NM
Cochin
Tuticorin
Sri Lanka
Indian Ocean
Ennore
Chennai
Bay of Bengal
To Rangoon 1020 NM
Port Colombo to Chennai 1250 NM
To Penang 1300 NM
Andaman and Nicobar islands
Visakhapatnam
Paradip
Haldia
Kolkata
Ports

Figure - 5.7

Table - 5.4 International Airports in India

Airport	Place
Rajiv Gandhi International Airport	Hyderabad
Lokapriy Gopinath Bartholy International Airport	Guwahati
Indira Gandhi International Airport	New Delhi
Sardar Vallabhai Patel International Airport	Ahammedabad
Bangaluru International Airport	Bangaluru
Bajpai International Airport	Mangalore
Thiruvananthapuram International Airport	Thiruvananthapuram
Nedumbasseri International Airport	Kochi
Karippur International Airport	Kozhikode
Chattrapathi Sivaji International Airport	Mumbai
Dr. Baba Sahib Ambedkar International Airport	Nagpur
Pune International Airport	Pune
Raja Sansi International Airport	Amritsar
Chennai International Airport	Chennai
Coimbatore International Airport	Coimbatore
Madurai International Airport	Madurai
Tiruchirappalli International Airport	Tiruchirappally
Chowdari Charan Singh International Airport	Lucknow
Netaji Subhash Chandra Bose International Airport	Kolkata

- Name the states which do not have International Airports?
- Name the state where maximum number of International Airports are located?

Mark the International airports given in the above table on a map of India.

Follow up Activities

- By assessing the various means of transportation prepare a seminar on the topic 'Influence of transportation on the life of the people of India'.
- Though rainfall is scarce in Punjab, Haryana and Rajasthan, they are famous for wheat cultivation. What are the factors that facilitate wheat cultivation in these areas? How is the problem of scarcity of water solved?
- Agro based industries and mineral based industries are mainly concentrated in the Great Northern Plains and sub-continental Plateaus respectively. Explain.
- Cash crops are not cultivated throughout India. Why?
- Which are the raw materials required for iron and steel industries? Are all the major iron and steel industries located where all raw materials are available? What do you think is the reason for their location in those places?

6

INDIA - HUMAN GEOGRAPHY

We have learned from the earlier chapters about the physiography of India and the distribution of resources in India. Don't you want to know their influence on the people and their way of life? Let us examine the characteristics of the population of India, their immigration and settlements.

India's Population

The total number of people residing in a country at a specified period of time is called the population of that country. Human resources of a country have a decisive influence on the development of that country. People find out the natural resources and develop them to enable social progress.

Let us examine certain facts relating to our country's population.

- India's population according to 2001 census is 102.7 crores. (1,02,70,15,169). Considerable increase in this is expected when the final reports of 2011 census come out.
- India has the second position in the world in terms of its population, even though it has only the seventh position in terms of its size.
- India has only 2.4% of the total land area of the world while 16.87% of world's populations live here.
- One out of every six persons in the world's population is an Indian.
- Excepting China which is larger than India in terms of its size, India has more than the total population put together of all the five larger countries viz Russia, Canada, United States of America, Australia and Brazil.

Why Population Analysis?

Population analysis helps in assessing the availability of human resources for production and in assessing the need for developing basic amenities, products and

Census

The collection, consolidation, analysis and publication of various kinds of information regarding the people residing in a country at specified period of time is called the 'Census'. The census conducted in every ten years is the basis for all the analyses of population. The first census of India was conducted in 1872. However it could not include all the regions of India. The first compete census was conducted in 1881. Thereafter, census has been regularly carried out at an interval of ten years.

services. It is essential for identifying a country's population problems and for planning remedial measures.

Population Distribution

Examine the given map (4.1). Do all the places in the country have the same population distribution?

Note down the States which have more population. Which are the regions where the population is vey less?

Wide disparity in population among the states can be noticed. Examine Table 6.1. The population characteristics of various States and Union Territories are given there.

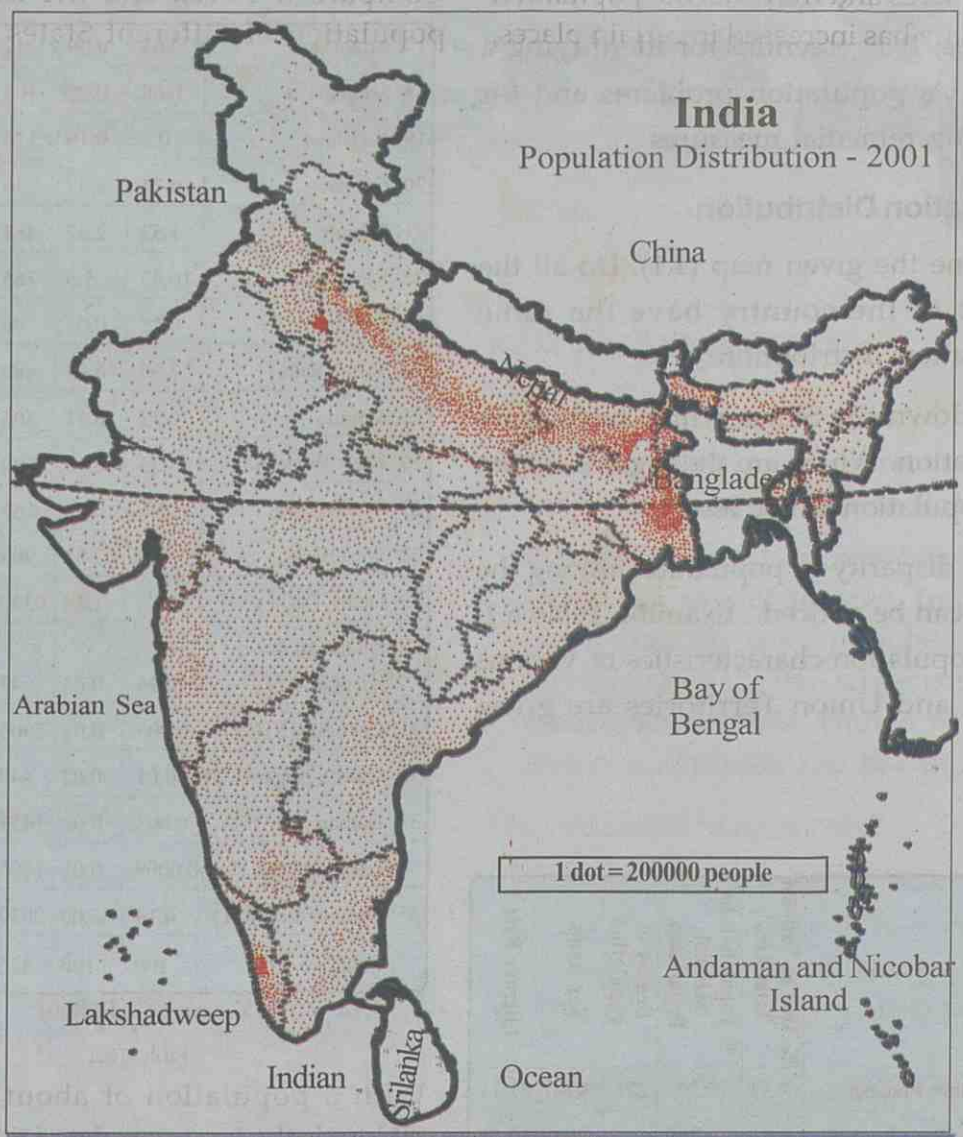
Sl. No.	States	% Area to National Total Area	% Population to National Population	Density of Population	Sex Ratio	Literacy Rate
1	Andhra Pradesh	8.37	7.37	275	978	61.11
2	Arunachal Pradesh	2.55	0.11	13	893	54.74
3	Assam	2.39	2.59	340	935	64.28
4	Chhattisgarh	4.11	2.25	154	989	65.18
5	Bihar	9.86	8.07	880	919	47.53
6	Goa	0.11	0.13	363	961	82.32
7	Gujarat	5.96	4.93	258	920	69.97
8	Haryana	1.34	2.05	477	861	68.59
9	Himachal Pradesh	1.69	0.59	109	968	77.13
10	Jammu & Kashmir	6.76	0.98	99	892	54.46
11	Jharkhand	2.42	2.62	338	941	54.13
12	Karnataka	5.83	5.13	275	965	67.04
13	Kerala	1.31	3.1	819	1058	90.92
14	Madhya Pradesh	9.38	5.88	196	919	64.11
15	Maharashtra	9.36	9.42	314	922	77.27
16	Manipur	0.68	0.23	103	978	68.87
17	Mizoram	0.64	0.09	42	935	88.49
18	Meghalaya	0.68	0.22	103	972	63.31
19	Nagaland	0.5	0.19	120	900	67.11
20	Orissa	4.74	3.57	236	972	63.61
21	Punjab	1.53	2.37	484	876	69.95
22	Rajasthan[3]	10.43	5.5	165	921	61.03
23	Sikkim	0.21	0.05	76	875	69.68
24	Tamil Nadu	3.96	6.07	480	987	73.47
25	Tripura	0.32	0.31	305	948	73.66
26	Uttar Pradesh	7.33	16.17	690	898	57.36
27	Uttarakhand	1.6	0.83	159	962	72.28
28	West Bengal	5.7	7.81	903	934	69.22
29	Delhi (NCT)	0.05	1.34	9340	821	81.82
30	Andaman & Nicobar (UT)	0.24	0.03	43	846	81.18
31	Chandigarh (UT)	0.003	0.09	7900	777	85.65
32	Dardra Nagar (UT)	0.01	0.02	449	812	60.03
33	Daman Diu (UT)	0.003	0.02	1413	710	81.09
34	Lakshadweep (UT)	0.0009	0.01	1895	948	87.52
35	Pondicherry (UT)	0.14	0.09	2030	1001	81.49
	India	100	100	325	933	65.38

Census of India 2001

Table - 6.1

With a population of about 5.5 lakhs Sikkim is the least populated State. At the same time with a population of about 16.6 crores Uttar Pradesh has the first place in the country. Population of this State is more than the total population of Pakistan which is in the sixth position in the world.

About 76% of the total population of the country is in the ten States viz Uttar Pradesh, Maharashtra, Bihar, West Bengal, Andhra Pradesh, Tamil Nadu, Madhya Pradesh, Rajasthan, Karnataka and Gujarat. At the same time the population in Sikkim (0.05%), Jammu & Kashmir (0.98%), Arunachal Pradesh (0.17%) and Uttarakhand (0.83%) is very less.



Population Distribution - 2001

Figure - 6.1

Find out the characteristics of distribution of population by comparing the given map (Fig 6.1) and the table (6.1).

Imbalances in the Distribution of Population

Do the physiographic, socio-cultural and economic factors influence the distribution of population in the country? Imagine.

Have you noticed that people reside away from hostile conditions? Likewise they make use of favourable conditions to the maximum and settle down crowded in certain places.

- What could be the reasons for low population in India's north and northeast?
- Why are Great Plains of north India and the river deltas thickly populated?
- Developments in irrigation facilities including the canals resulted in the increase in population in the deserts of Rajasthan.
- The physiography of the state of Jharkhand was not suitable for a comfortable living. But since this region is a storehouse of energy

resources and minerals the population density has increased in certain places.

- The growth of road, rail and other transportation and communication networks has influenced the distribution of population in those states which are part of the Peninsular Plateau.
- Even though population is less in mountainous regions, towns there have higher density of population.

Density of Population

Density is the ratio between population and the area. Density is described as the number of persons living in an area of 1 sq. km.

Compare the area and the density of population of different States given in Table 6.1.

Find out the States with high density of population from the map (Fig 6.2). Examine to which physiographic divisions those States belong. Similarly examine which are the States where the density of population is less and to which physiographic division they belong. You can understand the reasons for this when you compare the map shown in the earlier chapter, India's physiographic divisions (Fig 6.3) and the map showing the density of population (Fig 6.2). Prepare a note on this.

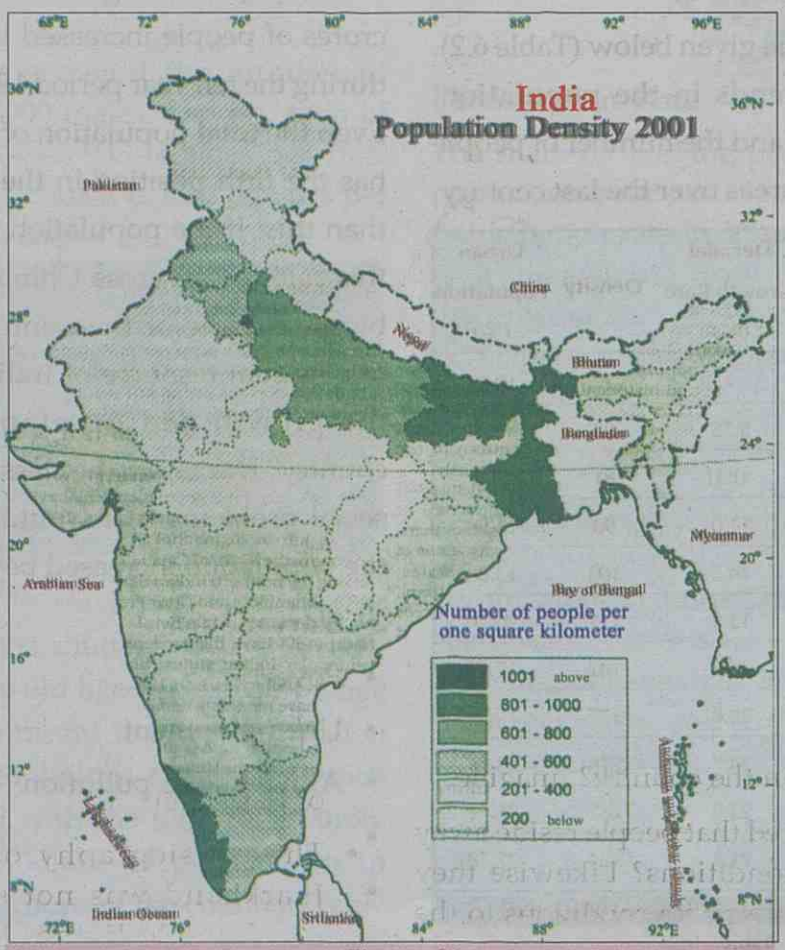


Figure - 6.2

Examine Table 6.1 and Fig 6.2 and answer the following questions related to the density of population.

- Three States with very high density of population.
- States with density of less than 100 persons per sq. km.
- State and Union Territory with the lowest density of population.
- Density of population of Delhi.
- Density of population of Arunachal Pradesh.

Population Growth

The changes in population of a given place at a specified period of time are called the population growth. Population growth is expressed in percentage.

Examine the table given below (Table 6.2). It shows the trends in the population, growth, density and the number of people living in urban areas over the last century.

Year	Population (Crores)	Decadal Growth Rate (%)	Density	Urban Population (%)
1901	23.8	-	77	10.84
1911	25.2	5.75	82	10.92
1921	25.1	0.31	81	11.2
1931	27.9	11.0	90	11.99
1941	31.8	14.2	103	13.86
1951	36.1	13.3	117	17.3
1961	43.9	21.6	142	17.97
1971	54.8	24.8	177	19.91
1981	68.6	24.7	216	23.34
1991	84.3	23.8	267	25.71
2001	102.7	21.3	324	27.78

Growth of Population in India - 1901 - 2001
Table - 6.2

- Only 23.8 crores of people were there in India in 1901. The increase in population in India in the last 100 years is 78.87 crores.
- The density of population which was less than 100 per sq. km in 1941 increased to above 200 in 1981 and above 300 in 2001.
- The population growth in the country was negative during the period 1911-1921. Famine, hunger and infectious diseases together reduced the population of the country.
- Urbanization is increasing rapidly in the country. About 90% of the population of the country was rural until a century ago.

You must have understood the trends in India's population growth. More than 18 crores of people increased in the country during the ten year period 1991-2001 itself. Even the total population of Brazil, which has the fifth position in the world is less than this. If the population is growing at this rate, it can cross China's population by the middle of this century. How can this human resource of India be used for the growth and development of the country? Discuss in the class. What are the social problems that would be created if the population increased beyond control?

- Starvation
- Poverty
- Unemployment
- Atmospheric pollution
-
-

National Population Policy

A National Population Policy was formulated in 1976 to control population growth and thereby ensure country's socio-economic development. Its main aim was to take measures of family planning and family welfare schemes to reach people. Measures for the betterment of health and education of all the people of the country are the speciality of our National Population Policy. National Population Policy is being implemented with timely changes.

Let us examine the other characteristics of India's population.

Sex Ratio

By sex ratio is meant the number of females per 1000 males. The sex ratio of India in 2001 was 933 females per 1000 males. But in Kerala it is 1058 females per 1000 males.

Examine the table (6.1) and understand how the sex ratio in various States is.

- Where is the sex ratio lowest?
- Which is the State where the females are more than males?

Age Structure

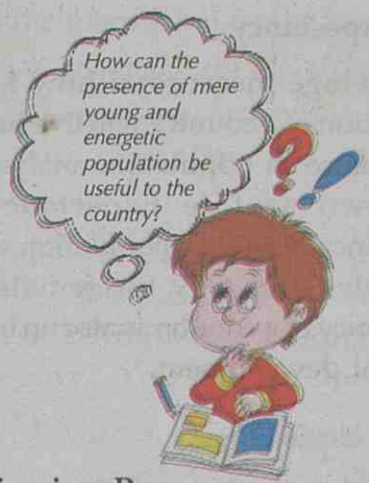
The population includes people from new born babies to old aged persons. By age structure it is meant that the population is grouped into various age groups which are compared with the total population. Examine the share of population in different age groups of the country (Table 6.3).

Age Structure

Age Group	Percentage of Population
Below 14 years	34.33
15-59	58.7
Above 60 years	6.97

Table - 6.3

People in the age group 15-60 are more in the population.



Participation Rate

The share of working people in the total population is the participation rate. India's participation rate in 2001 was 39.26. This is a measuring tool for the social development of India. Separate participation rates for males and females are calculated.

Dependency Ratio

The dependency ratio is the ratio of people dependent on the working population within a population. Children below 15 years of age, persons above 60 years of age, students, house-wives and those retired from services are included in this. Dependency ratio according to 2001 census in India is 60.7.

Literacy Rate

Ability to read and write and understand the meaning of it is known as literacy.

Literacy rate is the ratio of the number of literates to the total population. This was 65.38% in 2001. (Male 75.8% and female 54.16%). Discuss the situation for the low in female literacy rate.

Examine Table 6.1 and find out the States which are at the top and the bottom in literacy rate.

Life Expectancy

The average measure of how long the population of a country will live has much significance in population analysis. This is known as Life Expectancy. Life expectancy of India's population was 63.9 for males and 66.9 for females. Life expectancy of a country is also an indicator of social development.

Kerala Model

3.1% of the population of the country live in Kerala (31,836,619 persons) which has only 1.3% of the area of the country. Our state has the 12th position in terms of population among the states of the country. Population structure of Kerala is a model not only for the country but also for other countries of the world.

Examine the table given below.

Population	India	Kerala
Birth Rate	26 per 1000	17.2 per 1000
Death Rate	8.5 per 1000	6.4 per 1000
Infant Mortality Rate	68 per 1000	14 per 1000
Life Expectancy	65.4 years	71 years
Literacy Rate	64.8%	90.92%
Population Growth	2,11%	1.31%
Sex Ratio	933 per 1000	1058 per 1000

Table - 6.4

Find out where Kerala stands in terms of population structure compared to the national averages and prepare a note. They are the indicators of socio-cultural development of the State. Discuss the factors responsible for Kerala's social development. Seek the help of media and periodicals.

Births and deaths have a major role to play in changing a country's population structure. Are they the only reasons for the increase or decrease of population of a particular region? Think about that.

Migration

Does the movement and settling of population from one place to another result in the redistribution of population in these two places? Births and deaths mainly change the number of people of a place. But migration causes comprehensive changes not only in the number of population but also in the social and cultural characteristics.

Migration is the movement of people leaving one's own place and settling down in another place.

Migration from rural areas to urban areas (Rural-Urban Migration) is widely seen in our country. In addition to this, migration also takes place from rural to rural, urban to urban and urban to rural areas.

Reasons for Migration

People migrate to different countries even when they keep emotional attachment with the place where they were born and

brought up. Examine the following information.

There is a place called 'Kudiyan Mala' in Kannur District. As its name suggests most of the people of this area are hardworking migrant farmers. Rubber is the main cultivation of this area. Augustine reached Kudiyan Mala in 1940 along with his parents from Changanassery in Kottayam district. Augustine and his wife Rosakutty have thousand tongues when asked about their children.

Augustine and Rosakutty live along with George, the eldest of there three sons. George lives by rubber tapping and other household work. His only daughter is a nursing student in Bangaluru.

Their second son Joy, who had no job in his place, now runs his own business in Mumbai. His wife who is from Delhi is also there for his help.

Their youngest son, Jimmy is very smart. He is working in Dubai now after completing his engineering studies from Chennai. His wife who is a doctor is a native of Kollam.

Jiji, their only daughter works as a nurse in a private hospital. She was married to a person in the nearby village Chembathotty. Her husband who was in the Gulf has now returned home, unable to continue there after the recession.

Even though no children are nearby it seems that George and Rosakutty do not face any problems. 'Even though they are in different places they are all living happily'. Both of them are happy that their children and grand children are coming home next month.

Haven't you got some idea about Augustine's family? It can be seen that various types of migrations took place from their parents to grand children.

- Migration from one country to another is the International Migration. Can you say which members in the family by did the international migration?
- Which members did migration within the different states of the country? It can be said that they did interstate migration.
- Migration to different places within the state is called as intrastate migration. Doesn't Augustine belong to this category? You can see more such examples.

Emigrant Immigrant

They are two usages associated with International Migration. While migrations coming to a country are known as immigration, migration from one country to another is known as emigration. One who leaves the country is called emigrant and one who comes to a country is called immigrant.

People are pushed to other countries due to many factors such as poverty in some places, unemployment, lack of basic amenities, natural disasters, war etc. They are the factors (push factors) responsible for forced migration. At the same time certain factors that attract migration (Pull factors) speed up the process of migration. Can you mention these factors?

- Attractive job
- Higher salary
-
-
-

Now understand the following factors also.

- Migrants have a major share in the population of metropolitan cities like Mumbai, Delhi and Kolkata.
- Industrial growth and urbanization are the major factors that attract migrants to the States of Maharashtra, Delhi, Haryana and Gujarat.
- More people migrate to other States from Uttar Pradesh and Bihar.
- People from Kerala, which has a higher educational status, migrate to the major cites of the country and to other countries in search of better employment.
- Rural to rural migration in India is seen mainly among the female. At the same the majority of those under the rural-urban migration are males. Can you find out the reasons for this?

Impact of Migration

Migration cannot be seen only as the shifting of places of a group of people. Migration is the reorganization of human resources. It creates crucial changes in the social, cultural and economic sectors. You can imagine the changes that would take place in the population when migration occurs between two places. What other changes would be there in a place which is subjected to migration? Have you ever thought of how the rubber cultivation spread in Kudiyanmala, where we earlier met Augustine and in other highland regions of Malabar?

Migration has caused negative and positive implications. Collect more information on this and conduct a debate in the class.

Settlements

Have you learned about the primitive man? We too had ancestors who wandered in the forests and lived by collecting fruits and tubers and hunting animals and birds. We have progressed a lot from those people who lived in caves and under the tree. When man, who wandered aimlessly in search of food, started cultivation of what he wanted, it paved way for agricultural revolution. He started living in houses made from materials available in nearby places of his agricultural field. That is how the settlements are formed.

Now humans are engaged in various earning sectors and live in houses built of his choices. They lead the society by engaging in agriculture, fishing, mining, industry, commerce and other service sectors.

Settlements are places where human beings live permanently. Do settlements form in all the places? Discuss the role of the following factors in determining the site for a settlement.

- Topography
- Availability of water
- Fertility of the soil
-

Settlements can be classified into two based on the employment sectors where people are engaged.

1. Rural Settlements
2. Urban Settlements

Rural Settlements

Agriculture and allied activities are the major employment sector for rural people. Majority of the population depend directly or indirectly on agriculture for livelihood.

Rural people build settlements making use of locally available raw materials. They are seen as isolated settlements, hamlets or villages. Let us examine the peculiarities of each of them.

Topography, climate and availability of water often influence the location of settlements. Certain rural people select separate settlements for security. Socio-cultural factors (Caste, religion, class, language) also have an important role in the type of settlements.

Now let us examine various types of rural settlements.

Compact Settlements

In some places settlements are seen very close together. This is known as compact settlement. They are usually formed on the banks of rivers or on fertile plains. Common worship and social laws are the peculiarities of these settlements. Good co-operation and companionship among the people are generally seen here.

- Compact settlements are found in the fertile alluvial plains of north India and in places where water is available in Rajasthan.

Rural Settlements

Isolated Settlements	Hamlet	Villages
• One or two houses • Seen in broad agricultural fields and forests	• Some houses • Seen in broad agricultural areas. • Have small shops, post office and places of worship.	• Many houses • Have public buildings, places of worship, shops, post office, primary health centres, better roads etc. • Settlements develop in places where local roads meet.

Table - 6.5

- Rural people have formed compact settlements in Assam and Nagaland in view of security.

Dispersed Settlements

In places where physiography is not favourable people find out suitable places and build scattered settlements. These are called the dispersed settlements.

Most of the dispersed settlements are found in Himachal Pradesh, Uttaranchal and North Eastern States. Find out the reasons for this.

Settlement patterns

Imagine that we are viewing a group of settlements from an air plane or from atop a hill. They together seem to form a pattern rather than appear as individual houses. It will be clear that settlements are formed in different shapes.

Do you know that the influence of physiography, the availability of transportation facilities and the availability of water are the major factors that give different shapes to them. Linear Pattern, Circular Pattern, Triangle Pattern, and Star Pattern are some of the patterns commonly seen.

Complete the table by including the possible patterns for the given regions.

Characteristics of Settlements	Name
Settlements found parallel to roads or rivers	
Settlements found around a water body or around a place of worship	
Settlements formed in between places when roads or railways cross	
Settlements formed at the junction where a number of roads join.	

Table - 6.6

Urban Settlements

The major characteristics of urban settlements are that houses are seen close together and majority of the people are engaged in non-agricultural activities. Commerce, industry and various service sectors are the peculiarities of urban centres. Find out the other characteristics of urban areas.

Urban centres are classified in India on the basis of following four factors.

1. Places with more than 5000 population
2. More than 75% of the population engaged in non-agricultural activities
3. Density of population more than 400 per sq.km
4. Municipalities, corporations and cantonments

Urban centres are classified as towns, cities, metropolitan cities and megalopolis based on their size.

Town

Urban centres with less than one lakh population are called towns.

City

Urban centres with more than one lakh population and importance to service sectors with greater actvities.

Metropolitan City

Urban centres with more than ten lakh population are metropolitan cities.

Megalopolis

The conglomeration of many large cities is known as megalopolis.

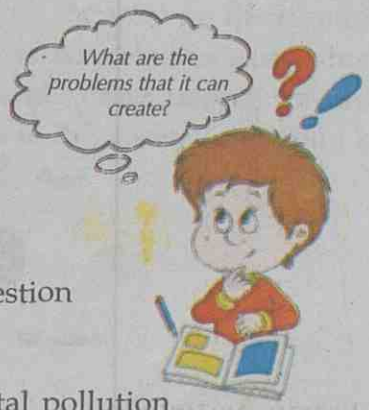
Urbanization in India

According to 2001 census 27.78% of the people of India live in urban areas. The percent of urban population is more in Goa and Mizoram. Half of the population of these States engage in non-agricultural activities and live in urban centres. At the same time percent of urban population is very low in the States of Himachal Pradesh and Bihar. Examine the following table (6.7) and understand the share of urban population in these States.

Urban Population More		Urban Population Less	
States	(%)	States	(%)
Goa	49.8	Himachal Pradesh	9.8
Mizoram	49.6	Bihar	10.5
Tamil Nadu	44.0	Sikkim	11.1
Maharashtra	42.4	Assam	12.9

Table - 6.7

Urbanization is increasing rapidly in the developing countries including India. Rural to urban migration leads to population explosion in urban areas. Metropolitan cities like Mumbai, Kolkata and Delhi have more population than they can accommodate.



- Traffic congestion
- Slums
- Environmental pollution
- Problems of houseless people
- Water scarcity
- Infectious diseases

Classification of Urban Centres

Urban centers in India are classified on the bases of population and the services they offer.

Classification Based on Population

According to the census Indian towns are classified into six based on the size of population. Examine the table (6.8).

Population	Class	% of Urban Population
1 lakh and above	Class I	61.5
50,000 - 100,000	Class II	12.3
20,000 - 50,000	Class III	15.0
10,000 - 20,000	Class IV	8.1
5000 - 10,000	Class V	2.8
Less than 5000	Class VI	0.3

Census 2001

Table - 6.8

According to the Census 2001 there were 35 metropolitan cities in India.

Understand the metropolitan cities of India and their population size by examining the map (Fig 6.3).

About 60% of the urban population live in these 35 Class I towns. As per 2001 census there were 5161 towns in 6 classes in India. Among this 20% of the urban population is in the first 6 cities! Examine the given map (Fig 6.3). Which are these six cities?

- Mumbai
- Kolkata
-
-
-
-

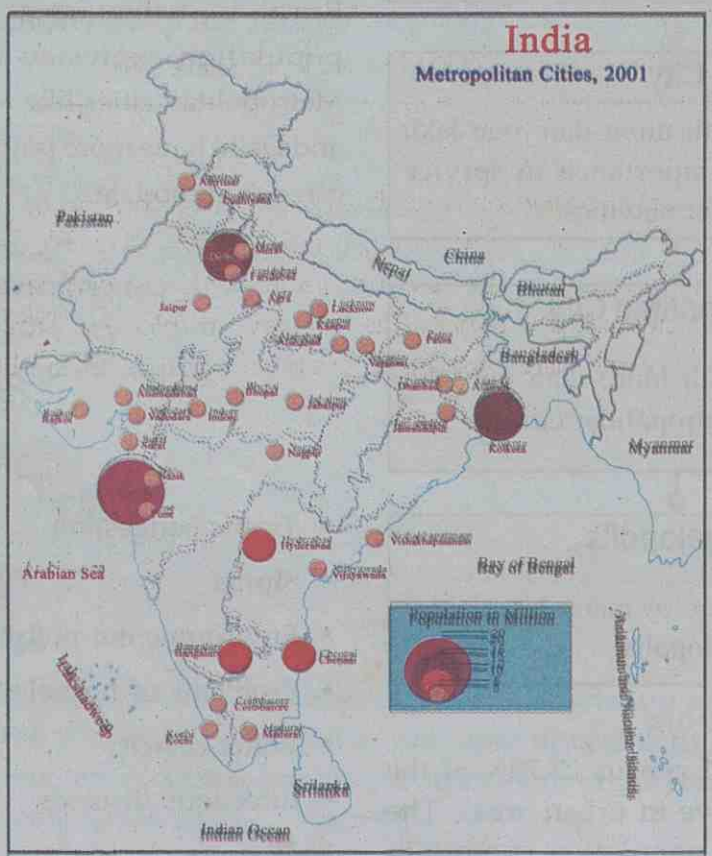


Figure - 6.3

Classification Based on Urban Functions

Each town has its own fields of influence. Towns attract these fields of influence to it through various functions offered by them. When expected functions are not available from one city people move to another city. Hence various functions offered by cities are responsible for the growth and existence of cities.

We have cities offering various functions such as industry, commerce, trade, education, transportation, tourism, administration, defense etc. There are also towns offering specialized functions. For example, let us take the case of Jamshedpur. Industry is its main function.

Towns can be classified on the basis of dominant function they offer. Examine the following examples.

Functions	Indian Towns
Administrative Towns	Delhi, Bhopal, Lucknow, Gandhi Nagar, Imphal, Srinagar
Industrial Towns	Jamshedpur, Hugli, Bhilai, Coimbatore, Mumbai
Transport Towns	Visakhapatnam, Kundla, Chennai, Agra, Itarsi
Mining Towns	Ranigunj, Jharia, Digboi
Commercial Towns	Kolkata, Ahmadabad, Chennai, Bangalore
Defense Towns (Cantonments)	Ambala, Jullundher, Meerut, Udampur
Educational Towns	Rourkee, Aligargh, Varanasi
Religious / Cultural Towns	Amritsar, Madurai, Puri, Ajmir, Tirupathi, Haridwar
Resorts	Mussorie, Nainital, Simla, Ooty

Table - 6.9

We have learned in this chapter about the uneven distribution of population in India and the influence of physiography and climate on this. Does the uneven distribution of resources induce migration? We have understood that towns develop in areas where geographic and socio-cultural conditions are favourable and attract people towards them. This mutual relationship between man and nature is the basic foundation of Geography.

Works to Continue

- 2011 census process has been completed. Is census merely taking account of population? What other information is collected through the census? Enquire and find out.
- Prepare an assignment / seminar on the topic "Kerala's Population".
- What are the possibilities and threats that urbanization can pose to a developing country like India? Discuss.
- It assumed that by 2050 India would become the country with the largest population in the world. Is this human resource a boon or a bane? Conduct a debate in the class.
- Assess the role of geographical factors in the distribution of population.
- Examine the growth of population at ten years intervals from 1901 to 2001. Discuss the change in growth rate after Independence.
- How do the push and pull factors influence international migration?
- "Kerala's population structure is a model not only for the country but also for other countries of the world". Explain.
- What is the role of geographical factors in the formation of settlements? What are the differences between rural and urban settlements?
- "Urbanization is more in North Indian Plains". Discuss.

7

THE ONE AND ONLY EARTH

We understood that the earth which we inhabit is quite different from the other planets. We also learned about its many distinctive characteristics - two thirds of its surface covered with water, continents having diverse topography and the atmosphere envelopes it like a protective shield. The very fact that no other planet in the solar system has such characteristics makes the earth different from others.

Biosphere can be seen only on the earth. It was Edward Suess who defined biosphere for the first time in 1875. Biosphere comprises different types of plants and animals forming the living community and the organic and inorganic constituents needed for their survival. It is the close interrelationship between the organic and the inorganic constituents that sustains the biosphere.

It is believed that the biosphere formed in the earth approximately 3500 million years ago. The inorganic part of the earth is referred to as the geosphere. The different components of the geosphere are the lithosphere, hydrosphere and the atmosphere. It is believed that the earliest form of life appeared in the oceans as a result of physico-chemical processes that took place in the geosphere resulting from constant solar heating. The first living thing called blob was in a jelly form. Blob had the capabilty to receive energy from the surroundings, grow and replicate. All living organisms have evolved from this blob. The sphere in which living things exist is called the biosphere.

Biosphere - Characteristics

The presence of life can be seen in the atmosphere to a certain distance from the earth's surface, in the oceans and on land. You have already studied about the origin of life. Organisms take birth, grow, reproduce, die and form part of the soil as a continuous process in this sphere.

Solar radiation provides the energy source for the sustenance of all organisms of the earth. However, if there is a variation in the amount of the solar radiation it will affect the constitution of the biosphere. Biosphere is a combination of all ecosystems.

Each ecosystem in the biosphere is known by the name biome. Biosphere is formed by numerous biomes comprising

thousands of species of plants and animals.

Each biome forms the habitat of various kinds of organisms. They have characteristic climates and distinct topographical features. This creates variations in the form, life habits and means of sustenance of the organisms of the specific regions. Because of this each biome has its own characteristics and independent existence. But all these are related to each other also.

Find out the important biomes of the earth and the subgroups which belong to them from the table given below. The distribution of these is shown in the Figure 7.1.

Biomes	Subgroups
Forests	1. Tropical forests a. Equatorial rain forests b. Deciduous forests 2. Subtropical forests 3. Plants in cold climates
Deserts	1. Tropical deserts 2. Semi arid deserts 3. Coastal deserts 4. Cold deserts
Grasslands	1. Tropical savanna 2. Tropical steppe
Aquatic	1. Fresh water bodies 2. Oceans
High altitudinal	1. High altitude mountain slopes

Table 7.1

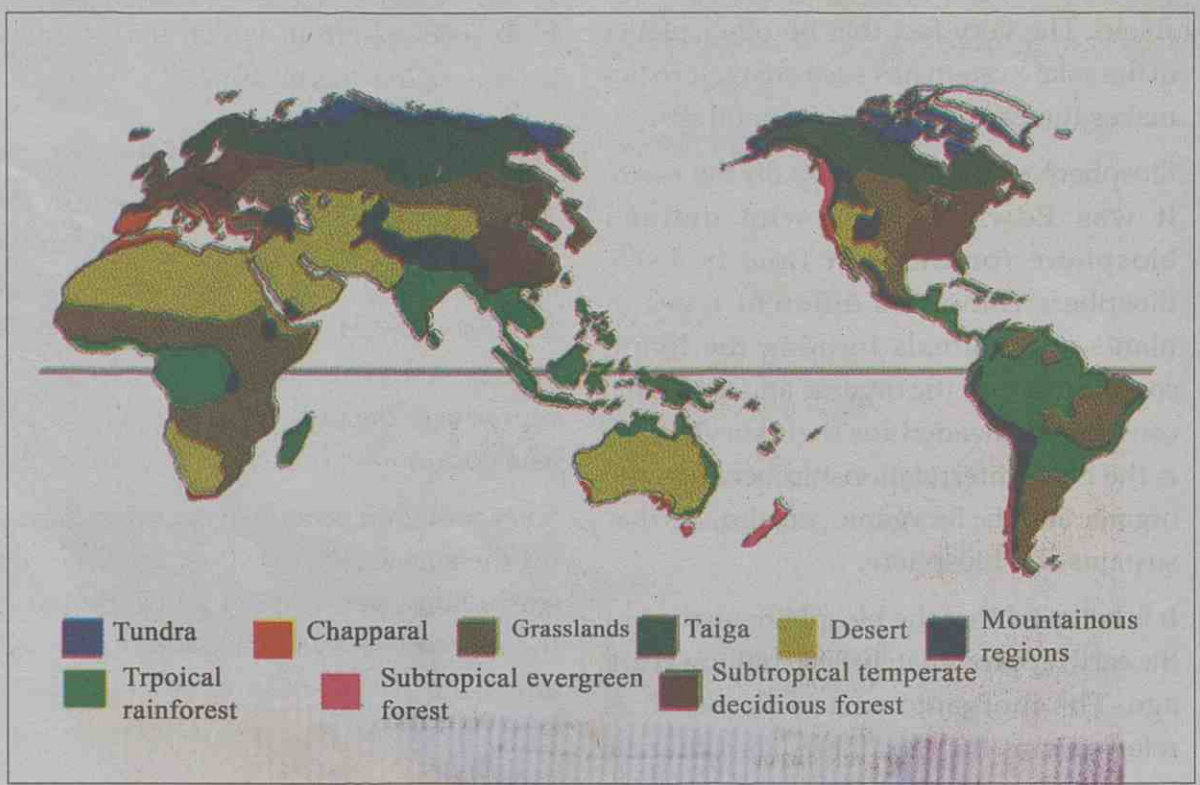


Figure - 7.1 Biomes

Let us find out the importance of various components of the geosphere in the survival of the biosphere.

Hydrosphere

Hydrosphere comprises water bodies on the surface of the earth including the oceans, lakes, rivers and glaciers. Water also exists in the vapour state in the atmosphere.

Hydrosphere plays an important role in the existence of the atmosphere in its present form. Oceans are important in this regard. When the earth was formed it had only a very thin atmosphere rich in hydrogen and helium similar to the present atmosphere of Mercury. Later the gases hydrogen and helium were expelled from the atmosphere. The gases and water vapour released at the time of the cooling of the earth helped in the formation of the atmosphere into its present form. Various types of gases and water vapour released by the volcanoes also reached the atmosphere. When the earth cooled due to continuous rains the water vapour also condensed and fell as rain. As carbon dioxide in the atmosphere started to dissolve in rain water, atmospheric temperature decreased considerably. This helped the water vapour to condense fast and fall as rain. It is this rain water that filled the depressions on the earth's surface to result in the formation of the oceans. It is estimated that these oceans formed about 4000 million years ago. It is in the oceans that the first life forms took shape. They did not breathe oxygen. Later when green plants evolved the process of conversion of carbon dioxide into food and oxygen began. As a result of this the earth's atmospheric composition became distinctly different from that of the other planets. It is this atmosphere of the earth that is the basis for the survival of life on the earth.

How do the changes in the hydrosphere affect the biosphere?

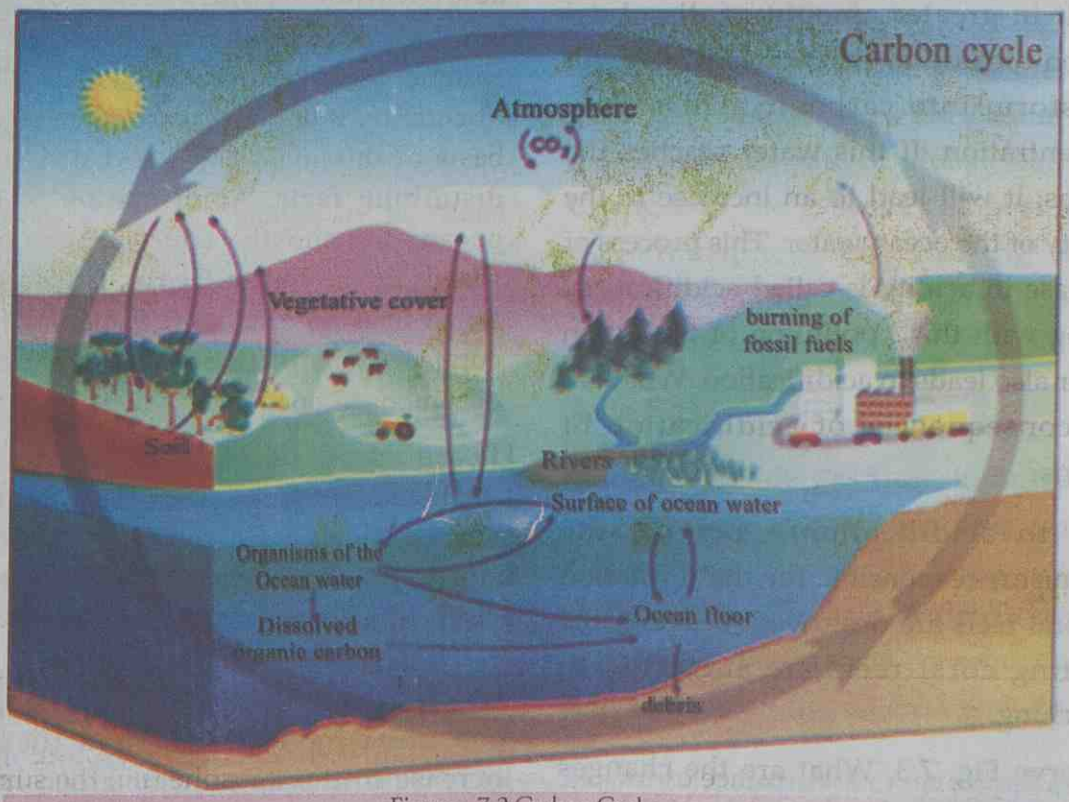


Figure - 7.2 Carbon Cycle

You have already understood that climate change is mainly caused by the increase in the green house gases including carbon dioxide. Unusual increase in carbon dioxide in the atmosphere results in changes in the characteristics of the ocean water.

Acidification of the oceans

The phenomenon which maintains a balance in the amount of the atmospheric carbon dioxide is the carbon cycle. See Fig. 7.2. Which are the sources involved in the exchange of carbon dioxide? What may be the reasons for the increase in amount of CO_2? What would happen to the oceans if the amount of carbon dioxide in the atmosphere increases considerably? Let us examine.

Considerable increase in the carbon dioxide levels in the atmosphere will result in greater amount of dissolved carbon dioxide in rain water which will transform into carbonic acid of low concentration. If this water reaches the oceans, it will lead to an increase in the acidity of the ocean water. This process of increase in acidity is called acidification. Along with this, pollution of the ocean water also leads to acidification. What are the consequences of acidification of oceans?

Due to acidification, polyps, the organisms responsible for the formation of coral reefs are destroyed. Besides, the existing coral reefs are subjected to bleaching.

Observe Fig. 7.3. What are the changes that have occurred in the coral reefs? Algae

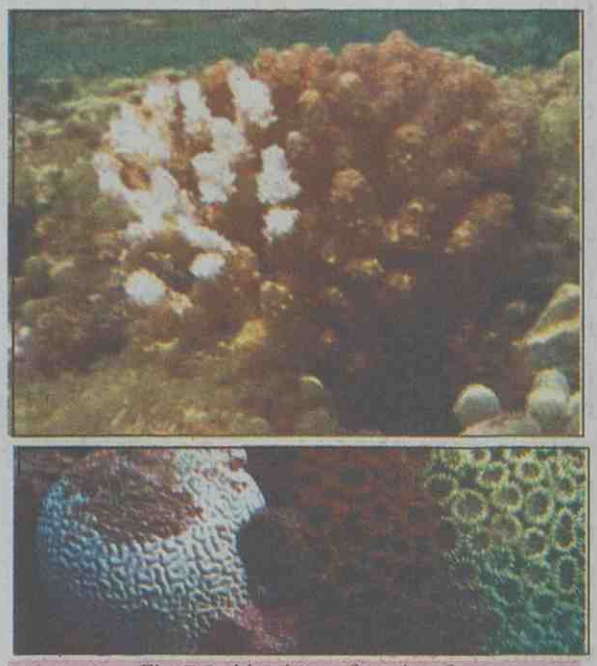


Fig. 7.3 - bleaching of coral reefs

spread over coral reefs that have undergone bleaching and they cause destruction of the reefs.

In 1982-83 it was discovered that the acidification of the Aden Sea was adversely affecting the coral islands of the eastern coast of Africa. The global study of coral reefs that was undertaken on the basis of this in 1997-98 revealed quite disturbing facts. Acidification of the oceans has mostly affected the coral islands of the Indian Ocean. It has been found that more than 50 percent of the coral deposits of these islands are in a decomposed condition.

Haven't you understood where the Lakshwadeep islands are located and how they have been formed? What would happen to these islands if the rate of acidification of oceans increased? Discuss.

Global warming and oceans

You must have understood that the increase in the amount of green house gases in the atmosphere would accelerate

the rate of global warming. Global warming increases the tempertaure of the ocean water. This would in turn affect the condition of the atmosphere and also result in changes in the nature and flow of ocean currents.

Will the ocean currents change their direction?

Since the temperature of the ocean water of the North Atlantic is relatively low, the dense ocean water of that region sink into the bottom of the ocean. The water which moves down in this fashion travels along the region at a depth of about 2.5 kilometer from the ocean surface towards the equatorial region. The Circumpolar ocean currents flowing around the Atlantic get attracted towards this region where ocean water sinks down and they flow into this region as the Gulf Stream and the North Atlantic Current after crossing the Equator. Thus currents in the oceans maintain a circulation. However, due to the abnormal rise in the atmospheric temperature in the North Atlantic the temperature of the ocean water here increased causing changes in the ocean water density. This affected the phenomenon of sinking of the ocean water which in turn influenced the ocean water circulation. If this state continues the movement of the Circumpolar current into the northern hemisphere would cease resulting in changes in the ocean currents in the Atlantic region. Studies point out that this would adversely affect fishing in the Newfoundland region.

There are reports that global warming is causing the melting of the ice caps in the Arctic and Antarctic regions. This leads to a rise in the ocean water level. As a result there is increased coastal erosion and adverse impact upon the coastal ecosystems due to saline water intrusion into the land areas. The changes that occur in the coastal ecosystems would lead to the destruction or redistribution of marine organisms.

Which other activities of man would adversely affect the marine ecosystem? Which activities influence the fresh water ecosystems comprising rivers and lakes? Discuss this. Do such interventions in your region cause changes in the ecosystems? Collect information through enquiries.

Atmosphere

You have understood that the gaseous mass enveloping the earth is known as the atmosphere.

Have you not understood that the natural gaseous composition of the atmosphere is changing due to the various activities of man? This global change has resulted in the rise of atmospheric temperature and increase in the rate of global warming. Changes in the gaseous composition of the atmosphere are causing many phenomena at the regional level too. Let us examine some of these.

Acid Rain

Sulphur dioxide gas from industries or volcanic eruptions that reaches the atmosphere dissolves in rainwater and changes it into an acid. It percipitates as acid rain. What are the consequences of acid rain? Read this report carefully.

Majority of industries in China use coal as fuel. An important gas present in the smokes that

rises from burning coal is sulphur dioxide. Estimates show that in the year 2001 alone about 25 million tons of sulphur dioxide reached the atmosphere from the Chinese industrial plants. This is 27 percent more in comparison with the figures of the year 2000. This has

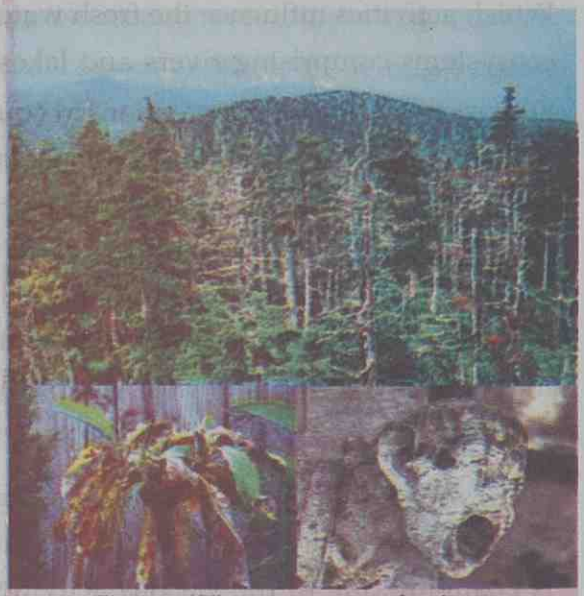


Figure 7.4 The consequences of acid rain

resulted in the occurrence of acid rain in China several times.

Examine Fig 7.4. What would be the consequences of acid rain upon the various ecosystems? Acid rain causes significant changes in living beings and fresh water sources. Haven't you understood that any changes in the natural gaseous composition of the atmosphere would affect the biosphere?

Smog

A major problem faced by the industrially developed cities such as London, Tehran, Mexico, Los Angeles, NewYork and Shanghai is smog formed in the atmosphere. The gases present in the smoke released by the factories and automobiles here involve in chemical

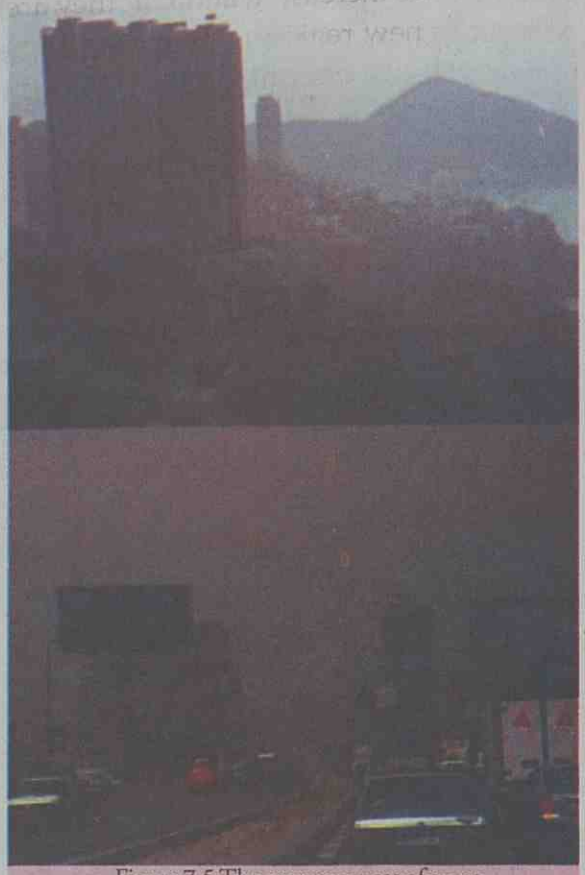


Figure 7.5 The consequences of smog

processes due to sunlight as a result of which a fog like phenomenon is created. The fog created due to smoke is known as smog.

Examine Fig. 7.5. The figure shows a scene formed during smog. Reports indicate that smog which creates problems for vehicular movement and human activities also causes serious respiratory diseases in humans. In order to reduce such problems vehicular traffic in the Chinese city of Shanghai has been controlled. Restrictions have been imposed in order to allow motor vehicle movement during certain hours and permit cycles only during other times.

Heat wave

You have understood about heat waves. Reports indicate that the intensity of the

heat waves is increasing and that they are forming in new regions.

"When the heat inside my flat became unbearable I got out of it. It was very hot outside. I managed to get into an air-conditioned bus that came by and got down in front of a super market. I spent as much time possible in the air-conditioned super market and got rid of my tiredness". This is an incident recorded in the diary of Pauline, an old woman living in Chicago. The heat wave of 13 July 1995 that spread panic in the Chicago city raised the air temperature as much as 106°F. In the following five days the temperature remained over 90°F. It is estimated that over 700 people died during these days. Thousands of people were admitted to hospitals due to this. The city experienced such an incident in 1999 also. It was in 2003 that such a natural calamity happened for the first time in Europe. The summer experienced here was the hottest one in the last five decades. The average temperature of most regions in Europe during this time was 100°F. During this natural disaster there was extensive damage to plants and animals and about 27,000 people lost their lives. What do all these reports indicate? They indicate that when the natural composition of the atmosphere is altered, it leads to changes in the biosphere that affect our ecosystem. This affects the existence of the biosphere itself. Do human interactions with nature lead to such changes? Organise a discussion about this in your class.

Lithosphere

The portion from crust to mantle is generally referred to as the lithosphere. Two thirds of the elements seen in this sphere are essential for the existence of life. The scientific community believes that if there is life anywhere else in the universe, it would be based on these elements. It is the relatively low temperature existing in the earth's crust that supports the biosphere. All organisms of the biosphere build their bodies using the elements present in the earth's crust. When organisms die these elements become part of the soil again. Haven't you studied about the micro organisms responsible for the decomposition of the bodies of organisms? The cells of living organisms which are made up of the elements of the earth's crust return to the non living world up on the death of organisms. Because of this the presence of the biosphere doesn't create any new materials or additional weight in the geosphere. However, man who established his supremacy in the biosphere created several new materials. Plastic is one such material. Since plastic doesn't decay for a long time it remains in the outer layer of the earth's crust and prevents the disintegration of materials including dead cells of organisms. This leads to changes in the constitution of soil. The increased population and the resultant pollution of the fast developed Cochin city have led to changes in the natural carrying capacity of the region.

There are several activities of man which affect the biomes of land regions. An example for this is the construction of dams. Let us examine the consequences of these activities on the biomes.

The formation of water reservoirs

When a dam is constructed across a river a water reservoir forms behind the dam. Following this the plants and animals which existed there get trapped in the reservoir. It is estimated that till date the dams that have come up in different parts of the world have caused the conversion of about 4 lakh square kilometres of land area into water reservoirs. It is indicated that this rate would increase considerably due to the increased demand for water and electricity.

Changes in ecosystems

The construction of dam prevents the natural flow of a river. Since it is a fact that the temperature at the surface of stagnant water is higher than that of flowing water, microorganisms in those areas get destroyed which threatens the existence of plants and animals there. The same situation prevails at the bottom of water reservoirs also. Here it is because of the non availability of the solar energy.

Consequences to human life

When the flow of a river is prevented, the fertile alluvium carried by it gets deposited in the reservoir of dams instead of river banks thereby affecting the water storage capacity of dams. This seriously affects the agriculture of farmers living on the banks downstream. As the soil does not get its natural fertility from clay deposits, its mineral content gets depleted leading to a situation where fertilizers have to be used. There are also reports about excessive use of fertilizers adversely affecting the quality of river water.

In a study about the fresh water organisms of the African mainland carried out by more than 200 scientists in about 5 years it was found that more than 20 percent of the species are facing threat of extinction. The important reasons determined were the inflow of poor quality water from agricultural fields, the construction of dams etc. This has seriously affected the availability of fish which is the main food of the poor people of Africa.

Affecting the earth itself

Water reservoirs can influence the earth's climate. The construction of dams results in the submergence and destruction of organisms. This leads to an increase in the content of the atmospheric green house gases such as methane, produced by the decay of the organisms. It also increases the amount of carbon dioxide which would have otherwise been used in the process of photosynthesis by plants. This accelerates global warming. Thus, the increasing human interventions in nature result in large scale changes in the natural constitution of the biosphere.

Earth - our ancestral wealth

We saw that the peculiar conditions that evolved in the geosphere after millions of years gave birth to the biosphere. Besides, for its existence and maintenance a combined action of the living and the non living components at a finer level is needed. Studies also reveal that permanent changes in any of these components affect the different aspects of life in a complex manner. Generations of humans have lived here leading their own lives from prosperity to greater prosperity by utilizing the earth's resources. The resources of the earth are also meant for

the use of unknown number of generations yet to come. However, if we follow our activities which lead to permanent changes in the fine constitution of the earth and its biosphere, this ancestral wealth of ours will get destroyed at a very fast pace. Who else other than humans-who can progress at a very fast pace, and at the same time foresee and find solutions through their collective efforts can conserve this ancestral wealth!!!

Follow up activities

1. Discuss the ways in which human interventions on the earth affect the existence of the biosphere.
2. What are the changes produced in the oceanic environment due to global warming? Collect information on these and prepare an article.
3. The earth is our ancestral wealth. We need to hand over this to our future generations. Prepare a project based on the human interventions that prevent this and also the consequences they create.

8

DEVELOPMENT AND SOCIETY

The aim of the modern governments is the welfare of the people. The increase in the production of goods and services is directed towards this goal. The governments not only increase production but also ensure just distribution of wealth. As a result the welfare of the people will be promoted. The general standard of living is improved on the basis of all these.

Development and growth

Do you think that the standard of living of all people living around us is the same? There are differences. What are the reasons for this?

Look at the figures given below.

What are the differences you come across when you compare the two figures?

Figure - 8.1

Comparing the two living situations, point out the differences in the table given below. Tick the suitable ones.

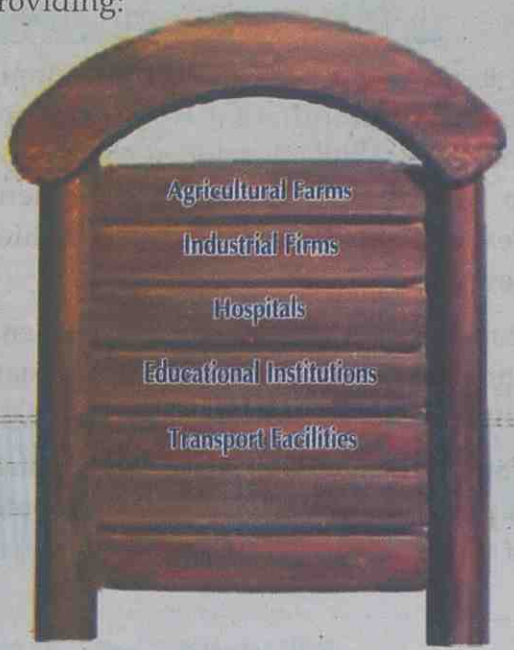
Sector	Picture 8.1a		Picture 8.1b	
	Good	Bad	Good	Bad
Housing				
Sanitation				
Health				
Food				

You have now found out the differences. Who has a better standard of living?

In which of the fields are qualitative changes required for the improvement of the standard of living of the people in figure 1?

We know that many people similar to those in Figure 8.1a live around us. These people intend to attain a better condition in their life. For these, the needs like

These basic needs can be met by providing:



They help the people to attain a better income and improved living conditions.

Ecnomic development is generally the process of increase in the income and the quality of life.

Apart from income, economic development includes food, housing, health and by education. Therefore development is both an economic and social process.

Development is realized through the production of necessary goods and services and ensuring social justice through the just distribution of the same.

Development should also consider the opportunities for social security, equality, human rights, gender equality, etc. Do you agree with this argument? Why? Prepare and present a note on this.

The Government provides food, medical facilities, etc free of cost or at concessional rates to the poor and weaker section of society, etc. What are the objectives behind this?

Have you noticed that governments at different levels give top priority to medical facilities, education, public distribution, food security programs, social welfare schemes, drinking water projects, etc?

- What are the objectives of these schemes?
- How do they help to improve the quality of life of the people?
- Conduct a discussion in the class and present the findings.

Let us now understand the meaning of 'Economic Growth'.

'Economic growth' is the process of increase in production or income for a particular year as compared to the previous year. As a result of economic growth, a country gets the ability to satisfy the wants of the people.

Economic Growth Rate

Economic growth is measured on the basis of increase in national income. When the increase is measured for a year with reference to the previous year, it is called economic growth rate.

For example:

National income during

2006 - 07 = ₹ 4283979 crores

National income during

2007 - 08 = ₹ 4947857 crores

Growth Rate = $\frac{4947857 - 4283979}{4283979} \times 100$

Can you make a formula for measuring economic growth?

Developed countries

The countries with high per capita income and good standard of living are considered as 'Developed Countries'. Western Europe, United States of America, Canada, Australia, New Zealand etc are examples for this.

In which part of the globe are most of the developed countries situated? See the globe.

Developing countries

The countries with low or moderate income are called developing countries. They have a poor standard of living when compared with developed countries. They are witnessing changes on economic and social fronts. India, Pakistan, China, Nigeria, Brazil, etc. are examples of developing countries.

We have now understood 'Growth and Development'. Identify which of the following statements represent growth. and which of them represent development.

The food production increased from 50.85 million tonnes during 1950-51 to 230. 78 million tonnes during 2007-08 in India.

The people below poverty line came down from 56.44 per cent during 1973-74 to 27 per cent during 2007-2008.

The infant mortality rate declined from 129 in 1971 to 66 (per1000) in 2001.

The number of electrified houses increased from 26.19 per cent in 1981 to 55. 85 per cent in 2001.

It is now made clear how developing countries are different from developed countries. While developed countries try to maintain their achievements, developing countries try to achieve development.

It means that development is the 'ends' and economic growth is the 'means' towards development.

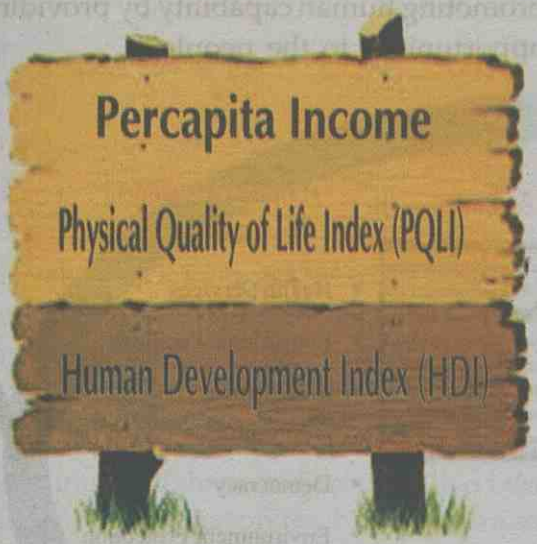
The realization of economic development is possible through the just distribution of the benefits of economic growth.

In short, economic development is a qualitative change along with economic growth.

In this background, prepare a note based on the statement: 'Growth is inevitable for attaining development; but growth alone will not ensure development'.

Development Indices

How can development of a country be measured? How will we compare the development of a country with that of another? It is possible only on the basis of certain criteria. The indicators used for evaluating the development are called 'development indices'. When the approach to development gets changed, new indices will also be developed to measure development. The important development indices are the following:



Per capita income

Per capita income was earlier regarded as the index of 'development'. Per capita income is obtained by dividing national income by the population. The higher the per capita income, the higher the development will be.

As a measure of development, per capita income suffers from a number of limitations. Let us discuss some of them.

Suppose, the income of five persons is as follows:

Find out the following from Figure 8.1

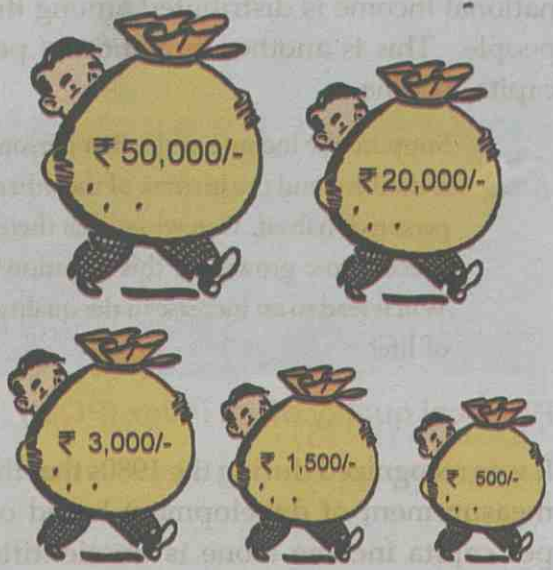


Figure - 8.2

- What is their average income?
- How many of them have income below the average?

It is made clear that there is no relation between actual income and per capita income.

Per capita income, being an average, does not help us to get a clear picture of the actual income of a person.

Based on the information given in 8.2, find out the following:

- How much of the income of the first person is greater than the average income?
- How much is the difference between the income of fifth person and the average income?

- What is the difference between the income of the first person and the fifth person?

What do the differences indicate?

It shows the variations in income distribution. In short, per capita income does not help us to understand how national income is distributed among the people. This is another limitation of per capita income.

Suppose the income of the first person is doubled and the income of the other persons is halved. Can we say that there is economic growth in this situation? Will it lead to an increase in the quality of life?

Physical quality of life index (PQLI)

It was recognized during the 1980s that the measurement of development based on per capita income alone is unscientific. Social factors like health, education, etc. are also given emphasis in the calculation of development. Accordingly, changes have taken place in development indicators. As a result , Physical Quality of Life Index was recognized in the place of per capita income. The indicators considered for measuring PQLI are:

- Basic literacy
- Infant mortality rate
- Life expectancy

PQLI has neglected income as an indicator of measuring development. This is a serious limitation.

Human development index(HDI)

United Nations Development Programme (UNDP) defines human development as follows:

Human development is the process of promoting human capability by providing opportunities to the people.

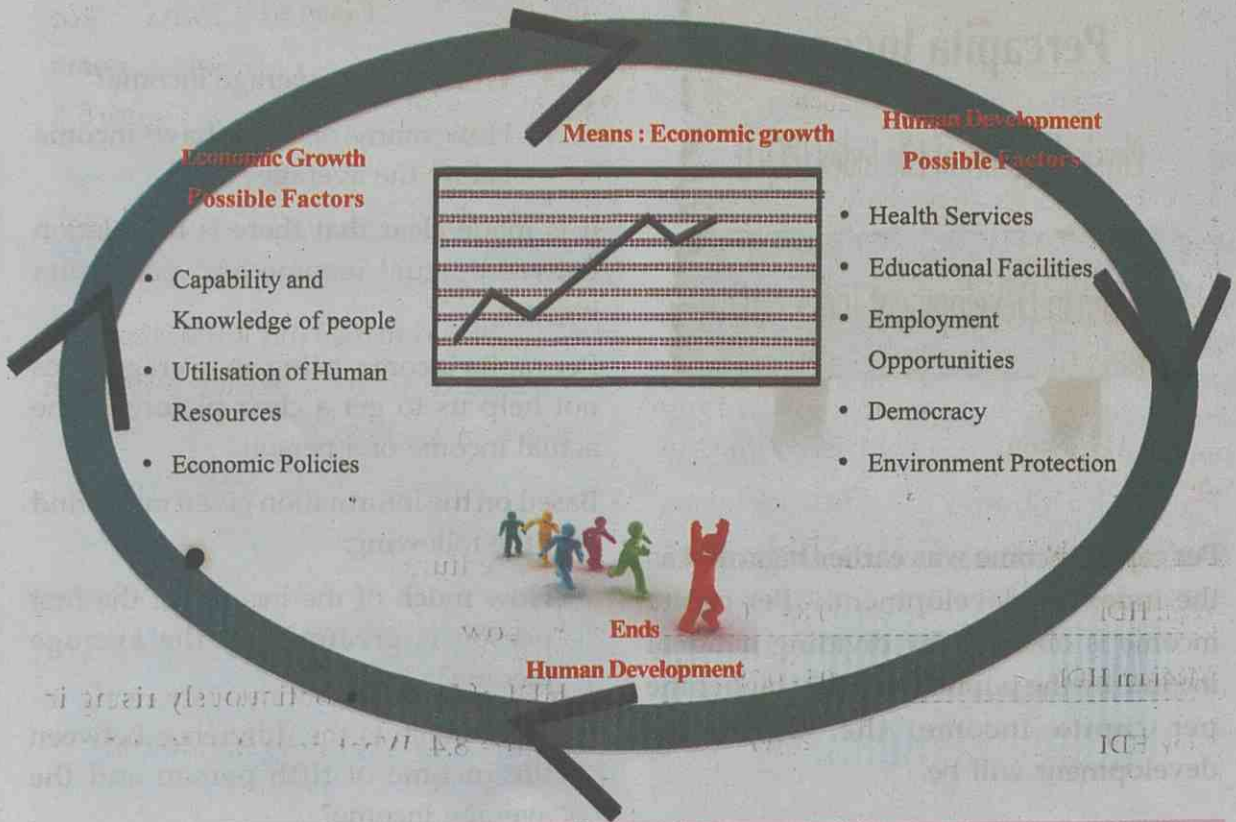


Figure - 8.3

The mutual relation between human development and economic growth is illustrated in Figure 8.3:.

It is now clear that economic growth leads to human development and vice versa. Human development is measured on the basis of the following factors:

- Life expectancy
- Literacy and gross school enrollment
- Per capita income

By taking the average of the value of each component, we get 'Human Development' Index.

UNDP has been publishing human development report every year since 1990.

Can you say that HDI as a development index is superior to PCI? Substantiate your argument.

From the above discussion, we have understood that the human development indices become sharper and holistic in the course of the. Why is it so?

Let us see the position of India in human development.

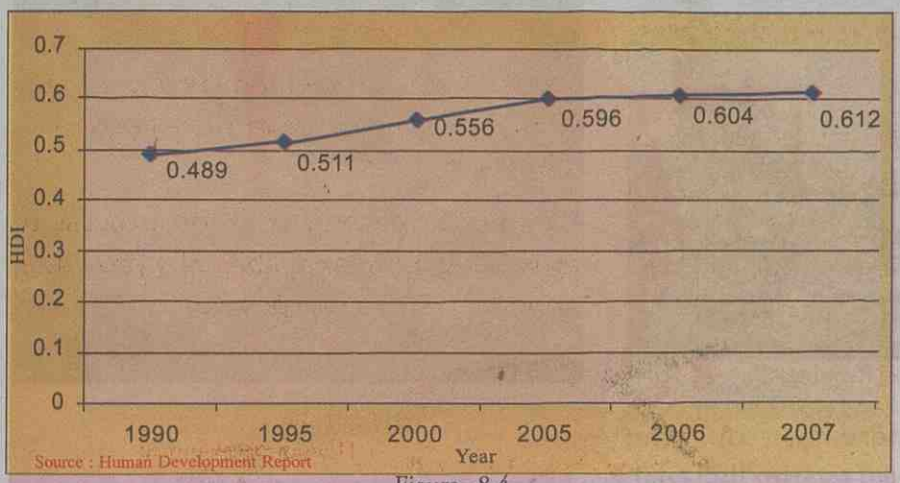


Figure - 8.4

India is in the 34th position as per Human Development Report 2009 (based on 2007 statistics). Observe the HDI of India for various years given in Figure 8.4.

The value of HDI ranges between zero and one. While one (1) represents the highest possible human development, zero(0) represents the absence of human development.

All countries of the world are classified into different categories on the basis of human development index. (See Table 8.2)

Category	HDI
High HDI	0.8 - 1.0
Medium HDI	05 - 0.79
Low HDI	<0.49

Table- 8.2

Find the following from Figure 8.4 and Table 8.2.

- To which category did India belong in the year 1990, based on the information given in Table 8.2?
  - High
  - Medium
  - Low
- HDI of India is continuously rising in Figure 8.4. What does it indicate?

Sustainable development

You have learned how industrial and agricultural revolutions influenced social and economic sectors. They changed:

- Production system
- Diversified products
- Volume of production
- Organisation of production

This has resulted in:

Figure - 8.5 - Oil Refining

- Tremendous increase in the consumption of fossil energy like coal, petrol, etc
- Faster urbanization
- Drastic jump in transport sector

Following commercialization of agriculture, there is:

- Deforestation for the cultivation of commercial crops
- Reckless/excessive use of fertilizer for boosting production
- Large scale use of pesticides

No doubt, all the above factors have led to a manifold increase in production. At the same time, environment has been affected adversely. What are the environmental problems due to the changes in the production system?

Figure 8.6 - Coal Mining

Figure 8.7
Air Pollution from factories

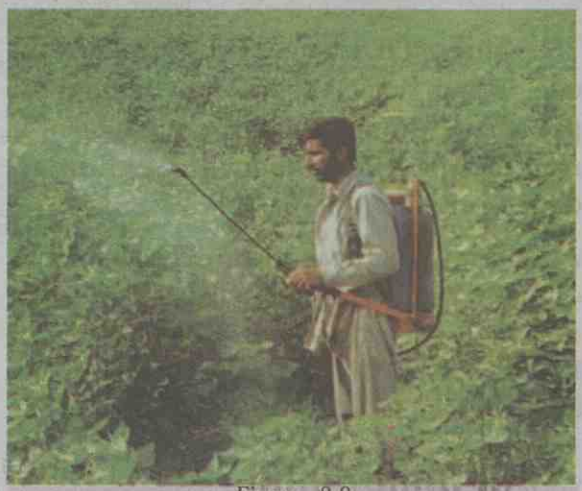


Figure - 8.8
Use of Pesticides

- Fall in the stock of fossil energy
- Diminishing of the natural fertility of the soil?

We are now aware of the circumstances that lead to environmental degradation. What are the ways in which environment affects human beings?

Figure - 8.9 - Polluted water bodies

Did it affect the living organisms? If so, explain

What is the way out for this? Write the answers.

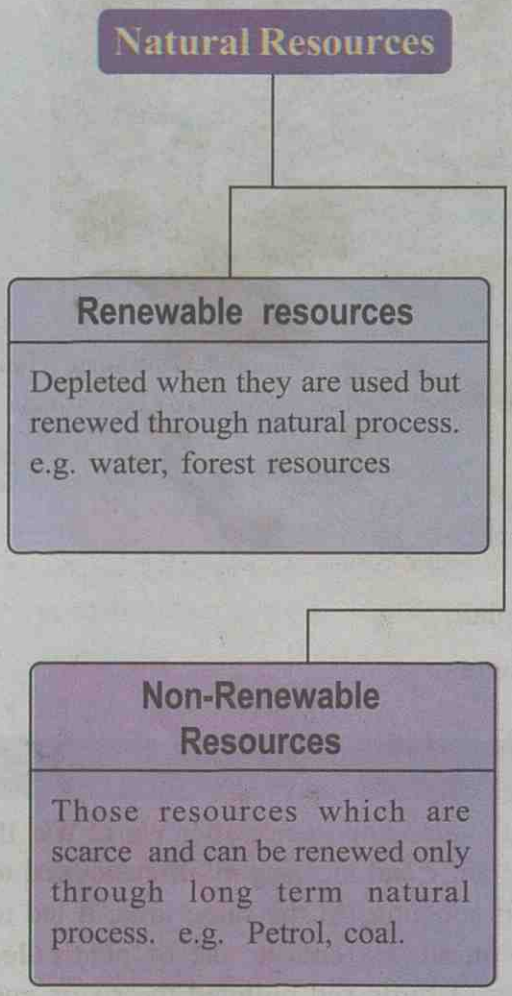
Environmental Protection

Rachel Carson with her famous book

Sustainable development gained importance after World War II. Drastic changes in technology and increase in efficiency led to a manifold increase in production. At the same time, it led to devastation of environment. Extensive use of pesticides destroyed different types of birds and polluted the rivers and wetlands. This followed the famous book "Silent Spring" written by Rachel Carson in 1962. It caused widespread protest against the use of pesticides. As a result a number of organizations in the world expanded their activities with the aim of environmental protection. Rachel Carson is recognized as the Mother of modern environment movement.

Overutilization of resources for rapid economic growth worsened environment problems. In this background, there arose wider discussions on the relation between economic growth and environment.

The deliberations established the fact that natural resources are not only meant for the present generation but also for the future generation. This vision is the essence of sustainable development.



In 1987 Brundtlanol Commission defined sustainable development for the first time. Accordingly, sustainable development is "the approach of the present generation to meet their requirements without affecting the ability of future generation to meet their requirements."

This ensures smooth availability and utilization of resources which provides social justice.

As against the above, there are a number of instances that deny social justice to different societies and generations. The activities of a society or nation can harm the interests of another society or nation. Let us watch some instances:

The" green house gases" that cause global warming are emitted by developed countries. The severe consequences of this phenomenon adversely affect the people living in regions close to the sea level.

Developed countries emit gases (CFC) that cause ozone depletion. The consequences of this are borne by the people the world over.

How do these activities stand in the way of sustainable development?

In this background, the importance of sustainable development gains importance. Today sustainable development is used in a wider sense to mean the realization of economic, social and environmental goals. It is illustrated in figure 8.10.

Are these goals mutually helpful? See an example.

- When production system is environment friendly, economic growth is sustainable and helps to maintain societal relationships.

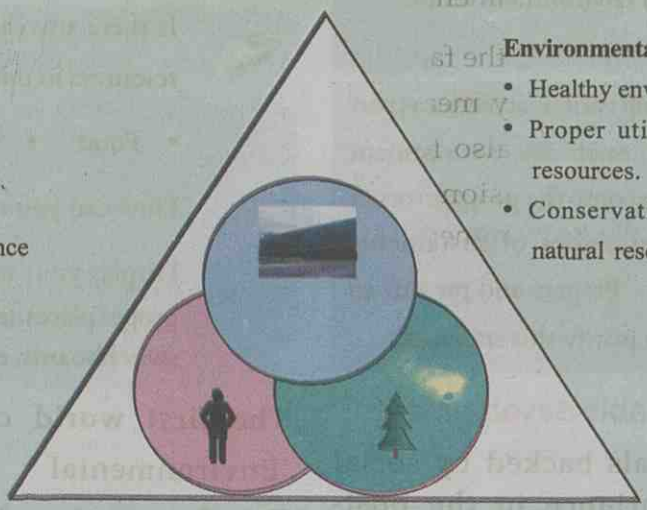
Add more examples.

Economic Goals

- Growth
- Efficiency
- Stability

Social Goals

- Equality
- Social Mobility
- Participation
- Cultural Identity
- Social Interdependence

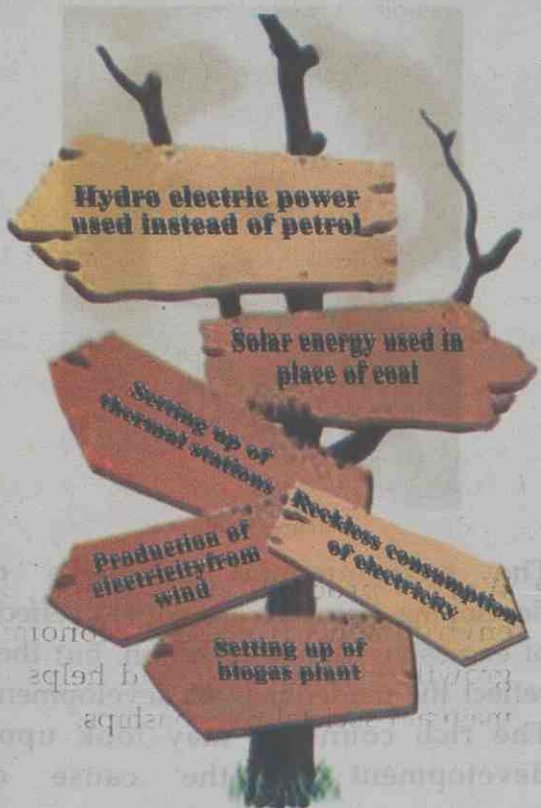


Environmental Goals

- Healthy environment
- Proper utilisation of renewable resources.
- Conservation of non-renewable natural resources.

Figure - 8.10

There are various activities around us that adversely affect sustainable development. Find out such activities from the following. Explain how they prevent sustainable development. Prepare a note and present it in the class.



Prepare suggestions for tackling the above issues. Display placards showing the do's and don'ts for the protection of environment in public places under the banner of environment clubs.

By undertaking various activities as part of ozone day, earth day, environment day etc we become the propagators as well as beneficiaries of sustainable development. Prepare and present an essay so as to justify this statement.

India and sustainable development

Development goals backed by social justice got importance in the post-independence India. We adopted a development strategy giving thrust to planning and public sector. Accordingly, efficient utilization of resources was made possible.

Howerver, policies centered on market gained importance since 1990s. This led to the over utilization of resources. As a result, social and economic inequalities have widened.

Our father of the nation, Mahatma Gandhi, expressed his opinion about the availability and use of resources like this:

Mahatma Gandhi

"Earth provides enough to satisfy every man's need but not every man's greed."

What do you understand from this regarding the use of natural resources?

Is there any careless use or misuse of resources in our everyday living?

- Food
- Water
- Electricity

How can you solve this?

Display your suggestions in posters in proper places-[e.g. Public tap, kitchen, switchboards, etc]

The first world conference on the 'Environmental Protection and Development' took place in 1972 at Stockholm, the capital of Sweden. While participating in the conference, Smt Indira Gandhi, the then Prime Minister of India, spoke:

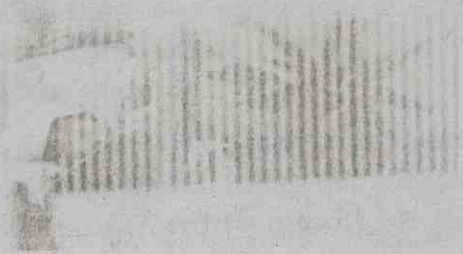
Indira Gandhi

The environmental problems of developing countries are not side effects of excessive industrialization, but they reflect the inadequacy of development. The rich countries may look upon development as the cause of

environmental destruction. But to us developing countries it is one of the primary means of improving the conditions of life or providing food, water, sanitation and shelter, etc. and of making the desert green and the mountains habitable.

What have you understood about the relation between the goal of resource utilization and environment from this?Can you connect it with the opinion of Mahatmaji?

India started enacting Environmental Laws after the 1972 Stockholm conference. Official bodies like Ministry of Forest and Environment, Pollution Control Boards, etc. function for the protection of environment. There are a number of non-governmental organizations (NGOs) operating with this goal in India. As a result, there are many efforts for the promotion of the idea of sustainable development. Still, there exist a number of problems to be addressed at national and regional level. Only when we solve these issues can we say that the ultimate goal of sustainable development has been realized.



Follow up activities

Who will face more difficulties, when sustainable development is discarded? [Rich, poor] why?

Points arrived at through discussion can be presented.

Seminar

Conduct a seminar on" Economic Activities and Environment" which should include factors that hinder sustainable development, the process of hindering it and the remedies.

Exhibition

Make an album, consisting of notes, photos including industrial disasters and the other threats to human life due to environmental impact. Based on this ,conduct an exhibition under the banner of social science club.

Group discussion

Rich countries consume 57 per cent of oil produced in the world in a year.

- Does this consumption pattern support sustainable development?
- Does this over- consumption affect environmental problems like climate change?

Project

Are there any activities that hinder sustainable development in our panchayats municipalities?

- What are the changes in environment in our region, in the last 20 years?
- What are the remedies for them?
- What are the alternatives?

Prepare a report containing all the points and submit it to your administrators.

9

DIFFERENT SECTORS IN INDIAN ECONOMY

People engaged in different economic activities are depicted in the above pictures. In the pictures, while some of them represent production of goods, others represent services. Categorize the activities shown in the pictures and record in the following table.

Production of goods	Rendering services
•	•
•	•

In these activities:

- Which are the activities directly involved in the utilization of natural resources?
- Which are the industrial activities that produce goods?
- Which are the activities that render services to others?

Normally, these economic activities are categorized into many sectors. Let us examine an example.

We are familiar with paddy cultivation. We depend on natural forces like climate, sunlight, rain, fertility of soil for the

cultivation of paddy. The output of this process is paddy, which comes under 'primary sector'. Agriculture is the most significant subcategory in the primary sector.

Why do we call this sector 'primary'?

- Activities are being undertaken by utilizing natural resources.
- These activities are inevitable for the existence of human beings.

When we analyse the production of goods, it is done through industrial process ,which is part of the 'secondary sector'. Construction works also come under this sector.

The third sector is concerned with the production of services that people require. The services that primary and secondary sectors require are provided by this sector. It is called 'tertiary sector'. In short, all economic activities can be categorized into one of these sectors viz., primary, secondary and tertiary sectors.

See the table (9.1) for understanding the activities that come under each sector.

Prepare a table showing the economic activities done by people in your region.

- Trade
- Cattle farming

Categories these economic activities into and note down in the table given below

Primary Sector	Secondary Sector	Tertiary Sector
•	•	•
•	•	•
•	•	•

Interdependence of sectors

We have seen that economic activities in an economy take place in primary, secondary and tertiary sectors. The interdependence of these sectors is helpful in attaining economic progress. The

Primary Sector	Secondary Sector	Tertiary Sector
• Agriculture and allied activities	• Industy	• Trade
• Forestry	• Electricity, gas, water supply	• Hotel
• Fishing	• Construction	• Transport and Communications
• Mining		• Storage
		• Banking
		• Insurance
		• Business
		• Real Estate
		• Social Service

Source : CSO National Accounts Statistics - Table 9.1 - Different Sectors

following are some of the situations showing the interdependence of sectors.

- What will happen to the sugar producing factories in the secondary sector if sugar cane is not supplied to them by the primary sector?
    - If sugar producing factories import sugar cane from foreign countries instead of purchasing it from domestic primary sector, what will happen to the primary sector?
- Suppose the services of transport, storage, etc, are not available to transport sugar produced in the secondary sector, what will happen to that sector?

What do these different situations indicate? Find out the answers through discussion. We have seen now how these sectors are inter-related. The interdependence can be seen in the availability of labour, raw material, trading of services, etc.

The sustainability of economy depends on the strength of interdependence among primary, secondary and tertiary sectors.

- Which of the sectors are inevitable for extracting rice from paddy, which is produced in the primary sector?
- Which are the inter-related sectors when we purchase tyre for vehicles?
- Which sector supplies raw materials for handloom industry?

Find out more examples showing the direct and indirect interdependence of each sector on others.

Contribution of each sector to the economy

We have seen that primary, secondary and tertiary sectors produce different goods and services. In order to understand the relative strength of a sector, we have to see how much goods and services is produced by each sector.

The sum of the value of goods and services produced in each sector during a particular period in a country represents the national income [NI] of that country. In India, we calculate this as Gross Domestic Product [GDP].

In the same way, each State will add up the value of final goods and services produced in each sector to get its state domestic product [SDP].

The contribution from primary, secondary and tertiary sectors to GDP and SDP during the year 2007-08 is shown in Table 9.2. Based on the following, what are the inferences that can be drawn?

- How much is the contribution of each sector to GDP/SDP?
- Which sector contributes the largest share to GDP and SDP?

- Which of the sub category in each sector contributes the largest share?
- Find out the GDP and SDP of India and Kerala respectively.

Sector	India 2007-2008 (₹ crores)	Kerala 2007-2008 (₹ crores)	India % 2007 - 2008
- Agriculture and allied activities	718278	17447	.....
- Forestry	29069	1588	.....
- Fishing	35250	2169	.....
- Mining	117431	685	.....
• Primary Sector Total	.....	.....	.....
- Industry	705130	9803	.....
- Electricity, gas, water supply	76066	1324	.....
- Construction	376266	23915	.....
• Secondary Sector	.....	.....	.....
- Trade	719262	35587	.....
- Transport and communications	371446	11736	.....
- Banking, Insurance Real Estate	594096	20496	.....
- Social service	578598	20484	.....
• Tertiary Sector	.....	.....	.....
Total *GDP*	.....	*SDP*	.....

Table - 9.2 (*Source* : CSO)

Structural changes of sectors

The structural change of sectors shows the fact that the primary sector contributes the largest share to the national income in the initial stage of development of all countries. But in due course, the importance will be shifted from the primary sector to the secondary and then from the secondary to tertiary sectors. In India also, primary sector was dominant. At present the, tertiary sector is the largest contributor in the place of the primary sector. See Table 9.3.

Sector	Share in GDP (in Crore Rs)				
	1950 - 51	1970 - 71	1990 - 91	2007 - 08	2008 - 09
Primary sector	5155	18657	164575	900028	987167
Secondary sector	1328	8470	124684	1157462	1296900
Tertiary sector	3285	15854	225773	2263402	2649115
GDP	.....	.....	.....	.....	.....

Table - 9.3 *(Source* : CSO)

After calculating GDP for each year, make suitable hints to analyse the table. What are your inferences when the table is analyzed on the basis of the hints?

- The tertiary sector contributes more share to GDP than the other two sectors.
-

The proportion of GDP contributed by the primary, secondary and the tertiary sectors can be understood from table 9.4

On the basis of the information given in Table 9.3, we can say that the contribution made by each sector to GDP is on the rise. But when we analyze Table 9.4, it is understood that the contribution of the primary sector to GDP is more than halved.

Sector	Share in GDP (in percentage)			
	1950 - 51	1970 - 71	1990 - 91	2007 - 08
Primary sector	53	43	32	21
Secondary sector	14	20	24	27
Tertiary sector	33	37	44	52
GDP	100	100	100	100

Table - 9.4 *(Source* : CSO)

What are the other inferences that can be derived from Table 9.4 and 9.5. Prepare a note based on that.

Let us see why the tertiary sector has got so much significance?

For the progress of any country, the growth of different sectors is vital. When there is high economic growth, the requirement of services goes up. As a result, we have to provide services on a large scale. This naturally raises the significance the tertiary sector or service sector.

- Hospitals
- Educational institutions

- Communication centres
- Transport facilities
- Banking, insurance
-
-

All these categories come under the tertiary sector. Table 9.5 makes it clear that the tertiary sector contributes more than the of primary and the secondary sectors to the GDP. This shows the growth of the tertiary sector.

Let us see the factors that perpetuate growth in the tertiary sector. Some examples are given below.

- To store and distribute goods produced in the primary and the secondary sectors, the services of tertiary sector are essential. Transport facilities in the tertiary sector are inevitable for the functioning of the other sectors. By providing services to other sectors, the tertiary sector gets expanded.
- As income of the people increases, the standard of living gets improved. For instance, people with high income visit tourist places and purchase luxury goods. This will promote the development of the tertiary sector.
- One of the fastest growing sectors in the tertiary sector is information technology. Growth in the sector creates employment opportunities in the tertiary sector. As a result the tertiary sector attains growth.

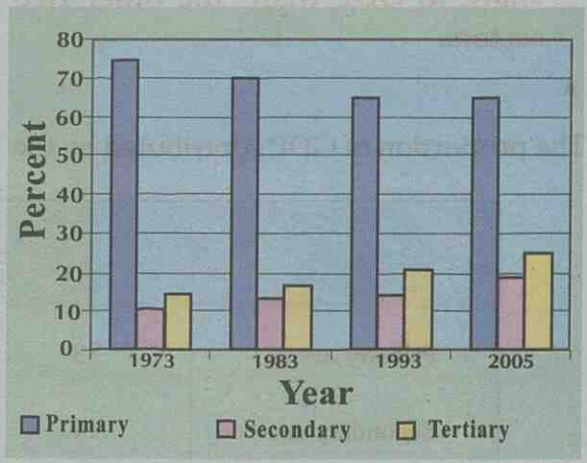
Sectors and employment opportunities

Let us see how the changes in the contribution of the primary, secondary and the tertiary sector affect employment opportunities. See Table 9.5

Sector	Employment opportunities in India (in percentage)			
	1973	1983	1993	2004 - 05
Primary Sector	74.4	69.9	64.9	56.5
Secondary Sector	10.8	13.3	14.2	18.7
Teritary Sector	14.8	16.8	20.9	24.8

Table - 9.5
Source : National Sample Survey

The data shown in Table 9.7 can be diagrammatically illustrated as follows.



What are the inferences derived from this diagram?

- Majority of the people depend on the primary sector.
- Only 43.5 per cent of the people depended on the other two sectors during 2004-05.
- As the proportion of employment in the primary sector comes down, it increases in the other two sectors.

Find out more inferences. What inferences can be arrived at by analyzing Table 9.4 and 9.5? Follow the model given below for writing inferences.

- Though the contribution of the primary sector to the national income comes down, the proportion of occupation in this sector comes down only negligibly .
- Majority of the people still depend on the primary sector for their livelihood.

The primary sector is not able to utilize properly all the persons engaged in that sector. Even when some of them are withdrawn from that sector, the total production will not be affected.

Classification in the employment sector

People around us engage in different activities. You may remember that these people were categorized and included earlier in a table.

- Out of them, which categories are getting permanent employment?

If workers are protected legally and entitled to get benefits, they are called 'organized workers'. What are the rights and benefits of workers in the organized sector?

- Job security
- Minimum wage as per law
- Fixed working hours
- Remuneration for overtime work
- Leave with pay
- Pension
-

Make an enquiry as to whether government employees get all these benefits.

Those who are not entitled to get rights and benefits like organized workers are called "unorganized workers".

People working in the agriculture sector are an example for workers in the unorganized sector. They have no fixed working hours. Their wages are low compared to those working in the organized sector.

Prepare a table consisting of unorganized workers and mention their peculiarities.

In India, it is estimated that 7 per cent of the labour force engage in the organized sector and the rest 93 per cent in the unorganized sector.

Out of the people who engage in the unorganized sector, 80 per cent of them are employed in the rural areas. They are largely engaged in agricultural activities. The other sectors in which they work are small scale trade, construction, transport, etc.

Prepare a note on the problems faced by the unorganized workers in your region.

Public sector and private sector

Some of the important production units in India and Kerala are given below

- Integral Coach factory
- Hindustan Motors
- Cochin Refinery
- FACT
-
-
-
-

Is the control of these units vested with the government? Which of them are under the complete control of the government? When the ownership of production units is completely vested with the government, these institutions are called "public sector undertakings". As against this, if the ownership is vested with private

individuals or companies, they are put in the category of "private sector undertakings".

Expand the list given above by adding more undertakings and enter them in the table given below after classifying them.

Ownership	
Private sector Undertakings	**Public Sector Undertakings**
•	•
•	•
•	•
•	•

Apart from the public and the private sectors there are joint sector and co-operative sector in India. There are undertakings operating in these two sectors. Joint sector is the coordination of the public and the private sectors.

Public sector undertakings work not only for profit but also for public welfare. Society expects many welfare activities from the government. The private sector, which operates for profit, cannot meet these goals. Public sector fulfills this and some of the activities that benefit the public are the following.

- Road development
- Dam construction
- Hospital
-

Government undertakes these activities, not for the profit but with a view to promote the welfare of the people.

Are there any activities of the government similar to these in your region? Make a proper enquiry and list them.

Follow up activities

Seminar

Will the expansion of the public sector help to increase public welfare? You can prepare a seminar paper on the topic and present it in the class.

- When various sectors of the economy operate interdependently, progress is realized. Substantiate it with an example from your region.
- Examine the peculiarities of Indian economy and state which of the following statements are applicable to India.
  - The contribution of the tertiary sector to GDP is less than that of the other two sectors.
  - The contribution of the secondary and the tertiary sector to GDP is on the rise.
  - The contribution of the tertiary sector to GDP during 2007-08 was less than 50%.
  - In terms of the share to GDP and the proportion of employment availability, the primary sector played a vital role in the early phase of development.
  - More than 50% of people in India are engaged in the primary sector.
- The workers in the organized sector are more secure than workers in unorganized sector. Substantiate it.
- List the important public sector undertakings in India and mark them in the map of India.

10

MONEY AND FINANCIAL INSTITUTIONS

In the previous chapter we learnt about many sectors in the Indian economy and the relative importance of each sector. The rise in the production of commodities in various sectors led to the exchange of goods. In the previous class you also learnt about the 'barter system'. Find out the main limitations of the barter system and complete the following list.

- The difficulty to estimate the value of commodity
-
-
-

With the advent of money, we could rectify almost all limitations of the barter system. Some of the examples given below show how money performs its functions.

- The seller gets money from the buyer when he sells the commodity . He makes use of that money to purchase goods and services he requires.
- The value of goods and services can be easily arrived at with the help of money. Let us see an example. When we say the price of rice is ₹26 per kg, it means that the value of rice is expressed in terms of money. Accordingly, one can choose the commodity.
- We keep a portion of our income for future needs. It can be stored in the form of money so that it can be used at any time.

In each of these contexts, money performs its functions in each situation. What are those functions? Find out them through discussions.

Functions of money

-
-
-

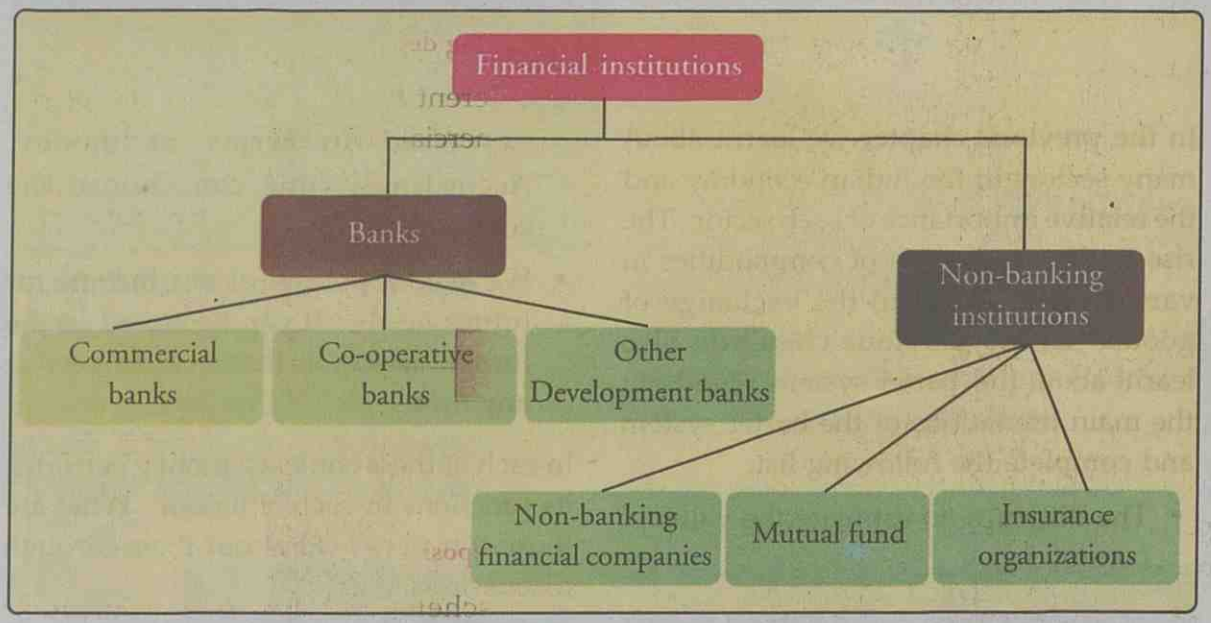
When money is accepted as a medium of exchange, economic activities become smooth. In the olden days those people who could generate savings started lending money to the needy. This led to the emergence of local money lenders. When the number of borrowers increased, local money lenders started accepting deposits. Gradually, it became a financial institution. These institutions lend out money on the basis of certain criteria. What were the criteria they considered?

- Repayment capacity
- Reliability

Often, people found it difficult to get loan due to these criteria. Moreover, these institutions were not functioning on the basis of a common guidelines. This hindered the easy availability of credit to all.

As the number of borrowers increased manifold, individuals themselves could not perform these operations. This necessitated the setting up of more financial institutions. As a result, banks and other financial intermediaries came to stay.

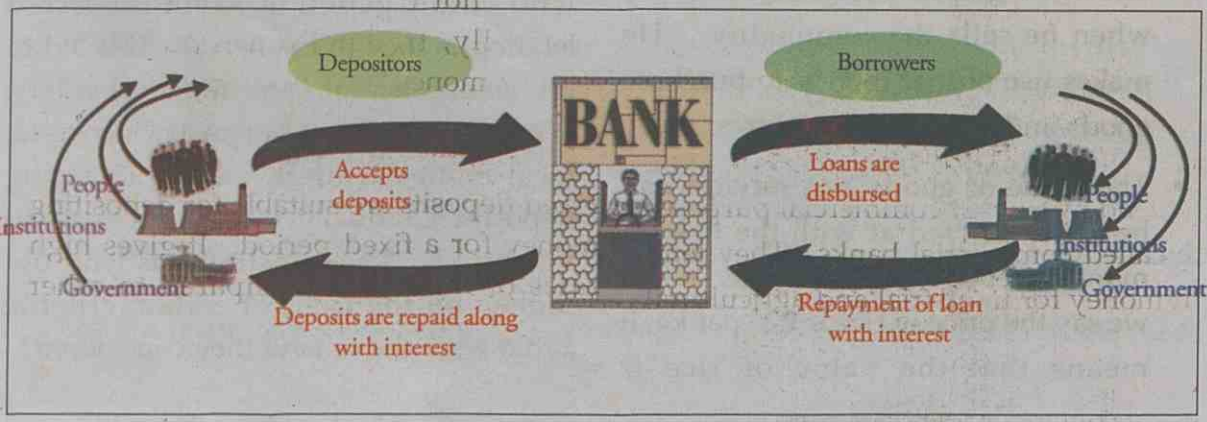
See the flow chart showing the major financial intermediaries.



Let us analyze each of them and its functions.

Banks

Banks are those institutions which accept deposits from the public and lend out money to the borrower on certain conditions. They operate on the basis of common bye-law and criteria. They act as an intermediary between borrowers and lenders. See the following figure.



Based on the information given in the figure, prepare a note on how banks act as a financial intermediary in the society.

With the transformation of local money lenders into banks, the following changes took place in their economic functions:

- Economic functions became transparent.
- People started getting more loans from banks than from money lenders
- Fall in the interest rate and intensity of exploitation
- Promoted saving habit of the people
- Loan availability led to the progress of the economy

Different types of banks

In each region, there are various banks performing different functions. List the banks in your region.

-
-
-
-

Though all types of banks perform basically the same functions, they are differentiated on the basis of certain activities. On the basis of this, banks can be categorized into different types. Each of them is discussed below.

Commercial banks

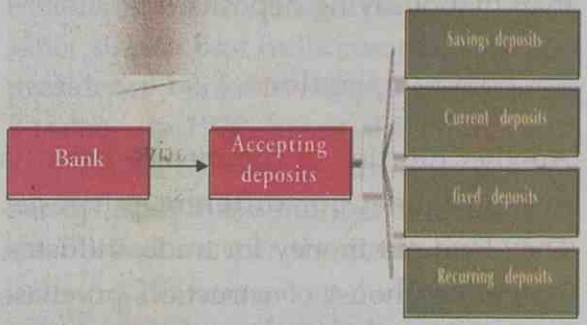
This is the oldest form in the banking sector. It follows branch banking system in India. The banks which accept deposits and lend money for commercial purposes are called commercial banks. They lend out money for industrial and agricultural purposes too. The lending of money is subject to certain conditions. These banks play a decisive role in the economic activities of a country.

Functions of commercial banks

Let us see the important functions of these banks:

1. Accepting deposits

The different types of deposits accepted by commercial banks are given in the flow chart.



Saving deposits

It is a scheme for depositing surplus income by individuals and institutions. It helps to promote saving habits of the people. Under this scheme, depositor can withdraw money as and when he/she desires. It offers low rates of interest.

Current deposits

Depositors can withdraw money from this deposit without any restriction at anytime. It does not offer any rate of interest. Normally, traders and industrialists deposit money in this scheme.

Fixed deposits

Fixed deposits are suitable for depositing money for a fixed period. It gives high rates of interest as compared to other

deposits. It can be normally withdrawn only after the expiry of the period. The higher the period of deposit, the higher the interest rate will be.

Recurring deposit

It is a variant of fixed deposit. When money is deposited at fixed intervals (daily, weekly, monthly) for a fixed period, it is called recurring deposit. It can be withdrawn only after the expiry of the period. It offers a rate of interest higher than that of saving deposits.

2. Lending operations

Another function of commercial banks is to lend money for different purposes. They lend out money for trade, industry, agriculture, house construction, purchase of vehicle, etc. on the basis of collateral securities. Which are the collaterals banks normally accept?

- Physical assets
  - Gold
  - Title deed of the property
- Salary certificate
- Fixed deposit certificate
-
-

On the basis of these, commercial banks give the following types of loans:

- Cash credit
- Loans
- Overdraft

Cash credit is given to individuals and institutions on the basis of collateral securities. Normally, it is given for commercial and industrial purposes. Accepting trade related assets as collaterals, banks provide cash credit to traders.

The liability created by individuals and institutions is called loans. Generally, loans which are given for a period of less than 18 months are called short term loans, and if it is for more than 18 months it is known as long term loans.

Overdraft is the facility given to permanent and reliable customers to withdraw money over and above the credit balance. This facility is provided to those who have current account deposit. In order to avail himself of this facility the customer has to make an agreement with the banker.

See the following example:

A person, who has a credit balance of ₹ 10,000 in his account, is in need of ₹ 12,000. When he approaches the bank he is permitted to withdraw ₹ 12,000. The excess money withdrawn over and above the credit balance is the overdraft. The bank will charge interest for the excess amount withdrawn. For utilising this facility, prior agreement with the bank is required.

Other services

Apart from basic functions like accepting deposits and lending money, banks render certain other services to their customers. The following is a board commonly seen in front of banks.

These are the services rendered by banks to the public. The bank charges a fixed amount as commission or levies service charge for these activities. Let us see each of these functions.

- Banks offer locker facilities to keep costly articles (gold, diamond, etc.) of their customers.
- Money transfer is a system whereby money can be transferred from a place to any other place in the world. Without any delay money can be sent to the needy with the help of money transfer.
- Automated Teller Machine [ATM] helps the customers to withdraw money without stepping into the banks. You may remember the facilities of ATM you studied in the previous class. Find out their peculiarities from the ATM card.

- Consumers can purchase goods with the help of credit card. With the help of ATM card, customers can purchase goods without carrying money along with them.
- Banks act as an agent by helping the customers to remit their insurance premium, telephone bills and to purchase travel tickets.

Growth of commercial banks in India

Indian banking system began with the establishment of General Bank of India in 1786. British East India company set up 3 presidency banks in Bengal, Madras and Bombay. In 1920, Imperial Bank of India was started by merging three presidency banks. After this, a number of banks were established. As per the Reserve Bank of India Act 1934, we set up the Reserve Bank of India in 1935. In 1949 India Government implemented the Banking Regulation Act with the intention of regulating commercial banks. Consequently RBI became the apex bank of all banks.

State Bank of India (SBI)

In 1955 Imperial Bank was nationalized into State Bank of India. State Bank is the agent for all transactions between Reserve Bank and both central and state governments. SBI provides financial help to agricultural sector and small scale industry by opening branches in different parts of the country. SBI is the largest commercial bank in India.

After Independence the growth of commercial banks was rapid. The reasons for this are:

- Need of money due to planned economic growth.
- Trust and interest of the public in banking sectors.
- Formation of State Bank of India and its associate banks
- Nationalization of banks
- Expansion of banking network.

Nationalization of Banks

Banking was earlier a private affair. With the domination of the objective of social welfare, nationalization was done by the Government.

Smt. Indira Gandhi, the then Prime Minister, nationalized 14 banks with assets worth more than ₹ 50 crore on 19 July 1969. What were the reasons behind the bank nationalization?

- Centralization of financial help provided by banks, to big industrialists and rich people in the society
- The economic crisis that led to the closure of many small scale industries and depression in the agriculture sector
- The awareness that banks should operate with the objective of social welfare
- Neglect of agriculture and rural economy

The growth of commercial banks after nationalization was praiseworthy. On 15 April, 1980, six more banks were nationalized. The names of the banks nationalized in two phases are given below:

Nationalized banks

- Central Bank of India
- Bank of India
- Punjab National Bank
- Bank of Baroda
- United Commercial Bank
- Canara Bank
- Dena Bank
- Syndicate Bank
- Union Bank of India
- Allahabad Bank of India
- Indian Overseas Bank
- Bank of Maharashtra
- Indian Bank
- Vijaya Bank
- Corporation Bank
- Andhra Bank
- Oriental Bank of Commerce
- Punjab and Sindh Bank
- United Bank of India

Now there are only 19 nationalised banks as New Bank of India has been merged with Punjab National Bank.

Apart from the nationalized banks, there are banks in the private sector too. Some of the private banks which have headquarters in Kerala are:

- Federal Bank
- South Indian Bank
- Catholic Syrian Bank
- Dhanalakshmi Bank

Which are the banks in your region coming under the category of commercial banks? Please list.

Cooperative bank

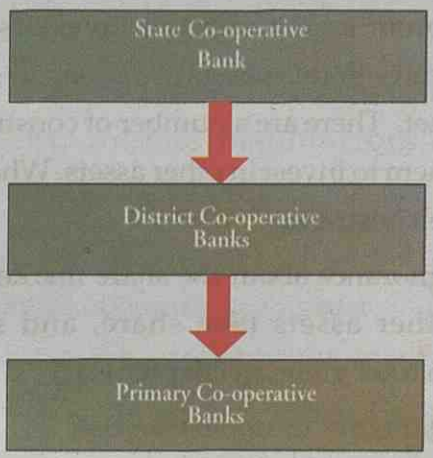
With the aim of extending financial help to farmers, handicrafts men, small scale industrialists, etc. cooperative banks were set up. Other objectives of cooperative banks are:

- To promote saving habits among the rural folk.
- To develop an attitude towards self help and mutual help
- To promote rural investment
- To give emphasis to social progress

Co-operative banks have been functioning in India for more than a century.

The structure of cooperative banks is given below.

Apart from serving the basic functions, cooperative banks operate on the basis of



principles like cooperation, self help, mutual help, etc. Co-operative banks, which have been set up for rural development, provide loans to different sectors. They are:

- Agricultural sector
- Cattle farming
- Dairy development
- Fishing
- Personal loans, etc

Nowadays cooperative banks concentrate not only on rural development but also on lending money for urban development. The latter category is known as 'Urban Cooperative Banks'. They lend money for the following:

- Self employment units
- Industrial units
- Consumer loans
- Personal loans

National Bank for Agriculture and Rural Development-NABARD

NABARD is the apex bank operating for agricultural and rural development. NABARD, under the control of the Central Government, coordinates all banks working for rural development.

Visit a cooperative bank in your region and prepare a note on its functioning.

New Generation Banks

The banks which are given license after 1991 are called New Generation Banks. The salient features of these banks are the following:

- They operate with modern technology
- They are concentrated in towns and cities.
- Most of them are in the private sector.
- They operate with the new management strategy.

List the important new generation banks.

Development banks

In addition to commercial banks and cooperative banks, certain other banks are also functioning. Among these, the most important one is Development Bank. They lend long term credit for agricultural, industrial and commercial purposes. Land development banks, aiming at agricultural development, come under this category. Likewise, Industrial Development Bank of India (IDBI) aiming at industrial development, also belongs to this category. Others are: Industrial Finance Corporation of India (IFCI), National Agricultural and Rural Development (NABARD), etc.

Non-Banking Financial Institutions (NDFI)

The institutions which operate in the financial sector but not rendering banking services are called NBFI. They operate by mobilizing money from the public in different ways. Important ones among them are discussed below.

Non-Banking Financial Companies (NBFC)

These institutions perform the basic functions of a bank like accepting deposits and lending money. But they do not provide the following services:

- Withdrawal of money using cheques.
- Issue of demand draft.

They are operating with the licence issued by the RBI. They provide the following services to the public:

- Gold loan
- Housing loan
- Hire purchase
- Chitties

Kerala State Financial Enterprises (KSFE) is a non - banking financial company in the public sector. They operate chitties, accept deposits, and lend money.

Prepare a note on KSFE in your region after visiting it.

Mutual Fund

Common man and retail investors find difficulty in investing the money in share market. There are a number of constraints for them to invest in other assets. What are these constraints?

- Ignorance about the share market and other assets (See share, and share market given in chapter (11))
- Difficulty to undertake risk
-

Mutual fund helps these investors to overcome these constraints. It is a system by which money is mobilized from such investors for investing in shares and other assets like debentures, real estate,

infrastructure, gold, etc. The profit or loss resulting from this is distributed among them. Mutual Fund Institutions operate both in private and public sectors. Some examples:

- Unit Trust of India
- LIC Mutual Fund
- SBI Mutual Fund

Insurance Institutions

These institutions provide security to life and property. Life Insurance Corporation (LIC) is a public sector organization working in this field. LIC offers different types of insurance policies so as to protect the life of individuals.

Certain Insurance Policies

- Health Insurance policy
- Accident insurance policy
- Property and asset insurance policy

Collect more information from local persons working in the LIC.

There are many private insurance companies operating in this sector. There are also public and private insurance companies giving insurance to motor vehicles.

Important public sector insurance companies

- United Insurance Company
- National Insurance Company
- Oriental Insurance Company
- New India Assurance Company

Micro Finance

The objective of micro finance is to extend financial services to low income groups. It helps to promote saving habits and self employment activities among the poor. This mechanism helps members to avail themselves of loans without providing any collaterals.

See the success story given in the box.

Bangladesh Grameen Bank

Bangladesh has a track record of giving loans at very low rate of interest to backward categories.

The founder of this institution is Prof. Mohammed Yunus, the Nobel Laureate for peace in the year 2006. It was established in 1970 as a small organization. It is now extended to 40,000 villages and 60 lakh people. Poor women earn income and improve the status by setting up enterprises with the loan provided by the Bank.

You have now understood the role of Grameen Bank in Bangladesh in promoting the standard of living of the

rural folk. There are similar instances in India. Kudumbasree in Kerala, self help group for men, etc. are some examples.

Women or men in a region form small groups. Then they mobilize a fixed sum from each member and lend it out to members. Thus self help groups (SHGs) get loan at low rate of interest. With the assistance of local bodies, SHGs run productive small enterprises. What are such activities?

- Pickles, food processing units
- Hotels
- DTP centres
-
-

SHG is a relief for the rural people who depend on money lenders who charge exorbitant rate of interest.

Private financial institutions

These institutions which are run by private individuals through mobilizing capital are called private financial institutions. Government has little control over these institutions. Though they are undertaking banking services, customers are exploited heavily.

The list of banks you prepared earlier can be classified as shown in the following table.

New trends in banking sector

Today, banking sector is witnessing drastic changes. The changes are in accordance with the policy change in the banking sector. Though they perform the basic functions, they undertake different innovative activities in order to attract the customers. Some of them can be discussed.

Commercial Banks		Co-operative Banks	Private Financial Institutions
Public Sector	Private Sector		

Electronic banking

Electronic banking is a system of helping the customers without the support of employees and banking instruments. It carries out transactions with the help of Internet. Following are its main features .

- Customers can send money anywhere in the world and remit the bills without stepping into the bank.
- Banking activities can be completed within a short time.
- Not expensive

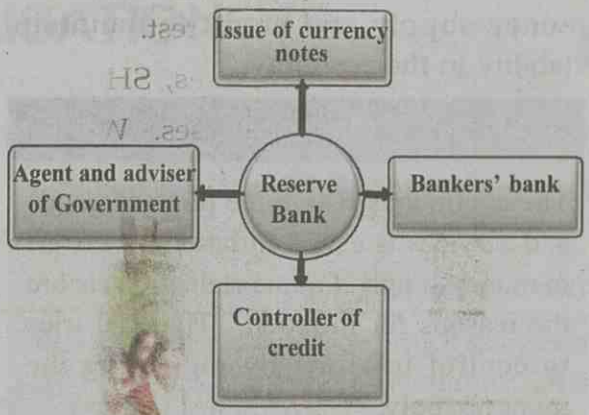
Core banking

Centralized Online Real Time Electronic (CORE) banking system allows a branch to provide services to customers of any branch of the same bank through interconnecting bank branches. It operates with the help of Internet. A customer who borrows money from a bank branch at Thiruvananthapuram can repay the loan installment with the Ernakulam branch through this system. Customers can save much time through this system, avoiding cumbersome procedures at the counter.

Reserve Bank of India (RBI)

Every country has a central bank. In a country central bank is the apex institution of monetary system. Issue of currency notes, control of credit, liquidity control, etc. are the functions of central bank. It is the duty of central bank to control the volume of money. The RBI is the central bank of India. Its headquarters is in Mumbai.

The figure showing the functions of the Reserve Bank is given below:



1. Issue of currency notes

In India, Reserve Bank has the legal right to issue all currency notes except one rupee note and subsidiary coins. The Finance Ministry is authorised to issue one rupee note and subsidiary coins. The Reserve Bank issues notes subject to certain conditions. Indian rupee acquired an international symbol (₹) in 2010.

In 2010, a symbol for Indian rupee came into existence. Now India joins the countries who have a symbol for their currency. As a result

- Indian rupee can be differentiated from other rupee currency
- Using symbol is simple and convenient
- Indian rupee symbol has become famous along with the symbol of other countries.

2. Agent and adviser of the government

The second important function of the Reserve Bank is to act as the agent and adviser of the government. The Reserve Bank gives advice to the government on money related matters.

3. Controller of Credit

The Reserve Bank of India controls the money supply and credit to maintain stability in the economy.

Inflation

The continuous rise in the price of goods and services is called inflation. Increase in money supply, fall in production etc are the reasons for inflation. The RBI tries to control inflation by regulating the money supply.

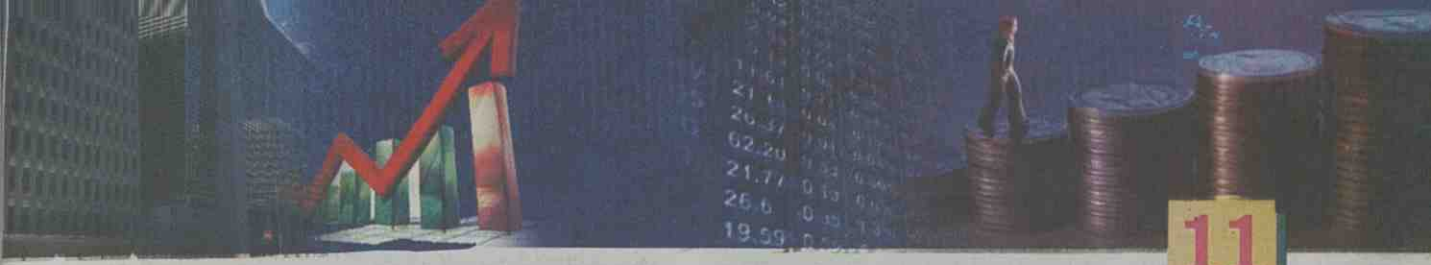
4. Bankers' Bank

Reserve Bank acts as bankers' bank. It regulates commercial banks and helps them in emergency. Hence the RBI is called bankers' bank.

The role of banks is vital for the economic growth of a country. The timely interventions of the RBI strengthen the Indian banking sector and thereby the rapid progress of the country.

Follow up activities

- Explain the factors that led to the formation of banks, saving the public from local money lenders.
- Which are the banks we see around us? Distinguish their functions.
- What are the other services, of banks in addition to the basic functions?
- Micro finance is beneficial for rural development. Substantiate it.
- Explain e-banking and core banking as new trends in the banking sector.
- Indian rupee got international recognition in 2010. How?
- Mark the symbol of the currencies of various countries in a map.



11

GLOBALISATION

Drastic changes can be witnessed across various sectors in the post-Independence India. This development can be seen in production sectors, marketing, consumption behavior, etc. For example, during the period till the 1990s we had limited choice for any product. In respect of television , the important brands were Keltron, Dynaro , BPL, etc. But what is the present situation?

- Name the companies which sell TVs in the market now.
- Which of them are Indian companies?

The 1990s were the decade which saw such rapid changes in the Indian economy. This can be attributed to the deviation from the economic policies followed prior to this period. We will see in detail what these changes were:

Pre- 1990s	Post-1990s
Most of the goods which we consumed were mainly produced by Indian companies. The foreign companies had to face strong restrictions imposed by the government, especially regarding capital and investment. The import duty was high and foreign technology transfers were restricted. The public sector units were active in the production. India followed a policy of protecting domestic industries and discouraging import. It was called Import Substitution Policy.	The production of most of the consumer goods saw an increasing presence of foreign companies. The markets of various consumer durables are dominated by these companies. Most of the restrictions on these companies by way of capital and market operations have been lifted. The import duties are less and foreign technology transfer restrictions have been shelved. Most of the PSUs have been privatized. India generally followed export-oriented policies.

Import duty

The tariff or duties imposed on goods which are imported from foreign countries are known as Import Duties. The imposition of high import duties is essential for controlling the flow of imports to an economy. For example, consider a product worth ₹ 50/- on which a 300% import duty is imposed. This would lead to an import duty of ₹ 150/- for this particular item. This would lead to a rise in the price of the commodity, thereby leading to a fall in its consumption and also import. On the other hand, an import duty of 10% would result in ₹ 5/- as import duty . It would lead to a rise in the consumption of this product, leading to a rise in its imports.

Study Box 9.1 and try to analyze the changes in the economic policies of India.

The result of such changes discussed in Box 9.1 can be seen in various markets. The goods which we now use in our day-to-day life are either mostly imported from foreign countries or made by foreign companies in India.

Find out how this is applicable to commodities like pen, pencil, calculator, soap, tooth paste, etc. which are used in our day-to-day life.

GLOBALISATION

The change which we were talking about can be seen in most of the countries around the world. As a result, market system became more free, extensive and powerful. The government control over the market weakened rapidly . Many new sectors came under the purview of market. Market as a solution to all the issues facing the economy became a widespread notion. The process of including these aspects and the political and economic system gaining strength around the world is called globalization. The results are:

- Foreign direct investment became extensive.
- Trade of goods and services across the borders became free from restrictions.
- Technology transfers among countries were also liberalized.

Globalisation is made possible through the process of avoiding trade restrictions among countries and opening up the market for all countries.

The following factors led to the acceleration of the process of globalization:

- International organizations and international agreements - World Trade Organisation (WTO), International Monetary Fund (IMF), World Bank, free trade agreements.

Free Trade Agreement

We have already seen how import duties can create barriers for the free flow of goods and services among countries. The process leading to the phased elimination of such barriers which helps to improve the trade relations among countries is known as free trade agreements. The trade agreement between India and ASEAN nations (Singapore, Malaysia, Indonesia, Vietnam, etc.) is an example of free trade agreement. Similarly, India has entered into free trade agreements with Sri Lanka and South Korea.

- Multi National Companies (MNCs) - foreign investment.
- Growth of information technology --- internet
- Changes in information and broadcasting - TV, mobile phone.
- Progress in transport - jet planes, container ships.

Figure - 11.1- Container ship

Globalisation - Background

The phase after Industrial Revolution saw the strengthening of the capitalist mode of production. New technologies, inventions, new production techniques, etc, all led to the rapid growth of Western countries. Colonisation process led these Western countries to expand their influence over other countries.

The capitalist countries implemented policies which gave maximum freedom to conduct economic transactions for individuals and institutions. This led to the strengthening of colonial exploitation. The Great Depression of 1930s led these capitalist countries to one of its biggest crises. To overcome this major crisis, the government imposed restrictions on economic activities. The Soviet Union which followed a socialist system challenged the dominance of capitalism. To counter this challenge, the capitalist countries started implementing many welfare schemes. With the end of Second World War, the United States emerged as the dominant country overcoming the challenge from European countries in the capitalist system.

Economic Depression of the 1930s

The Great Depression which affected most of the countries during the 1930s is considered as one of the biggest financial crises of the 20th century. The fall of stock market in the United States in1929 drew increased attention to this situation. The financial crisis resulted in a fall in production, income and employment. This crisis which severely affected the United States led to an increase in the unemployment rate to 22%.

Figure 11.2 - People queing up for food after the economic depression in the 1930s

The 1970s also saw such a crisis affecting the nations of the world. The capitalist countries tried to come out of this crisis by strengthening the market system. This led to the widening of liberalization and privatization. The fall of the Soviet Union led to further strengthening of the dominance of the United States. This paved the way for the acceleration of the economic reforms which were initiated to strengthen the market system. The monetary reforms initiated as a part of the economic reforms led to the economic crisis of 2008.

Economic Crisis of 1970s

This crisis which was precipitated by the rising crude oil prices started in 1973. The formation of a cartel known as OPEC among petroleum producing companies and the Arab- Israel War triggered a rise in crude oil price. This caused a general price rise and also an economic crisis.

World Economic Recession of 2008

The crisis of 2008 started in the US. The lack of repayment of home loans led to the fall of banks and financial institutions. This created an adverse impact on the production sector and an increase in unemployment.

LIBERALISATION

You must have understand how the government controls the economic activities in a country. Poverty-alleviation programmes and public distribution system are some of the examples of government intervention in the economy. We would see how the government intervened in economic activities in the post-Independence period.

- Development of basic infrastructure - road, electricity, information and broadcasting service, etc.
- Development of basic industries - iron and steel, ship making.
- Monitoring of the financial sector - bank nationalization, role of central bank.
- Steps to improve the productivity of agriculture sector - Green Revolution, irrigation, farm subsidy.
- Planning and implementation - fund allocation on the basis of social priorities.
- Encouragement of exports-- Loans at low rate of interest and tax and concessions
- Restrictions on foreign investment - identifying the sectors for foreign investments, limiting the foreign investment.
- Restrictions on industries permission for starting industries (licence), control over private sector.
- Control over imports - high import duty, identifying the goods which need to be imported.

We have seen how the government interferes in and controls the economy. Discuss how the government intervenes in education, public health, social security, etc.

Reducing the intervention of the state in the form of controls in the economy is known as liberalization. The process of liberalization led to the exit of government from the sectors so far cared for to market economy, which in turn increased the importance of the private sector.

Discuss how liberalization impacted the following sectors-education, health services, social security, and public distribution system. Present the findings as short notes in the class.

PRIVATISATION

Globalisation policies aim at reducing the intervention by the state and increasing the role of market. The process of reducing the role of the public sector in the economy and increasing the role of the private sector is known as privatization. This is done by reducing the stake of the government either fully or partially and thereby increasing the stake of the private sector in the Public Sector Units (PSUs). The sectors which were previously reserved for the public sector would also be opened up for private participation which is another form of privatization.

The period after 1991 saw the privatization of various public sector undertakings in India. For example, the Modern Bread Company was privatized and now it is a private sector undertaking. Many of the PSUs which were privatized were actually enterprises making profit.

Explain how far privatization of public sector undertakings would be beneficial for the economy. Make short notes.

The role of foreign investment in accelerating the process of globalization is very high. This takes place through multi national corporates.

Foreign Capital

The act of investing one country's capital in another country's companies, land, bank deposits, bonds, shares, etc. is known as foreign investment. There are two types of foreign investment: foreign direct investment as well as foreign portfolio investment.

Foreign Direct Investment (FDI) would directly help in increasing the production level of the economy. On the other hand, foreign portfolio investment (FPI) need not increase the production level in an economy. Investing a country's capital in another country's industries, agricultural sector, power sector, etc. is known as Foreign Direct Investment. On the other hand, when capital is used for investing in another country's bank deposits, bonds, shares, etc. it is known as foreign portfolio investment. Foreign portfolio investments are mainly made by foreign financial institutions. This is also known as foreign institutional investment. In modern days, most of the foreign investments are made in the form of portfolio investments.

Globalisation would lead to a situation where the financial institutions of a country can freely invest in any of the stock markets across the world. For example, consider a case where such institutions invest a huge amount in one of the stock markets abroad. This would lead to a rise in the price of the shares in that market following great demand for shares. In this scenario, they would sell the shares and thereby make profit from such a rise in the price.

Bonds

Bonds are debt instruments issued by government or government institutions to raise money and can be bought from the market. Those investing in bonds get interest on their deposits.

Shares

The amount which a company intends to raise from the open market is known as Share Capital. The share capital is divided into equal units which are known as Shares. These shares help the companies in raising the required capital. The investors who buy shares get dividends.

Share market

The system for selling and buying shares is known generally as stock market. The prices of shares can rise or fall. The stock markets witness the speculation regarding fall and rise in price, thereby making profit in the process.

Multi National Corporations (MNCs)

Most of the foreign investments in the 19th century were made mainly by banks and individuals. MNCs appropriated this role in the 20th century. These companies which are registered in one country and whose operation is in various other countries are known as MNCs. Most of these MNCs have their headquarters in developed nations. About 20% of the goods and services consumed around the world are produced by these MNCs. Most of these MNCs have a turnover in excess of the national income of many small countries.

During the colonial days, the raw materials from colonies were imported and made into processed goods to be exported back. For example, cotton from India was imported by Britain and then exported back to India as finished cloth. The MNCs invest their capital in developing countries and exploitated their raw materials, labour and market. These MNCs employ their economic clout on developing countries to make the policies and laws suitable for them.

Foreign capital and technology are catalysts of growth for developing countries. The developing nations are mostly backward in these two aspects. In this background, the developing countries fight among themselves to attract MNCs which have both capital and technology with them. The developing countries try to bring out policies which are suitable for these MNCs.

Identify the goods which we use in our day-to-day life and fill the following table. Then find out the companies which produce these goods and also their countries where there are registered and find out whether they are MNCs or not. If the company is an MNC then find out whether their home nation is developed or not. Use internet. Add more goods and services.

Product	Name of the company	Home nation of the company	Whether MNC or not. Mark yes or no

Table - 11.1

International Organisations

The role played by international organizations like IMF, World Bank and WTO are vital for the implementation of the globalization process. IMF and World Bank came into existence following the Bretton Woods Conference held in the United States in 1944.

Figure -11.3- Bretton woods Conference

IMF

IMF came into existence in 1944 with its headquarters in Washington. The functions of IMF are the following:

- Mobilizing the required funds for world trade.
- Stability in exchange rates.
- Loans to member countries.
- Advising member nations on matters relating to budget, finance and foreign exchange.

World Bank (WB)

WB was established in 1945 with its headquarters in Washington. The functions of the World Bank are:

- Reconstruction of war-torn economies in the post-world war-II period.
- Developmental aid for member countries.
- Encouraging foreign investment.

The countries in economic crisis approach the World Bank and IMF. The countries taking loan from such international institutions also have to adhere to the conditions prescribed by them. These conditions mostly strengthen the process of globalization.

There were attempts to form an international organization to regulate world trade. This led to a common agreement relating to trade and tariff. This was known as GATT (General Agreement on Tarrif and Trade). GATT, which came into being in 1947, aimed at removing the barriers (for example, high custom duty) to trade. The developed nations tried to influence the consequent agreements with developing countries to suit the former's interests. Developing countries protested against such attempts of the developed nations.

GATT conferences are known as various 'Rounds'. The first 'round' was held in Geneva. The most important of the 'rounds' was the Uruguay Round in 1986.

WTO came into existence in 1995 in lieu of GATT, on the basis of the consensus reached during the Uruguay Round. The headquarters of WTO is in Geneva. The free trade agreements following the Uruguay Round and WTO strengthened the gloablisation process. The main recommendations of these agreements are:

- Import duties on goods and services to be reduced in phases.
- Subsidy to exports to be reduced.
- Reduction in agricultural subsidy.
- Reforms in patent laws.

Patent Law

The protection offered to the inventor of a new product, new technology and new production method for a fixed period is known as patent. There are two types of patent: product patent and process patent. In the 'process patent', if an individual or a company obtains patent for its new product, it is open for others to produce the same commodity through different methods. On the other hand, in the case of 'product patent' nobody has the right to produce that commodity even by another method. As a commitment to international agreement, India moved from 'process patent' to 'product patent'.

- Allow foreign investment in media, telecom, banking, insurance, etc. in the service sector.
- Extending the privilege enjoyed by domestic capital to foreign capital also.

GLOBALISATION IN INDIA

Post-Independence India followed an economic policy based on planning. As part of this, government effectively controlled the operation of the economy and laid emphasis on public sector. In the beginning of the 90s, India faced a severe foreign exchange crisis. To tide over this crisis, India sought the help of the IMF. In line with the change in the economic policies of other countries, India also changed the economic policies. This accelerated the globalization process in India.

Foreign Exchange crisis of 1991

Every country keeps a certain portion of their foreign exchange as reserve. Dollar, Pound, Euro, etc. are the main currencies in the reserves. On an average, a country keeps foreign exchange to meet the import payments for 10-20 weeks. In 1990, India's foreign exchange was hardly enough to meet the requirements for 2 weeks.

As part of this India took the following steps:

- Except a few selected industries, the government abolished the restrictions on setting up industries.
- Most of the sectors reserved for public sector units were opened up for private participation.
- Foreign technology transfer contracts were liberalized.
- Permitting the use of foreign brand names.
- Phased removal of import duties.
- Personal Income tax rate reduced.
- Corporate income tax rates reduced.
- Tax rate on commodities reduced.
- Subsidy on agriculture reduced.

Follow up activities

- It is over two decades since reforms were implemented in India. On the basis of the hints given, evaluate the consequences of these reforms in the country.

Hints

- Privatization of PSUs.
- Changes in market
- Growth rate of Indian economy
- Foreign investment
- Foreign exchange reserves.
- Economic inequality
- Liberalization of import and agriculture
- Privatization of PSUs
- Reforms in patent laws
- Government participation in the economy.
- Employment security
- Retail Trade, Small scale industry, traditional industry

- We have seen how the import duties have come down thanks to gloablisation. Discuss the effect of reduced import duties on the Indian economy.

Hints for discussion

- Import and import duty.
- Reduced import duty and the agricultural sector
- Reduced import duty and domestic industries
- Changes in the goods market.

There are various views both for and against globalization. Some of them are given below in table. Examine the views and organize a discussion in the class on globalization:

Views For	Views against
(1) Availability of a wide variety of goods at low prices. (2) Market makes the functioning of the economy efficient. (3) Better technology and efficient management (4) More ways to get foreign capital. (5) High export potentiality (6) Indian companies also benefit by way of getting chances to invest in foreign countries.	(1) Increasing inequality of income and wealth (2) Adversely affects farm workers, small scale producers, and traders. (3) Privatization of PSUs would lead to fall in government income. (4) The role of government in controlling the economy is greatly reduced. (5) Job security is reduced. There is also a wide gap in wages/salary. (6) MNCs exploit markets, raw materials and labour.

12

ECONOMY AND GOVERNMENT

There is a qualitative change in the living conditions of most of the countries in the world with the acceptance of the 'welfare state' concept. It is generally believed that the increased intervention of government in economic activities helped to achieve the qualitative change. Still, each country has to solve the problems like poverty, inequality, unemployment, illiteracy, health issues, environmental issues, etc. Governments all over the world strive to solve these problems and to improve the quality of life.

Depending upon the economic system prevailing in a country, the method of solving these problems is also different.

The important economic systems prevalent in various countries are the following

- Capitalist economy
- Socialist economy
- Mixed economy

Economic systems

Capitalist system

It is an economic system characterized by private free enterprise and minimum government intervention.

Market solves the problems under this system.

Mixed economic system

It is a system in which both public and private sector work together. It solves the socio-economic problems with the help of both market and planning.

Socialist system

It is an economic system in which productive factors are owned by government and less importance is paid to private sector. Centralized planning system solves the socio-economic problems in the country.

It is clear from the above that the intensity of government intervention is different in each system.

Can you find out which of the systems India has adopted?

The ongoing globalization process in the world aims at limiting the role of the government. However, a number of situations still exist in the world, demanding the intervention of the

government. A classic example of this is the special packages implemented by various governments to tackle the economic crisis in 2008.

How did governments come to occupy this much of importance?

Private enterpreneurs will invest money in the field where there is profit. Naturally, market economy cannot solve the entire problems. The 2008 World Economic Crisis substantiates this.

Private sector has less interest in the following fields.

- Rural road development
- Drinking water scheme
- Immunization
- Food security

Private sector is not bothered about social issues. All these show that whenever market fails, government has to interfere. The situation in which government intervenes is shown in the following chart.

Which of the activities mentioned above are found in your society? List them.

Government make a lot of expenditure for these activities. As a result, the government has a responsiblity to generate income for this. Let us see the important sources of income and types of expenditure of the government.

Public expenditure and Revenue

The expenditure of government is known as 'public expenditure' and income of the government as 'public revenue'.

It is understood from the above that a government undertakes a lot of activities. On the basis of this, find out the sectors in which government spends money.

Assume that government increases expenditure for rural road construction. It provides employment to the people and generates income. In this situation government expenditure is converted into the revenue of the public. How does this help the life of the people?

Recently, the public expenditure of all governments is mounting up. Which are the fields in which expenditure goes up?

- Defence
- Rural development

Do you think that people are benefited out of this?

Prepare a note after making an enquiry.

Which are the sources of income for meeting the expenses of government?

Are you involved in any programmes of fund mobilization by the government?

The income of the government (public revenue) is classified into tax revenue and non-tax revenue.

The income from all sources of taxes constitutes tax revenue. Income from fees, grants, profit, etc. represent non-tax revenue.

Tax revenue constitutes the lion's share of public revenue.

You must have heard a lot about taxes. The background of Mahatmaji's "Salt satyagrah" is the introduction of tax on salt.

Tax Revenue

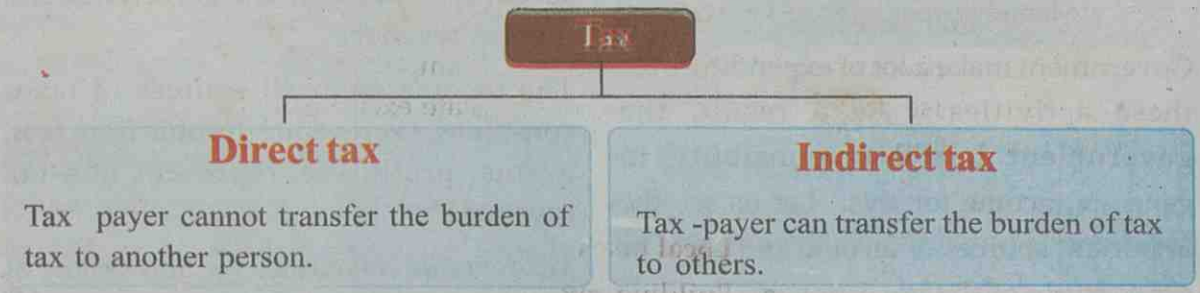
Tax is a compulsory payment, made by people to the governments without expecting any direct return for it. The person who pays the tax is called the tax payer.

Dhandi March under the leadership of Mahatmaji

When a person pays the tax imposed on him, the burden of the tax is borne by him. The reason is that this activity reduces his income to that extent. The loss in the income due to the payment of tax is called 'tax burden". It is the duty of a citizen to pay tax.

Suppose the government imposes 10% tax on a person who earns ₹100000 annually. What would be the tax burden? Calculate.

Taxes are of two types. See the following chart



Direct taxes are given below:

Personal income tax: It is a tax imposed on a person when income is beyond a limit prescribed by law. As income increases tax burden also increases.

Corporate income tax: It is a tax imposed on the income of a company.

Find out the personal income tax rates in India.

Income slabs	Tax rate

Important Indirect Taxes

In the case of indirect taxes, taxes are imposed on one person but paid by another person.

Example:-Take the case of a toilet soap.

Assume that the price of soap is ₹ 20 and tax rate is 10%. Trader remits ₹ 2 by way of taxes. The trader in turn sells the soap for ₹ 22 by adding the tax in the price. Therefore the tax burden is shifted by the trader to the consumer.

The following are the important indirect taxes:

Excise duty : It is a commodity tax. It is imposed on the production of a commodity. It has no connection with sales.

Customs duty: It is the tax imposed on the import and export of commodity. It is used as an instrument to regulate foreign trade.

Sales tax: It is a tax imposed on the sale of a commodity.

Service tax: It is a tax imposed on the services.

Value added tax (VAT) : It is a tax imposed on the value added at each stage of production of a commodity.

The attitude of avoiding tax payment exists in different forms (not collecting bills for the product, non verification of the genuineness of bill, tax evasion etc). How do these affect the welfare activities?

Important taxes in India

- **Central taxes**
  - Corporation income tax
  - Personal income tax
  - Union excise duty
  - Customs duty
- **State taxes**
  - Sales tax/VAT
  - Stamp duty
  - State excise duty
- **Local taxes**
  - Building tax
  - Professional tax
  - Entertainment tax
  - Advertisement tax

Increase in tax rate leads to increase in the prices of commodities. Which of the following will you recommend for tax imposition? Why?

- Gold jewellery
- Petroleum products
- Diamond jewellery
- Salt
- Life saving medicines
- Luxury cars

High tax rate is imposed on liquor and drugs. What is the objective behind this?

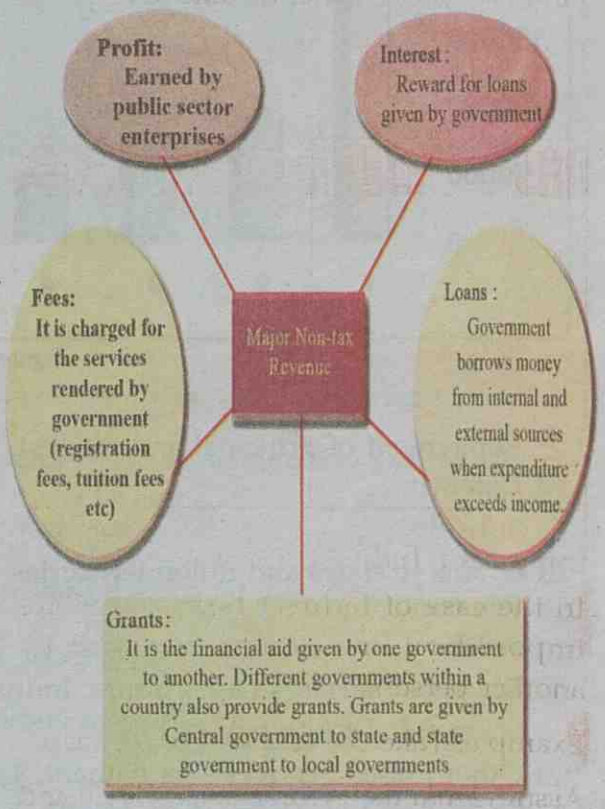
- Increased income?
- Social welfare?

Whether increase in corporate tax or sales tax affects the living condition of common man? Why?

- Fall in the profit
- Increase in prices of commodity
- Increase in the burden of life

Important Non-tax Revenues

How much of income is derived by central government from all these sources? Find out this from figure (12.3).



Budget

Budget is the annual statement showing the income and expenditure of the government during a financial year. In India the financial year is from 1st April to 31st March. The following are the main components of a budget:-

- Activities the government propose to implement.
- Sources of income
- Important expenditure items

Budget has great significance because it has to properly direct the activities of the government.

Different types of Budget

Balanced budget→expenditure = revenue

Deficit budget→expenditure> revenue

Surplus budget→expenditure< revenue

The details of the central budget for the year 2010-11 are given in figure (12.1)

Central Budget 2010-11 Major Expenditure Items

(in croresof Rs)

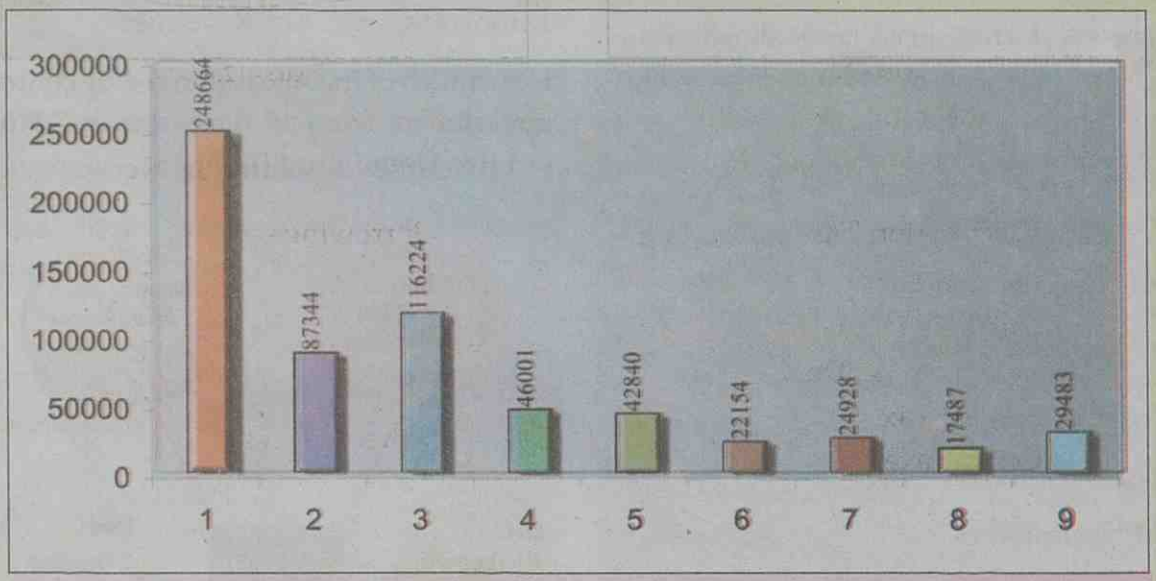


Figure - 12.1

1. Repayment of principal and interest
2. Defence
3. Subsidy
4. Grants to states and union territories
5. Pension
6. Police
7. Economic services (Agriculture, Industry, Power, Transport, Communication, Science & Technology etc)
8. Other Public Services - Parliament, Tax Revenue, Foreign affaris, etc.
9. Social Services - Education, Health, Broadcasting, etc.

Find out the following with the help of the diagram

- On which item does the government spend more money?
- Which of the items gets the lowest share?
- Prepare a list of expenditure items in the ascending order.

Central Budget - 2010 -11

(in croresof Rs)

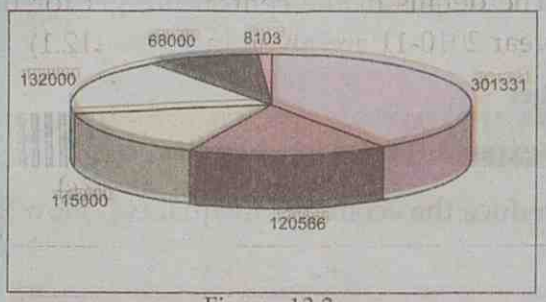
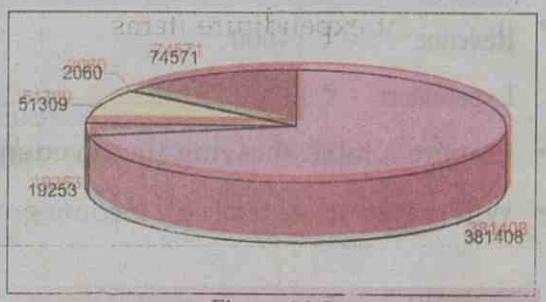


Figure - 12.2



Figue - 12.3

Sources of Tax Revenue

- Corporation Tax
- Income Tax
- Customs Duty
- Union Excise Duty
- Service Tax
- Other Taxes

Sources of Non-Tax Revenue

- Borrowing
- Interest
- Profit
- Grants
- Other sources

Examine diagrams 12.2 and 12.3 and find out the answer for the following

- Which type of tax is the largest source of revenue for the central government?
- Which type of tax draws less income?
- Arrange the tax sources in the ascending order on the basis of income.
- Which is the main source of non-tax revenue?
- From which source is the least income derived?
- Arrange them in the ascending order.

Follow up activities

- Classify the following budgets

  Revenue - ₹ 14800

  Expenditure - ₹ 14800 ..... budget

  Revenue - ₹ 14800

  Expenditure - ₹ 16200 ..... budget

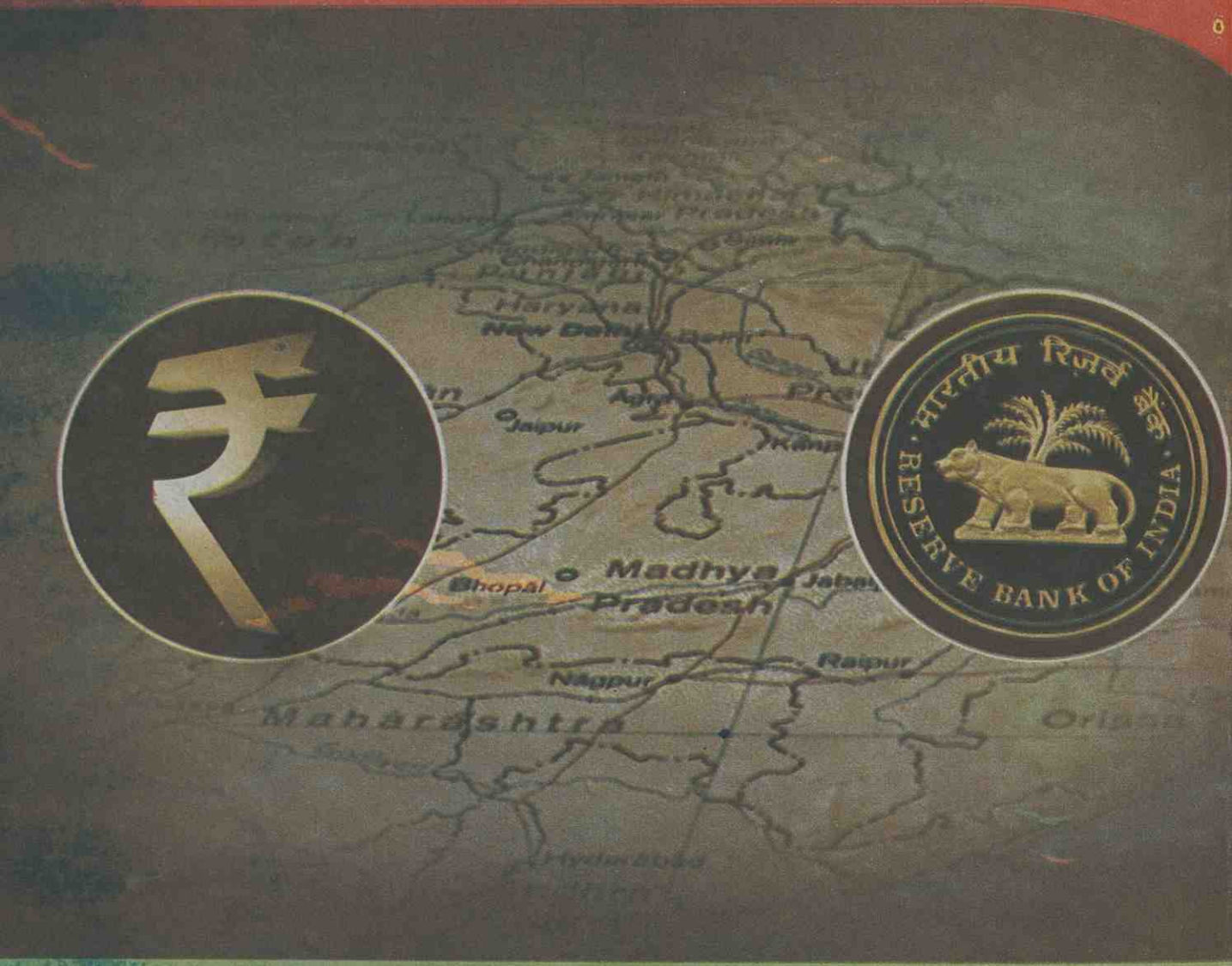
  Revenue - ₹ 14800

  Expenditure - ₹ 13200 ..... budget

- Prepare a table showing the revenue and expenditure of local bodies.
- Will higher taxes for high income group reduce the economic inequality? How?

Social Science - II

X



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