

LANDS AND PEOPLES

Part III

A Geography Textbook for Class VIII

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Foreword

'Lands and Peoples' is a series of geography textbooks meant for the upper primary stages, i.e., Classes VI-VIII. The earlier version of this series was published during 1987-89 as a follow-up of the National Policy on Education, 1986. However, some of the world events such as unification of Germany and disintegration of the USSR, that took place in early nineties rendered certain portions of these textbooks obsolete. As such a thorough revision of the textbooks of this series was initiated in a phased manner. The present textbook entitled *Lands and Peoples — Part III* meant for Class VIII is the last in the series being published.

The geography component of social science at the upper primary stage provides a spatial dimension to the child's mental horizon through the study of world geography. The geography syllabus developed by the National Council of Educational Research and Training (NCERT) at this stage recommends the study of man-environment interaction in different parts of the world through case studies of selected countries from each continent as well as a few elements of physical geography which help in understanding such interactions. For a better understanding of the concepts, the study of the continents has been put in a sequence from simple to complex patterns as reflected in topography, climate, natural vegetation and economic development. Hence, the continents of Africa, South America, Australia and Antarctica have been covered in Class VI. One need not get alarmed by the sheer number of the continents because conceptually they are easier to be handled. In view of the simplicity of the geographical patterns the students of comparatively lower age-group may also be able to interpret and make certain generalisations. Two highly developed continents — Europe and North America, reflecting wider varieties have been dealt with in Class VII. Only one continent, i.e., Asia having emphasis on India and its neighbouring countries has been taken for Class VIII. It is assumed that after having some idea of the world, the pupils at this stage can understand and appreciate the geographical features of their own country better.

This textbook has four units, which cover the study of maps, lithosphere, Asia and India respectively. The text lays emphasis on concept formation. Different kinds of information and other factual details are given for developing an understanding of the shades of varieties as reflected in the man-environment interrelationships at different levels. Gradually the students are enabled to make broad generalisations on their own. Learning by rote should, therefore, be avoided. A large number of illustrations and maps have been added to support the text as they form an integral part of teaching-learning

process in geography. They should be used as the main tool rather as an appendix or a ritual to be performed. This should help students learn basic geographical skills and methods of inquiry.

This textbook has been written by my colleagues Professor Savita Sinha and Shri Mohd. Akhtar Husain of the Department of Education in Social Sciences and Humanities (DESSH). We are grateful to them for undertaking this work. Thanks are due to Professor Rajendra Dixit, Dr V.K. Bajpai and Dr Sandhya Rani Sahoo, who have gone through the English version of the manuscript and offered their valuable comments and suggestions to make it linguistically comprehensible. Dr Md. Shainul Haque has helped at various stages in the preparation of this manuscript — collection of data and factual information from various sources, preparing the draft and final version on the computer, making captions and exercises and finalising the maps. We thank him for his hard work. The Hindi version of this book has been prepared by Shri B.L. Gupta, Senior Lecturer, School TV, Directorate of Education, Delhi. We are grateful to him. We also thank Shri Balkrishna who has prepared the maps and diagrams of this book.

The NCERT would welcome comments and suggestions on any aspect of this textbook.

New Delhi
April 2000

J.S. RAJPUT
Director
National Council of Educational
Research and Training

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THE CONSTITUTION OF INDIA

PREAMBLE

WE, THE PEOPLE OF INDIA, having solemnly resolved to constitute India into a
[SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC] and to secure to all its citizens:

JUSTICE, social, economic and political;

LIBERTY of thought, expression, belief, faith and worship;

EQUALITY of status and of opportunity;

and to promote among them all

FRATERNITY assuring the dignity of the individual and the ² [unity and integrity of
the Nation];

IN OUR CONSTITUENT ASSEMBLY this twenty-sixth day of November, 1949, do
HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.

1. Subs. by the Constitution (Forty-second Amendment) Act, 1976, Sec.2, for "Sovereign Democratic Republic"
(w.e.f. 3.1.1977)
2. Subs. by the Constitution (Forty-second Amendment) Act, 1976, Sec.2, for "Unity of the Nation"
(w.e.f. 3.1.1977)

Part IV A Fundamental Duties

ARTICLE 51A

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, wild life 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 achievement.

UNIT ONE

Studying Local Maps

By now, you are familiar with a variety of maps of continents and countries used in the textbooks of the previous classes. In this unit, you will learn more about studying maps. This will help you recognise in a better way various features depicted on a map. With practice, you will be able to describe a place by looking at the map of that area.

To begin with, two maps of Delhi have been given here. Once you acquire some skills of studying these maps, you may study the local maps of your surrounding/village/town/region. After developing necessary skills of map reading and map interpretation, learning geography is a real pleasure.

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CHAPTER 1

Studying Local Maps

You have already studied a variety of maps of continents and countries. A *map* is the representation of a part or whole of the earth on a flat surface. It is drawn to a scale and uses conventional signs for showing various features. Every map has a title, indicating the nature of information contained in it. All the maps used in this book are made on small scales. Hence they do not show a large number of details. In fact, these maps are even smaller than the atlas maps. They can be used for giving only a generalised picture of an area. Due to limitations of space, only a few selected features such as transport routes and centres of mining or industrial activities are shown in such maps.

But if you want to know about your surroundings, you need to look for a more detailed map. A village map or a city map is drawn on a very large scale. As such, it is possible to locate each plot of land, building and other features on these maps.

Every country prepares detailed maps

of its own territory based on precise surveys. Being drawn on a fairly large scale, the topography of the area and various other features are depicted accurately. They do not show boundaries of individual plots or buildings. These are called *topographical maps* or *sheets*. They are valuable tools for understanding the natural and cultural landscape of any part of the country.

Let us find out how we can study a more detailed map to know our surrounding. As you know, we will require maps on a larger scale for this purpose. These need not be drawn on a very large scale as used for topographical sheets.

Look at the two maps selected for this purpose (Figs. 1.1 and 1.2). In Fig. 1.1 the location of the city area of Delhi has been shown. The other map (Fig. 1.2) depicts a portion of Delhi on a scale larger than the one used in the previous map. With the help of these maps, you may learn to identify various features and develop a fairly good idea of the area shown here. You may then use similar methods to read other maps.

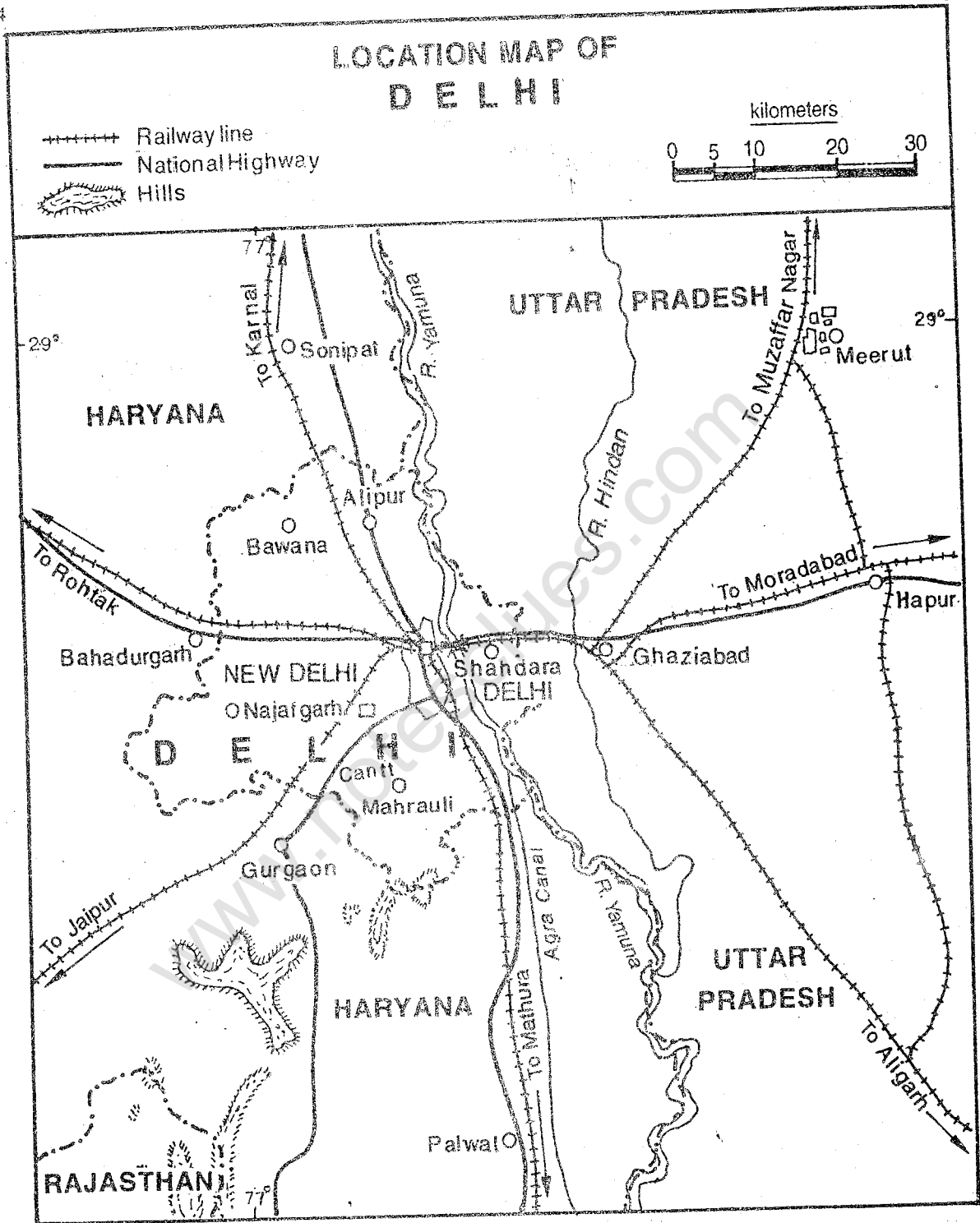


Fig. 1.1 Location Map of Delhi

In the map given above, the location of Delhi has been shown. You will notice that the map has been drawn on a small scale. As such, it shows the surrounding of Delhi as well but lacks in detail.

STUDYING LOCAL MAPS

A PART OF DELHI'S CITY AREA

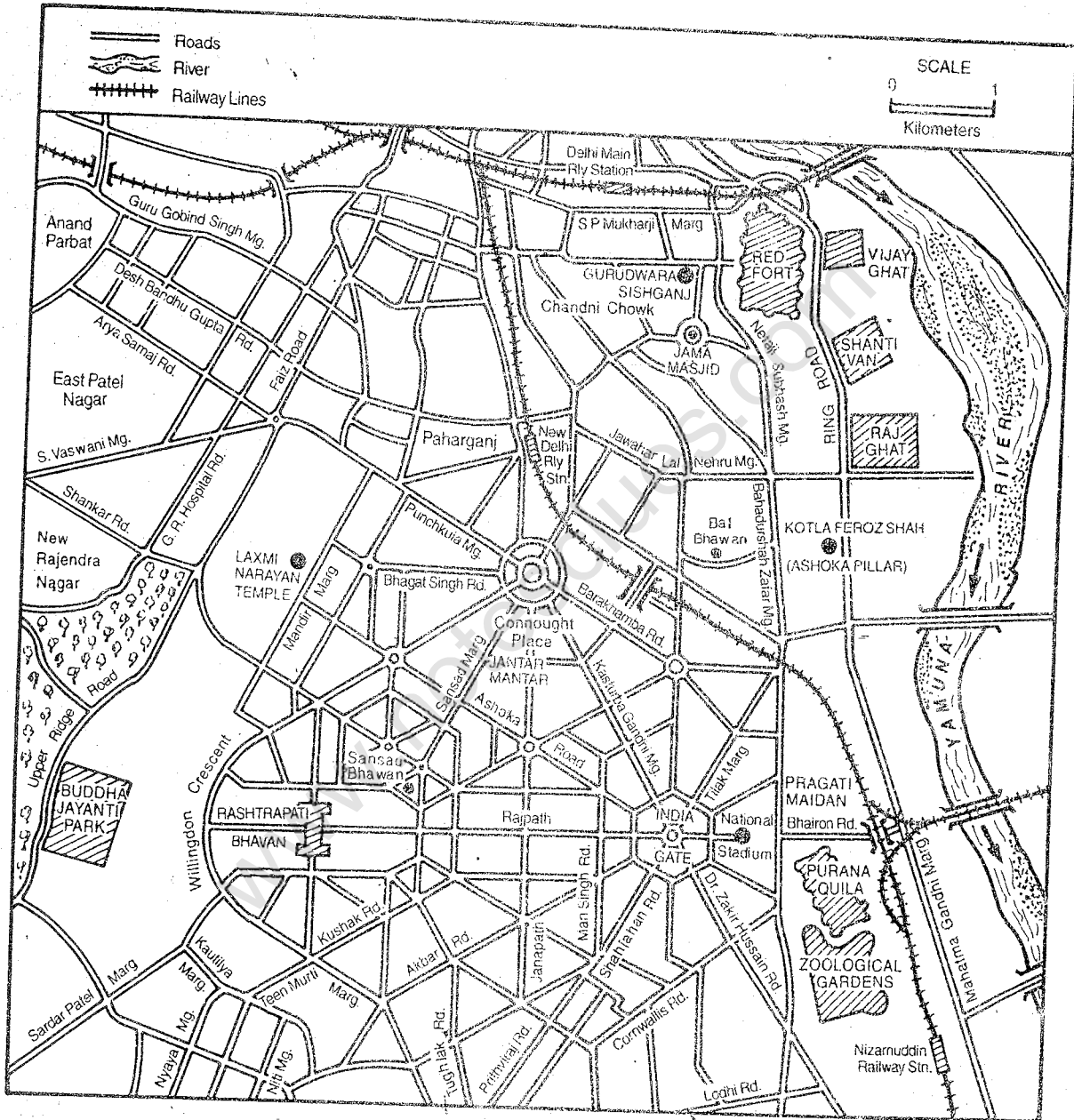


Fig. 1.2 Map Showing a Part of Delhi's City Area

Note that the map shows a large number of details compared to the previous one because it is made on a large scale. Compare the scale of both maps. How much actual distance on the ground is represented by a centimetre on each map?

Reading a Map

Map reading is an art in which skills to follow direction and information given in a map are developed. Through practice, one can develop the ability to visualise the actual picture of the ground depicted on a map.

The first step is to get general information about the map, i.e., the title, the direction and the scale. In a map, one looks for the title to know the contents of the map. The North Line helps in finding out the directions. In the absence of any North Line, the top of the map is taken as the North. The scale is mostly given in a linear form.

The next step is to identify various features shown in a map by conventional signs. These features are broadly grouped as natural or physical and cultural. Different types of landforms (mountains, plateaus and plains), water bodies such as seas, rivers, lakes, canals, and tanks and natural vegetation are physical features. The settlements — rural or urban, types of buildings according to their uses such as religious, educational and health transport routes (roads and railways) and open spaces developed for specific purposes such as airports, zoological parks etc. are cultural

features. All these features are represented by some standard symbols, called *conventional signs*. They may be grouped under three categories: point symbols, linear symbols and areal symbols. The location of a place or a feature is shown by a point symbol, for example, a city and a peak on a map are shown by a circle and a triangle respectively. The rivers, canals, railway lines and ocean routes are shown by linear symbols. Distribution of vegetation, soil and population or an area affected by flood is shown by areal symbols.

While reading a map, we look at various symbols as given in the index. We identify them on the map. Locations of various features and the pattern of their distribution are analysed to understand the area depicted in the map.

Now study the two maps shown in Figs. 1.1 and 1.2 and answer the questions given in Activity Sheet 1. After completing this sheet, write a paragraph each describing the area shown in these two maps.

Being located in the plains, Delhi and its surrounding regions do not have a great variation in relief. Besides, being an urban

ACTIVITY SHEET 1

(A) Study Fig. 1.1 and answer the following :

1. What is the scale of the map?
2. What is the latitudinal and longitudinal extent of Delhi?
3. Which are the neighbouring states of Delhi? Also mention the direction in which they are located.
4. On which side of the river Yamuna is Delhi situated?
5. Where do the railway lines from Delhi go?
6. In which direction of Delhi do you observe low hills?
7. What is the name of the canal that runs roughly parallel to the railway route between Delhi and Mathura?

STUDYING LOCAL MAPS

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8. Which tributary of Yamuna has been shown in the map?
9. What kind of roads have been shown in the map?
10. Name one town each of Haryana and Uttar Pradesh located to the south and east of Delhi respectively.

(B) Study Fig. 1.2 and answer the following:

1. Which part of Delhi has been shown in the map?
2. What is the scale of the map?
3. In which direction is the river Yamuna flowing?
4. Find out the direction of Raj Ghat, India Gate, Buddha Jayanti Park, and New Delhi railway station from Connaught Place.
5. Name the two forts shown in the map.
6. Name the road linking Rashtrapati Bhavan and India Gate.
7. Which road seems to be running roughly in north-south direction almost parallel to river Yamuna?
8. Name the park located in the north-west part of the area shown in the map.
9. What is the distance of India Gate from Connaught Place?
10. What is the general pattern of roads?

area, the cultural features predominate here. However, the relationship between the physical landscape and the cultural landscape is quite clear.

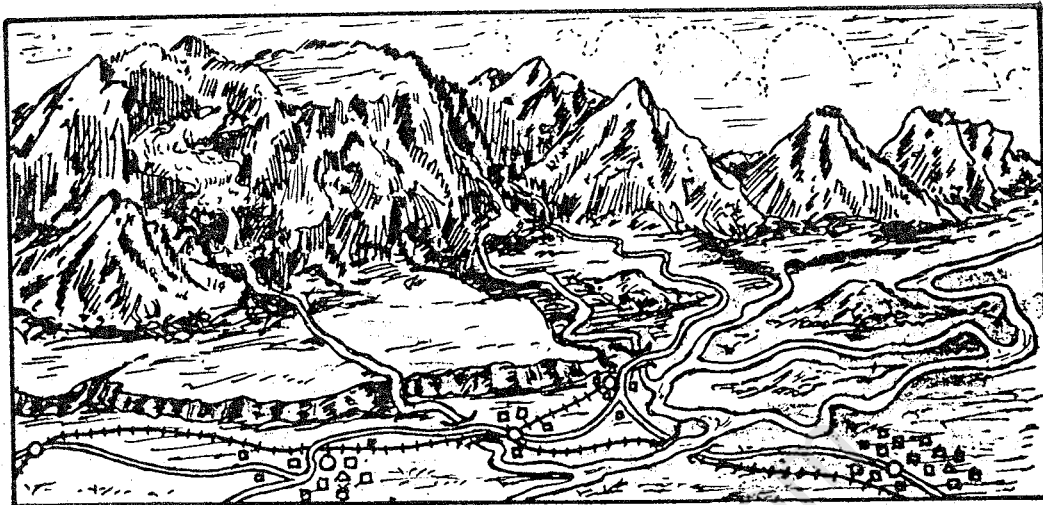
Identification of Landforms on Maps

In atlases, you have seen coloured maps of different countries and continents. In physical maps, the colours are used in a conventional manner. Generally various relief features are shown by certain standard colours such as blue for water, white for snow, green for lowland, yellow or light brown for plateaus and dark brown for hills and mountains. Different shades of a colour are used for showing the variation in heights of a particular relief feature such as a plain or a mountain or the depth of a water body such as an ocean.

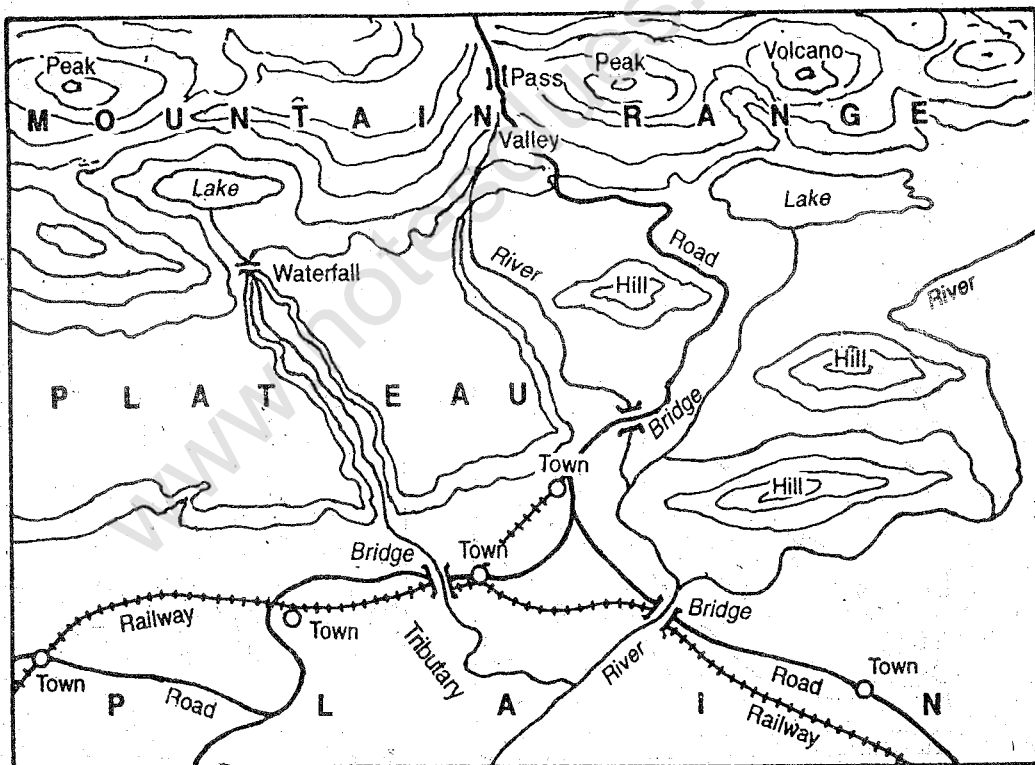
As you know the mountains, plateaus and plains are the three major landforms of the

earth's surface (Figs. 1.3 a and 1.3 b). Each landform is recognised on the basis of two distinguishing features: height and slope. Ignoring the details in the beginning, one should first look for the broad category of landform to which the area belongs. After recognising the major relief, one should identify the other features such as hills, plateaus, and ridges.

Various landforms on maps are shown mostly by contours. A *contour* is an imaginary line drawn on a map which joins the points of the same height above the sea level. It is perhaps the most accurate, the commonest and the most popular method of showing landforms. Closely spaced contours denote steep slope and widely spaced contours denote gentle slope. Thus the contour patterns give us an idea of the shape or form of various relief features of an area.



AN IMAGINARY PICTURE OF LANDFORMS



MAP OF ABOVE PICTURE

Figs. 1.3 a and 1.3 b Landforms — The Picture and the Map

Look at the pictures of mountain, plateau and plain in Fig. 1.3 (a). What difference do you notice in the shapes of these three features? In Fig. 1.3 (b) the same features as shown above have been depicted by contours and shadings.

STUDYING LOCAL MAPS

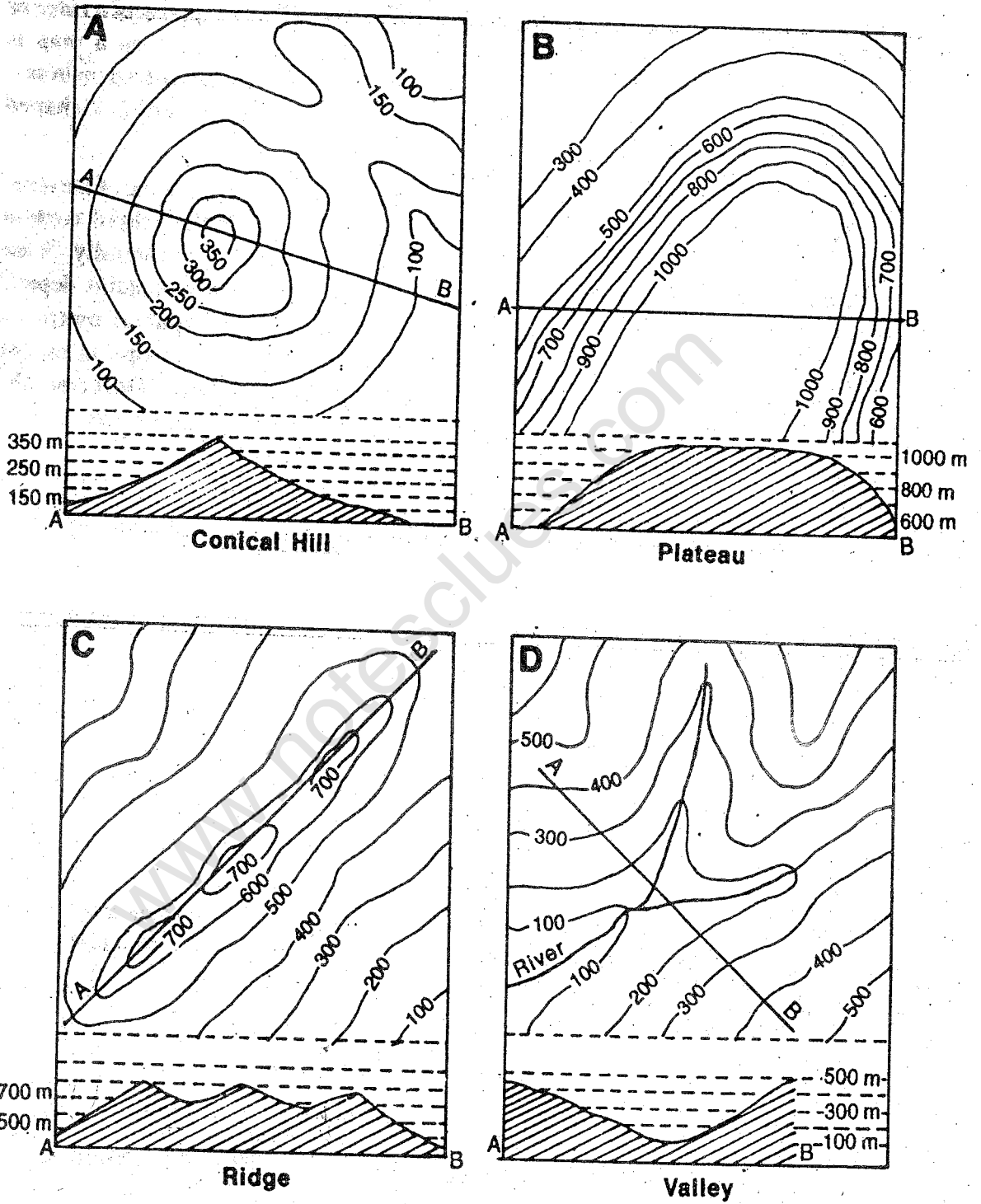


Fig. 1.4 Contour Patterns of Selected Landforms

Compare the contour patterns of all the four landforms and find out the differences among them.

In many cases landforms are more easily identified from contour lines and their spacing in the map than from actual travel in the area.

Some typical contour patterns are given in Fig.1.4. Study the values of contour lines and their arrangement.

Concentric contours spaced almost evenly on a map represent a *conical hill*. The top of a *plateau* is more or less flat and is represented by very few contours. But its sides are steep and they are shown on a map by closely spaced contours. Contours

forming linear shapes and very often enclosing isolated peaks represent a *ridge* or an elongated hill. A *plain* on a map is represented by very widely spaced contours. A *valley* is shown by inverted V-shaped contours.

Now you may recognise some of the relief features on a map with the help of contour patterns. Study Fig. 1.3 (b) carefully. What kind of contours do the mountains depict? What do the closely spaced contours indicate? What kind of slope is on the margins of the plateau? Describe the landform with the help of contours.

EXERCISES

Review Questions

1. Answer the following questions briefly:
 - (i) What is a map?
 - (ii) What type of maps should be used for studying local area?
 - (iii) What are topographical maps?
 - (iv) What is a contour?
 - (v) Which colours are used to show water, plains, plateaus and mountains?
 - (vi) Give one example each of point symbols, linear symbols and areal symbols.
2. Distinguish between:
 - (i) Large-scale maps and small-scale maps
 - (ii) Closely-spaced contours and widely-spaced contours.
3. Describe the four main components of a map which help in reading it.
4. Explain the differences among the contour patterns of a conical hill, a plateau, a ridge and a valley.

UNIT TWO

The Earth and its Landforms

The earth has four distinct realms — the lithosphere, the atmosphere, the hydrosphere and the biosphere. You have read about the atmosphere, the hydrosphere and the biosphere in the earlier classes. Now you will know more about the lithosphere.

The lithosphere is the home of humans. It is the stable platform for all life-forms. It is the basic source of many nutrient elements without which plants and animals cannot live.

The lithosphere is shaped into various landscape features or landforms — mountains, plateaus and plains. These landforms have been created over millions of years and the process is still on.

While you are going through the above statements, a number of questions may come to your mind. For example, What constitutes the earth? What is inside the earth? How are landforms created and shaped? What are those processes that shape the surface of the earth and how are they powered? You will find answers to many such interrelated questions in the following chapters of this unit.

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CHAPTER 2

Inside the Earth

We have a detailed knowledge about the earth's surface today. A few of us have also been able to reach the moon and bring a sample of rocks for study. But no one has been able to take samples of the centre of the earth so far. Using the current technology, we have been able to drill only approximately upto 13 km, whereas the centre of the earth is about 6,400 km below the surface. However, using indirect sources scientists have been able to determine the structure and composition of the earth's interior. The most important source of information is the study of earthquakes. You will read about it in higher classes.

The Earth's Interior

The structure of the earth may be compared with that of an onion. The earth too has shells or layers, though of unequal thickness. If we cut a section through the earth, you will get a view as shown in Fig.2.1.

You will notice that the earth is divided into three layers: the crust, the mantle and

the core. The outermost shell, called the *crust*, is the thinnest layer. Its average thickness, however, varies from 5 to 40 km. The average thickness of the crust beneath the ocean is 5 km. On the other hand, the continental crust on an average is about 40 km thick. Despite greater thickness, the continental crust is less dense than the oceanic crust because it is made of a mix of light and dense rock types. The oceanic crust is composed mostly of dense rocks such as basalt. Hence, these rocks settle at a lower level than the rocks of the continental crust.

The next layer of the earth is called the *mantle*. It is separated from the crust by a boundary, called *Moho discontinuity* (named after the geologist Mohorovičić, who discovered it). The mantle is about 2900 km thick. It is divided into two sections: the upper mantle and the lower mantle. These are separated by another boundary, after which the rocks of the mantle become soft and pliable due to pressure and heat. Temperature and pressure inside the earth increase with depth.

The innermost layer of the earth is called the *core*. Being composed of mostly metal, it is also known as the metallic core. It is separated from the mantle by a boundary. Find out the thickness of the core from the centre of the earth. The core is also divided into two parts. The outer core is composed of iron and is in liquid state. The inner core

is composed of iron and nickel. The extreme pressure exerted by the weight of the overlying rocks keeps the inner core solid. It is interesting to note that the density of rocks increases as we go down from the surface to the core of the earth.

The Lithosphere

The layers of the earth may also be grouped according to their consistency. The lithosphere is the solid layer composed of the crust and the upper mantle. *Lithos* is a Greek word that means 'rock'. Thus, the lithosphere means the 'rock sphere'. It floats on the *asthenosphere*, which is a 100 km thick layer found at the top of the lower mantle.

In this part, due to high pressure and temperature, some melting takes place. It makes the asthenosphere a bit softer than the rest of the mantle. This may be explained with the help of an illustration. If a bar of cast iron is heated at one end till it reaches the melting point but has not yet melted, it reaches a state where it becomes soft and pliable. This state may be compared with the state of rocks in the asthenosphere.

Let us now find out answers to some of the questions coming to our minds: What constitutes the lithosphere? What are rocks? How are they formed?

Some of the most abundant elements of the lithosphere on the earth's crust are oxygen (O), silicon (Si), aluminium (Al) and iron (Fe). The elements of the lithosphere are organised into compounds to form minerals. A *mineral* is a naturally occurring substance consisting of a single element or a compound

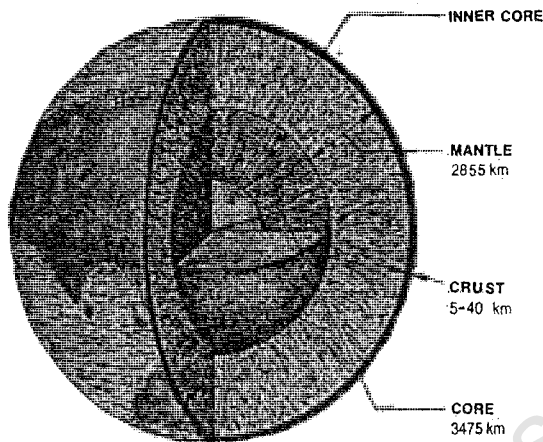


Fig 2.1 The Earth's Interior

Note the three major shells forming the earth's structure. Also note that the density of rocks increases with depth. Which shell would have the highest temperature and why?

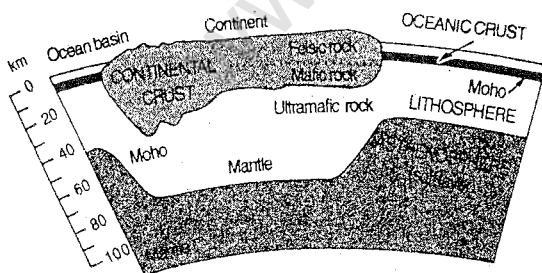


Fig.2.2 The Crust and the Mantle

Note the different types of rocks found in the continental crust. Where does the Moho discontinuity lie?

of elements. You will be surprised to know that most of the minerals are composed of a few common elements like silicon and oxygen. Quartz is an example of this kind. Feldspar is another example, which contains potassium and aluminium in addition to silicon and oxygen. When oxygen is bonded with iron or aluminium, we get iron oxide (hematite) and aluminium oxide (bauxite) respectively. Some minerals contain only one element but they are rare. Many minerals are valuable metals such as gold, silver and copper.

Rocks are naturally occurring combinations of minerals. A few rocks contain only one type of mineral. However, most of the rocks contain two or more different minerals. On the basis of the origin, rocks may be grouped under three categories: igneous, sedimentary and metamorphic.

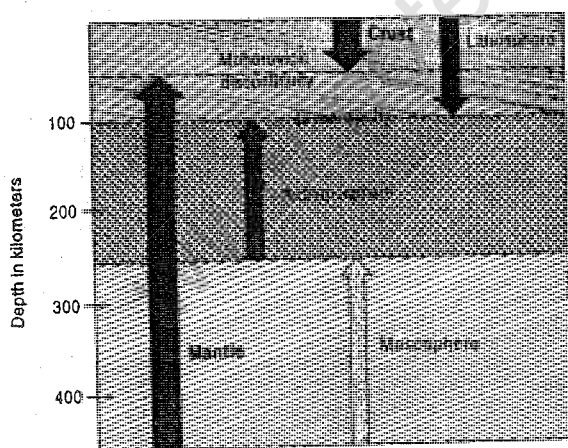


Fig. 2.3 The Lithosphere and the Asthenosphere

Arrange the three spheres in descending order on the basis of their thickness. Which layer does contain asthenosphere?

'Igneous' is derived from a Latin word *ignis* meaning 'fire'. As the name suggests, these rocks are formed from hot molten lava or magma. Due to very high temperature deep inside the earth, materials are in molten state. They are called *magma*. When this magma reaches the earth's surface, it is called *lava*. Cooling of magma either inside the earth or above it results in the formation of hard solid igneous rocks. They make up about two-third of the earth's crust. They are also called primary or basic rocks. Why? Granite and basalt are examples of igneous rocks.

Rocks are broken into small pieces in many ways and form sediments. These sediments are of different sizes ranging from gravel to sand, clay and silt. Sediments as well as organic remains are deposited in layers in low-lying areas. They get compressed and cemented together to form *sedimentary rocks*. These rocks are soft and break easily. Most of the rocks on the earth's surface are sedimentary rocks. Conglomerate, sandstone, limestone, shale and coal are examples of sedimentary rocks.

Due to pressure and heat, chemical and structural changes take place in the existing rocks (both igneous and sedimentary). Chemical changes lead to recombination of elements and thus totally new minerals are formed. During structural changes, more compact mineral patterns or different forms of crystals are formed. Rocks thus formed are completely different in appearance and characteristics from the original rocks. They are known as *metamorphic rocks*. 'Metamorphosis' means a change of form.

Gneiss, slate, marble and diamond are some examples of metamorphic rocks transformed from granite (an igneous rock), shale, limestone and coal (sedimentary rocks) respectively.

The lithosphere is broken into several sections or plates. Each plate carrying oceanic and continental crusts alike moves independently over the asthenosphere. The energy required to move these plates is produced by the internal heat of the earth.

At places, these plates move away from each other creating wide rifts on the earth's surface (San Andreas fault). At some places, these plates come closer and collide. When an oceanic plate collides with a continental plate, the denser oceanic plate is forced below the continental plate. As a result of the pressure from above the rocks heat up and melt. The molten rocks (magma) rise again forming volcanic mountains along the continental edge. Alternatively, a trench may be formed between two plates. When two

LITHOSPHERIC PLATES

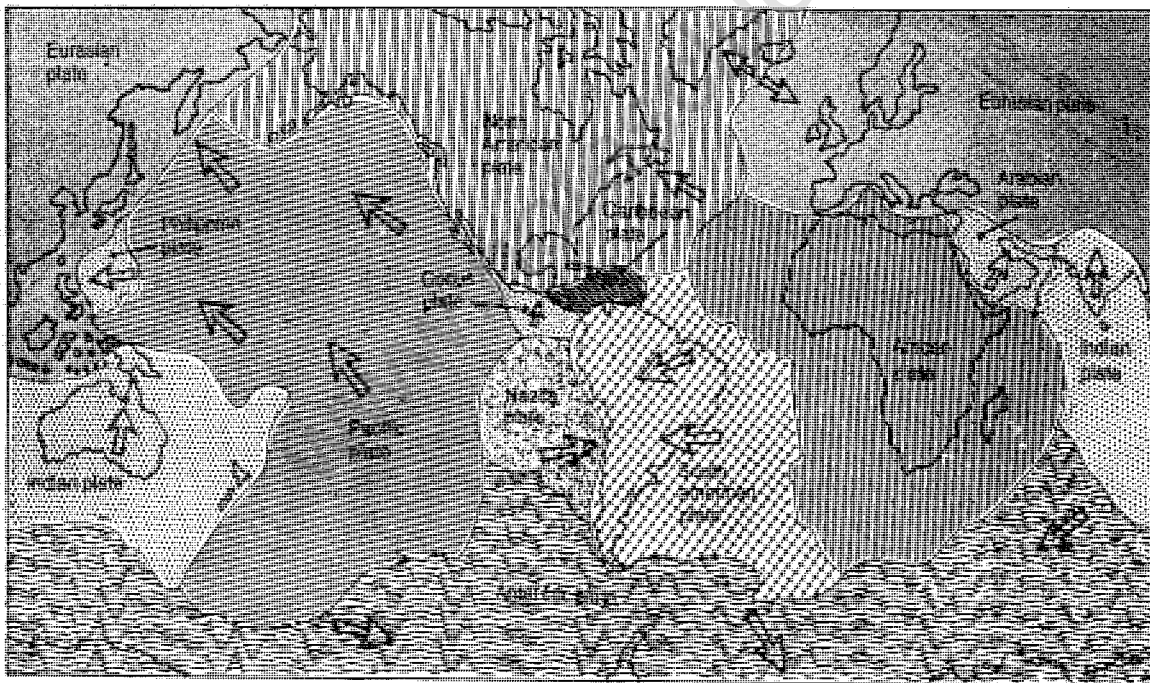


Fig. 2.4 The Major Plates of the World

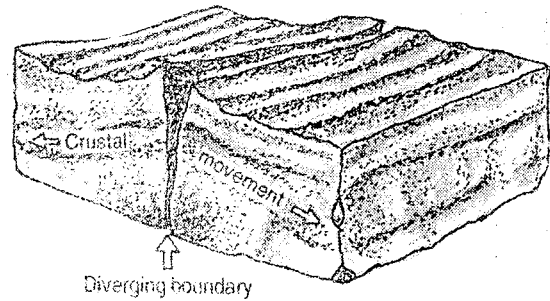
Note the five major plates in the decreasing order of their size. Also note the directions of their movements.

INSIDE THE EARTH

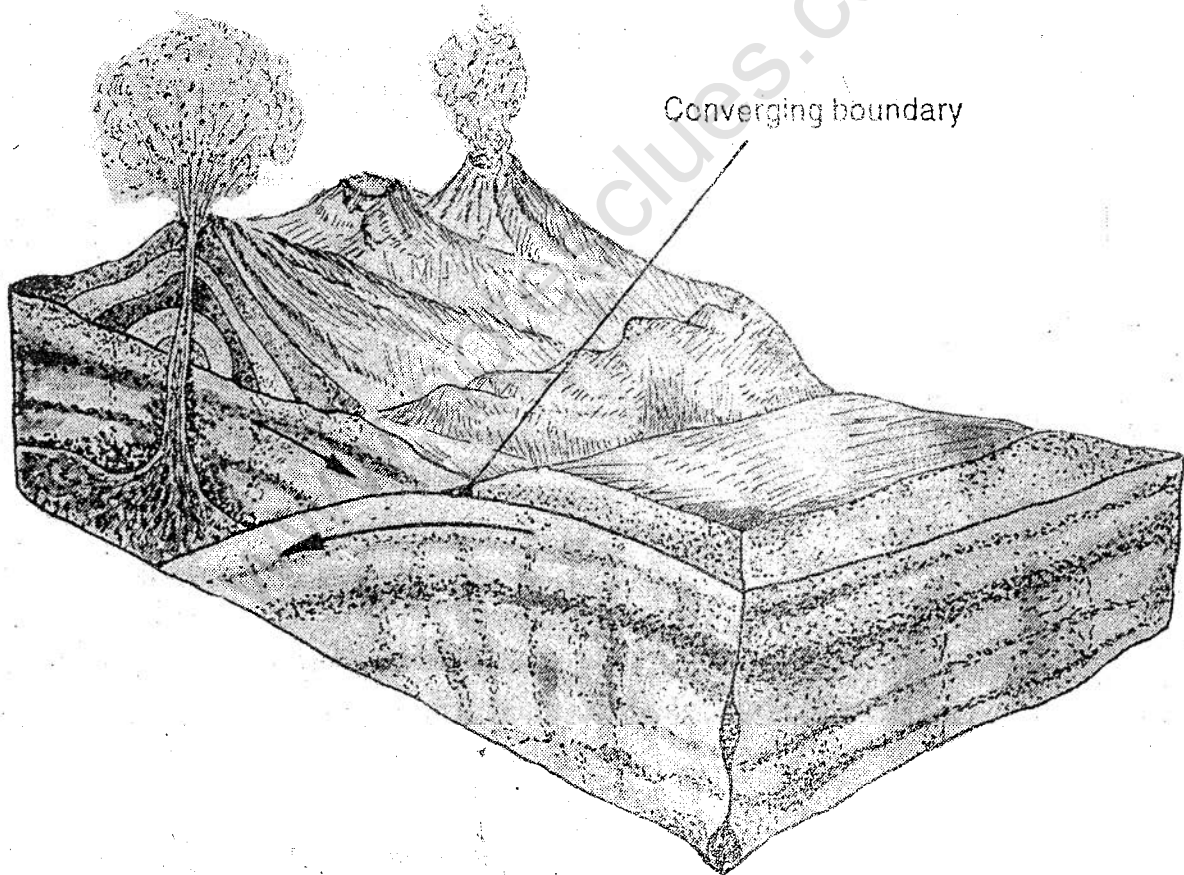
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continental plates converge, neither plate can be forced under the other. Instead, folds may be created. Great mountain ranges like the Himalayas have been formed in this way. Movements of the crustal plates cause compression and tension on rocks. Thus, the areas of collision are marked with deep trenches on the ocean floor, rows of volcanic islands and mountain ranges.

Existing geologic events occur along the boundaries of plates. Although there are exceptions, most earthquakes and volcanoes occur near the edges of plates.



Figs. 2.5 (a) Diverging Boundaries
Note that diverging boundaries are found where plates move apart.



Figs. 2.5 (b) Converging Boundaries
Note that converging boundaries are found where two plates press together.

EXERCISES

Review Questions

1. Answer the following questions briefly:
 - (i) Name the layers of the earth's interior.
 - (ii) What is a 'discontinuity'?
 - (iii) What constitutes the lithosphere?
 - (iv) Why are igneous rocks called basic rocks?
 - (v) Name four most abundant elements of the earth's crust.
 - (vi) Name the metamorphic rocks transformed from granite, limestone and coal respectively.
 - (vii) What happens when an oceanic plate collides with a continental plate?
 - (viii) What kind of landform is created when two continental plates converge?
 - (ix) Where do most earthquakes and volcanoes occur?
2. Classify the following rocks into three groups, i.e., igneous, sedimentary and metamorphic:
 - (i) conglomerate (ii) basalt (iii) gneiss (iv) granite (v) shale (vi) sandstone
 - (vii) slate (viii) marble (ix) limestone (x) diamond.
3. Distinguish between:
 - (i) The outer core and the inner core
 - (ii) Rocks and minerals
 - (iii) Igneous rocks and metamorphic rocks
 - (iv) An oceanic plate and a continental plate
4. Draw a diagram of the earth's interior and describe the important characteristics of each layer.
5. Explain the difference between the lithosphere and the asthenosphere.
6. Explain why do the continents float higher than the ocean basin.
7. What are rocks? How are different kinds of rocks formed?

Skills in Geography

8. Carefully examine each plate shown on the map in Fig. 2.4. Record the name of each plate, the name of any landmass included in the plate, the direction of the movement and the type of the plate, i.e., oceanic or continental, in the following table and then answer the questions given below.

INSIDE THE EARTH

<i>Name of the Plate</i>	<i>Name of the Landmass Included in the Plate</i>	<i>Direction of Movement</i>	<i>Type of Plate — Oceanic or Continental</i>

- (i) How many different plates do you find?
- (ii) How many plates contain landmasses?
- (iii) In which direction is the Indian plate moving?
- (iv) Which ocean shows diverging (moving apart) plate boundaries?

CHAPTER 3

Changing Landforms

Landforms are the surface features of the land. You must have noticed that the earth's surface is not uniform. A variety of land features such as mountains, valleys, plains and plateaus are found here. All these major landforms on the earth are created by tectonic activities associated with the movement of the lithospheric plates. In the earlier chapter you have read about these movements and formation of fold mountains, oceanic trenches, rifts and volcanoes. The energy for moving the lithospheric plates or uplifting a portion of the earth is generated inside the earth. As soon as a portion of the earth is raised above the ground, the process of gradation, i.e., levelling of the earth's surface starts through the action of running water, moving ice, wind, waves and currents. They are collectively known as *agents of gradation*. They carve the initial landscape into a number of minor landforms. Unlike earth movements, these processes are operated by external forces.

All these surface features on the earth are ever-changing. Most of these changes are

hardly noticeable from one day to another or even in one's life-time. If we take a longer view and mark time by thousands of years, the sight would be dramatic. During this period continents may split into fragments and drift apart. Mountains may be rising above the ground and rivers changing their courses. We can, however, experience something of the earth's dynamism in a volcanic eruption, earthquake tremor or in the fury of a flood or a cyclone. These bring sudden changes on the earth's surface.

Although the earth's surface has been changing continuously, the rate of this change varies. While some changes are too slow to be noticed, such as formation of the soil and rise in the sea level, some changes are sudden and dynamic, such as volcanic eruption. All events, such as wearing away of the top soil from the hill slopes with rain water or the awesome power of the winds in a cyclone, seem to be isolated. They, however, form part of a larger pattern of development going on for millions of years.

CHANGING LANDFORMS

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Let us now see how the sudden movements of the earth's crust are responsible for the formation of some of the landforms.

Tectonic Activities

Basically, there are two different expressions

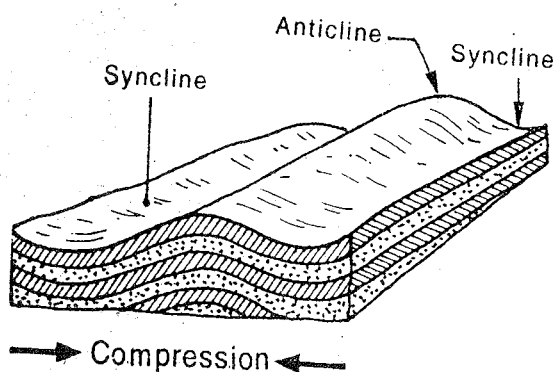


Fig. 3.1 Folds

Which kind of force is responsible for the formation of folds? Find out the names given to uplifted and depressed parts.

of tectonic activity. Along the converging boundaries of the lithospheric plates, tectonic activity is that of *compression* as illustrated in the diagram in Fig.2.5(b). As a result, the sedimentary layers of the ocean floor get compressed to form folds (Fig. 3.1). The wavelike undulations have alternating upfolds (anticlines) and downfolds (synclines).

In areas of rifting of continental plates, explained earlier, faulting takes place. A *fault* is a fracture along which displacement of rock layers takes place. (Fig. 3.2). These landforms may be formed on land as well as under oceans.

Volcanoes

A *volcano* is an opening in the earth's crust that allows magma to reach the earth's surface. The magma that reaches the earth's

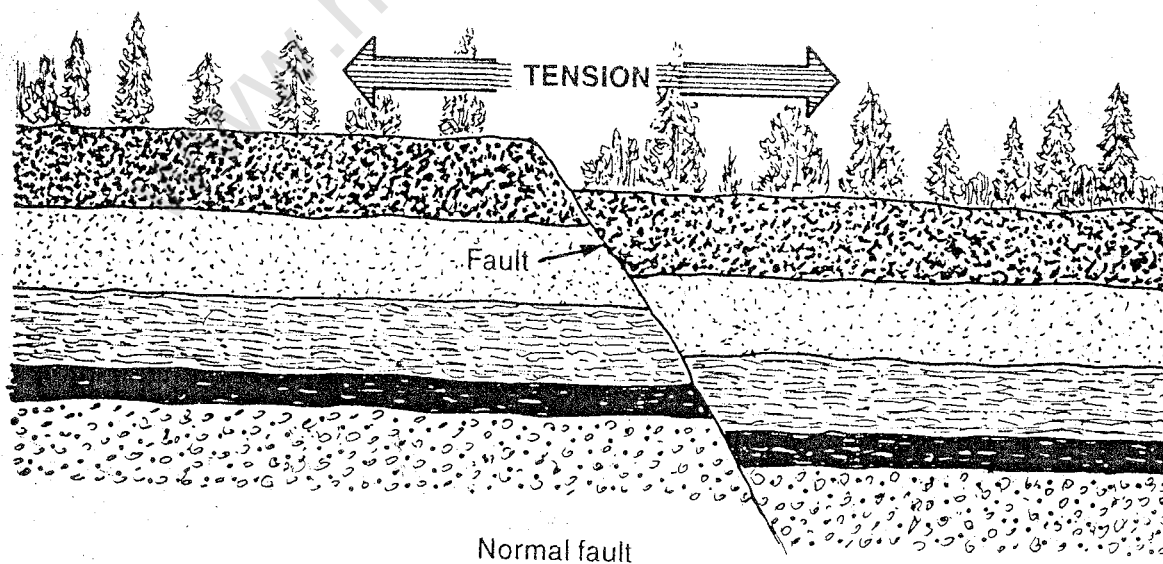


Fig. 3.2 Faults

Which kind of force is responsible for the formation of faults?

surface. The magma that reaches the earth's surface is called *lava* and the passage through which it travels is called a *vent*. In course of time, lava and other materials thrown out of a volcano accumulate around the opening and form a conical hill or a mountain. The top of this cone is usually marked by a funnel-shaped depression, which is called a *crater*.

Sometimes, magma rises slowly to the

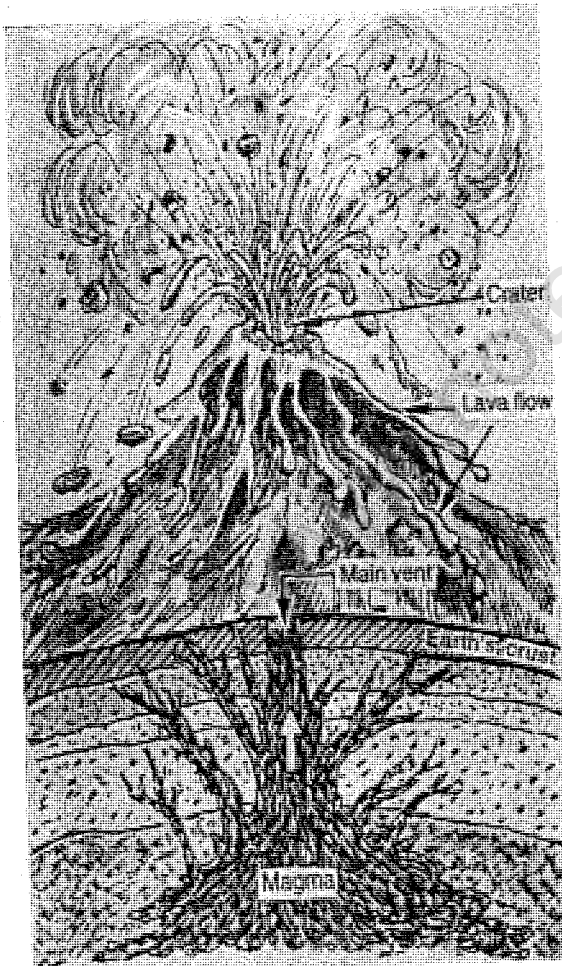


Fig. 3.3 Volcanic Mountain

Look at the diagram and find out the names of the two major parts of a volcano

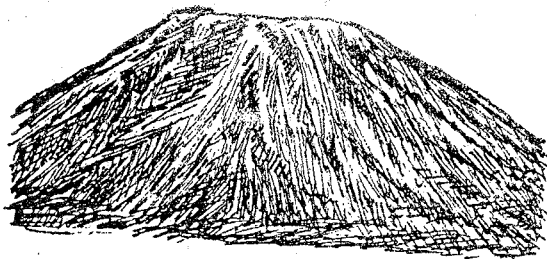
surface and spreads over a vast area. This is known as *lava flow*. Some plateaus and plains have been formed in this way, e.g., Deccan plateau in India and the Colombian plateau in North America.

If the magma rises quickly to the surface, lava is thrown high into the atmosphere. Besides lava, ash, steam, gases and pieces of rocks are also thrown out. Lava flow is affected by viscosity. You must have read in science that *viscosity* refers to a liquid's resistance to flow. For example, honey has high viscosity, so it flows slowly, while, water has low viscosity, so it flows easily. The viscosity of lava is determined by the amount of silica and water in magma. High-viscosity lava is rich in silica and has little water. Low-viscosity lava has little silica but a lot of water. It, therefore, moves rapidly forming smooth flows.

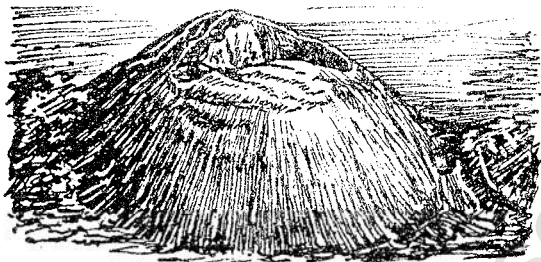
The shape of a volcano depends on the type of lava and the force of the eruption. On the basis of shape, there are three types of volcanoes: shield, cinder-cone and composite volcanoes.

A *shield volcano* is formed by quiet eruption of lava with a low silica content. Such a volcano has a wide base and a cone with gentle slopes. Volcanoes off the Hawaii islands are of this type.

Silica-rich magma traps gases inside the volcano until enough pressure is built to push the magma out of the earth's crust. When this type of volcano erupts, it shoots gases, ash etc. with great force throwing them several kilometres up into the atmosphere. Such volcanoes have steep slopes and are made of



Shield volcanoes



Cinder-cone volcanoes



Composite volcanoes

Fig. 3.4 Types of Volcanoes

Note the difference in the shapes of the three types of volcanoes. How are they different from each other?

cinder and ash. They are known as *cinder-cone volcanoes*. Many volcanoes of Mexico and Central America belong to this group.

A series of successive eruptions of different types of lava gives rise to a *composite volcano*. Such volcanoes are made of alternate layers of lava, cinder and ash. They have undulating slopes. Mt. Fujiyama of Japan is an example of composite volcano. There is a circular belt of volcano round the Pacific Ocean. It is commonly known as the *Ring of Fire*.

Earthquakes

Earthquakes are the most prominent evidence of present day earth movements. An

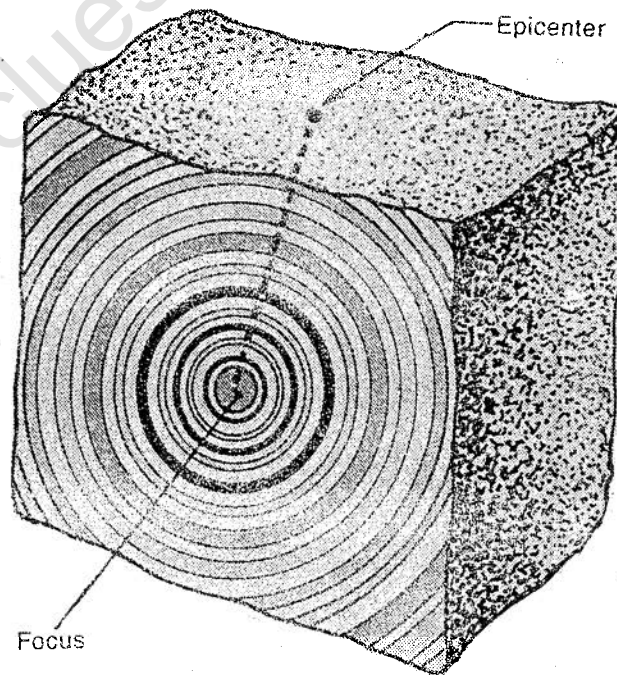


Fig.3.5 Earthquake — Focus and Epicentre

You will notice that focus is the point where earthquake waves originate in the earth's interior. The epicentre is the point just above it on the ground.

earthquake is a vibratory motion of the ground surface. It ranges from a faint tremor to a wild motion. Earthquakes are capable of causing widespread damage to life and property.

Tectonic movements lead to disturbances within the earth's interior. The point where these vibrations originate is called the *focus* of the earthquake. The point of the earth's surface directly above the focus is called the

epicentre of the earthquake. From the focus, the earthquake vibrations travel in different directions in the form of seismic waves. These waves travel outward in the same way as ripples produced on the surface of a quiet pond do when a pebble is thrown into it.

The earthquake waves are recorded by an instrument known as *seismograph*. The magnitude of an earthquake is measured by the *Richter Scale*. The numbers on this scale

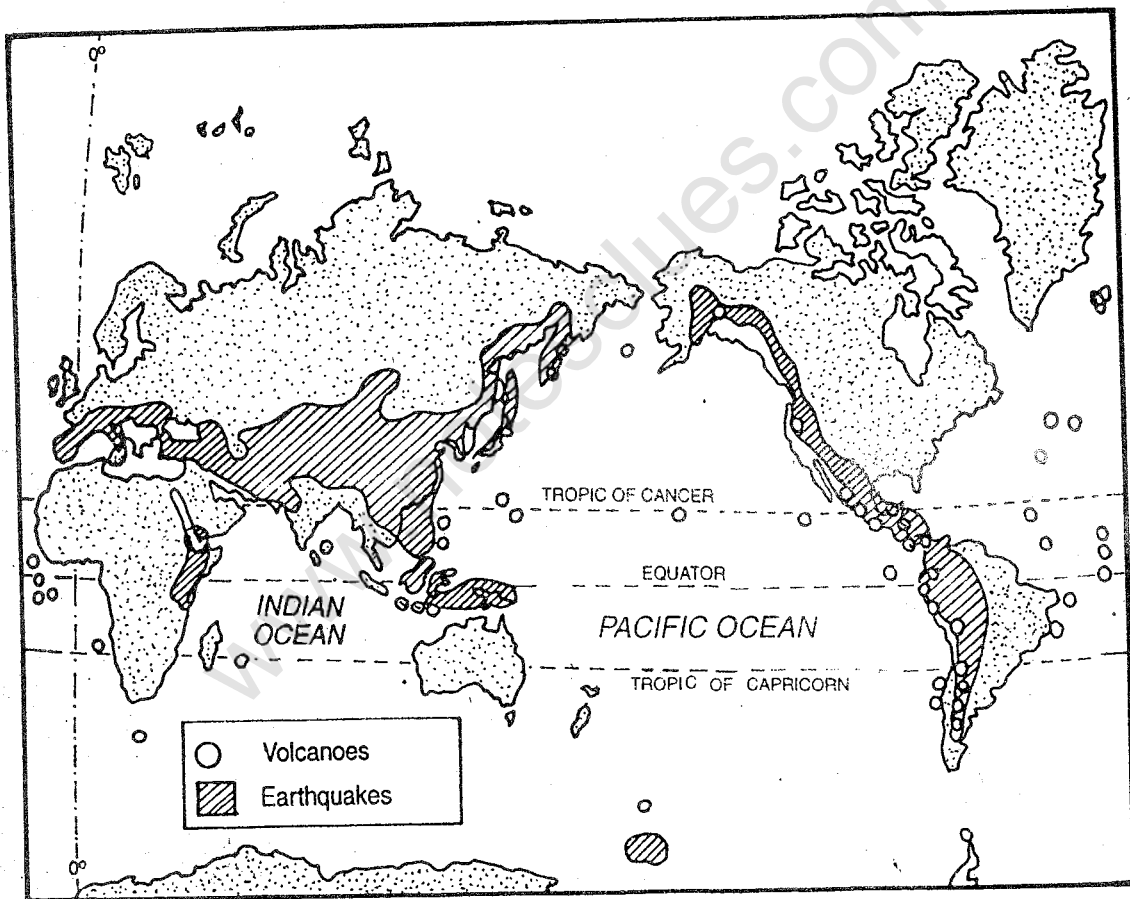


Fig. 3.6 World-areas Prone to Volcanic Activities and Earthquakes

Note that the major earthquake belts and volcanoes are located around the Pacific Ocean. Which are other major areas frequently affected by the earthquakes and why?

range from 0 to 9, though there is no upward limit except for nature's own limit of energy release. So far, no earthquake has been measured above 9. Each increase of one unit on the Richter Scale represents a ten-fold increase in earthquake strength. The extent of destruction increases with the increase in the number on the Richter Scale.

Some areas on the earth's surface are more prone to earthquakes. For example, the region around the Pacific Ocean, which is also the area of most prominent tectonic activities, experiences frequent earthquakes.

In India the Himalayan region and the Ganga-Brahamaputra valley are prone to earthquakes. A number of earthquakes have been experienced in this region. Some of them were very severe and caused extensive damage, e.g., the earthquake of Uttar Kashi in 1991 and Chamoli in 1999. The Deccan Plateau, which was supposed to be comparatively free from the dangers of the earthquakes, has experienced two severe earthquakes in the recent past, the Koyna earthquake in 1967 and the Latur earthquake in 1993.

EXERCISES

Review Questions

1. Answer the following questions briefly :

- (i) What activities are responsible for the creation of the major landforms on the earth?
- (ii) What is meant by the 'process of gradation'?
- (iii) Name four agents of gradation.
- (iv) Give one evidence each of slow and sudden changes on the earth's crust.
- (v) What is a volcano?
- (vi) What is viscosity?
- (vii) What is the epicentre of an earthquake?
- (viii) What is a seismograph?
- (ix) Name the scale which measures the magnitude of an earthquake.
- (x) Which areas on the earth's surface are prone to earthquakes?

2. Distinguish between:

- (i) Fold and fault
- (ii) Anticline and syncline
- (iii) Vent and crater
- (iv) Magma and lava

3. Describe the three types of volcanoes in terms of their composition and shape. Give an example of each.
4. Explain how viscosity, and steam affect the eruption of volcanoes.
5. What is an earthquake? How does it originate? Giving examples from India, explain which part experiences frequent earthquakes and why?

Skills in Geography

6. On an outline map of the world, mark and label the following :
 - (i) The 'Ring of Fire'
 - (ii) The earthquake prone regions
7. Collect information regarding major earthquakes in India during the last fifty years (1949-1999). Arrange them in a chronological order in the given table and answer the questions that follow.

<i>Place of Occurrence</i>	<i>Year</i>	<i>Physiographic Region (the Himalayan Mountains., the Indian Plains and the Peninsular Plateau)</i>
e.g. Koyana Nagar	1967	The Peninsular Plateau
1.		
2.		
3.		
-		
-		

- (i) How many major earthquakes were experienced during 1949-1999?
- (ii) Which physiographic region experienced the maximum number of earthquakes? Also give the probable reasons for the high frequency of earthquakes in this region.

CHAPTER 4

Sculpturing of the Landscape

Major landforms created by tectonic and volcanic activities are being modified continuously by external processes operating above the ground. These processes acting through the mediums of the hydrosphere and the atmosphere shape the landforms. They are powered by solar energy. These activities of land sculpture include lowering as well as raising of the land surfaces. Agents of gradation, i.e., running water, ground water, glaciers, sea-waves and winds are constantly busy in erosion, transportation and deposition of rock materials. Weathering also plays a major role in gradation as disintegration and decomposition of various kinds of rocks facilitate the erosional work. Weathering and mass wasting as well as erosion, transportation and deposition of earth materials by agents of gradation produce a variety of landforms. Let us now find out more about these processes and associated landforms.

Weathering

When rocks are exposed to the environment

at or near the surface of the earth, they are gradually disintegrated into small pieces *in situ* (at the same place). This process is called *weathering*. Breaking of rocks takes place due to change in temperature and pressure as well as effects of air and water and the mechanised actions of animals, plants and humans.

Weathering is often described as the first phase in the gradation of the landscape because it prepares rock materials which are transported by other agents of erosion. Weathering is also an important prerequisite to the formation of soils.

There are mainly three types of weathering: physical, chemical and biological.

Physical Weathering

It refers to mechanical disintegration of rocks without any change in their chemical composition. It takes place in many ways. Change in temperature causes rock forming minerals to expand when heated and contract

when cooled. In areas of extreme range of temperature, rock surface are exposed daily to intense heating during the day and intense cooling during the night. As a result of the daily cycles of expansion and contraction rocks are weakened and they break apart.

Change in temperature also affects the water collected in cracks or pore spaces of rocks. Due to fall in temperature at night, water freezes and expands. Consequently, the crack also enlarges under pressure. Gradual widening of the cracks leads to disintegration of rocks. This is called *frost action*.

Sometimes rocks are exposed on the earth's surface. Due to the difference in day and night temperatures, expansion and contraction take place. In the process the outer layers of rocks get peeled off. This is called *exfoliation* which is very common in granitic rocks.

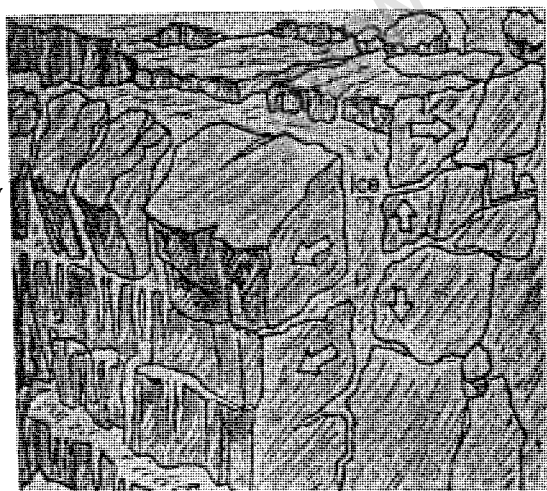


Fig. 4.1 Frost Action

Note how cracks are formed and widened due to frost action.

Chemical Weathering

In chemical weathering, the mineral composition of the rocks changes due to chemical reaction of water or air. For example, when an iron rod is kept outside, it rusts after some time. This is due to oxidation. Similarly, when rain falls, CO_2 reacts with it and carbonic acid is formed. It reacts with several minerals. Limestone and marble react to carbonic acid and produce interesting features in humid regions, for example, rock cavities, sinkholes and caverns.

Biological Weathering

When seeds sprout in a rock-crack and begin to grow roots, they exert pressure on rock walls and expand the cracks. This leads to breaking of rocks. Burrowing animals and humans also contribute to this process.

Mass Wasting

Everywhere on the earth's surface, gravity continuously pulls all materials downward. The various kinds of downhill movement occurring under the pull of gravity are collectively known as *mass wasting* or *mass movement*.

Movement of loose rock pieces and soil on most mountain slopes is quite common. On mountain slopes, when rock masses break free, they slide on the slope causing environmental hazard. There are different types of mass movement depending upon the size of the rocks moved, the amount of water involved and the steepness of the slope. When the rock materials such as clay and silt saturated with water move down a gentle slope, it is called an *earth-flow*. The mud-



Fig. 4.2 Exfoliation

Note how layers of rock get separated in this process.

flows, on the other hand, are the movement of water-saturated rock debris down channels on steep hill sides. Quite often dry soil and rock pieces suddenly move down a steep slope. This is known as *landslide*.

Soil and its Formation

Most of the earth's surface is covered with soil. All forms of life depend on it. It is

required to grow all kinds of vegetation—trees, plants, shrubs, grasses and crops. Do you know what soil is and how is it formed?

Soil is a combination of fine rock particles and organic material (*humus*) in which plants grow. *Humus* is derived from the remains of plants and animals. It makes the soil fertile. Soil is formed from the weathering and erosion of rocks as well as the decay of plants and animals. Soil formation is a very slow process. It takes hundreds of years to form one centimetre thick layer of soil.

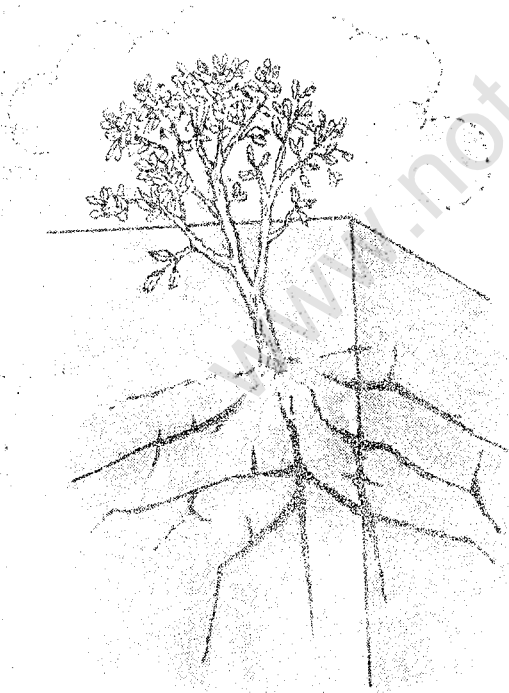
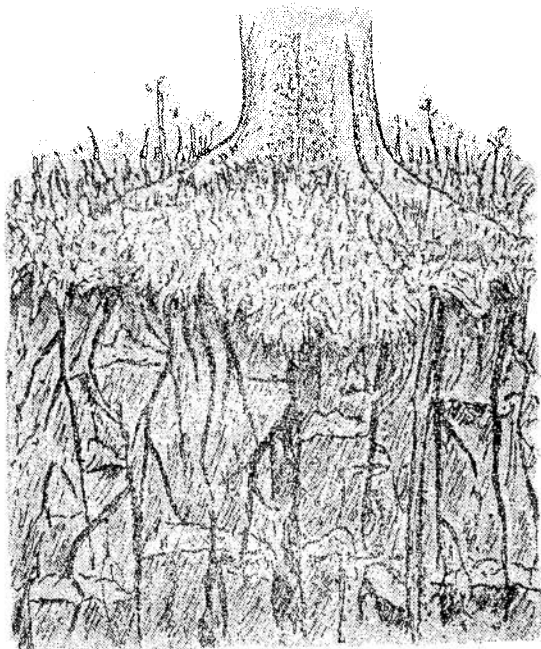
Soil develops in horizontal layers. You might have noticed different layers of soil at construction sites where ground is dug deep. A side view of the soil layers is known as a *soil profile*. The top layer on the surface is called *topsoil*. It contains clay, silt, sand, and humus. Roots of many plants are restricted to this layer. The layer below is known as *subsoil*. It contains coarse clay, sand, some minerals and small amount of humus. Below this layer is found the partially weathered rock, beneath which is the *bedrock*.

Agents of Gradation

Running water, glaciers, winds, and sea-waves are called *agents of gradation*. They erode, transport and deposit the earth material while moving from one place to another. They change the landscape continuously and make different types of landforms. Each of these agents is responsible for shaping a typical landscape.

Running Water

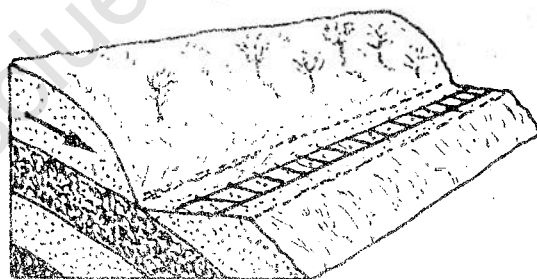
Running water moving in the form of rivulets,



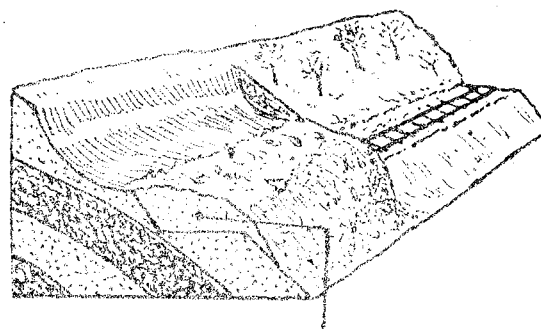
Figs. 4.3 (a) and 4.3 (b) Root Pry
You will notice that roots of trees cause disintegration of rocks.

streams and rivers is the most common agent of gradation. The moment rain falls on the ground, the water starts flowing down the slope. Some water soaks into the ground, but most of it moves across the surface toward a lower level. This movement of water is called *run-off*. The slope of the land, the amount of rainfall and the extent of plant cover affect the run-off. Rainwater often washes away the top layer of the soil and hence reduces its fertility. This is called *soil erosion*. Erosion refers to the process of removing rock material and topsoil from the land surface.

Before Landslide



After Landslide



Landslide buries railway line

Fig. 4.4 Landslide

Look at the two diagrams. You will notice how landslides affect the landforms and disrupt human lives.

SCULPTURING OF THE LANDSCAPE

Soil is eroded by rainwater in many ways. During heavy rains, the volume of run-off is high. In the absence of plant cover, the layer of soil from a large area is washed away by the force of surface run-off. It is known as *sheet erosion*. In an uneven terrain, the rainwater while moving down the slope, scoops out the soil forming narrow deep channels called *gullies*. These gullies gradually multiply, deepen and spread over a large area. This is known as *gully erosion* resulting in the formation of ravines. If you happen to travel between Agra and Gwalior,

you may see a large area affected by gully erosion in the Chambal valley.

Soil erosion is one of the most serious kinds of environmental degradation. While it takes hundreds of years to form one centimetre thick layer of soil, it can be washed away comparatively very quickly. Hence certain measures should be adopted to stop soil erosion. These measures include terrace farming, contour ploughing, afforestation, bunding, and gully plugging.

Work of a River

A river or a stream is a body of flowing water. It occupies a valley and moves down the slope under the force of gravity. The place where a river originates is called its *source*. The other end of the river where it meets a large body of water such as a lake, a sea or an ocean, is known as its *mouth*. The river during its journey from its source to the mouth performs three interrelated activities like any other agent of gradation. These activities are erosion, transportation and deposition which create different land features.

Erosion

The process of removing rock material and topsoil from the land surface is called *erosion*. Rivers erode in many ways depending upon the nature of the surface rocks, their own velocity and the tools with which these are armed. The force of the flowing water exerts dragging effect upon the river bed. As a result, poorly consolidated rock materials such as clay, silt, and sand get eroded. Rivers also erode their banks and widen the valleys. Rock pieces carried by rivers rub against the

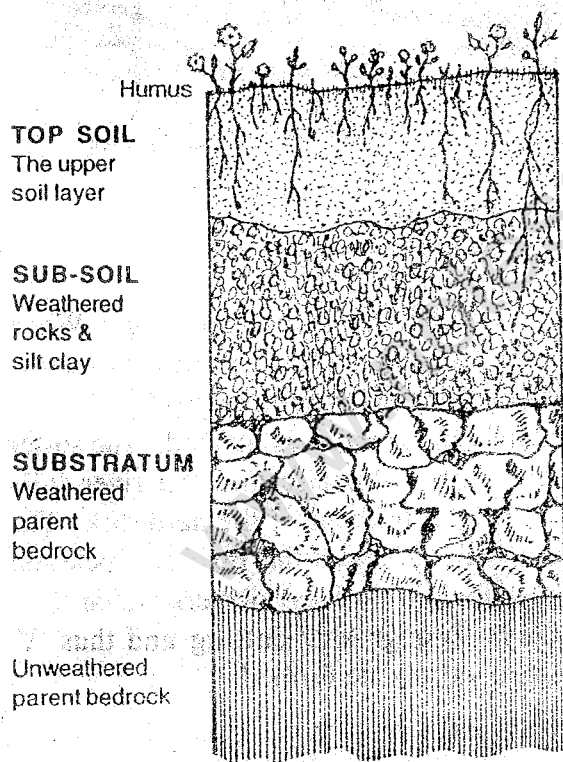


Fig. 4.5 Soil Profile

Look at the various layers of the soil. What is topsoil?

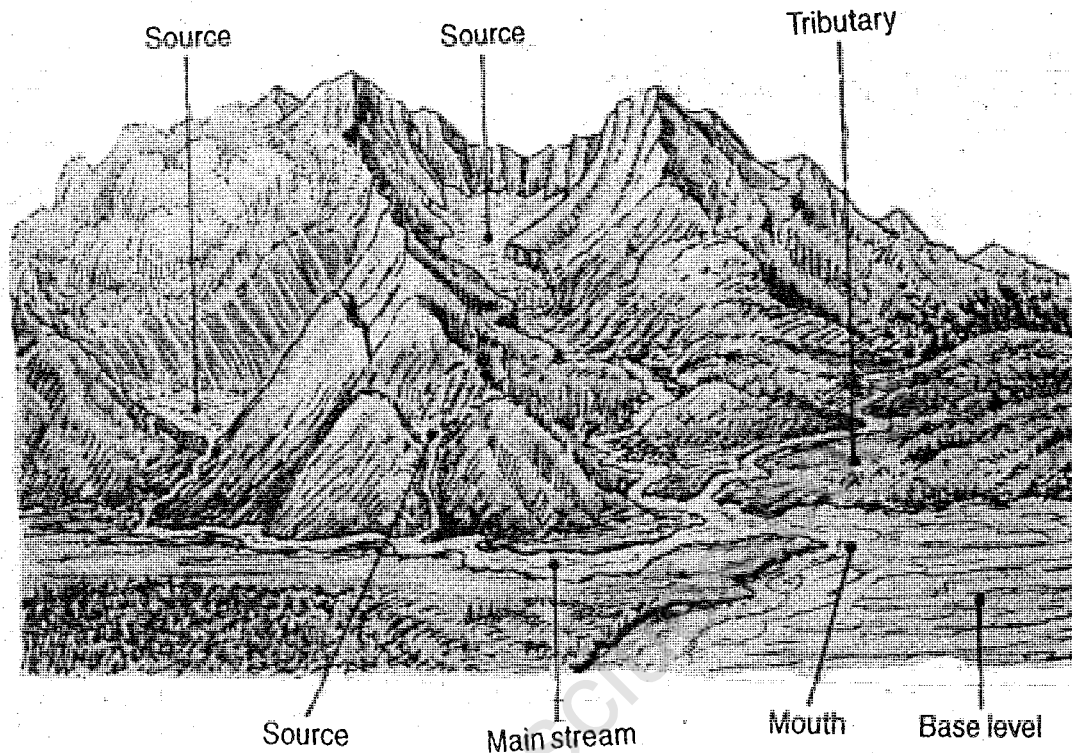


Fig. 4.6 A River and its Tributary

Note how a river originates and ultimately meets a lake or a sea.

bedrock and deepen their valleys. While rolling down the slope, the rock pieces also get rubbed and further broken into small particles. Rocks such as limestone are also removed by chemical reaction and solutions.

A stream or river cannot erode below the height of its mouth. The sea level is the ultimate level of all rivers.

In the upper portion of a river, steep slope is responsible for the high velocity of river water. The capacity of the stream to transport exceeds the load supplied to it. Hence there is little or no deposition. The down cutting of the channel continues. As a result rivers make deep and narrow valleys with steep-

walls. Such features are called *gorges*. When a river encounters a layer of rock resistant to erosion followed by comparatively soft rock, a *water fall* or *rapid* is formed. The softer rock is eroded easily and the river falls vertically at the edge of the hard rock. The water slowly erodes the resistant rock and the water fall recedes. Rivers widen their valleys through side cutting and thus 'V' shaped valleys are formed.

Transportation

Rivers carry loose weathered and eroded rock materials along with them. Some of these rock materials also act as tools and help in the erosion activity. The amount of eroded

materials carried by a river is called its *load*. The amount of load which a river can carry with it depends on the volume of water and the steepness of the slope over which it flows. You may notice that a large and fast flowing river can carry more load than a small and slow-moving river.

Some materials are carried by a river in dissolved form, e.g., salt and lime. Materials like clay and silt are carried as *suspended load*, i.e., held in water. Coarse and heavy materials like sand and pebbles roll, bounce and are dragged along the river bed. They are carried by the river as *bedload*.

Transported rock materials are gradually deposited on the river beds, on their banks

and on the floors of the water bodies such as lakes, seas and oceans. As long as the rivers are able to carry the load, they transport the material.

Deposition

When the carrying capacity of the river decreases because of fall in the speed or decrease in the volume of its water, the excess load is deposited. Such deposits gradually raise the elevation of the river bed. A narrow and deep river channel gradually takes the form of a wide and shallow channel. Once the deposits come above the level of water, they subdivide the channel into multiple threads. These may rejoin and subdivide

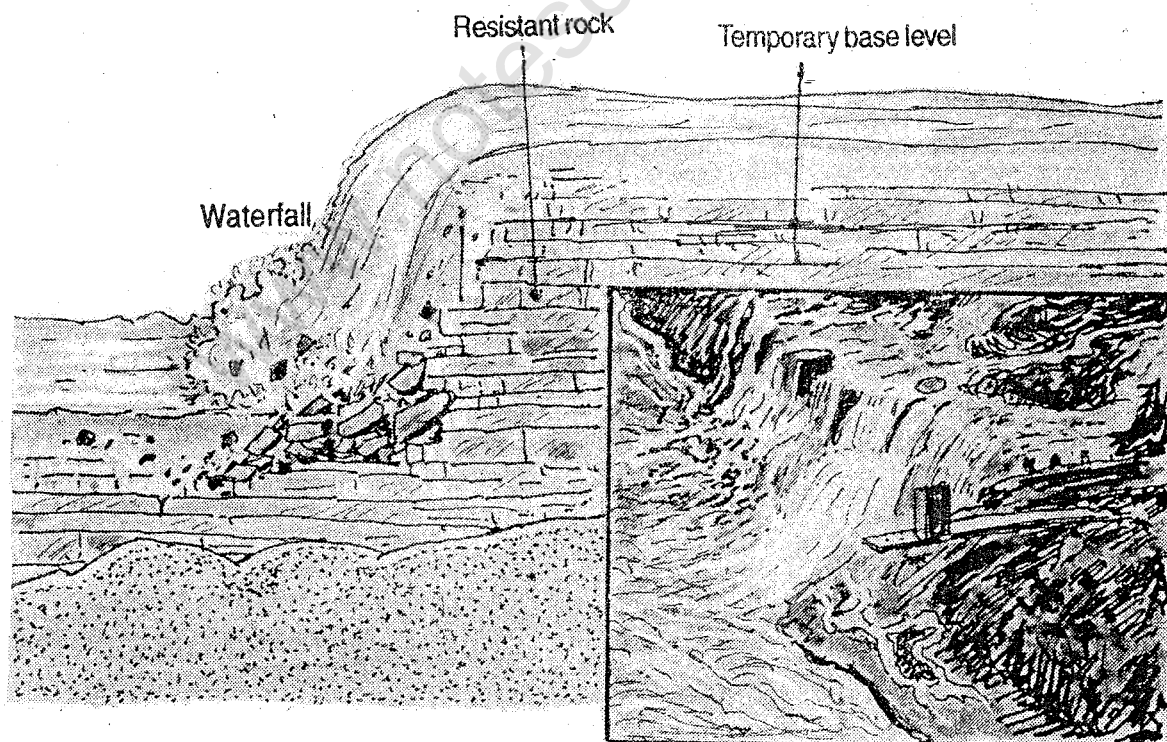


Fig. 4.7 Waterfall

Note how a waterfall is formed.

again to form a criss-cross. Such a river channel is called a *braided channel*. You may have seen such a feature in a river or a stream near its mouth.

Deposition of sediments takes place in a sequence. Larger and heavier pieces of rocks such as pebbles and gravel settle first followed by coarser materials like sand. Finer particles such as clay and silt are carried by the river more easily and hence they are deposited much later.

When the river bed rises due to deposition of sediments, any increase in the volume of water causes the river to overflow its banks. The river, thus, floods the surrounding area. The area over which the river water spreads is known as the *flood plain*. When a stream overflows, it deposits sediments on its flood plain, renewing and enriching the soil and making it fertile. With the spread of flood water, the current rapidly slows down

depositing sand and silt on both sides of the channel. The amount of deposition decreases as one moves away from the channel. This kind of accumulation is known as *natural levee*.

The dominant feature of the flood plain is the meandering river. On a gentle slope, the stream laden with sediments moves comparatively slowly forming broad curves known as *meanders*. At this stage lateral erosion is more and the flow of water swings from side to side. The meanders often form a broad loop with a narrow neck. Sometimes this narrow neck is cut by the river as it flows straight. The water follows the shorter route leaving the broader meander loop abandoned. This meander loop, filled with water and converted into a lake, is known as an *ox-bow lake*.

When a stream loaded with sediments reaches its mouth, the speed of water drops and the flow spreads out. As a result, the sediments are deposited near the mouth forming a delta. It is a triangular deposit of sediments at the mouth of the river. Its shape resembles the Greek letter Δ (delta). This name was first used to describe the delta of the Nile. It obstructs the flow of water and the mouth of the river shifts. With continuous shifting of the mouth, the delta gets enlarged. Sometimes the slow-moving stream splits into several channels depositing sediments in between. These are known as *distributaries*. How are they different from tributaries? The Ganga-Brahmaputra delta is one of the most spectacular deltas in the world.

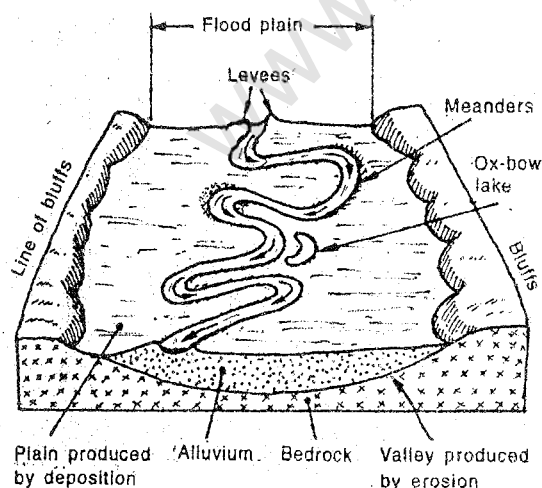


Fig. 4.8 Some Landforms made by a River
You may notice various kinds of features associated with the river-action.

EXERCISES

Review Questions

1. Answer the following questions briefly:

- (i) What is weathering?
- (ii) Why is water an important agent of chemical weathering?
- (iii) What is mass wasting?
- (iv) What is soil? How is it formed?
- (v) Name the most common agents of gradation.
- (vi) What is meant by run-off?
- (vii) What makes a river flow down the slope?
- (viii) Which two factors determine the amount of load that a river can carry?
- (ix) Among clay, pebbles and sand, which will be deposited by a river first?
- (x) What is a natural levee?
- (xi) What is a delta?

2. Distinguish between:

- (i) Topsoil and subsoil
- (ii) Weathering and erosion
- (iii) Sheet erosion and gully erosion
- (iv) Source and mouth of a river
- (v) Suspended load and bed load of a river
- (vi) Tributary and distributary

3. Make out correct pairs from the following two columns:

A	B
(i) A deep and narrow river valley with steep walls	(a) Delta
(ii) Gradual widening of rocks due to freezing of water	(b) Landslide
(iii) Downhill movement of dry soil and rock pieces	(c) Frost action
(iv) A triangular deposit of sediments at the mouth of a river.	(d) Exfoliation
(v) The peeling of rocks into layers or sheets	(e) Gorge
	(f) Earth-flow

4. Given below is a list of landforms associated with running water. Re-arrange them in two groups — erosional features and depositional features.
(i) V-shaped valley (ii) gorge (iii) delta (iv) water fall (v) ox-bow lake (vi) flood-plains (vii) natural levee (viii) braided channel
5. Explain the weathering process and the factors that influence it. Also describe the major types of weathering.
6. Describe the various types of soil erosion giving examples from India. What measures can be adopted to check soil erosion?
7. Explain the differences among landslides, earth-flows and mud-flows.
8. Describe the work of a river. Relate a stream's slope, volume and velocity to its ability to erode the land.

Skills in Geography

9. Examine the exterior of old stone buildings/monuments in your area. Determine if any kind of weathering has occurred. Make a report to your class on your findings.
10. The Sphinx, a huge statue in the Egyptian Desert has withstood the processes of weathering for thousands of years. Yet in the last fifty years, the decay of the statue's features has increased greatly. What might have caused this rapid increase? Find out which statues/monuments in our country are facing similar problems.
11. Collect photographs and pictures of the following and prepare a brief write-up on each:
 - (i) Landslides in the Himalayan Region;
 - (ii) Effects of weathering on buildings/ monuments/statues in different parts of our country; and
 - (iii) Various landforms made by rivers in India.

CHAPTER 5

Landforms Made by Ground Water, Winds, Glaciers and Sea Waves

Besides being created by the running water, landforms are also created by ground water, winds, glaciers and sea waves. In the previous chapter, you had read about the

landforms created by the running water.

Landforms Made by Ground Water

Water is the most important agent of

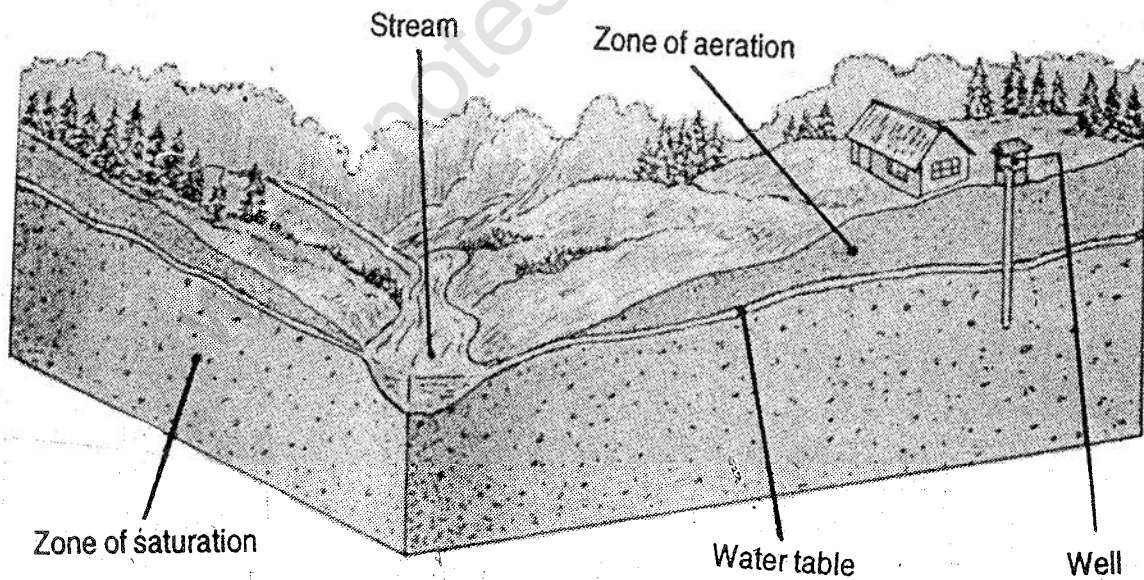


Fig. 5.1 Water Table

Note that the water table is located above the zone of saturation. Why has the well been dug in this zone?



Fig. 5.2 Karst Topography

It is an interior view of a cave in a limestone region. You will notice different kinds of interesting features, formed by the underground water.

landscape development whether it is on the surface as running water or under the ground. Landscape formed by ground water is the most spectacular in limestone region. Such a landscape is also called *karst topography*. This name has been given to it after the Adriatic Coast of Slovenia (part of former Yugoslavia).

Not all the water that falls on the earth runs off into streams. Some water seeps into the ground where it enters tiny air spaces in the soil and rocks. While some water remains with the soil fragments, much of it moves

down into the ground. It ultimately reaches an area called the *zone of saturation* where all the spaces are filled with water. The top of the zone of saturation is called the *water table*. The depth of the water table varies in different locations. The water table is very high in areas near a sea or a river. In desert regions, it may be hundreds of metres below the earth's surface.

In areas with limestone bedrock, the ground water travels down through the fractures in the limestone. In this process the rock is dissolved in course of time

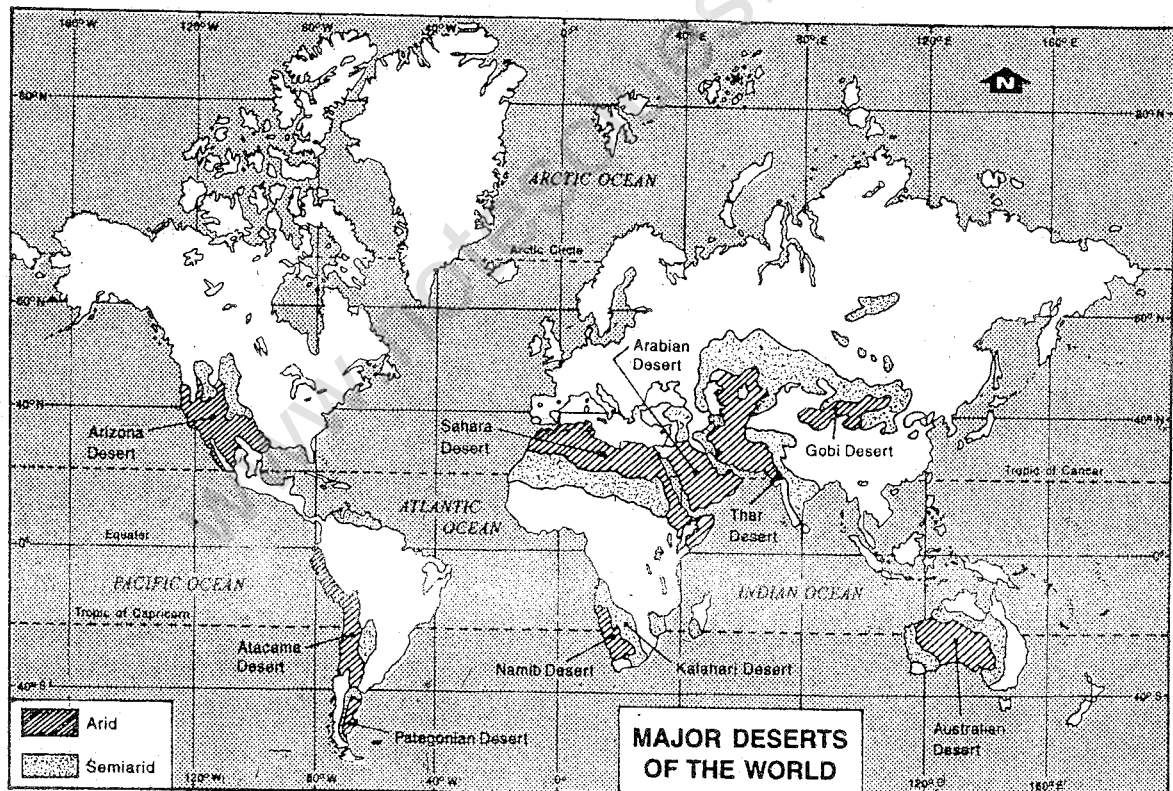


Fig. 5.3 Major Deserts of the World

Look at the distribution of major deserts in the world. Name one major desert from each continent and state which climatic region they belong to.

because of carbonation. As a result, large *underground passages* and *caves* are formed. These passages sometimes carry *underground streams*. Sometimes they reappear on the surface in the form of *springs*.

Besides erosional features, one may also notice depositional features in such areas. As the ground water containing dissolved lime or calcite drips from cave ceilings, the water evaporates and calcite is left behind. These deposits hanging downward from the ceiling are called *stalactites*. When a similar deposition takes place upward from the floor of a cave, *stalagmite* is formed.

Landforms Made by Winds

The wind is another active agent of landform development. Ordinarily, the wind is not strong enough to dislodge mineral matters

from hard rocks, or moist clay-rich soils, or soils bound by dense vegetation cover. Instead, wind action is mostly limited to dry or arid or semi-arid areas where loose particles are available. Though our planet is covered mostly by water, yet you may be surprised to learn that over one-third of the land is desert. In such areas, wind action is predominant. It is responsible for creating unusual landforms which make deserts fascinating.

The gradational role of the wind results in two kinds of landforms—erosional and depositional. Erosion takes place when loose particles lying on the ground are lifted off and taken away by strong winds. In course of time, a hollow is formed in the desert surface called *wind eroded basin*.

Deposition of transported particles takes place, when an obstacle lies in the path of the wind or due to a decrease in the velocity of the wind. As a result of this deposition mounds of sand, called *sand dunes*, are formed. These sand dunes may be of various shapes and sizes.

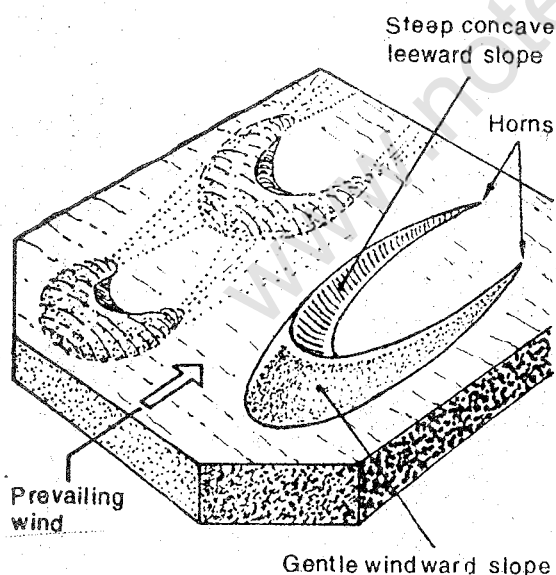


Fig. 5.4 Sand Dunes

Note the direction of the wind and the formation of sand dunes.

Landforms Made by Glaciers

Glacial ice has played an important role in shaping landforms of mid-latitudes and sub-arctic zones. Most of us know ice only as a brittle and crystalline solid piece because we see it in small quantity. Where ice exists in great thickness — 100 metres or more, the ice at the bottom behaves as a plastic material. The ice then slowly flows in such a way that it spreads out over a larger area or moves downhill depending upon the landscape. This behaviour characterises a glacier. A *glacier*

is a slow moving river of ice and snow. Glaciers mostly crawl at such a slow pace that their movements are hardly noticeable.

However, a rapidly moving glacier may travel as fast as 4 km per year. Despite large areas being covered with ice and snow, glaciers are found only in a few areas. It is because glaciers form only in areas where the temperature remains too low for all of the snow or ice to melt.

Glaciers that form in high mountains are characteristically long and narrow because they occupy valleys of former streams. These are called *valley glaciers*. In arctic and polar

zones, due to low temperature throughout the year, ice accumulates over large areas. When ice cover is limited to high summit areas of mountains or plateaus, it is called an *ice cap*. When the ice cover expands over surrounding lowlands and spreads over an extensive area, it is called an *ice sheet* or *continental glacier*.

Glaciers modify the landscape in a number of ways. They erode the surface, transport and deposit materials of all sizes — ranging from boulders and sand to fine silt. A glacier armed with pieces of rocks grinds the valley bottom as well as its sides. As a result a valley occupied by a glacier has flat bottoms and steep or vertical sides. Because of its

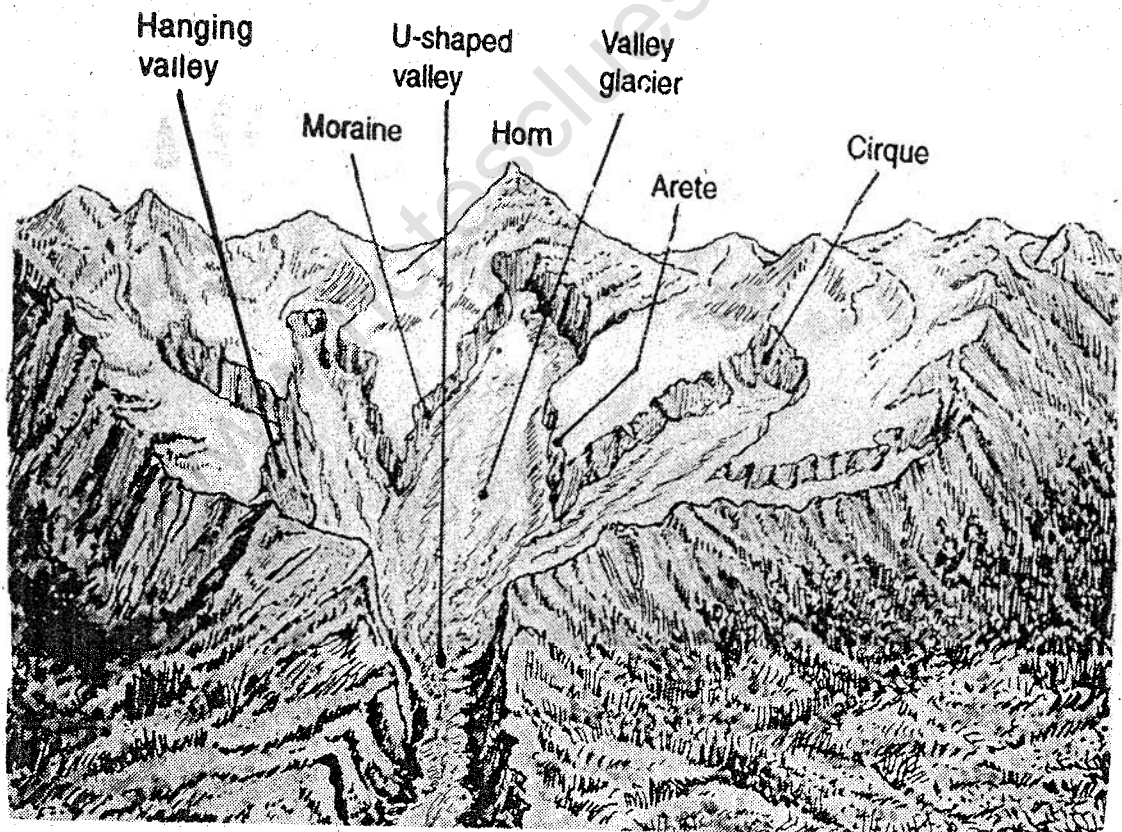


Fig. 5.5 Glacial Landforms

Note the various features formed by Sea Waves

typical shape, it is called an *U-shaped valley*. As a glacier melts, it leaves mounds of rock debris at its edge. A mound of unsorted rock materials left behind by a glacier is called a *moraine*. Moraines appear as long ridges or hills on an otherwise flat landscape.

Landforms Made by Sea Waves

Sea waves are by far the most important agents modifying the coastal topography. Even the hardest rock is undercut and broken into fragments by the impact of the sea waves. If the rock formation along a coast differs in resistance, softer rocks are eroded first and harder rocks stand out forming distinctive coastal features as *arches* and *sea stacks*.

Sea waves are also responsible for depositional features such as beaches and sand bars. Pieces of gravel, sand and silt are constantly sorted out and deposited along the coast or on the sea bed itself by sea waves. Deposition of sand or gravels at the coast form *beaches*. Marina beach in Chennai is one of the famous beaches in India.

Sometimes embankments of sand and gravel are built up by wave action on the sea floor at a short distance from the coast. They are called *sandbars*. If a sandbar grows in

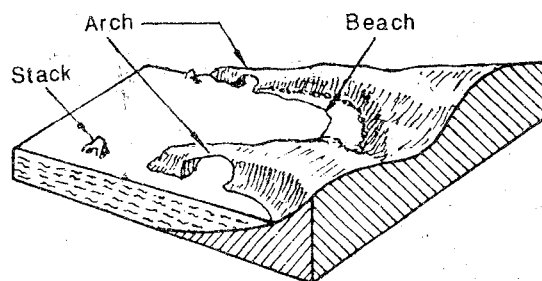


Fig. 5.6 Landforms Made by Sea Waves

Note some of the features formed by Sea Waves

size and cuts off a portion of sea from the main body of water, a salt water lake is formed along the coast. It is known as a *lagoon*. Lagoons are able to maintain a connection with the open sea through narrow outlets. On the Malabar coast of India, there are a number of lagoons. On the east coast, however, there are two large lagoons — Chilka Lake in Orissa and Pulicat Lake in Tamil Nadu.

You have thus seen how the landforms around us are being created and modified by various natural agents. While some parts are being eroded, others are being filled with sediments. Thus the process of levelling or gradation is continuously in progress.

EXERCISES

Review Questions

1. Answer the following questions briefly:
 - (i) What is karst topography?

LANDFORMS MADE BY GROUND WATER, WINDS, GLACIERS AND SEA WAVES

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- (ii) How are caves and springs formed?
 - (iii) What is meant by "water table"?
 - (iv) Why is wind action most prominent in arid and semi-arid areas?
 - (v) Which areas on the earth's surface depict landforms made by glaciers?
 - (vi) What is a glacier?
 - (vii) How are lagoons formed? Give two examples of lagoons from India.
2. Distinguish between
- (i) Stalactite and stalagmite
 - (ii) 'V' shaped valley and 'U' shaped valley
 - (iii) Valley glacier and continental glacier
 - (iv) Beaches and sandbars
3. A list of landforms made by different agents of gradation has been given below. Name each agent of gradation and arrange the erosional and depositional feature made by them in the following table.
- (i) Sand dunes (ii) Caves (iii) Sandbars (iv) 'U' shaped valleys (v) Springs (vi) Beaches (vii) Moraines (viii) Lagoons (ix) Stalactites (x) Stalagmites (xi) Wind eroded basins (xii) Arches (xiii) Stacks

<i>Agents of Gradation</i>	<i>Erosional Features</i>	<i>Depositional Features</i>

4. How does wind affect rocks and what kinds of rocks are eroded the fastest? Explain the formation of landforms by winds.
5. Describe the formation of glaciers. Explain the erosional and depositional features of glaciers.
6. Which is the most important agent modifying the coastal topography? Describe the various coastal features formed by this agent of gradation.

Skills in Geography

7. Using suitable materials (clay, plaster of paris, sand, etc.) prepare models of the following landforms: 'U' shaped valley, underground cave, sandbar, beaches and sand dunes.

8. Collect photographs and pictures of some typical landscapes in India formed by various agents of gradation. On an outline map of India, mark the places where these photographs were taken. Do you see any relationship between the type of landscape and the broad geographical region where it is found? Explain your answer.

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UNIT THREE

Asia

Asia is the world's largest continent both in area and in population. It accounts for roughly one-third of the world's land area and three-fifths of its population.

Asia is as complex and diverse as it is large and populous. The complexity and diversity of the landforms are reflected in the physical landscape of the continent. A web of mountain ranges extend in all directions from the Pamir Knot in south-central Asia. In between these ranges, there are uplands and valleys. In addition, Asia has a number of high plateaus, and vast plains and river valleys. The Asian continent has many peninsulas and islands, which break up the surrounding oceans into a large number of seas, bays and gulfs. Like landforms, there are great variations in the climate and natural vegetation of Asia as well.

Asia is rich in many natural resources. It has large deposits of coal, mineral oil, iron-ore, manganese, tin and bauxite. Asia has less than 20 per cent of land suitable for agriculture. But it is a major producer of several crops such as rice, millets, jute, rubber, tea, sugarcane, spices, oilseeds and coconuts.

Forests are mainly found in the northern, eastern and southern parts of the continent. They yield a variety of products such as timber, paper-pulp and rayon.

Asia is also rich in water resources. It has several large rivers. Some of them are known for being cradles of civilization. Water from many rivers are being used for generating electricity and irrigating the fields by constructing dams on these rivers.

The people of Asia belong to various ethnic groups. They speak different languages and dialects. They follow different religions. Yet, culturally they have many similarities as reflected in their ways of life. It is interesting to note that all major religions of the world originated in Asia.

The distribution of population is very uneven. Vast tracts of land are

uninhabited or have negligible population. On the other hand, some of the river valleys and coastal plains are the most densely populated.

The countries of Asia vary in their physical, social and economic characteristics. A few countries have been selected for detailed study in this unit.

Pakistan, Nepal, Bhutan, Bangladesh, Myanmar and Sri Lanka are our closest neighbours. Along with India they are situated in South Asia. Malaysia and Indonesia are two South-east Asian countries. China in the North is the most populous country of the world. Here farming has been practised for more than four thousand years. Japan in the East is an island country. It is one of the most prosperous country of the world.

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CHAPTER 6

Asia : The Physical Landscape

Asia and Europe, though part of the same landmass are generally considered separate continents. Occupying about one-third of the land area of the world, it is the largest continent. Though its latitudinal extent is between 10° S and 80° N latitudes, all of the Asian mainland lies north of the equator. Its east-west extension is between 25° E and 170° W longitudes, which is nearly half-way round the globe. Thus most of Asia lies in the Eastern Hemisphere but a portion of it extends to the Western Hemisphere also.

Most of the world maps show Europe and Africa in the centre with the Prime Meridian in the middle of the map. As a result, the 180° E meridian is shown twice as Asia is shown to the right side of the map while North and South Americas are shown on the left side. This gives a false impression to many people that North America is closer to Europe than to Asia while the reverse is true. In fact, a part of Asia is in the Western Hemisphere. Therefore, if we want to view Asia in its proper geographical place, we should place it in the centre.

Look at the political map of Asia in Fig. 6.1. Find out the three largest countries of Asia. Which country lies in both, Asia and Europe? Which countries are land-locked, i.e., do not have access to sea? Which countries have common boundaries with India? Locate the capital cities of Japan, China and India. Name three countries which consist of large groups of islands.

It is obvious that over such an enormous area as Asia has, there must be great differences in relief, climate and natural vegetation. Let us first look at the relief (Fig. 6.2).

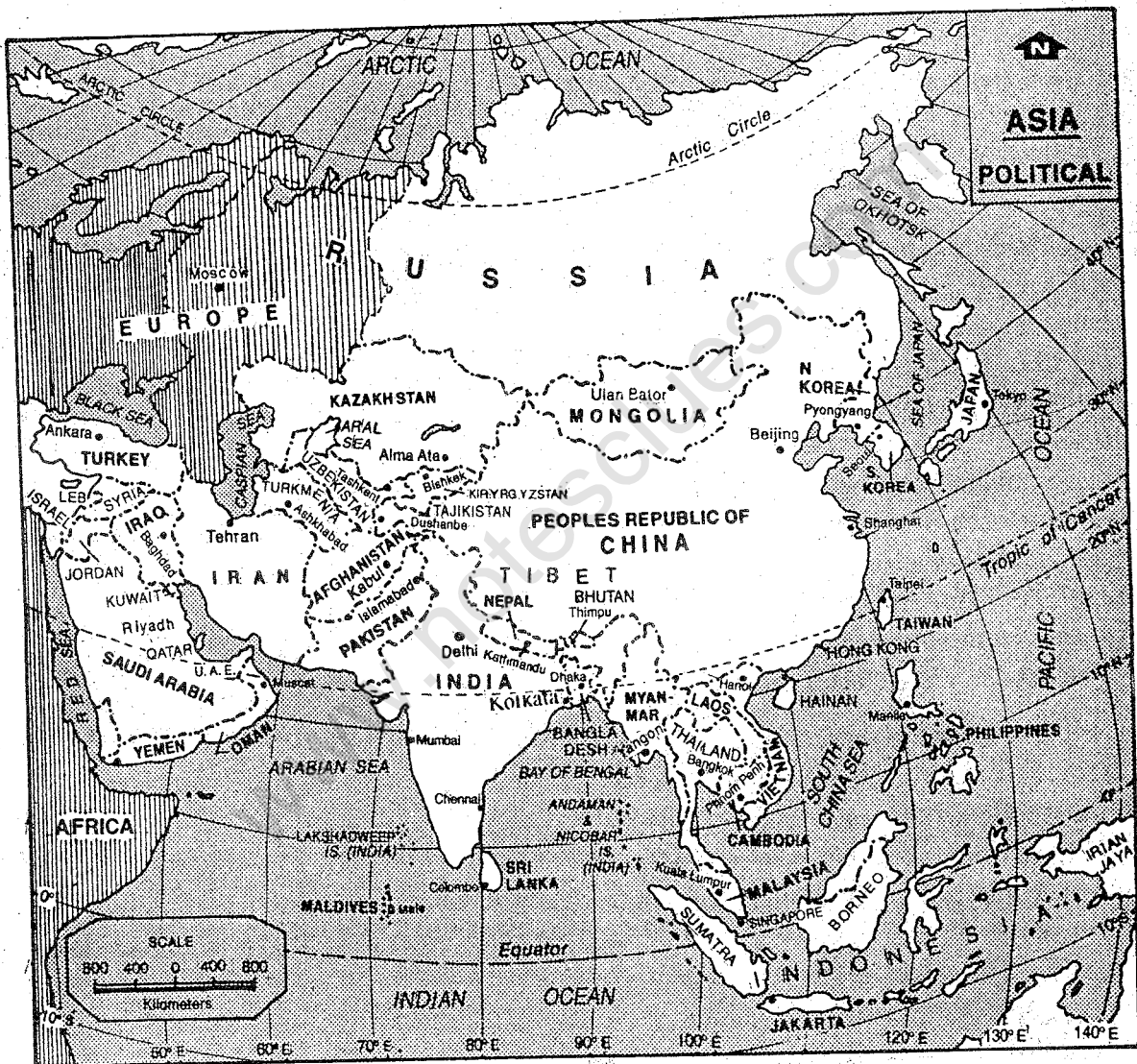
Physical Features

Asia may be divided into five major physical divisions. They are : the Northern Lowlands, the Central Mountain, the Southern Plateaus, the Great River Valleys and the Island groups.

The Northern Lowlands (Plains)

Extending between the Ural Mountains in the west and Lena River in the east, there is a vast lowland in the northern part of the

ASIA POLITICAL



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

Fig. 6.1 Asia — Political

*Note that Asia has a large number of countries. Which is the biggest in area?
Which part of the continent has comparatively more number of countries?*

ASIA PHYSICAL

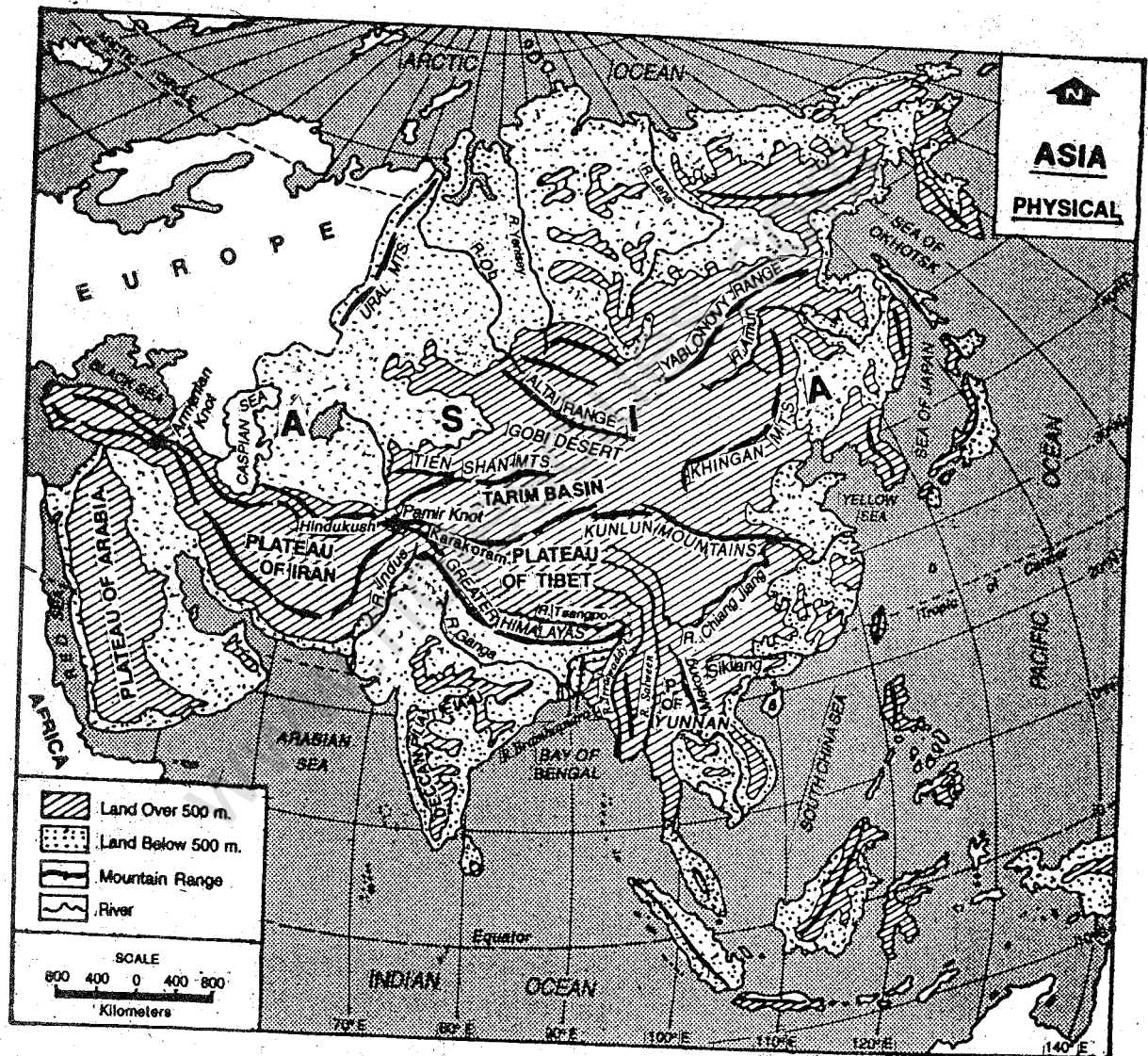


Fig. 6.2 Asia — Physical

Asia is a continent of mountains, plateaus and river valleys. Note the position of Pamir Knot and the mountain ranges which run in different directions from the Knot.

continent. It is called the Siberian plain. While the western half of this plain is a flat area made of sedimentary rocks, the eastern part is an eroded plateau. It is drained by the rivers such as Ob, Yenisei and Lena. They originate from the highlands and mountains of central Asia and flow northward. Due to severe prolonged winter in the polar region, the lower courses and mouths of these rivers remain frozen for several months. As such the water flowing from the upper course gets blocked and spreads over a large area making the land marshy.

Lake Baikal — the deepest lake of the world is located in Siberia. As estimated by scientists, it holds about 20 per cent of all fresh lake water on the globe.

The interior Heartland of Asia is landlocked and desolate. Surrounded by mountains and deserts, it is a world apart from the rest of Asia.

The Mountains

To the south of the Northern lowlands, there are fold mountains and plateaus. If you look at Fig.6.2, you will notice that Pamir plateau is a meeting place of several ranges which form the Pamir Knot. This plateau is also known as the 'Roof of the World' because it is the highest plateau in the world. Chains of mountain ranges extend in all directions from here. The Hindu Kush extends to the west, the Tien Shan towards the north east, the Kunlun to the east and the Karakoram and the Himalayas to the south-east. Each mountain chain consists of a series of ranges. Some of these ranges enclose plateaus and uplands.

Two groups of mountain ranges diverge to the west of the Hindu Kush. The northern group forms the Elburz mountains, which skirts the southern shores of the Caspian Sea and continues westwards. The southern group — the Zagros mountains extends along the Arabian Sea and overlooks the Persian Gulf. They enclose the plateau of Iran. Moving westward, these two ranges converge at the Knot of Mount Ararat. Two groups of mountain ranges diverge westward from Mount Ararat. The Pontic mountains in the north and the Taurus mountains in the south enclose the plateau of Anatolia formed of ancient rocks.

The Karakoram and the Himalayan ranges, running to the south east of the Pamir Knot, contain some of the highest peaks of the world. Mount Everest (the highest peak of the world) and K₂ (the second highest peak) belong to the Himalayas and the Karakoram ranges respectively. Some of the largest glaciers of the world are also found in the Karakoram range. Between these two ranges in the south and the Kunlun range in the north, is the Tibetan plateau. Further north, Tarim basin is located between the Kunlun in the south and the Tien Shan in the north.

Eastern part of the Tibetan plateau has a complicated relief. All mountain ranges turn southwards forming parallel chains. To the south east of Tibetan plateau lie mountain ranges with a north-south trend. Some of these ranges continue southwards through Myanmar. One of these ranges continues through Andaman and Nicobar islands upto Sumatra and Java. Some ranges continue

through Malay peninsula before turning into Borneo and extending upto Philippine islands.

In between the Tien Shan mountains in the west and the mountain chains of north-east Siberia, there is a broken crescent of ancient fold mountain—the Altai, the Yablonoi and the Stanovoi ranges. In between these ranges, there are huge desert basins—the Tarim basin and the vast cold desert of Gobi.

The Southern Plateaus

To the south of the central mountain belt, there are some plateaus made of very old rocks — older than the above mountain ranges. They form the major part of the peninsulas projecting southward from the mainland of Asia. They are : the plateau of Arabia, the Deccan plateau and the plateau of Yunnan.

The Great River Valleys

In between mountains and plateaus, there are some of the most fertile river valleys of the world — the Tigris-Euphrates, the Indus, the Ganga-Brahmaputra, the Ayeyarwaddy (Irrawaddy), the Mekong, the Sikiang, the Chang Jiang (Yang-Tse-Kiang) and the Huang He (Hwang-Ho). Some of these rivers are older than the mountains which they cross through deep gorges. These river valleys are some of the most thickly populated areas of the world.

The Island Groups

An interesting feature of the Asian landscape is the location of most of the islands to the south-east and east of the continent. There

are three major island groups — Indonesia, Philippines and Japan. Most of these islands have mountainous core surrounded by narrow coastal plains. Volcanic ash from past eruptions provides extremely fertile soil in some areas like Sumatra and Java. Some islands still have active volcanoes.

The Climate

The Climate of Asia is influenced by a number of factors such as its vast size, great latitudinal extent as well as its relief. The presence of the great east-west mountain barrier across Asia, and the open nature of the boundary with Europe too have an important influence on the climate of Asia.

In winter, the interior part of Asia (Fig. 6.3) becomes extremely cold. Temperature falls below freezing point due to the great distance from the sea. Hence, the air contracts and becomes very dense and heavy, forming high pressure area over Mongolia. Winds blow outward. Since they blow from land, they are dry. As a result, most parts of Asia do not get rain during winter. But while blowing over the sea, these winds pick up moisture and may cause rainfall in some areas.

In summer, on the other hand, most of Asia becomes very hot (Fig. 6.4). As a result, the air expands, becomes light and low pressure areas develop over central Asia and the north-west part of South Asia. By this time, high pressure areas are located over oceans, and winds start blowing to these low pressure areas. Thus most of the continent receives rainfall in summer from the moisture-laden winds coming from the oceans.

ASIA CLIMATIC CONDITIONS (JANUARY)

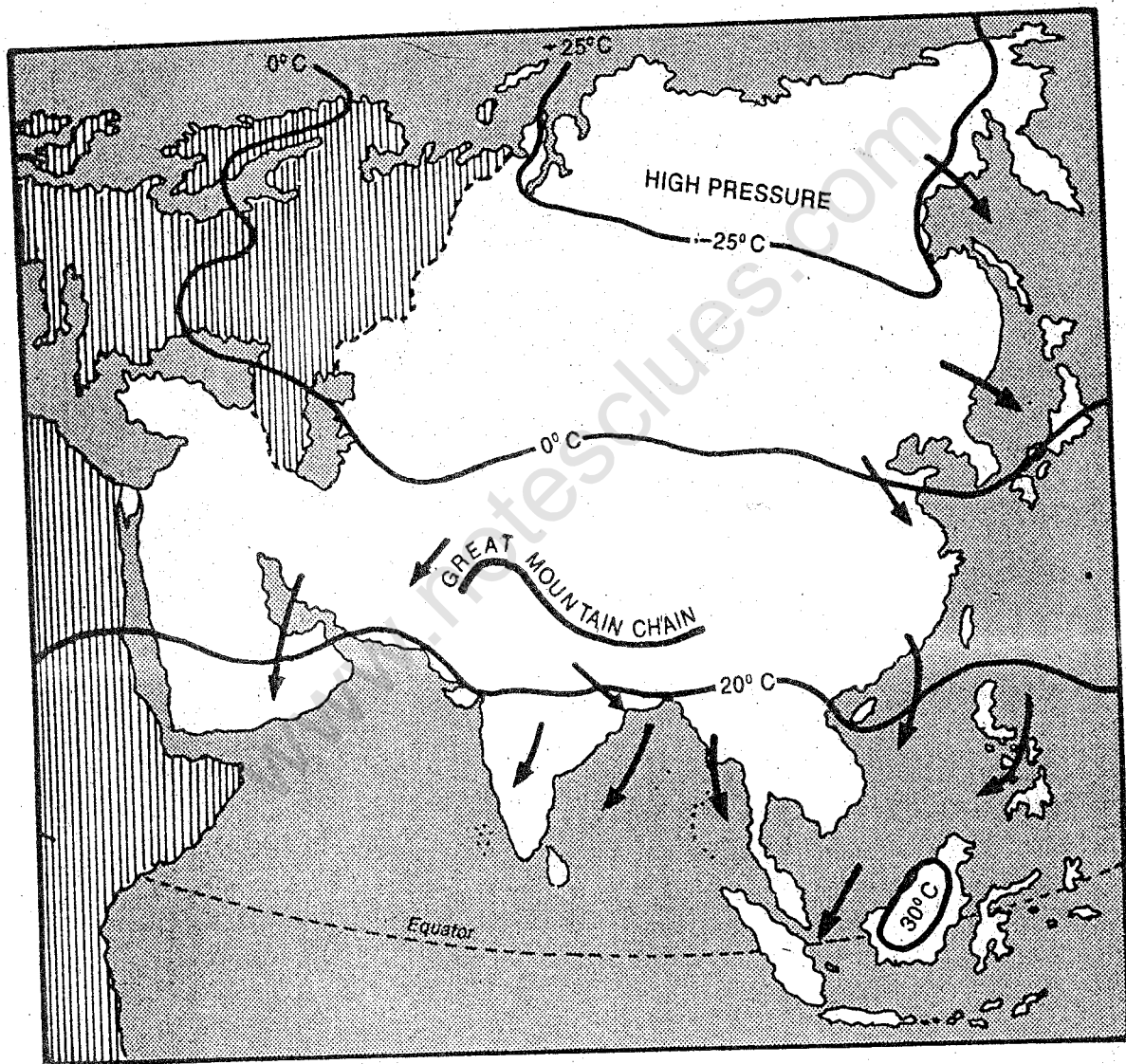


Fig. 6.3 Asia — Climatic Conditions (January)

Note that in winter northern and central Asia have very low temperatures, high pressure and out blowing winds. Why does the climate of most parts of Asia remain dry in this season?

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ASIA CLIMATIC CONDITIONS (JULY)



Fig. 6.4 Asia — Climatic Conditions (July)

Note that in summer the interior of Asia is very hot and becomes a huge low pressure area. Winds from the surrounding oceans are drawn towards this low pressure. These winds give rainfall to most parts of Asia.

The impact of latitudinal extent of the continent, location of the mountain barrier in an east-west direction and the open nature of the boundary with Europe, can be seen clearly in the temperature and rainfall pattern of the continent (see Figs. 6.3, 6.4 and 6.5). Verkhoyansk in north-east Siberia is the coldest place in the Northern Hemisphere recording a mean January temperature of -45°C . During summer several places in the north-west India and in the Persian Gulf area record about 33°C temperature. Mawsynram in Meghalaya (India) is the wettest place in the world. But Asia also contains the largest area in the world with very low rainfall extending from the Red Sea to Mongolia. Thus there are great variations in temperature and rainfall. This is reflected in the vegetation patterns also.

Natural Vegetation and Wild Life

The natural vegetation in Asia varies from the mosses and the lichens of the Arctic Tundra to the impenetrable equatorial rainforests of the south-east. Almost all vegetation belts can be seen in Asia in some part or the other. Natural vegetation of Asia as shown in Fig. 6.6 clearly shows its close relationship with the climate.

Along the northern coast of Asia is the *tundra belt*. This area is covered with snow for a major part of the year. Precipitation is about 30 centimetres annually and winter precipitation occurs mostly in the form of snow. Summer is short and cool whereas winter is long and severe. Under such conditions the plants do not attain much height. Vegetation consists mainly of mosses

and lichens. The reindeer is the most important animal of this region.

To the south of the tundra is a much broader belt of coniferous forests called the *taiga*. Precipitation varies between 25 and 50 centimetres. Winters are severe and summers are warm. As evaporation is little, even small amount of precipitation is sufficient for the growth of trees. This region is known for the softwood trees such as pine, fir and spruce. These are used as timber and for making paper pulp and rayon. Fur-bearing animals such as fox, sable and mink are found here.

Temperate grasslands, known as the *steppes*, form the next belt south of the *taiga*. Winters are cold and summers are fairly hot. Annual rainfall varies between 20 and 40 centimetres. As evaporation is high, rainfall is not sufficient for the growth of trees. Hence grasslands are luxuriant but treeless. Grass-eating animals such as antelopes are most common.

Large parts of south-west and central Asia are deserts. While deserts of Arabia and Thar in South-west Asia are hot, Gobi and Tibet in central Asia are cold. This region is characterised by *desert vegetation*. Due to unfavourable conditions for plant growth, only shrubs, thorny bushes and poor quality of grasses can grow here. The common animals are camel, ass and gazelle. The yak is found on the high plateau regions.

South, south-east and east-Asia have *monsoon forests*. Summer is hot and humid here. Rainfall varies between 62 and 1250 centimetres and takes place mostly in

ASIA ANNUAL RAINFALL

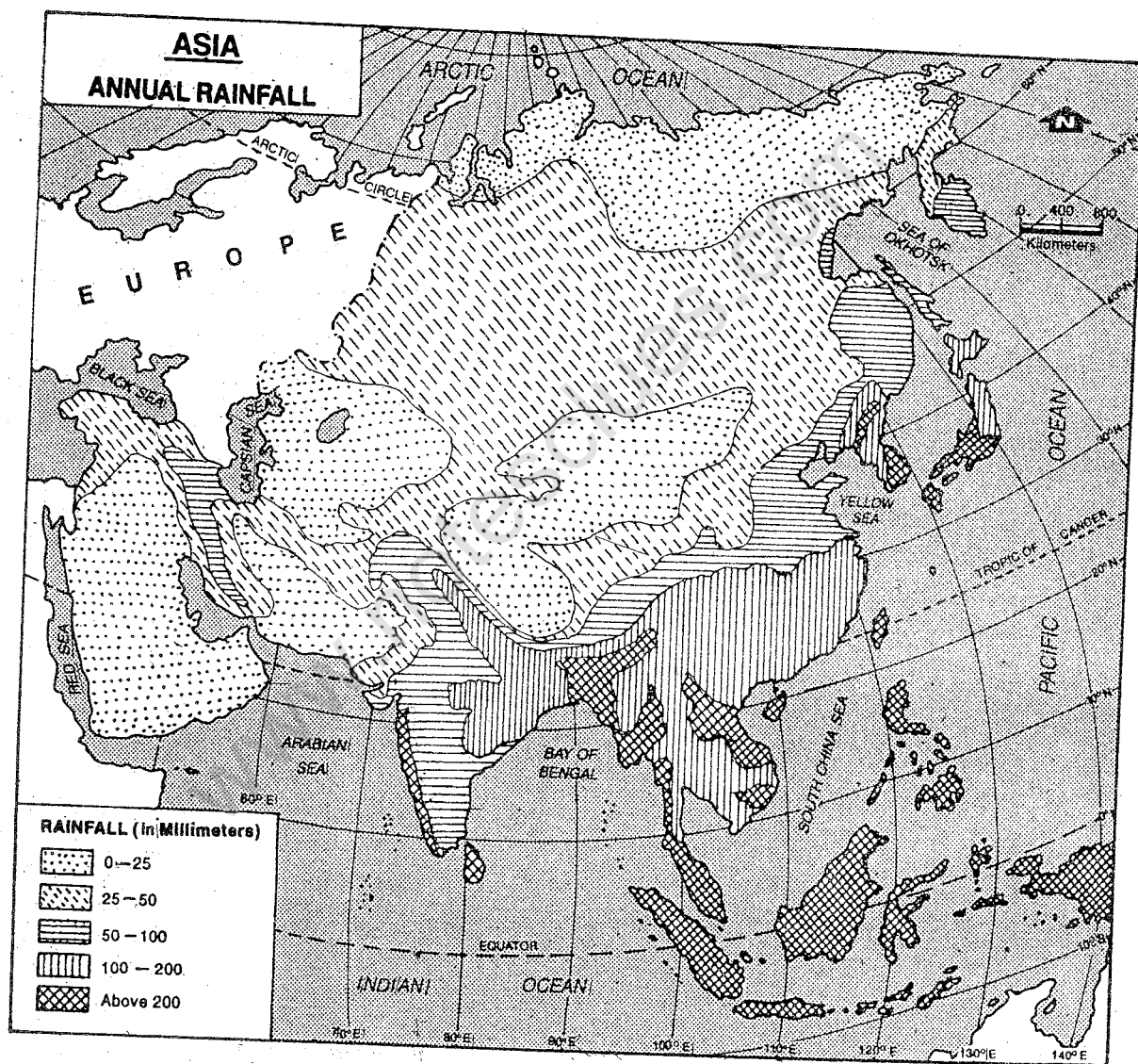


Fig. 6.5 Asia — Annual Rainfall

Note the countries receiving highest amounts of rainfall in Asia. Why is the maximum rainfall received in the southern and eastern parts?

ASIA NATURAL VEGETATION

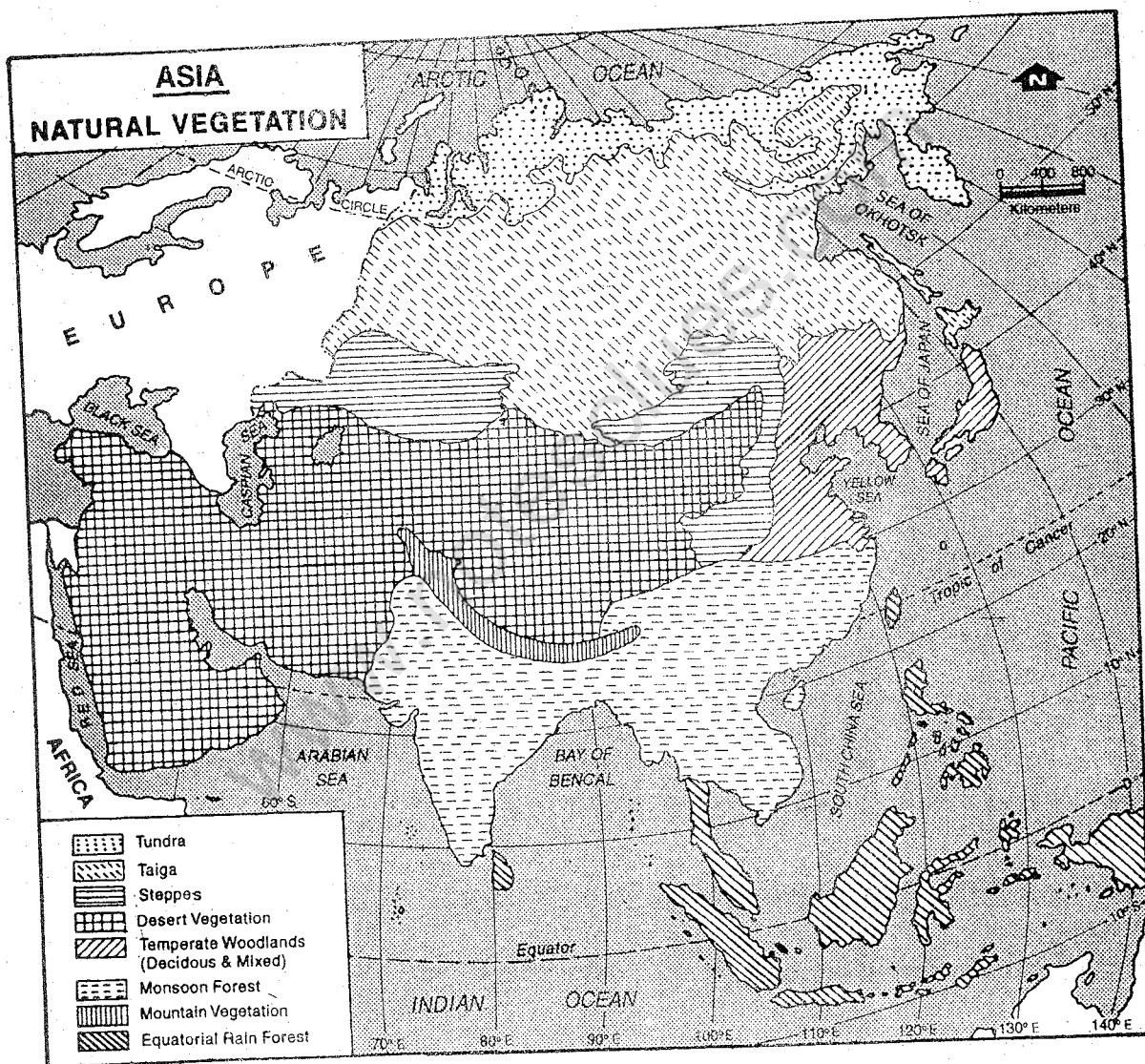


Fig. 6.6 Asia — Natural Vegetation

Note the broad natural vegetation belts. They generally run from east to west. What is the relationship between climate and vegetation?

summers. Winter is mostly mild and dry. Monsoon forests have many useful trees such as teak, sal and sandalwood. Elephants are found in these forests. In north-east Asia, the climate is generally cooler and hence monsoon forests give way to *temperate woodlands*.

Extreme southern portions of Asia, which are closer to the equator, have *equatorial rain-forests*. These forests are dense and contain a variety of trees, plants and bushes. Apes, monkeys and various types of animals are found in these forests.

EXERCISES

Review Questions

1. Answer the following questions briefly:
 - (i) Name the five physical divisions of Asia.
 - (ii) Why does northern part of the Siberian plain become marshy?
 - (iii) Which plateau is known as the 'Roof of the World' and why?
 - (iv) Name the two mountain ranges, which contain some of the highest peaks and largest glaciers of the world.
 - (v) Which three plateaus form the major part of the peninsulas projecting southward from the mainland of Asia?
 - (vi) Why most part of Asia does get rain during summer?
 - (vii) Why do you find a great variation in climate and natural vegetation of Asia?
 - (viii) Give one example, each of a hot and a cold desert of Asia.
2. Distinguish between:
 - (i) The tundra and the taiga.
 - (ii) The monsoon forests and the equatorial rain forests.
3. A list of vegetations and animals has been given below. Arrange them in the following table:

(i) moss	(ii) pine	(iii) lichèn	(iv) apes	(v) fir	(vi) reindeer	(vii) fox	(viii) shrubs
(ix) teak	(x) mink	(xi) yak	(xii) antelopes	(xiii) camel	(xiv) sal	(xv) grasslands	(xvi) elephants

<i>Vegetation Belt</i>	<i>Common Vegetation</i>	<i>Animals</i>
Tundra		
Taiga		
Steppe		
Desert		
Monsoon Forests		
Equatorial Rain-forests		

4. Describe the chief characteristics of the major physical divisions of Asia.
5. Explain the factors that influence the climate of Asia.
6. With the help of suitable examples, explain how-distribution of major climatic and vegetation types are closely related.

Skills in Geography

7. On an outline map of Asia show the following:
 - (i) Mountains: The Hindu Kush, the Elburz, the Zagros, the Kunlun, the Himalayas and the Altai.
 - (ii) Plateaus/Basins: The Pamir Knot, plateau of Anatolia, Tarim basin and the Tibetan plateau.
 - (iii) Rivers: The Tigris-Euphrates, the Mekong, the Lena and the Indus.
8. Collect photographs of different parts of Asia showing varieties in landforms, climate and vegetation. Write a brief description of the major physical divisions based on the above photographs.

CHAPTER 7

Asia : People and Natural Resources

The People

Asia is the largest continent both in area and in population. Over 59% of the world's population belonging to different ethnic groups live here. There is a great variety of languages and dialects, spoken by them. It is interesting to note that all major religions of the world began here. Despite such a great diversity, there is a common thread linking the people of Asia. This is reflected in their ways of life.

In traditional Asia, the family and the village are the most important social units. The family may include many generations in one household. Most of the property is owned by the family groups and not by individuals. The family also determines the social status and influences the day-to-day decisions of individuals within the family. However, with industrialisation and urbanisation, the traditional family set-up is breaking affecting the village life as well. But certain values and beliefs cherished and

followed for centuries are not easily uprooted. For example, in a south-east Asian society such as in Vietnam, till recently life centred around a village. It was the nucleus of economic activities. Village was usually surrounded by rice fields. A traditional villager spent his life in the village and was bound to the rice-fields of his ancestors. The area of arable land was fixed and the farmer knew that it could not be stretched. He believed that if he extended his land for accumulation of more wealth, it would be at the expense of his neighbours, who would be forced to starve. Today Vietnam has changed a lot. Still, the accumulation of wealth at the cost of others is considered anti-social. What kind of changes are taking place in our society?

Changes are taking place in Asia at a varying pace in different parts of the continent. However, you may notice old and new ways of living existing side by side in almost every Asian nation today. It is easily

observed in urban areas because they are the centres of modernisation. People from rural areas come to these places in search of jobs. During their stay in towns and cities, they pick up new ideas and ways of living, which they carry back home to rural areas.

The population of Asia was nearly 3,488 million in 1996. The average density of population was 110 persons per square kilometre. However, the actual distribution is highly uneven (Fig. 7.1). You will notice that a vast stretch of land in northern and eastern parts of Siberia, the deserts and highlands of central and west Asia have very low to low density of population, i.e., less than 10 persons per sq. km. Medium density of population ranging between 10 and 50 persons per sq. km. is found in large parts of west and south-east Asia and in some parts of east and south Asia. High to very high density of population, i.e., 50 to 100 and more persons per sq. km is found mostly in south and east Asia and in some parts of south-east Asia. The density of population is also high along the courses of many rivers and along the coastal areas.

Most of the people in Asia (about 80%) still live in villages. Japan is the only exception where about 75% of population is urban. Many cities in Asia such as Tokyo, Manila, Bangkok and Djakarta look similar in appearance to cities of Europe and America. A large number of small towns and urban areas still appear as overgrown villages. A number of cities in Asia have a population of more than one million. They are mainly concentrated in the South, South-east and East Asia. It is interesting to note that five

of the world's ten largest metropolitan areas are in Asia. They are Tokyo, Shanghai, Calcutta, Mumbai and Seoul. Find out their locations on the map of Asia. Asian cities like other cities in the world are facing many problems such as overcrowding, poverty, pollution and lack of basic amenities such as shelter, water and transportation.

Natural Resources and Economic Activities

Asia is rich in several natural resources such as soil, water, forests, grasslands and minerals. These resources are distributed unevenly. Utilisation of the available resources also varies from country to country. The nature and extent of resource utilisation depends mainly on the aspiration of the people and the level of scientific and technological development. Japan, for example, has very limited natural resources. Yet it is one of the most industrialised nations of the world. In fact, it would rank first among nations if we rate the ability to build a modern economy on a thin resource base. This has been possible because of the expertise of the Japanese people. They could efficiently and skilfully turn the imported raw materials into high-quality and high-value products like electronic goods, cameras and automobiles.

Let us now have a close look at the distribution pattern of natural resources and major economic activities in Asia.

Soil Resources

A large part of Asia is covered with mountains and deserts. Only one-sixth of

ASIA DISTRIBUTION OF POPULATION

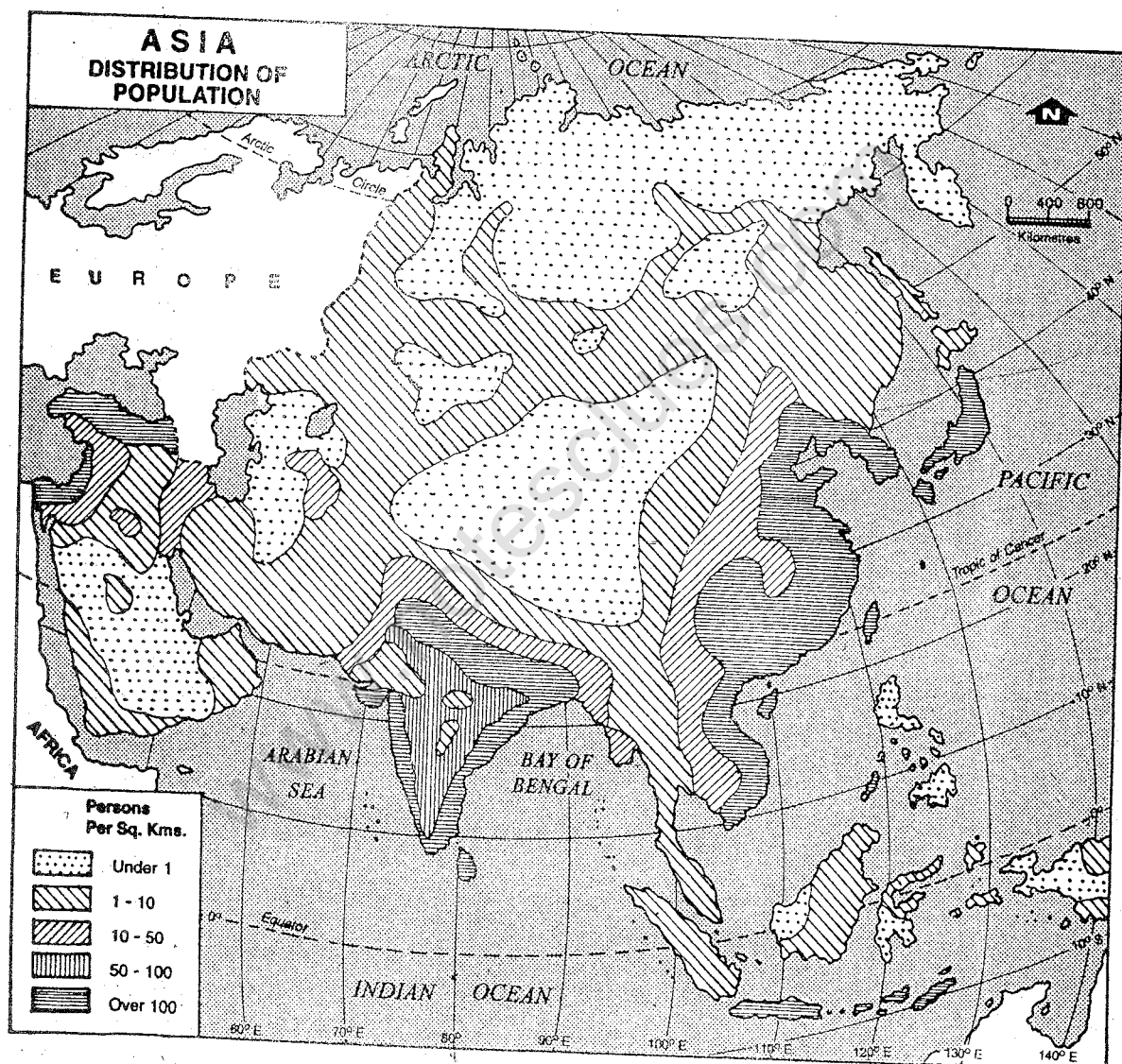


Fig. 7.1 Asia — Distribution of Population

Note the most densely peopled parts of Asia. How will you explain the very heavy concentration of population in these areas?

the total area is suitable for agriculture, which is concentrated mainly in the plains and river-valleys. Favoured by fertile soil, suitable climate and assured water supply, some of the river-valleys witnessed the early beginning of agriculture.

Farming is the most important economic activity dependent on soil. All major types of agricultural practices—primitive to modern — may be seen in Asia.

Shifting Agriculture

It is the oldest method of growing crops. Simple and crude implements are used for various purposes such as digging the soil and harvesting the crops. In this method, a patch of forest is cleared by burning the vegetation. This land is tilled poorly and seeds are scattered. When crops mature in the field, they are harvested. After some time, i.e., two to three years, the soil loses its fertility. This land is then left and a fresh clearing in the forest is made for cultivation. Shifting agriculture gives a very low yield of crop, i.e., production of crop per unit area. Besides, a lot of a forest wealth is wasted. Find out from the map, which parts of Asia still have this type of agricultural practice.

Intensive Agriculture

It is the predominant form of agricultural practice in Asia. Since the density of population is very high in the plains and river valleys of Asia, manual labour is available in plenty. Average farm size is small, which gets fragmented with each generation. In these areas, therefore, large manual labour is used on a small piece of land. All farming

operations are done in a systematic manner. These operations include ploughing the field, making rows and sowing seeds, applying manures and fertilizers, irrigating the fields, removing weeds, harvesting the crops and finally making them ready for the market or storage. Yields of crops are generally high. Depending upon the fertility of the soil and assured water supply, a farmer may take two to three crops from the same field in a year.

Many farmers plan succession of crops in a manner that fertility of soil is maintained as much as possible even after taking two to three crops in a year. In India, for example, a foodcrop like rice or wheat is followed by a legume such as *arhar (tur)* as it replaces the nitrogen lost earlier by the soil. This is called *rotation of crops*.

Extensive Agriculture

It is restricted to a few areas such as in West Siberia and Central Asia. In these areas density of population is comparatively low and farms are large which prohibit use of manual labour. Hence farming operations depend heavily on various kinds of machineries such as tractors, sprinklers and harvesters. Farming is done scientifically, and hence the total crop-production is high.

Major Crops

Major crops grown in Asia are rice, wheat and millets, pulses, oil seeds, sugarcane, tea, cotton, jute and rubber. Cultivation of rice is mainly confined to Monsoon Asia as it requires warm and humid climate. India, China, Japan, Bangladesh and countries of South-east Asia are its main producers.

ASIA CROPS

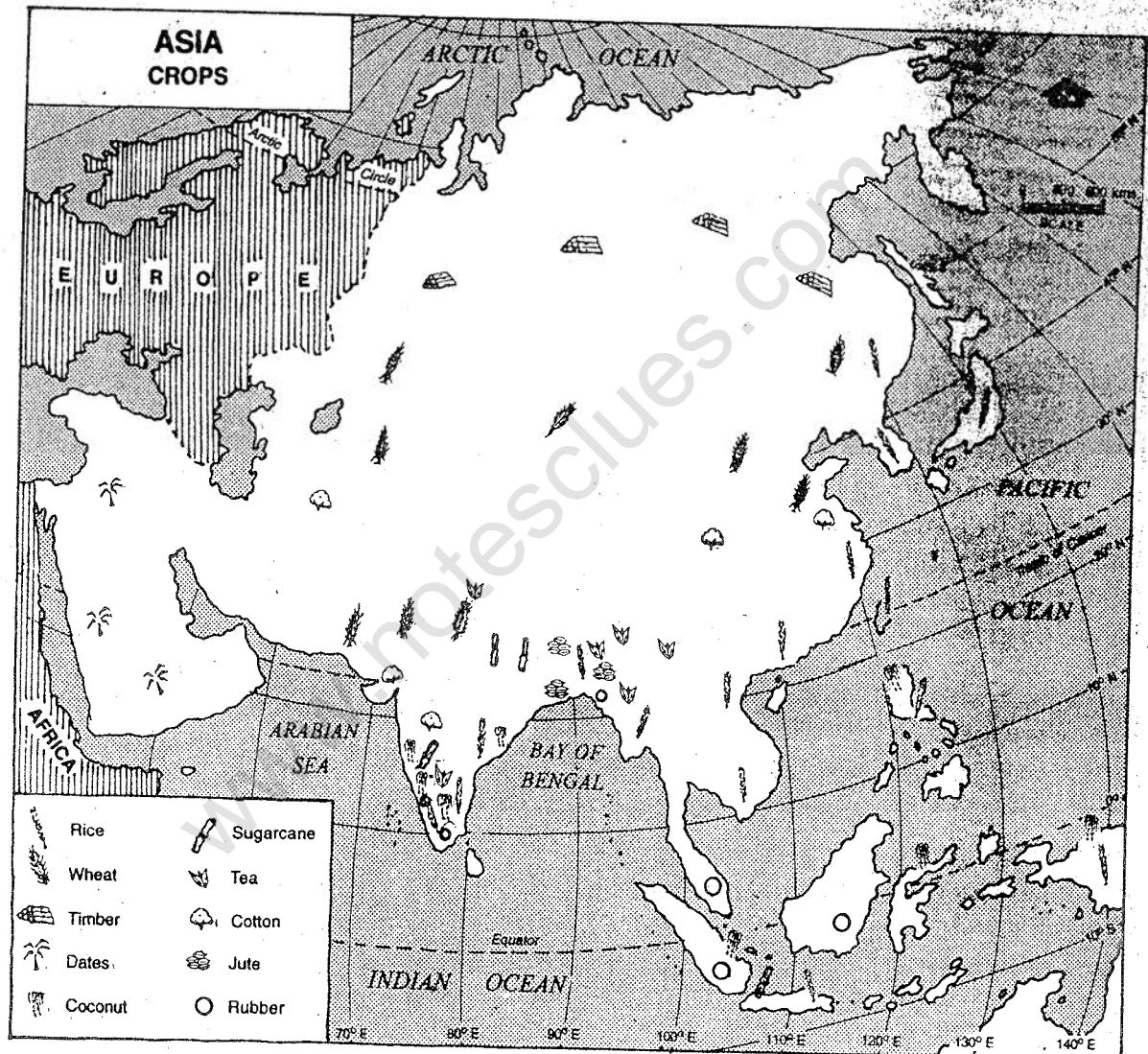


Fig. 7.2 Asia — Crops

Note the areas producing rice and wheat. What are the other crops and where they are grown?

Wheat is the main crop of the sub-tropical and temperate parts of the continent. West Siberia, Kazakhstan, China, Northern India, Pakistan, and countries of South-west Asia are the main producers of wheat. Coarse grains like jowar, bajra and ragi are grown in semi-arid regions. Besides these cereals, different kinds of pulses and oil seeds are grown in different regions of Asia.

Sugarcane requires hot and moist climate and well-drained fertile soils. It is an important crop of Pakistan, India, China, Thailand and Indonesia. Tea grows well in warm and moist climate on well-drained fertile hill slopes. The major producers of tea are India, Sri Lanka, China, Japan and Indonesia. Cotton and jute are two important crops from which fibres are obtained. Cotton is essentially grown in dry climate. Its major producers are, therefore, China, countries of Central Asia (Tajikistan, Kazakhstan, Turkmenistan and Uzbekistan), India and Pakistan. Jute is grown in fertile soil of the flood plains in the Ganga-Brahmaputra delta. It needs high temperature during the growing season. Another important commercial crop of Asia is rubber. It is grown mainly in Malaysia and Indonesia, Thailand, India, China and Sri Lanka.

It is thus apparent that crops grown in a particular region depend primarily on the physical environment such as relief, climate and soil. Within these physical limits, however, the types and methods of farm production such as the choice of crops, the scale and intensity of production, etc., are determined by social and economic considerations. The size of farm, ownership of land, availability of capital and labour, cost

of production, market demand, government support policies and subsidies are some of the factors which influence agricultural production. Malaysia, for example, is known for rubber plantations. The physical requirements of the rubber tree are matched in Malaysia no doubt but such ideal conditions exist in other equatorial regions also. Besides, Malaysia's physical environment is suited to other crops like sugarcane, cocoa, rice and coconut. Why should then rubber be grown in preference to these crops? The answer can be given only in economic terms, i.e., the comparative advantage. If a farmer gets a better financial return from rubber than other crops depending on differences in demand and costs of production for these crops, the choice goes in favour of rubber.

Forest Resources

Three main types of forests are found in Asia. *Coniferous forests* associated with temperate climate are found in Russia, Japan and in the Himalayan region at an altitude between 1,600 and 3,300 meters above sea level. They provide softwood which is used as timber and for making paper-pulp and rayon. *Monsoon forests* are found in South, parts of South-east and East Asia. They provide useful trees such as teak, sal and bamboo. *Equatorial forests* are found in Indonesia and Malaysia and the island groups close to the equator.

Mineral Resources

Several mineral resources such as iron, manganese, bauxite, mica, tin, coal, mineral oil and natural gas are found in Asia. These

ASIA MINERALS

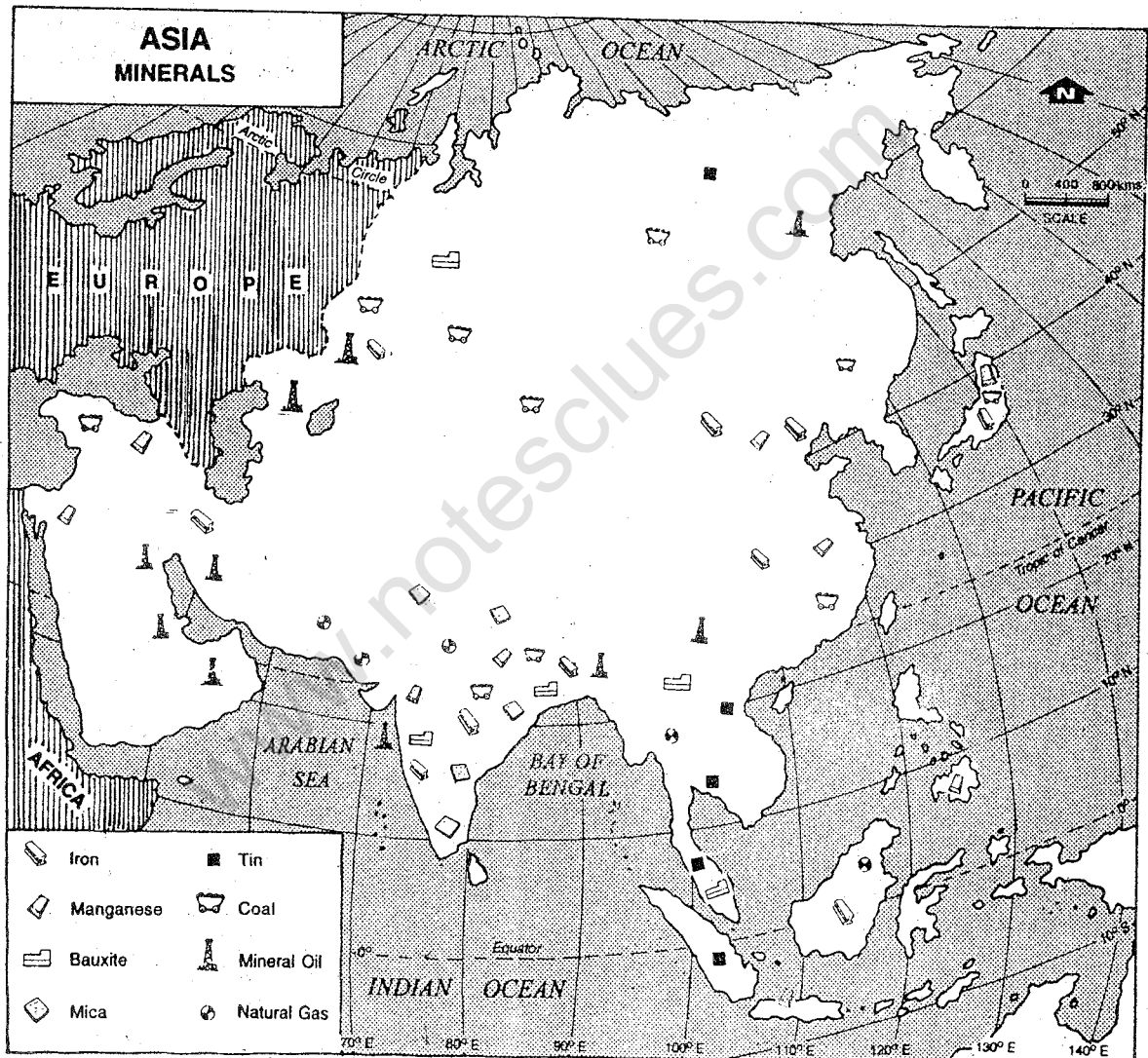


Fig. 7.3 Asia — Minerals

Note the distribution of major minerals in Asia. Which parts of Asia have concentration of mineral oil?

resources are distributed very unevenly. Iron is found in Russia, China, Azerbaijan and India. Mica and bauxite deposits are mainly in India. Malaysia is very rich in tin. Coal deposits are found in Russia, China and India. Countries of Central, South-west and South Asia possess deposits of mineral oil and natural gas. Look at the distribution pattern of some of the important mineral resources in Fig.7.3. You will notice that their distribution is highly uneven.

The extraction and preparation of minerals for industrial uses generally involves a number of processes such as extracting ores, separating minerals from ores and transporting them to the areas of demand. Mining, thus forms an important economic activity of Asia. It provides raw materials for industries and for generation of power. Fossil fuels such as coal, mineral oil and natural gas still continue to be the principal

sources of energy in use at present.

Transport

Roads and railways provide the most common modes of transport system. Since they are built on the land surface, the nature of the terrain influences their construction. The plains and the thickly populated areas have denser network of roads and railways than the mountainous and thinly populated areas.

Airways have played an important role in connecting the far-flung areas of Asia with the rest of the world. Sea transport has been important since ancient times. The trade between the western and the oriental world takes place mainly through the oceans. For heavier and bulkier goods, ocean continues to be the cheapest and most commonly used mode of transport.

EXERCISES

Review Questions

1. Answer the following questions briefly:
 - (i) Why are urban areas considered the centres of modernisation?
 - (ii) Which two factors are responsible for breaking up the traditional family set-up in Asia?
 - (iii) What reflects the common thread linking the people of Asia?
 - (iv) Why large parts of Asia have a very low density of population?
 - (v) What are the major problems of Asian cities?

- (vi) What factors determine the nature and extent of resource utilisation?
 - (vii) Name the three types of forests found in Asia? Also mention the regions where they are found.
 - (viii) What is meant by 'rotation of crops'?
 - (ix) Which part of Asia grows mainly rice?
 - (x) What is the major crop of the temperate parts of the continent?
 - (xi) Name any two commercial crops of Asia. Also state two major producers of each.
2. Describe the distribution of population in Asia especially with reference to relief and climate.
 3. Which are the three main types of agricultural practices in Asia? What are their distinguishing features?
 4. Explain how the physical environment determines the cultivation of crops. What are the other considerations influencing the type and method of farm production?
 5. Write a note on the distribution of important minerals in Asia.

Skills in Geography

6. Collect information and photographs concerning "Lives of people in different parts of Asia", under the following heads:
 - (a) Food
 - (b) Clothes
 - (c) House types
 - (d) Cultural activities — Religion/Faiths, language, important festivals, customs and rituals.Share the material with other students in the class and collectively prepare a report.
7. On an outline map of Asia, show the following:
 - (a) major crops
 - (b) iron, coal, petroleum and natural gas deposits

CHAPTER 8

Our Western and Northern Neighbours

Pakistan, Nepal and Bhutan are our neighbours in the west and the north respectively. They belong to south Asia.

PAKISTAN

The Islamic Republic of Pakistan extends roughly between 24° N and 37° N latitudes and 61° E and 75° E longitudes. Its total area is about 800,000 sq. km. Look at Fig. 8.1 and find out the names of countries located on its eastern and north western boundary. Which sea lies to its south?

Physical Features

Pakistan can be divided into two physical units. The mountains and the plateaus in the west constitute the mountainous region. The Indus river basin in the east is the plain region.

The Baluchistan plateau and the mountain ranges of the Kirthar, the Sulaiman and the Hindu Kush are located in the same order from south to north. These mountain ranges

together with the Himalayas separate south Asia from the rest of Asia. There are two important passes in these mountains — the Khyber pass in the Hindu Kush and the Bolan pass in the Kirthar. Find out their locations in the map (Fig. 8.1). In the northern part, the Potwar plateau is located to the south-east of the Hindu Kush. This region is generally dry and hence only a few streams are found in this part.

The Indus river basin in the east is a vast plain. It stretches from the Potwar plateau in the north to the Arabian Sea in the south. Much of this region would be a desert without the Indus. Since, this river is perennial and brings huge volume of water, irrigation is possible. The Indus flows from north to south. In Pakistan, it is joined by the combined channel of rivers Jhelam, Chenab, Ravi and Satluj from the east and the river Kabul from the west. In its lower reaches, it flows through the Thar desert. It, however, makes a fertile delta at its mouth before meeting the Arabian Sea.

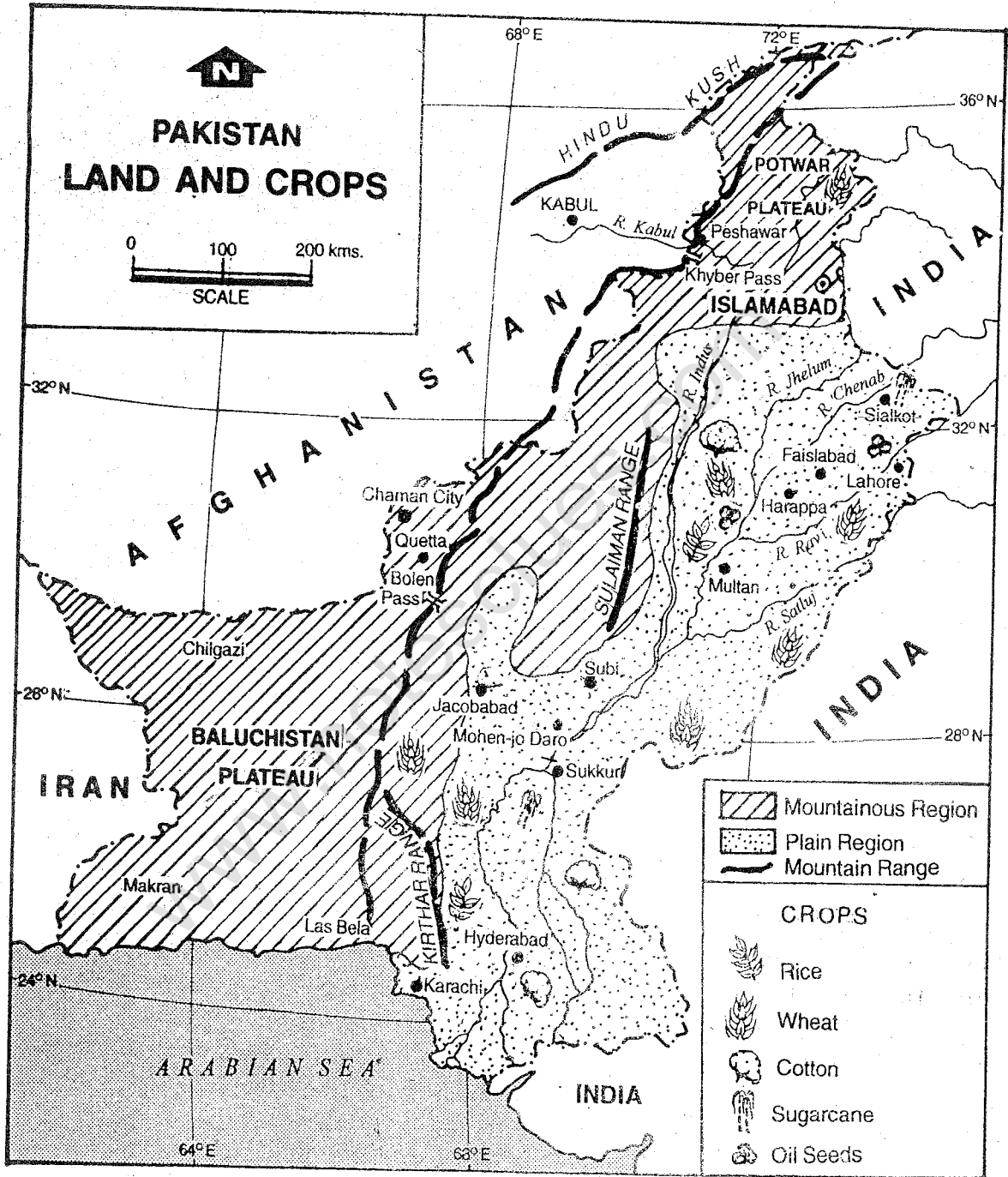


Fig. 8.1 Pakistan — Land and Crops

Locate the mountain chains which separate the plateaus of Baluchistan and Afghanistan from the Indus Plain. Note the major crops and areas of their cultivation

Climate and Natural Vegetation

The climate of Pakistan is hot and dry. However, in the high mountains temperature drops below freezing point during winter. Rainfall decreases from north to south. The average annual rainfall is 50 cm.

The mountainous area in the north are largely forested with broad-leaved evergreen, oak and chestnut. At higher levels, deodar, chir, pine, fir and spruce are found. The southern part has steppe. In semi-desert areas, short grasses and shrubs are the main vegetation.

Natural Resources and Economic Activities

Soil in the mountainous areas are immatured and skeletal. Large parts of the country have sandy soil, which have been little leached. With adequate watering, they are generally fertile. But in areas of poor drainage, they have formed saline patches.

Pakistan is mainly an agricultural country. Due to hilly terrain and arid climate, agriculture is difficult in the western region. The Indus provides water for irrigating the fields in its fertile basin. Hence most of the eastern part has several large dams. A fine network of irrigation canals has been built here.

Wheat, cotton, sugarcane and rice are important crops grown in Pakistan. They depend heavily on irrigation.

Bajra and oil-seeds are grown in non-irrigated areas. Rearing of milch cattle is very important. Chaman city, Quetta and Kalat are known for growing fruits.

Pakistan has only a few mineral resources.

Coal, iron ore and gold are found in Baluchistan. Mineral oil is found in Potwar and Ghodak. Meyal region is known for natural gas. Generation of hydro electricity is quite important as there are a number of large dams. There is a nuclear power plant near Karachi.

In recent years, a number of industries have developed in Pakistan. Textiles, paper, sugar, cement, fertilizers and leather goods are some of the important industries. Some of the important industrial towns are Karachi, Faisalabad and Sialkot. Most of the industries are concentrated in Punjab.

Pakistan mainly exports cotton yarn and cloth, carpets, rice, leather and sports goods. It imports mineral oil and other minerals, vegetable oil, chemicals, machineries and automobiles. Countries of Europe and the Gulf region and the USA are its major trading partners.

The road and rail network is dense in the Indus basin especially in Punjab. Due to rugged terrain in the western part, there are only a few roads and rail routes which take advantage of the Bolan pass. A railway line links Peshawar in north to Karachi in south. Karachi is a big industrial and commercial city. It is also a major sea port as well as an international airport. Islamabad is the capital city. Lahore is another big city. Harappa and Mohenjodaro are two ancient towns where ruins of the Indus Valley civilisations have been excavated.

People

Pakistan has a total population of 148 million people. The average density of population is about 186 persons per sq. km.

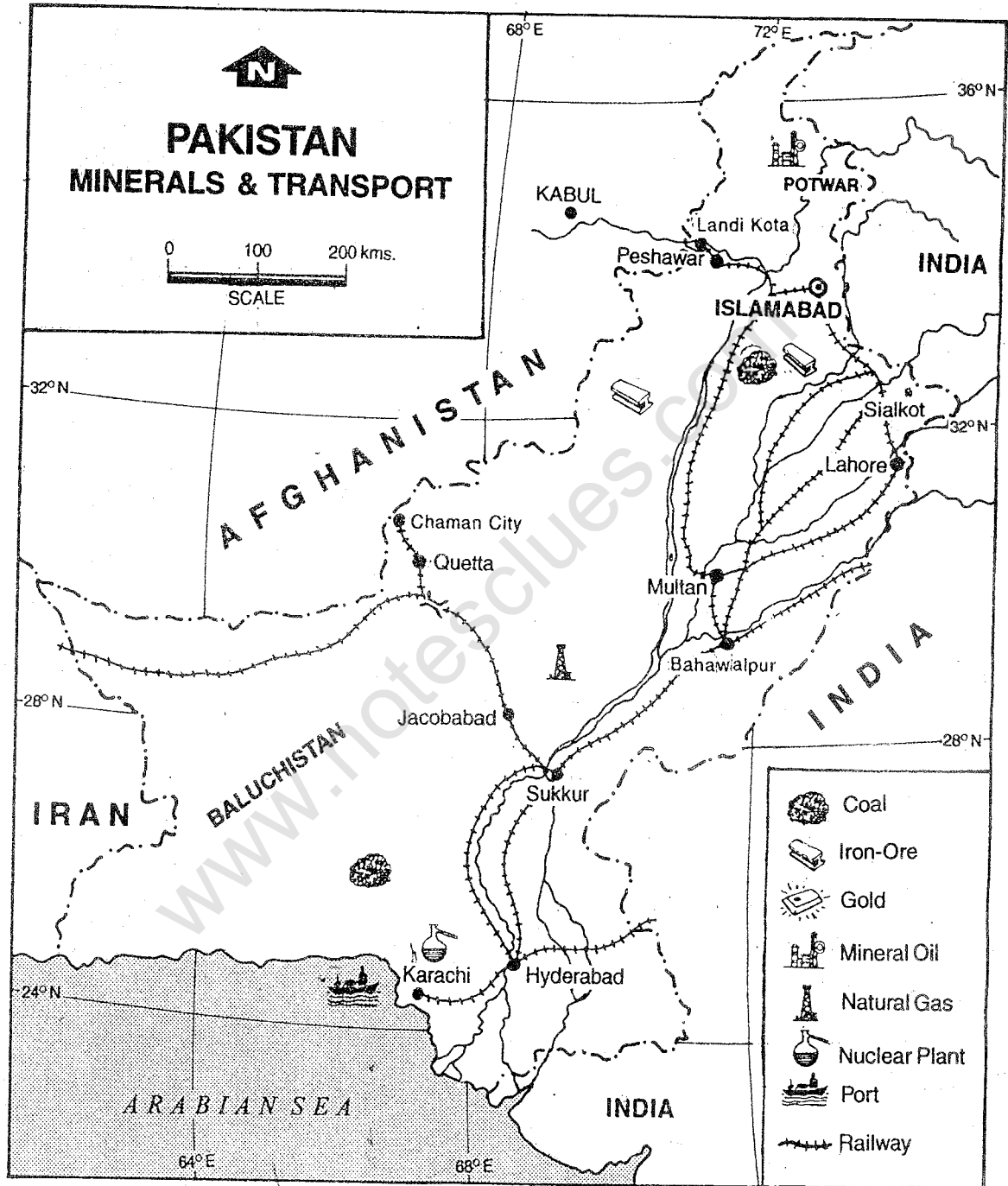


Fig. 8.2 Pakistan — Minerals and Transport

Note the distribution of minerals in Pakistan. Which part of Pakistan has high density of railway network?

Most of the people in Pakistan are followers of Islam. Urdu is the national language. Punjabi, Sindhi, Pashtu and Baluchi are other important regional languages.

NEPAL

Situated in the Himalayas, the kingdom of Nepal covers an area of about 1,47,000 sq. km. It is smaller in area than Orissa. It extends from 26° N to 30° N latitudes and from 80° E to 88° E longitudes. It is bordered by India on three sides, i.e., west, south and east and by China in the north.

Physical Features

Nepal is a mountainous country. It can be

broadly divided into three physical units. The southernmost part is a low-lying plain, called *terai*. It is highly liable to flooding during the monsoon. Hence it is marshy and forest covered. The northern part, on the other hand, is dominated by the Himalayan ranges. The Great Himalayas, i.e., the northernmost and the highest range of the Himalayas passes along the northern border of Nepal. Mt. Everest, the world's highest peak (8,848 m) lies in Nepal. It is known as Sagarmatha in Nepalese. Several mountain peaks having more than 8,000 m height are found in the Great Himalayas. To the south, lies the Mahabharata Range of Middle Himalayas.

The central part of Nepal is occupied by

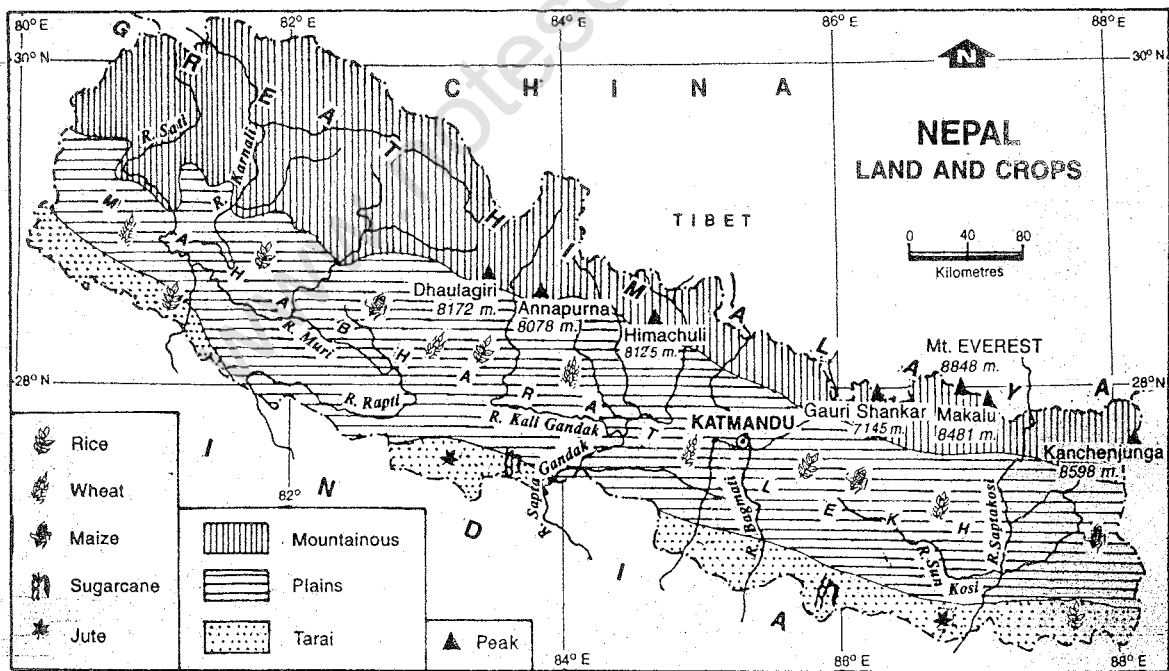


Fig. 8.3 Nepal — Land and Crops

What crops are produced in the plain regions? Note the three major physical divisions of Nepal from north to south.

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small valleys such as Kathmandu and Pokhara.

Rivers in Nepal originate from the Himalayas. They flow east-west and then turn southwards to join the Ganga in India.

Climate and Natural Vegetation

The climate shows two main tendencies. Temperature decreases from south to north, i.e., from terai to the higher Himalayan ranges. Rainfall tends to decrease from east to west. Why? The climate in the terai region is warm and humid. It gets cooler as one goes to the higher region. In the Kathmandu valley, the climate is warm in summer and cold in winter.

The vegetation also changes from south to north and east to west. The terai region has moist deciduous forests. On its western margin where rainfall is less, there are grasslands. Towards the north on the Himalayan slopes, temperate forests are found. Species of trees change with altitude. On the lower slopes, pine and oak trees are common. Fir and birch are found a little higher.

Natural Resources and Economic Activities

Soil is generally thin and poor on steep slopes. However, valleys have good soil in the terai region. Only about 30% of the total land area is suitable for cultivation.

Mineral resources are very few. Mica is mined east of Kathmandu. Small deposits of lignite, copper, cobalt and iron are also found.

Forests are one of the most valuable resources

of Nepal as they provide timber, medicinal plants, herbs and other forest products. Fuelwood is the major source of energy. It alone accounts for 68% of the total energy consumption. As such forest cover has been reduced from 60% of the total area in 1950s to less than 30% in 1980s.

Agriculture is the most important economic activity of Nepal. About 80% of people are engaged in this activity. During 1994-95, it contributed 43.8% of Gross Domestic Product (GDP). GDP refers to the total value of goods and services produced by a country during a year. It gives us some idea of the nature of economic development of a country.

Agriculture is mainly of subsistence type. It is very underdeveloped. Due to high growth rate of population and small percentage of arable land, pressure on land is very high. As a result landholdings have been fragmented day-by-day. More than 50% of all households in hills of Nepal, cultivate less than 0.5 hectare of land. Methods of farming are still traditional. Irrigation facilities are limited. Agriculture, therefore, depends heavily on monsoon rains. As such agricultural production gets adversely affected by poor monsoon.

Foodgrains constituted around 72% of total agricultural production in 1993-94. The principal crops are rice, maize, wheat, millet and barley. Nepal's major cash crops are sugarcane, oil seeds, tobacco, potato and jute. Production of fruits and vegetables has increased in recent years.

Nepal is one of the least industrialised countries in the world. In the absence of

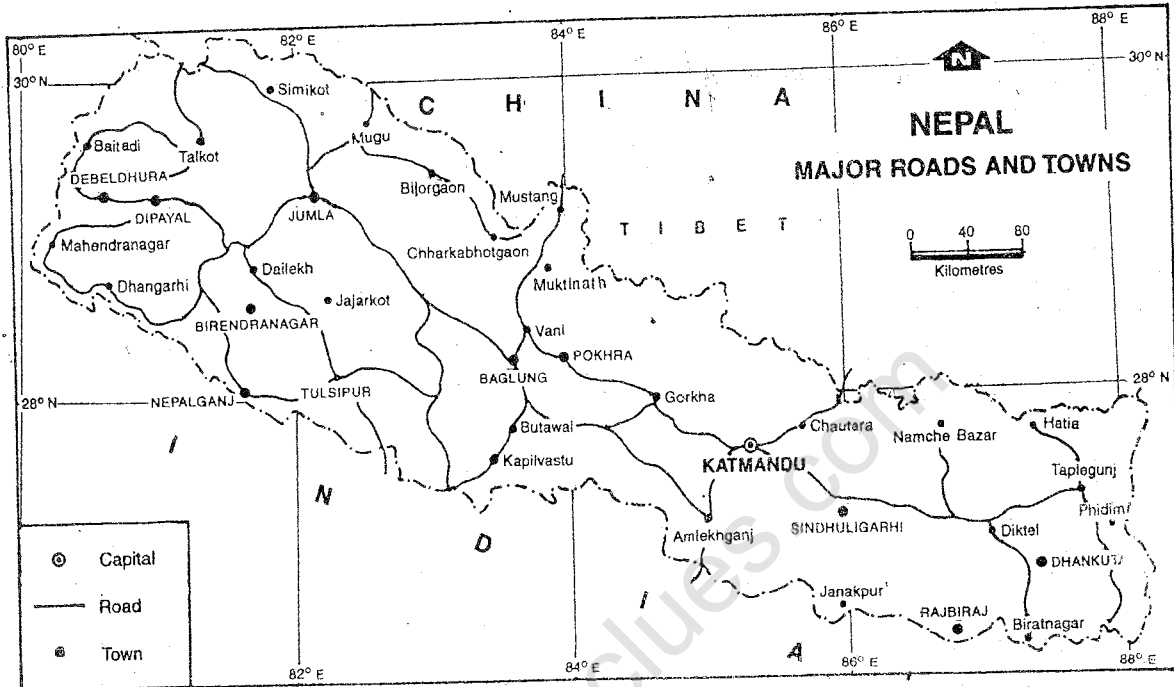


Fig. 8.4 Nepal — Major Roads and Towns

Name the major towns located along the shortest route between Kathmandu and Biratnagar

necessary infrastructure such as an efficient transport network, availability of skilled labour and a reliable power supply, industrial development is very slow. Nepal has one of the greatest hydropower generation potentials in the world. But only 0.28% of this potential is being used. Traditional cottage industries constitute 60% of the total industrial production. Some industries like cement, brick and tile manufacturing, paper, food processing and carpet making have developed in the past two decades. However, a few of them especially carpet manufacturing, which was mainly oriented towards the export market, declined very fast. A number of reasons is given to explain the cause of the

decline. It is felt that rapid expansion and lack of quality control led to over-production and manufacture of poor-quality carpets. Recession in Europe especially Germany, which was the main importer of Nepalese carpets, led to a decrease in its demand. Another reason for the decline of the carpet export is due to the fact that the western countries are against the use of child labour in carpet factories.

Tourism is the most important industry of Nepal. It is the major source of earning foreign exchange. Tourism is concentrated in limited areas mainly in the Kathmandu valley, Pokhara and along a few trekking routes.

Being a land-locked country, Nepal faces difficulties in diversifying its foreign trade structure. Traditionally, India has been a major trading partner. In addition, Nepal also has trade with countries of Europe and Asia for which it requires sea route passage through India. Such passage have been given to Nepal through bilateral treaties between these two countries. Nepal imports manufactured goods and exports forest and agro-based products.

Road transport is the most important. From outside world, Nepal is connected mainly through the air routes.

People

Estimated population in mid-1998 was 23.2 million. The average density is 158 persons per sq. km. Population is distributed very unevenly. It is dense along the river valleys and in the terai.

Nepal is one of the world's poorest nations. Approximately 49% of the people live in absolute poverty. Another 20% live just above it.

BHUTAN

Bhutan is a small land-locked country in

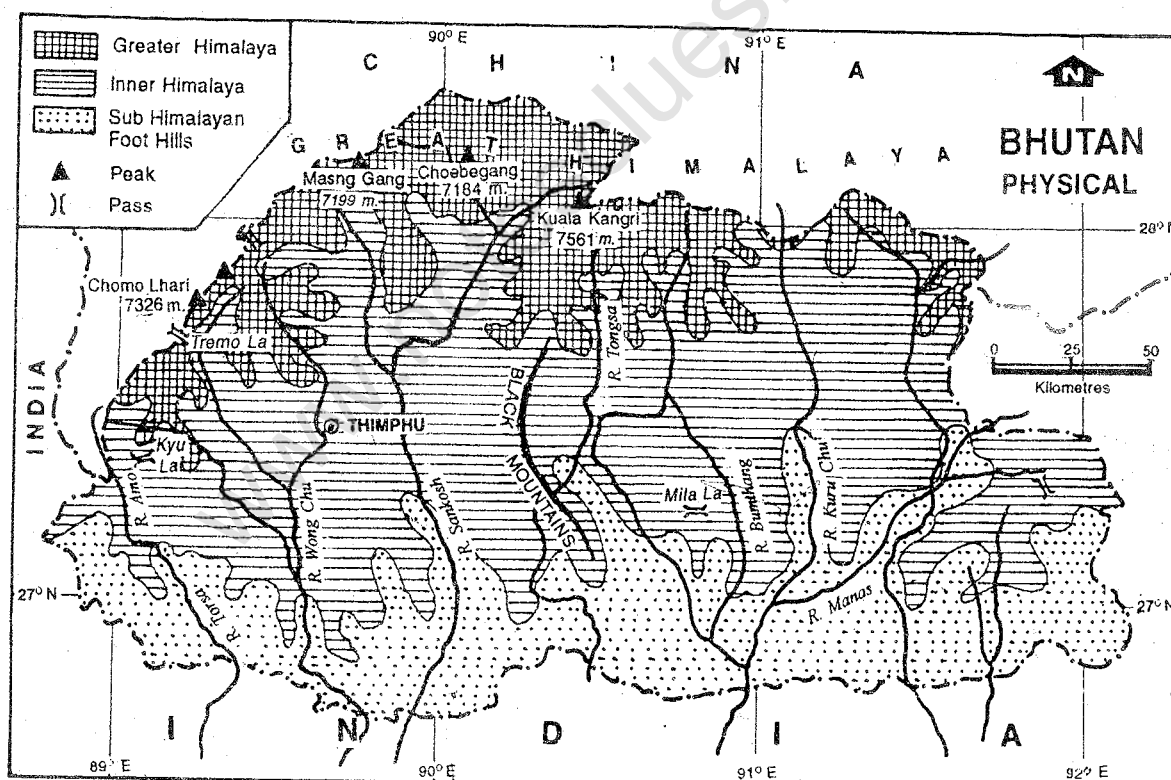


Fig. 8.5 Bhutan — Physical

Name the highest mountain peak in Bhutan. What are the major rivers which enter into India?

Eastern Himalayas. To the north and north-west it adjoins Tibet (China). To its west, south and east, it is bordered by India. Its total area is about 46,500 sq. km which is slightly more than the area of Haryana and less than that of Punjab. It lies between approximately $26^{\circ} 45' N$ and $28^{\circ} 20' N$ latitudes and $88^{\circ} 50' E$ and $92^{\circ} 05' E$ longitudes.

Physical Features

Bhutan is almost entirely mountainous. Its terrain is among the most rugged in the

world. The elevation from sea level may increase from 150 metres to more than 7,000 metres in less than 100 km of distance. Its physical divisions are similar to those of Nepal. From the level plain area in the south called *duars*, the land rises steadily towards the north. While the inner Himalayas are in the middle part, the Great Himalayas form the highest landforms in the north. The highest peak in Bhutan is Gangar Punsun (7561m). Flat land is limited to duars and the broader river valleys, generally run north-south. Some important rivers are the Wang Chin, the Togsa and the Manas.

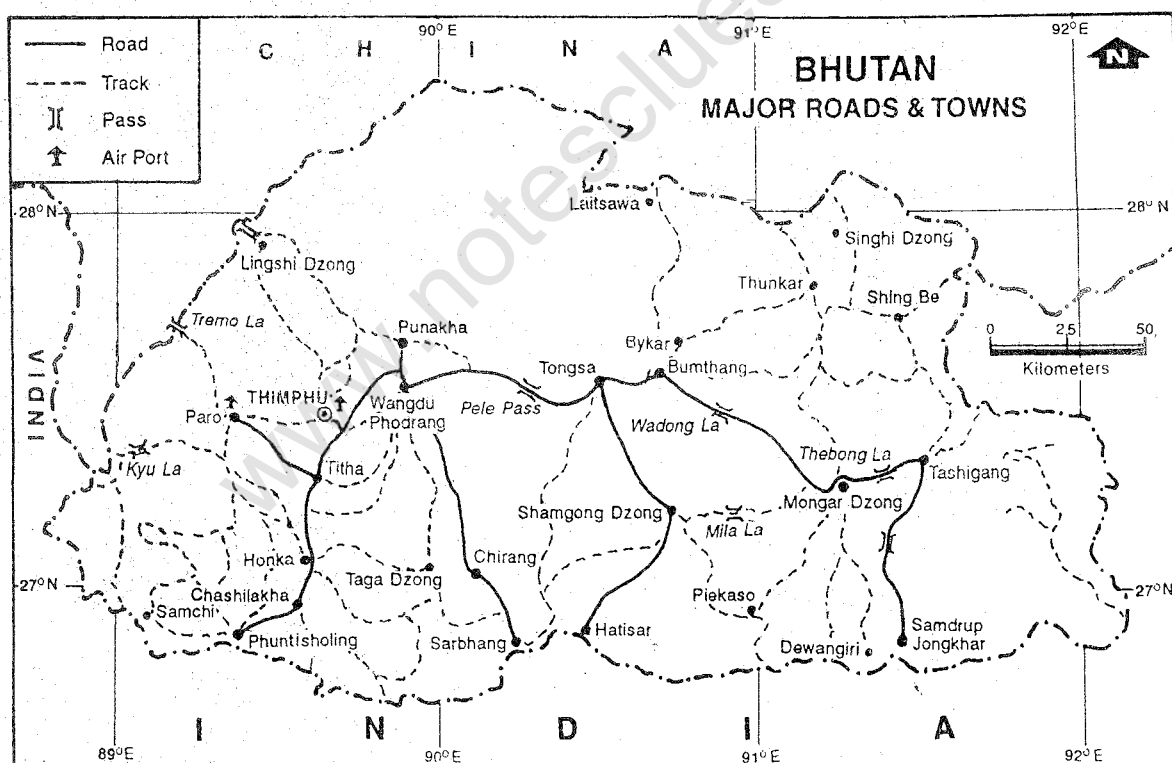


Fig. 8.6 Bhutan — Major Roads and Towns

Locate the major passes in Bhutan. Name the major towns situated along the road from Thimpu to Hatisar.

Climate and Natural Vegetation

Corresponding to the physical divisions, three distinct climatic zones can be identified in Bhutan. The southern belt with an average height of 1,500 metres above sea level, has a hot and humid climate. Temperature varies between 15° and 30° C. Annual rainfall ranges between 250 cm and 500 cm. The inner Himalayan region having a height of 1,500 metres to 3,000 metres, enjoys a cool, temperate climate. Annual precipitation is about 100 cm. The high northern region has a severe alpine climate. Here, annual precipitation is about 40 cm, most of which is concentrated in summer months (mid-June to September). South-west monsoon account for 60-90% of the total annual rainfall. Bhutan has some of the greatest biodiversities in the world for a country of its size. Wild life varies from almost tropical to extreme cold polar creatures.

Natural Resources and Economic Activities

Bhutan is well endowed with natural resources like water and forest. Its rivers are snow-fed and perennial. Flowing through the rugged terrain, they have hydroelectric potential.

Nevertheless the cost of building hydel project is enormous. Bhutan has built some projects with the help of foreign aid including that from India. The Chukha hydroelectric project, for example, built with the help of India has a generating capacity of 336 MW.

Forests cover about 57% of the total land area. Their exploitation is, however, unbalanced. The accessible forests in the

south have been overexploited. On the other hand, the forests of the remote areas have not been exploited. Two main forest-based industrial complexes have been established at Gedu. They produce plywood and boards. Bhutan also has large deposits of some minerals such as limestone.

Bhutan remained isolated from the rest of the world till early 1960s. It began to develop its economy through cautiously planned development programmes. During the past thirty-five years, there has been a steady change in the social and economic situation. The government identified industries that can improve Bhutan's capability to earn money. Seven new types of industries have been established. They are mining, manufacturing, food processing, textiles and clothing, wood and paper based, chemicals and mineral based.

Despite these efforts, Bhutan is not yet in a position of having a favourable trade balance, i.e., exports exceed imports. India is one of the most important trading partners of Bhutan. The mountainous terrain has made transport and communication difficult both within the country and with the outside world.

Construction of all-weather roads started in 1960. Since then nearly 3,000 km of roads have been built. Limestone and dolomite are the principal minerals which have been exploited.

Over 40% of the total area is mountainous. Therefore, cultivable land is very limited. Agriculture and settlements together share only 16% of the total land area. In the

hills and mountains is thin and poor. But in the river valleys and plains (duars), it is thick and fertile. Major crops grown here are rice, wheat, barley, maize and potatoes. Growing of fruits such as oranges and apples is quite important.

Agriculture is the most important economic activity. It includes farming as well as rearing of livestock which in turn includes yak and sheep.

Nearly 90% of people are dependent on agriculture. It is of subsistence type. Most of the farmland is owned by women. They have a very high status in the Bhutanese society. Almost all rural households own some cattle. A farmer's prosperity is measured by the number of cattle he/she owns. But the pasture land is limited. Therefore, the animals graze in the forests as well. They are used as draught animals as well as for dairy products such as milk and butter.

People

With an estimated population of 19,00,000 the

average density of population is 41 persons per sq. km. It, however, varies considerably. While the higher regions are sparsely populated, the southern duar valleys and the eastern region around Tashigang are the most densely populated areas.

Economically Bhutan is a poor country. But it has progressed considerably through planned efforts, during the last thirty-five years. There has been a tremendous increase in the infrastructure like road, communication and electricity as well as social amenities such as education and health facilities. Only one weekly newspaper is published in Bhutan. Earnings of people have increased. With a better diet, proper houses and access to education and health facilities, the death rate came down from 23 per thousand population in 1970 to 1 per thousand in 1990. Infant mortality also lowered from 144 in 1970 to 102 in 1990.

Bhutan's plan is to develop its economy without damaging its environment, even if it means slowing down the process of modernisation.

EXERCISES

Review Questions

1. Answer the following questions briefly:

- (i) What are the two physical units of Pakistan?
- (ii) Name the plateau located south-east of the Hindu Kush.
- (iii) What is the importance of the Indus in Pakistan?

- (iv) What type of climate is found in Pakistan?
 - (v) Why has most of the development in Pakistan taken place in the eastern part?
 - (vi) What is meant by 'terai' ?
 - (vii) Why do rivers in Nepal flow east-west?
 - (viii) What is the major source of energy in Nepal?
 - (ix) What type of industries in Nepal contribute maximum in the industrial production?
 - (x) Which industry of Nepal is the major source of earning foreign exchange?
 - (xi) What are the problems of being a land-locked country?
 - (xii) What is the similarity between Bhutan and Nepal in terms of their physical divisions ?
 - (xiii) Name the three distinct climatic types of Bhutan?
 - (xiv) Which hydroelectric project in Bhutan has been built with the help of India?
 - (xv) What industries have been identified by Bhutan to improve its capability to earn money?
 - (xvi) What is the status of women in the Bhutanese society?
2. Make the correct pair from the following two columns.
- | | |
|----------------------------------|-------------------|
| (a) A mountain range of Pakistan | (i) Gangar Punsun |
| (b) A range of the Himalayas | (ii) Hindu Kush |
| (c) The highest peak in Bhutan | (iii) Bolan |
| (d) A pass | (iv) Potwar |
| (e) A desert | (v) Mahabharata |
| (f) A plateau in Pakistan | (vi) Kabul |
| | (vii) Baluchistan |
3. What type of industrial development has taken place in Pakistan, Nepal and Bhutan?
4. Why is the percentage of arable land low in Nepal? Also explain the implications of high growth rate of population and the small percentage of arable land.
5. What changes have taken place in the economic and social life of people in Bhutan during the last thirty-five years?

Skills in Geography

6. On an outline political map of Asia:
- (i) Label Pakistan, Nepal and Bhutan
 - (ii) Show the capital cities of these countries
7. On an outline map of Pakistan show the following:
- (i) The Baluchistan plateau

- (ii) The Kirthar, the Sulaiman and the Hindu Kush ranges
 - (iii) The Khyber and the Bolan passes
 - (iv) The Indus, the Chenab and the Kabul rivers
 - (v) An area known for growing fruits
 - (vi) The region known for natural gas
 - (vii) Cities — Karachi, Islamabad, Lahore
8. On an outline map of Nepal show the following:
- (i) The Mahabharata range
 - (ii) Mt. Everest or Sagarmatha
 - (iii) Kathmandu and Pokhra
9. On an outline map of Bhutan, show the following:
- (i) Gangar Punsun peak
 - (ii) Wang Chin, Togsa and Manas rivers
 - (iii) The Chukha hydro-electric project.

CHAPTER 9

Our Eastern and Southern Neighbours

Myanmar and Bangladesh are our neighbours in the east sharing land boundary with us. Sri Lanka, on the other hand, is an island country located off the Tamil Nadu coast in the south.

MYANMAR

The Union of Myanmar, formerly called Burma lies to the east of India and Bangladesh and to the south-west of the People's Republic of China. Look at Fig.9.1 and find out which countries share its eastern boundary? Myanmar has a long coastline, which faces the Bay of Bengal and the Andaman Sea. It extends from 10° N to 28° N latitudes and from 92° E to 101° E longitudes. Its total area is about 6 lakh 77 thousand sq. km.

Physical Features

Surrounded on three sides by a great horse shoe of mountains, Myanmar forms a compact unit. Structurally, the country can be divided into three physical divisions. The

young fold-mountains of the west and the north are the southward continuation of the Eastern Himalayas. From north to south, they are known successively as Patkai, Naga, Chin and the Arakan Yoma. The altitude of the mountain ranges decreases towards the south.

The eastern part is an area of upland and low hills. The mountains of the east and the north extend through the Shan and Kayinni plateaus to the southern part. The height of the Shan plateau, which is the most extensive one, is 1,000 to 1,200 metres.

The third physical division consists of lowlands. The Central Myanmar is a long trough running north-south between the mountains of the west and the upland regions of the east. It contains the great alluvial lowlands formed by the river systems of Ayeyarwady (Irrawaddy) and Chindwinn, Sittoung (Sittang) and Salween. The Ayeyarwady runs as the central artery, both of drainage and of communication throughout the length of these lowlands.

Climate and Natural Vegetation

Apart from the high mountain regions of the north, the climate of Myanmar is of tropical monsoon type. Coastal areas are hot and humid. In the central plains, temperature varies considerably between summer and winter months. Mandalay's temperature, for example, is 21°C in January and 32°C in April. However, in the plateau region, temperature is moderate throughout the year. Hence, it is cool. The mountainous region of the north have low to very low temperature and, therefore, the climate is cold.

Myanmar receives rainfall mainly from the south-west monsoon during May-October. The coastal areas especially Tanintharyi which is backed by steep high ranges as also the Ayeyarwady delta receive very heavy (500 cm) to heavy (about 250 cm) rainfall. While the average annual rainfall is about 100 cm in the interior of the central lowlands, it falls below 64 cm in some parts. The difference in total amount of rainfall is reflected spectacularly in a major change of vegetation types. Dense tropical monsoon forests of the rainier coastal regions give way to open cover of vegetation in the interior and in places, a mere thorny scrub.

Natural Resources and Economic Activities

Forests are one of the major natural resources of Myanmar. More than half of the country's total area is occupied by forests. 'Sundari' trees are found in the delta regions. Rubber trees grow in the hot and humid coastal regions. Teak is the most important species of trees found here. It is of the best quality

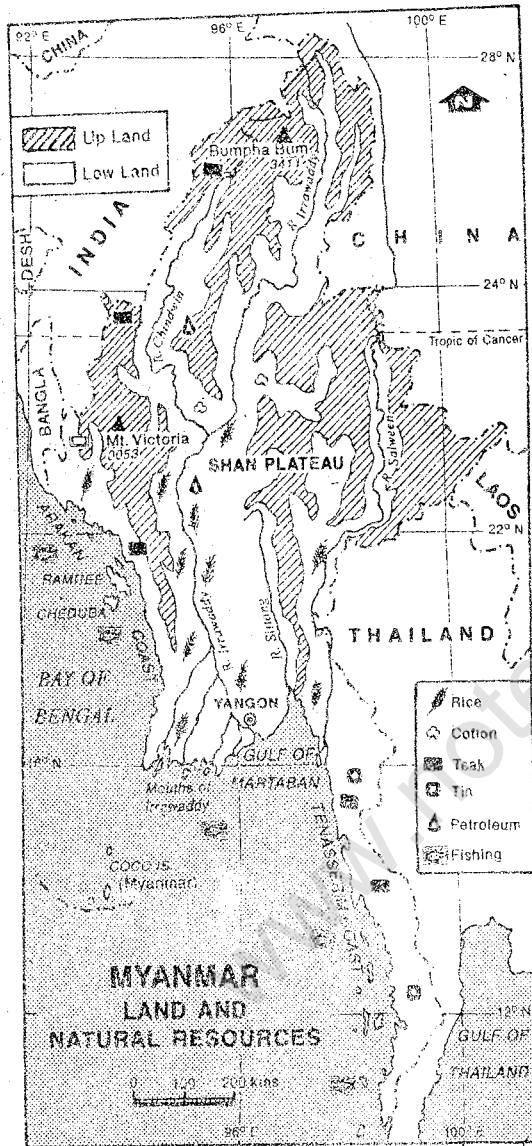


Fig. 9.1 Myanmar — Land and Natural Resources

Which is the largest river of Myanmar? Which plateau is located between the rivers Ayeyarwady and Salween? Which parts of Myanmar have teak plantation? Note the distribution of other resources.

and is in great demand from all over the world. It alone contributes to nearly 17% of the country's total export. Lumbering is an important economic activity.

Myanmar is also rich in mineral resources. The eastern plateaus are known for metallic minerals such as silver, lead and zinc. Precious stones such as sapphires, emeralds and rubies are found on the Shan plateau. Tanintharyi has tin and tungsten mines. Pearls are found in the Gulf of Martaban. Mineral oil is found in the central part of the Ayeyarwady valley. Coal deposits are found at Kalewa near Chindwinn-Myittha confluence. Mining is an important economic activity in several areas.

Agriculture including livestock rearing and fishing is the largest sector of the Myanmar economy. It contributes about 60% of GDP. About 68% of the total employment is in this sector. Rice is the main crop and it occupies about 50% of all land under cultivation. Maize, pulses, groundnuts, sesame seed, sugarcane, jute, cotton and tobacco are other major crops. Besides, fruits and tea are also grown in the coastal region and the Shan plateau respectively. Livestock rearing and fishing have developed rapidly in recent years.

Industrial development is restricted due to shortage of power and other infrastructure such as road and rail transport. Roads provide the most important means of transport for both freight and passenger traffic. However, the total road length in 1988 was about 24,000 km, of which about half the length was metalled. In 1992-93, railways had a

network of 4,740 km, most of which was single track. Air transport has been particularly affected due to paucity of funds.

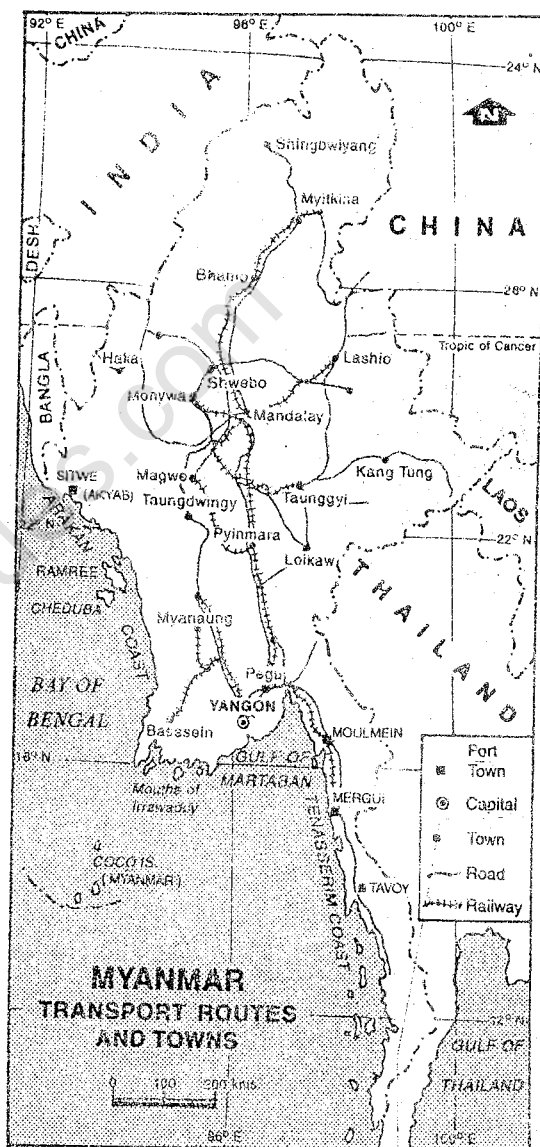


Fig. 9.2 Myanmar — Transport Routes and Towns

You will notice that major transport routes run in north-south direction in the central part of Myanmar. Why is it so? Name the Capital city and port towns.

Inland water transport through rivers continue to provide an important link in north-south communication. All roads and railways run north-south. Can you explain why?

Forest products contribute nearly 32% of the total export (by value). Rice, pulses and minerals are other important export items. Myanmar mainly imports machineries, medicines, vehicles, and textiles.

People

In 1998, the population was 48 million. Average density of population was about 70 persons per sq. km. The highest density was found in the delta region.

Most of the people follow Buddhism. Compared to other south-east Asian countries, the pace of economic development in Myanmar is slow. As such, the urbanisation is also quite low. There are only a few towns and cities. Yangon (Rangoon), Moulmein, Tavoy, Mandalay and Akyab are important cities. Yangon is the capital. It is located in the delta region. It is also a major sea port. Akyab, Moulmein and Tavoy are other sea ports. Mandalay is located in the interior on the bank of the Ayeyarwady. Being the ancient capital of Myanmar, it is an historical place and has ruins of many ancient buildings.

BANGLADESH

People's Republic of Bangladesh, formerly called 'East Pakistan', became an independent country in 1971. It is bordered by India from three sides — west, north and east. Myanmar lies to its south-east. The Bay of Bengal is to its south.

Bangladesh extends from 20° 30' N to 26° 45' N latitudes and 88° E to 92° 40' E longitudes. Its total area is about 1.4 lakh sq. km.

Physical Features

Almost all of Bangladesh lies in the Ganga-Brahmaputra delta. As such most of the country is a level and low-lying alluvial plain. It has been formed by silt brought by rivers. Hence, the land is very fertile. Rivers often change their courses due to alluvial deposits. Because of shallow river beds, floods are very common during the rains. The coastal region is a marshy land. In the delta region, many small islands have been formed by the river deposits near the coast.

The south-east part of Bangladesh is hilly. The Chittagong hills, in fact, are continuation of the hill ranges of Myanmar. Cox's Bazaar, located on the eastern coast of Bangladesh, is the largest sandy beach in the world. It is about 120 km long.

The Brahmaputra is known as 'Jamuna' in Bangladesh. After meeting the Ganga, the joint stream is called Padma. Other important rivers are the Meghna, the Surma and the Karnaphuli. The rivers and their tributaries and distributaries criss-cross the country forming a maze.

Climate and Natural Vegetation

Bangladesh has a tropical monsoon climate. Winter is short, mild and dry. Temperature is high for most part of the year. Rainfall is heavy ranging between 250 and 500 cm a year. It is brought by the south-west monsoon winds, which blow from the Bay of Bengal

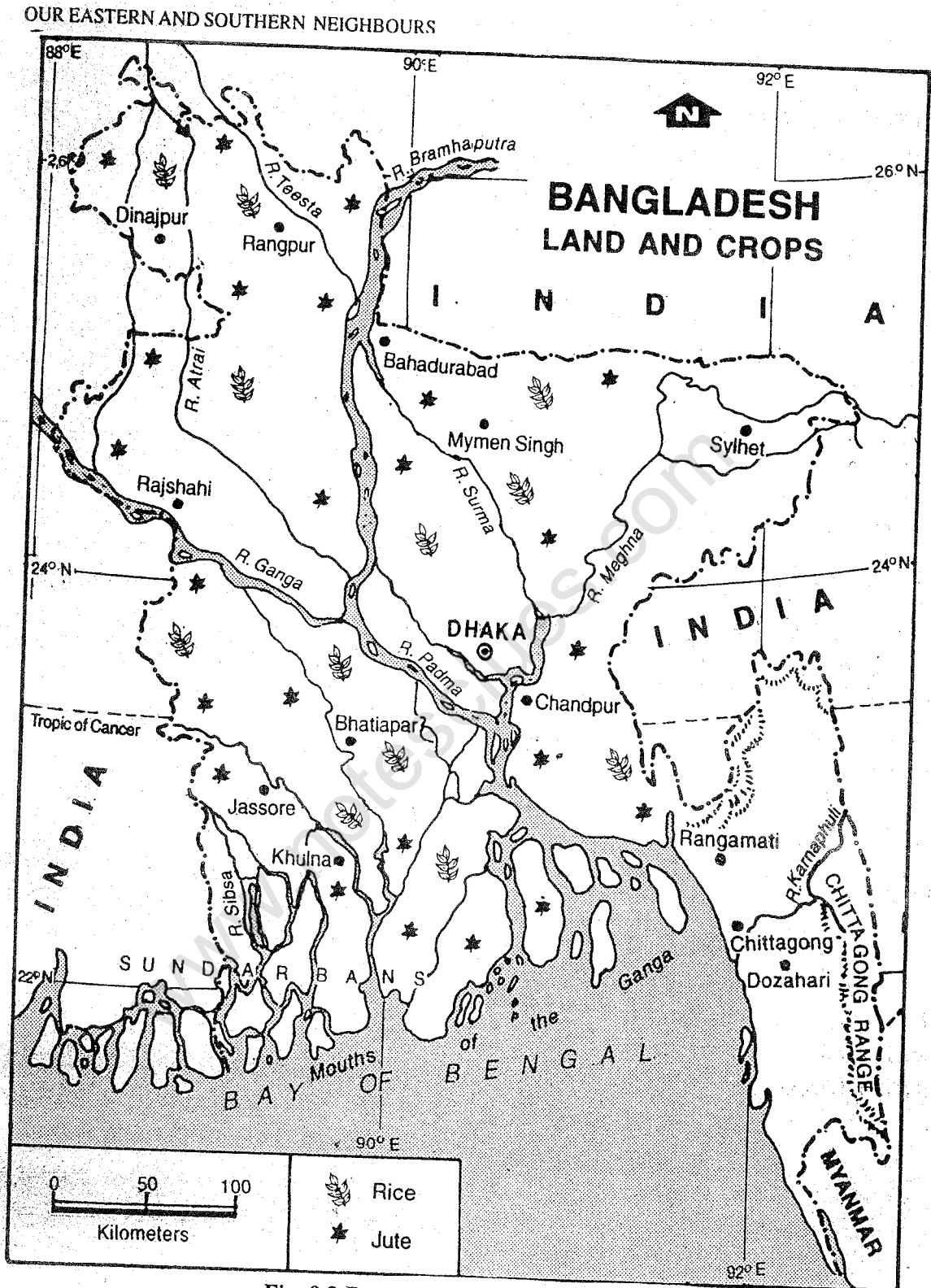


Fig. 9.3 Bangladesh — Land and Crops
Bangladesh occupies the Ganga-Brahmaputra delta. What is the name of the combined flow of the Ganga and the Brahmaputra? Which are the major crops?

during June-October. They cause heavy rainfall, which varies from 250 cm in the coastal region to 500 cm in the eastern hilly areas. The coastal areas are often affected severely by the tropical cyclones, which are common during August-September.

Natural Resources and Economic Activities

Monsoon type forests are found in the hilly Chittagong region. Trees such as teak and sal are found here. In the deltaic coast, mangrove forests containing 'Sundari' trees are found. Wood of this tree is used for making boats.

Bangladesh has only a few mineral resources. Lignite, limestone, China clay and glass-sand are the important minerals found here. Natural gas is found in Comilla and Sylhet districts.

Much of Bangladesh has fertile alluvial soil, which is its most important resource. Hence most of the land is under cultivation. Plenty of water and long growing season allow farmers to take more than one crop from the same field. Rice and jute are the major crops grown here. Wheat, sugarcane, tobacco, pulses, oilseeds, tea, potatoes are the other important crops.

Rural people have evolved semi-aquatic life style adapted to deep flooding during the monsoon season. For example, they construct earthen plinths 4 metres or higher to raise their house above flood level. They also sow varieties of rice which grow in deep water.

Agriculture is the most important

economic activity. It contributes about one-third of GDP. More than half the population depends on it for a living. The average farm size is small.

Bangladesh has a small manufacturing sector. It consists of a few large scale and numerous small scale and cottage industries. A large number of people are occupied in making fibres and other handicrafts from jute and bamboo. Jute and cotton textiles, tea, paper, cement, chemical fertilisers and light engineering are the major industries.

There are few roads and railways in Bangladesh. It is mainly because a large part of Bangladesh is a lowland which gets flooded during rainy season due to the presence of a large number of rivers and streams.

River transport is, however, very important. Almost the entire country can be covered through the network of waterways and also the sea routes along the coast. Dhaka, Chandpur, Barisal and Khulna are inland ports. Chittagong and Monga are sea ports. There are international airports at Dhaka, Chittagong and Sylhet.

People

Total population of Bangladesh in 1998 was 124 million. Its average density of population is more than 885 persons per sq. km.

The majority of people follow Islam. Bangla is the official language.

SRI LANKA

The Democratic Socialist Republic of Sri Lanka lies to the south-east coast of the

southern tip of India. It is an island country consisting of one large island and several islets. Extending between roughly 6° N and 10° N latitudes and 80° E and 82° E longitudes, it covers an area of about 66,000 sq. km. Its maximum north-south length (including small islands) is 435 km and greatest width is 225 km. Find out the names of water bodies surrounding this country. Sri Lanka is separated from India by the Gulf of Mannar and the Palk Strait. You will notice in the map that a chain of small island below the shallow water seem to link the two land masses.

Physical Features

Almost the entire island except the Jaffna peninsula in the north and a coastal strip in the north-west is made of hard rocks. Eastern coast and river valleys have alluvial deposits.

South-central part is the highest land which rises to more than 1,500 m above sea level. From this upland, the land falls by steps to a rolling coastal plain. This plain is narrow in the west and south-west and is broadest in the north. The rivers are generally short and flow radially outwards from the upland area. The Mahaveli Ganga is the longest river, which flows north-east and meets the Bay of Bengal.

Climate and Natural Vegetation

Sri Lanka has hot and humid climate. There is little variation in temperature, appropriate to its near-equatorial position. In Colombo, the temperature varies between 25° C in January and 28° C in May. Temperature is,

however, modified by altitude. Central hilly region has comparatively low temperature.

With regard to the rainfall, there is a marked contrast in the amount of rainfall received by different parts. It divides the country in two zones – the wet zone and the dry zone. The south-western quadrant of the island receives rainfall from both SW and NE monsoons and hence falls in the wet zone. The northern and eastern parts receive rainfall only from NE monsoon, which is not adequate. It, therefore, falls in the dry zone.

A small portion of the wet zone of Sri Lanka is covered with dry mixed evergreen forests, which provides valuable timber. In the drier north-west and south-east, thorny scrubs are found, while the eastern dry zone is covered with Savannah like grasslands.

Natural Resources and Economic Activities

Fertile alluvial soil is found only in small patches in the river valleys and some parts of coastal areas.

Agriculture is the most important economic activity of the people. Rice is the main food crop. The three principal cash crops are tea, rubber and coconut. Cocoa and spices are also grown for export.

Sri Lanka is poor in mineral wealth. Except for very small quantity of iron-ore deposits, there is no other ferrous metal worth mentioning. The only workable sources of non-ferrous metals are beach sands yielding ilmenite, monazite and zircon. Graphite and gemstones are Sri Lanka's most valuable mineral products.

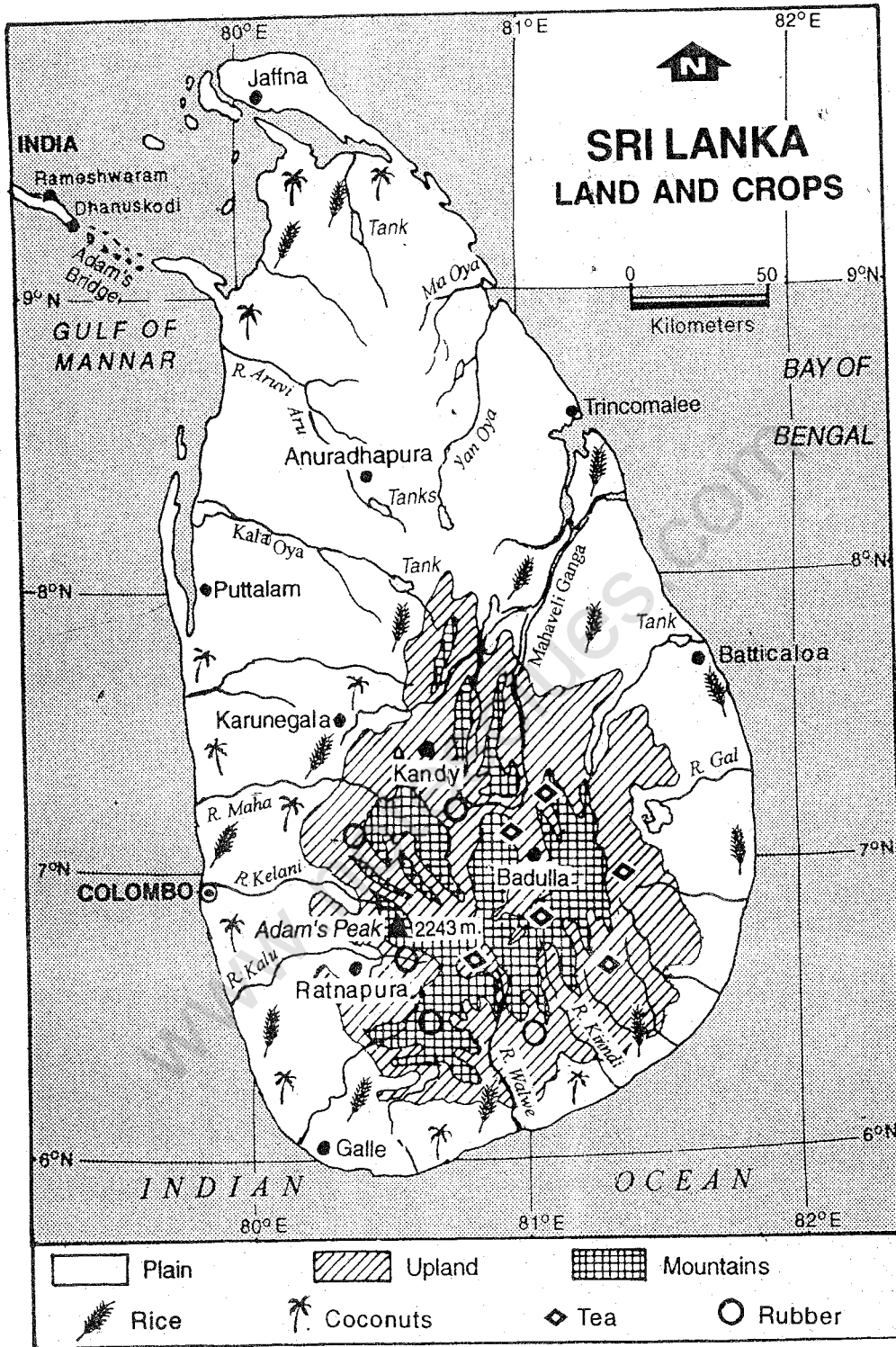


Fig. 9.4 Sri Lanka — Land and Crops

Locate the highest peak in Sri Lanka. Why rivers flow in all directions from the south central part? Note the distribution of crops.

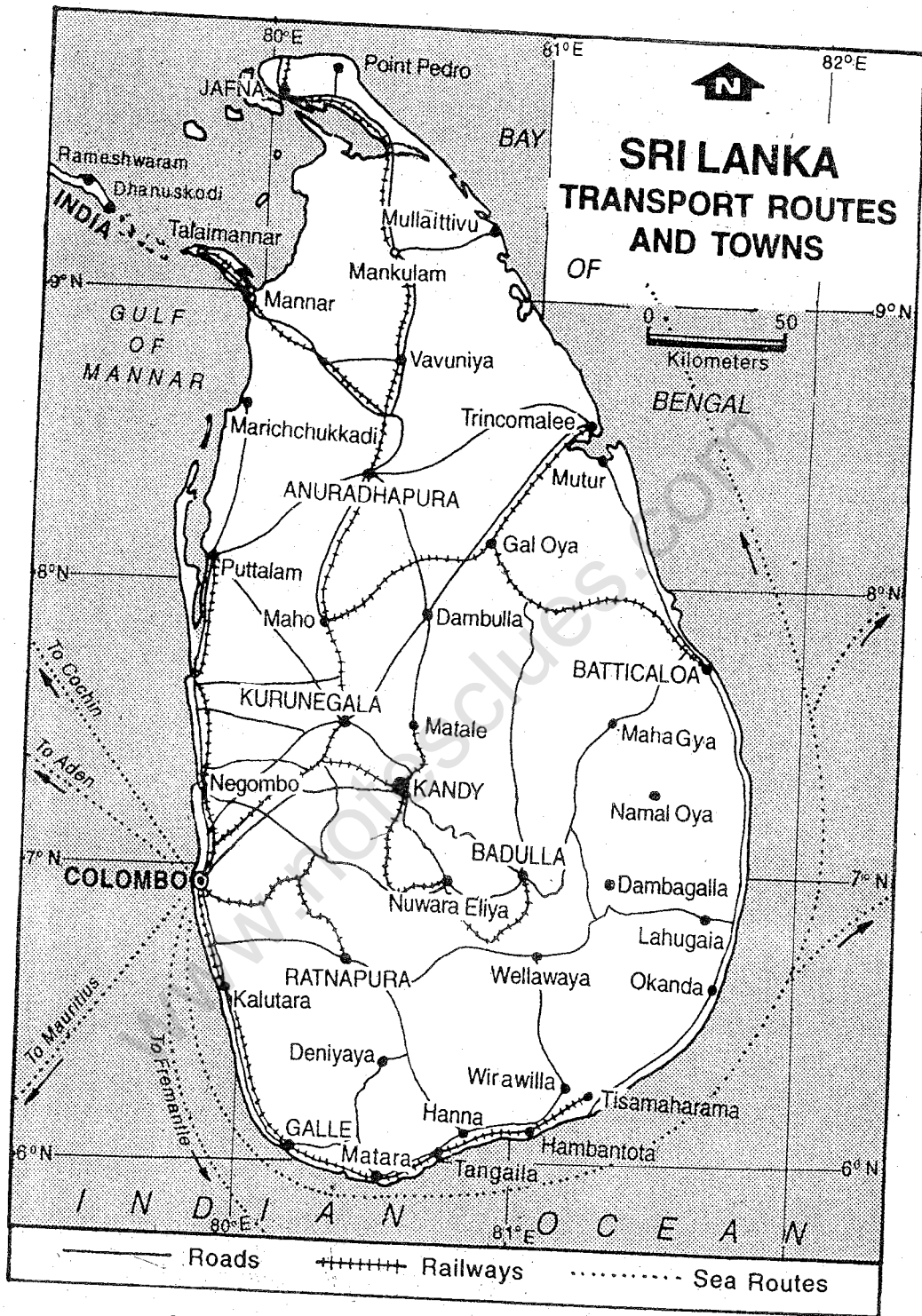


Fig. 9.5 Sri Lanka — Transport Routes and Towns
 Note the location of this island country in the Indian Ocean, in relation to the international sea routes. Which are the other major port towns?

Being surrounded by sea on all sides, fishing is an important occupation of the people in the coastal areas.

Most of the industries in Sri Lanka are based on the products of agriculture and forests such as processing of foods, making beverages, extracting coconut oil and making coir products. Besides, there are leather, plastic, and chemical industries.

Road is the most important means of transport. They make a network linking all the cities, most of which are located on the coast. Railways connect all important cities. Being an island, Sri Lanka has a long coastline. Hence sea transport is very important. Ferry boats are used for carrying people. Trincomalee on the eastern coast and Colombo on the western coast are important sea ports. Air transport is gaining importance gradually. Colombo is an international airport. It is also the capital and the largest city of Sri Lanka. Kandy, Jaffna and Anuradhapura are other major towns. Kandy is a modern city. It is famous for Buddhist temple.

Sri Lanka has radio and television transmission centres. Newspaper circulation in Sri Lanka, compared to other SAARC countries, is quite high. It reflects a high

level of awareness among Sri Lankan people, which is probably due to high adult literacy (89.3%).

The composition of trade items has gradually changed in Sri Lanka. Tea, rubber and coconut, though grown mainly as export-oriented crops, do not dominate exports as in the past. Garments, textiles and other industrial exports accounted for 71% of the export earning during 1994. Sri Lanka is one of the leading exporters of gemstones in the world.

People

The population of Sri Lanka was 19 million and the average density was 285 persons per sq. km in 1997. It is very unevenly distributed. The wet zone and the upland area have a high density of rural population.

Sri Lanka has plural society. The majority group, the Sinhalese are Buddhists. They speak Sinhalese. The other major group is of Tamils from India, who have settled in the northern and eastern parts of Sri Lanka. They are Hindus and speak Tamil. Besides, there are Muslims and Christians. Sinhalese, Tamil and English are the principal languages spoken in the country.

EXERCISES

Review Questions

1. Answer the following questions briefly:

- (i) Name India's two neighbours in the east sharing boundary with it.

OUR EASTERN AND SOUTHERN NEIGHBOURS

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- (ii) Which river of Myanmar does act as the central artery of drainage and communication?
- (iii) What kind of landforms are found in the eastern part of Myanmar?
- (iv) Why does rainfall decrease from south-west to north-east?
- (v) What is the most predominant crop of Myanmar?
- (vi) What factors restrict industrial development in Myanmar?
- (vii) Which is the largest sandy beach in the world? Where is it located?
- (viii) What type of climate is found in Bangladesh?
- (ix) What kind of life style has been evolved by the rural people of Bangladesh to face frequent flooding?
- (x) Name the longest river of Sri Lanka.
- (xi) Which are the two most valuable mineral products of Sri Lanka?
- (xii) What are the three important cash crops of Sri Lanka?
- (xiii) What kind of industries have developed in Sri Lanka?

2. Make the correct pairs from the following two columns:

I

- | | |
|--------------------------------------|--------------------|
| (a) A mountain range of Myanmar | (i) Mahaveli Ganga |
| (b) An important river of Bangladesh | (ii) Arakan Yoma |
| (c) A river of Sri Lanka | (iii) Padma |
| (d) Hills of Bangladesh | (iv) Chindwinn |
| (e) A river of Myanmar | (v) Akyab |
| (f) A beach of Bangladesh | (vi) Shan |
| (g) A plateau of Myanmar | (vii) Cox's Bazaar |
| | (viii) Chittagong |

II

- | | |
|------------------------------------|---------------|
| (a) An inland port of Bangladesh | (i) Dhaka |
| (b) The ancient capital of Myanmar | (ii) Khulna |
| (c) The capital of Sri Lanka | (iii) Yangon |
| (d) The capital city of Bangladesh | (iv) Mandalay |
| (e) A modern city of Sri Lanka | (v) Tavony |
| (f) The capital city of Myanmar | (vi) Kandy |
| | (vii) Colombo |

3. Describe the major physical divisions of Myanmar.
4. Explain how forests are the major natural resources of Myanmar.
5. What are the major economic activities of Myanmar and in what way do they contribute to GDP?
6. What is the special features of Bangladesh's relief? How does it affect agriculture?
7. What changes have taken place in Sri Lanka's trade?

Skills in Geography

8. On outline maps of Myanmar, Bangladesh and Sri Lanka, show the following:
- (i) Important mountain ranges and plateaus
 - (ii) Major rivers
 - (iii) Distribution of mineral resources — coal and mineral oil — in Myanmar and natural gas in Bangladesh

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CHAPTER 10

Indonesia and Malaysia

Indonesia and Malaysia are two South-east Asian countries, which lie in the equatorial region. Malaysian states of Sarawak and Sabah, which occupy the northern Borneo.

INDONESIA

The Republic of Indonesia lies between the south-eastern tip of the Asian mainland and Australia. It consists of more than 13,000 islands of various sizes. Of these only about 6,000 are inhabited. The main islands of Indonesia are Borneo (in Indonesian known as Kalimantan), Sumatra, Irian Jaya, Celebes (Sulawesi), Java, Madura and Bali. Northern Borneo is a part of Malaysia.

This island country spreads along the Equator over a distance of about 5,000 km in an east-west direction. Its north-south extension is about 2,000 km. The total land area is about 19 lakh sq. km.

Look at the map of Indonesia in Fig. 10.1. Find out the names of water bodies near the country. You will notice that Indonesia's only land frontiers are with Papua New Guinea, to the east of Irian Jaya, and with the

Physical Features

Indonesian island generally have mountainous relief. The coastal plains are generally narrow, except for eastern Sumatra, southern part of Kalimantan (Borneo) and Irian Jaya.

The Indonesian archipelago bears the marks of widespread volcanic activities. Most of the mountain peaks are volcanic cones, many exceeding an altitude of 3,000 metres. Earthquakes and associated tidal waves called 'tsunamis' are quite common. Sometimes they cause tremendous loss of life and property.

Climate and Natural Vegetation

The climate is of equatorial type with consistently high temperature (except high altitudes) and heavy rainfall in all seasons. However, in many parts of western Indonesia, there are distinct peak periods of

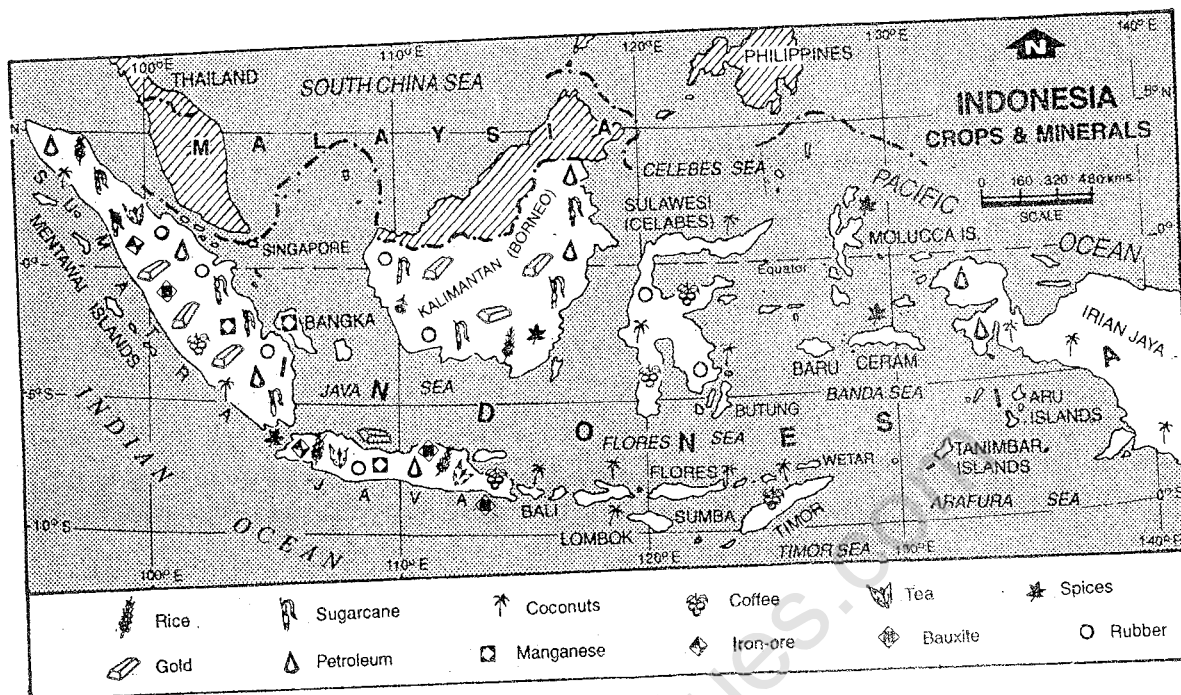


Fig. 10.1 Indonesia — Crops and Minerals

Look at the distribution of major crops and minerals in Indonesia.

exceptionally heavy rain caused by monsoon. The eastern parts, on the other hand, which are nearer to Australia experience a clearly marked dry season during this period (June-September).

Very dense forests in their natural state are found in most parts of Indonesia. There are significant variations in vegetation types from coastal regions to lowlands, to higher altitudes. The forests are less dense towards the east.

Natural Resources and Economic Activities

Some parts of Indonesia such as eastern two-thirds of Java, Bali and a small part of interior and coastal north-eastern Sumatra have fertile soil.

Agriculture is the most important economic activity. In terms of employment, it is the most important sector. Little less than 50% of the working population is engaged in agriculture.

Major crops grown in Indonesia may be divided into two groups — food crops and cash crops. Rice is the most important food crop followed by maize, cassava, sweet potatoes and soyabeans. They are cultivated on small land holdings. Indonesia is an important producer of a wide range of cash crops such as rubber, oilpalms, copra, coffee, tea, cocoa, sugarcane and tobacco. They are mainly grown on large plantations in a scientific manner. These are also grown by small farmers. All cash crops are export-oriented.

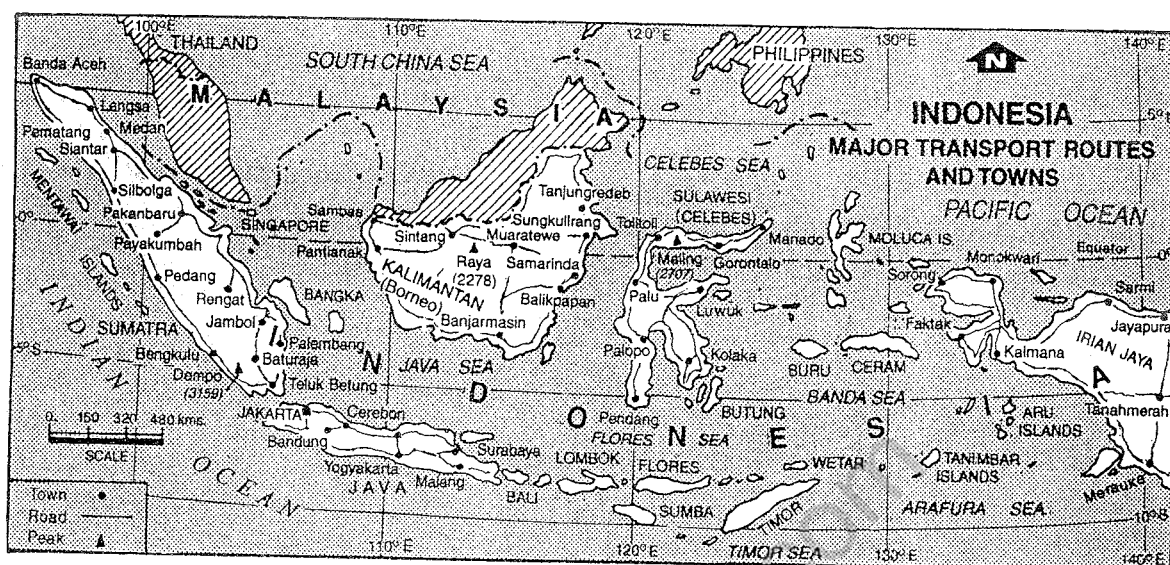


Fig. 10.2 Indonesia — Major Transport Routes and Towns

Note the location of Indonesia. Why is it called the "Islands country"? Being a country of numerous islands, sea transport is very important.

Considerable efforts were made by Indonesia during late 1980s to accelerate the growth of animal husbandry. Recently Indonesia has begun developing marine and fresh water fisheries.

Indonesia has about two-thirds of its land area covered with forests, mainly tropical hardwoods. Instead of exporting timber and other raw forest products, Indonesia exports processed wood.

Some of the important minerals found in Indonesia are petroleum, natural gas, coal, tin, bauxite, copper, nickel, silver and gold. Most of the minerals are localised and are found in remote areas involving high cost in exploitation.

The manufacturing sector has grown

rapidly. Indonesia now produces a wide variety of goods ranging from handicrafts to high-technology aerospace products. Cement, iron and steel, automobiles, consumer goods such as processed food and beverages, tobacco products, textiles and garments, electrical appliances and petrochemicals are major industries here.

In 1991, Indonesia had a total road length of about 2,45,000 km, of which about two-thirds is located in Sumatra, Java and Bali. Most cities of these islands are connected with highways. Railways are limited to Java, Madura and Sumatra. River transport is very important in several areas especially Kalimantan and eastern Sumatra. Jakarta is the capital city. Surabaya and Bandung are other major cities.

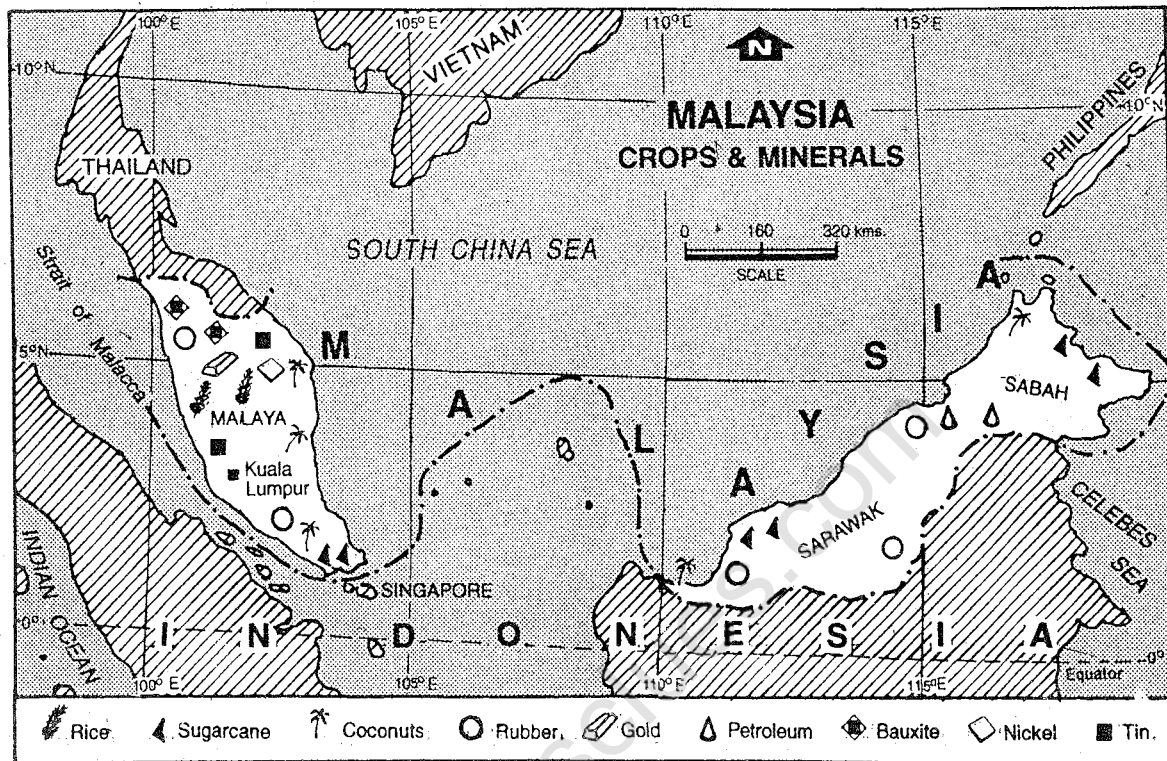


Fig. 10.3 Malaysia — Crops and Minerals
Note the distribution of major crops and minerals.

People

The estimated population of Indonesia in 1998 was 206.5 million. It ranks fourth among the most populous countries in the world after China, India and the USA. However, distribution of population is highly uneven. The density of population is very high in Java, Madura and Bali which contain one-thirteenth of the total land area of Indonesia and two-thirds of its population. Many islands, on the other hand, are sparsely populated.

Nearly 90% of the population were Muslims in 1993, but their religious practices

vary considerably from normal Islamic practices. They are influenced greatly by local customs and traditions. Christianity, Hinduism, Buddhism and Confucianism are some other religions being followed by people in different parts. Bahasa Indonesia is the official language. It has many Sanskrit and Arabic words.

MALAYSIA

Malaysia is located north of the Equator between 1° N and 7° N latitudes. The country consists of two widely separated areas — the Malay Peninsula, which is part of the Asian

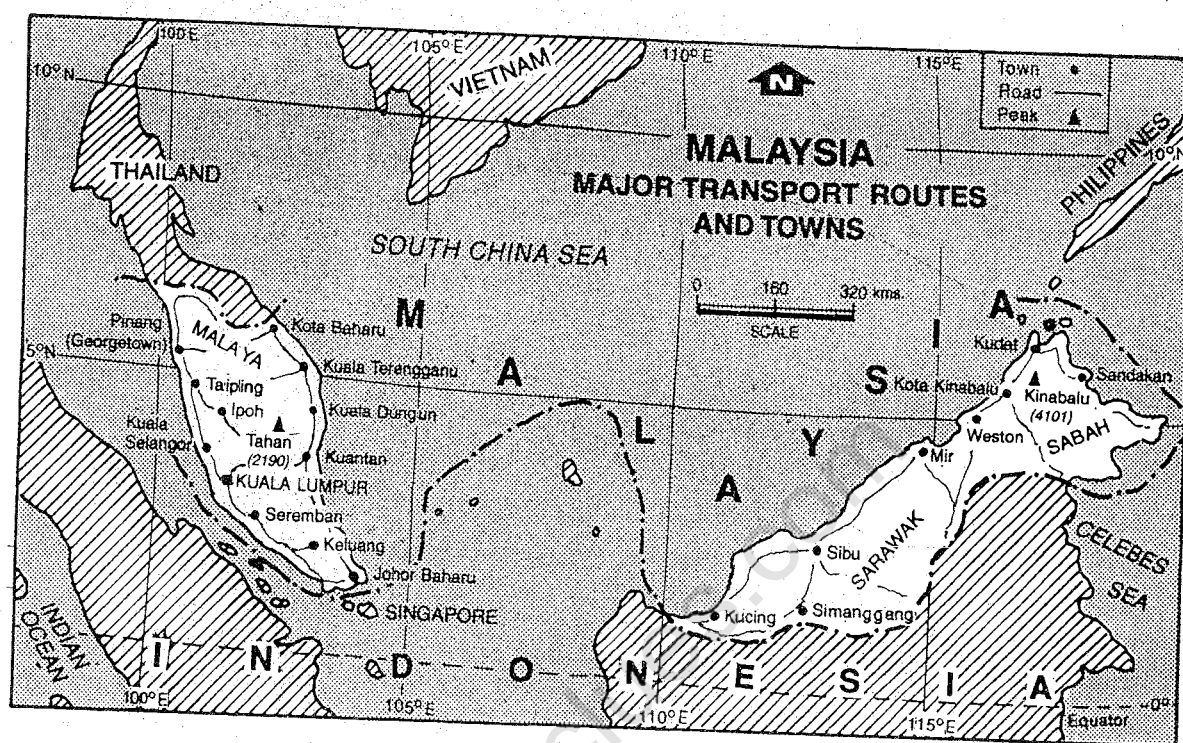


Fig. 10.4 Malaysia — Major Transport Routes and Towns

Look at the major roads which run along the coast. Also note the location of major towns in these areas.

mainland, and the northern part of Borneo island. Peninsular Malaysia is divided into 11 states. A number of small islands are also part of the Peninsular Malaysia. Northern Borneo has two states namely, Sarawak and Sabah. They together cover an area of 3.3 lakh sq. km. Forming the southern tip of the Asian mainland, the Peninsular Malaysia is located on one of the oldest and busiest ocean routes of the world. The Peninsular Malaysia is separated from Sumatra island by the Strait of Malacca and from Sarawak and Sabah by the South China Sea.

Physical Features

The Central part of Malay Peninsula is

mountainous and is surrounded by narrow coastal plains. In this part, the trend of the mountain ranges is from north to south. The height of these mountain ranges vary between 1,200 and 2,100 metres.

Eastern Malaysia consisting of Sarawak and Sabah displays mountainous characteristics. The highest peak of this area is Kinabalu (height 4,101 metres). The western part of Sarawak is, however, a broad coastal plain.

Climate and Natural Vegetation

Malaysia has an equatorial type of climate having uniformly high temperature and rain

throughout the year. Average daily temperature varies between 21^o C and 32^o C.

Natural vegetation consists of evergreen forests, which occupy large areas. The forest cover in Sarawak and Sabah is denser and more continuous than that of the Peninsular Malaysia.

Natural Resources and Economic Activities

Malaysia is rich in several mineral deposits such as tin, copper, uranium, bauxite, coal, mineral oil and natural gas. Tin, copper and uranium deposits are found in the central highlands of Malay peninsula. Sabah has copper-mines, while bauxite and coal are exploited in Sarawak. The most important wealth of Malaysia is, however, petroleum and natural gas deposits.

Till the discovery of vast petroleum resources, agriculture was the main economic resource of Malaysia. There are two types of crops grown in Malaysia : cash crops and food crops. Important cash crops of Malaysia are rubber, oil palm, coconut and cocoa. For a long period, Malaysia has remained the leading producer of natural rubber in the world. There are large rubber estates where trees are planted in rows at fixed intervals. These estates are managed by big firms. They spend large amounts of

money to improve the quality of crops. The scientific and commercial type of farming specialising in a single crop is known as *plantation agriculture*. Rice is the main food crop. A section of Malaysian people is engaged in marine fisheries, while some are engaged in livestock rearing. Sarawak and Sabah are known for their vast wealth of tropical timber.

The manufacturing sector has expanded and grown very fast. The highest growth has been recorded in electronics and electrical products, transport equipment, rubber products, chemicals, food products and steel products.

Road and rail transport are better developed in Peninsular Malaysia than in Sabah and Sarwak. The major sea port of Peninsular Malaysia is Pinang, (Georgetown). Kuching and Miri are the main ports in Sarawak.

People

The estimated population of Malaysia was 21.5 million in 1998. About 81% of the people lived in the Peninsular part, 10% in Sabah and 9% in Sarawak. Malays, Chinese and Indians are the main ethnic groups. About 55% population is urban. Kuala Lumpur is the capital and the largest city of Malaysia.

EXERCISES**Review Questions**

1. Answer the following questions briefly:
 - (i) What are the main islands of Indonesia?
 - (ii) What kind of relief is generally found in Indonesia?
 - (iii) Name two major food crops of Indonesia.
 - (iv) What are the three export-oriented cash crops of Indonesia?
 - (v) Which islands of Indonesia have the major concentration of roads?
 - (vi) What separates the Peninsular Malaysia from Sumatra islands?
 - (vii) What types of climate are found in Indonesia and Malaysia?
 - (viii) What industries have recorded highest growth in Malaysia?
2. Make out correct pairs from the following two columns:

(a) An island of Indonesia	(i) Sabah
(b) A state of Malaysia	(ii) Jakarta
(c) A neighbour of Indonesia	(iii) Kuala Lumpur
(d) A major sea port of Malaysia	(iv) Madura
(e) The capital city of Malaysia	(v) Kinablu
(f) The capital city of Indonesia	(vi) Papua New Guinea
	(vii) Pinang
3. Describe the main features of agriculture in Indonesia and Malaysia.
4. What is the pattern of population distribution in Indonesia and Malaysia?
Explain why density of population varies in these countries. Give examples from both the countries.

Skills in Geography

5. Collect information and photographs on the "Lives of people in Indonesia and Malaysia" under the following headings:
 - (a) Economic Activities
 - (b) Social and Cultural life

Divide the work in small groups. After preparing reports discuss your findings in the class.

6. Consult a good atlas showing maps of Indonesia and Malaysia in a greater detail. Now answer the following questions:
- (i) Which island of Indonesia has three main cities — Jakarta, Surabaya and Bandung?
 - (ii) Which country is located at the tip of the Malay Peninsula?
 - (iii) Which is the highest mountain peak on the island of Sumatra?
 - (iv) Why do most rivers in Borneo rise in the central part and flow either east or west?

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CHAPTER 11

China and Japan

China and Japan are two major East Asian nations. While the former occupies the Asian mainland, the later is a group of islands off the East Asian shore.

THE PEOPLE'S REPUBLIC OF CHINA

Spreading over an area of about 9.6 million sq. km China is the third largest country in the world. It extends about 34 degrees in latitude and 60 degrees in longitude. It shares political boundaries with as many as 14 countries. Name the countries sharing boundaries with China.

Physical Features

China is a country with complex physiographic features. The most predominant features are high mountains and plateaus, which share about one-fifth of the land. The plains account for about 15% of the land. The remaining land is covered by hills and low plateaus. Thus, about 65% of land is above 1,000 metres high.

China's relief may be compared with three semi-circular steps going down from west to east. The first step, i.e., the western part is mountainous and rugged. It has high mountain ranges with snow covered peaks and glaciers such as the Kailash and the Kunlun ranges. The plateau of Tibet, (Xi Zang) is located between the Kailash and the Kunlun ranges. It is the world's largest plateau. The average height of this region is 4,000 metres.

The second step is formed by inner Mongolian, Loess and Yunnan-Guizhou plateaus and the Tarim and Sichuan basins. Locate these features on the map of China. Its average height is between 1,000 and 2,000 metres. The cold and dreary desert of Taklamakan is located in the Tarim basin. The Loess plateau is made of fine yellow dust called *loess*. This has been brought and deposited by the strong winter winds blowing from the deserts in the interior.

CHINA PHYSICAL

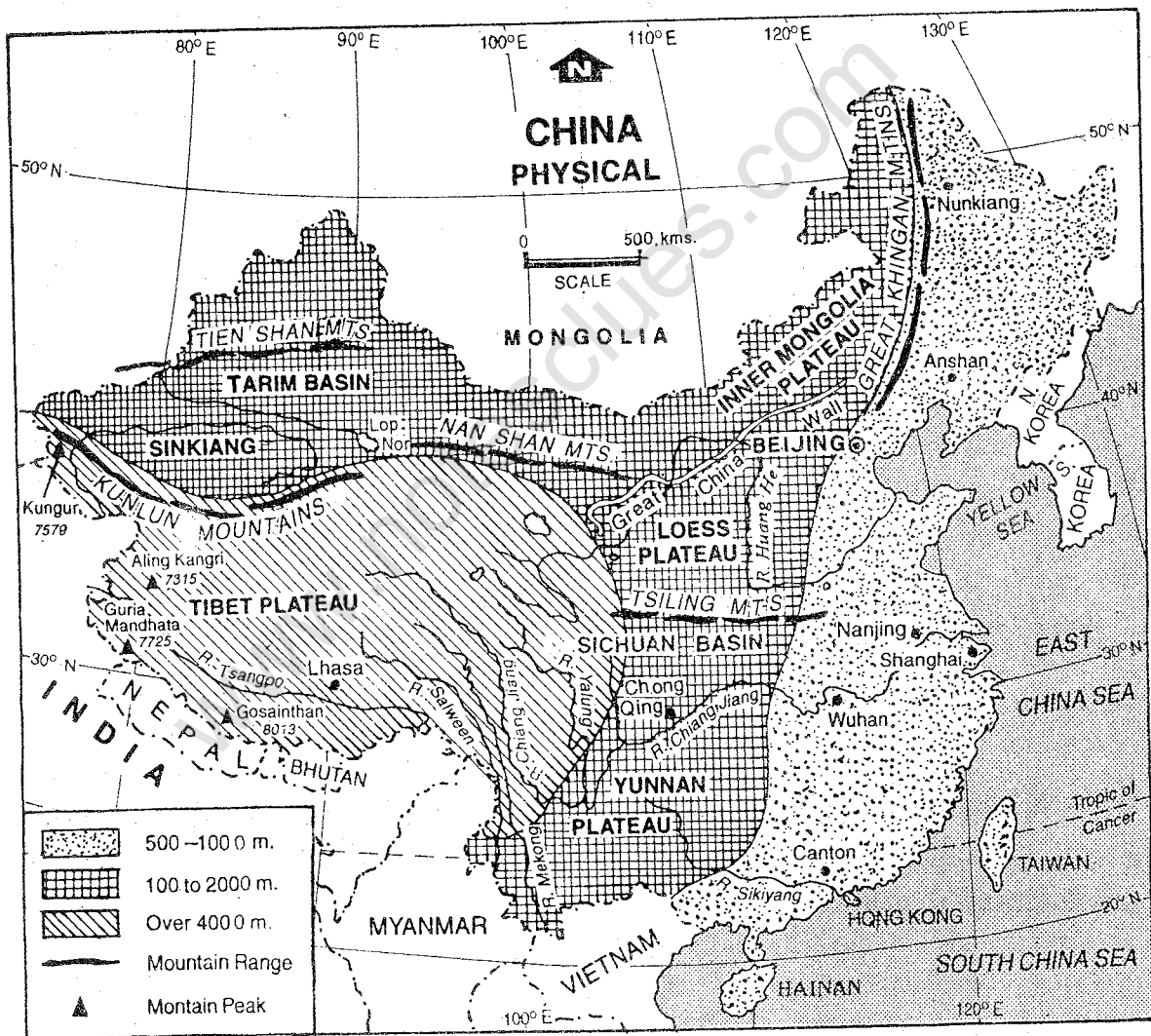


Fig. 11.1 China — Physical

Note that the China may be divided into three distinct physical units. The height gradually decreases from west to east. Most of the rivers originate on the plateau of Tibet.

The eastern part of China stretching from the edge of the Greater Hinggan, Taikang and Wu-Shan mountain ranges to the coast forms the third step. It includes the river valleys of Huang He, Chang Jiang and Xi Jiang interspersed with hills. The average height of the plain is 500-1,000 metres.

Several rivers originate from the western region of Tibet. Three great rivers — the Indus, the Satluj and the Tsangpo (known as Brahmaputra in India) originate very close to each other. While the Indus and the Satluj flow westward, the Tsangpo flows eastward. All of them enter India at different places and make deep gorges while crossing the Himalayas. How has Yellow Sea derived its name? Why is the amount of silt high in the river Huang He?

The Salween and the Mekong originate from the eastern part of the plateau of Tibet. They flow into South-east Asia. The Xi Jiang, the Chang Jiang and the Huang He flow eastward through China and drain into the Pacific Ocean. Of these, the Xi Jiang valley is the smallest. The valley of Chang Jiang is the largest. It provides navigation and irrigation. The Huang He drains the Northern China and carries large volume of yellow silt. Due to silting, the river used to shift its channel frequently and flood the region. The fury of flood has been controlled now to a large extent by constructing dams. The river is used for irrigating the northern plains.

Climate and Natural Vegetation

Climatically, there is great variation between north and south and between inland and

coastal areas of China because of variations in temperature and rainfall. Temperature decreases from south to north. Rainfall is caused mainly by the south-east monsoons during summer. Its amount decreases from south to north and also from east to west. Thus in the south and south-east, summers are hot and wet, winters are mild and the annual rainfall is high. Further north, in the Chang Jiang basin, summers are warm and rainy, winters are cool and the annual rainfall is moderate. In northern part, summers are warm, winters are very cold and annual rainfall is scanty.

Natural Resources and Economic Activities

Large part of China is mountainous and arid, hence, cultivable land is very scarce. Thus, in many places the hill sides have been converted into terraces (a series of steps for growing crops). Even this land is declining in area every year to meet the growing demand for houses, roads and factories as a result of ever increasing population. China already has one of the smallest areas of cultivated land per person (about 1/15 hectare) in the world.

However, the Chinese farmers have been successful in increasing the per unit yield of crops substantially. Yet, China has to import food to meet her domestic needs.

China is essentially an agricultural country. Intensive agriculture and horticulture have been practised for over 4,000 years. Hence, Chinese farmers are highly skilled in farming. They know the best crops for different areas and best

CHINA

CROPS AND MINERALS

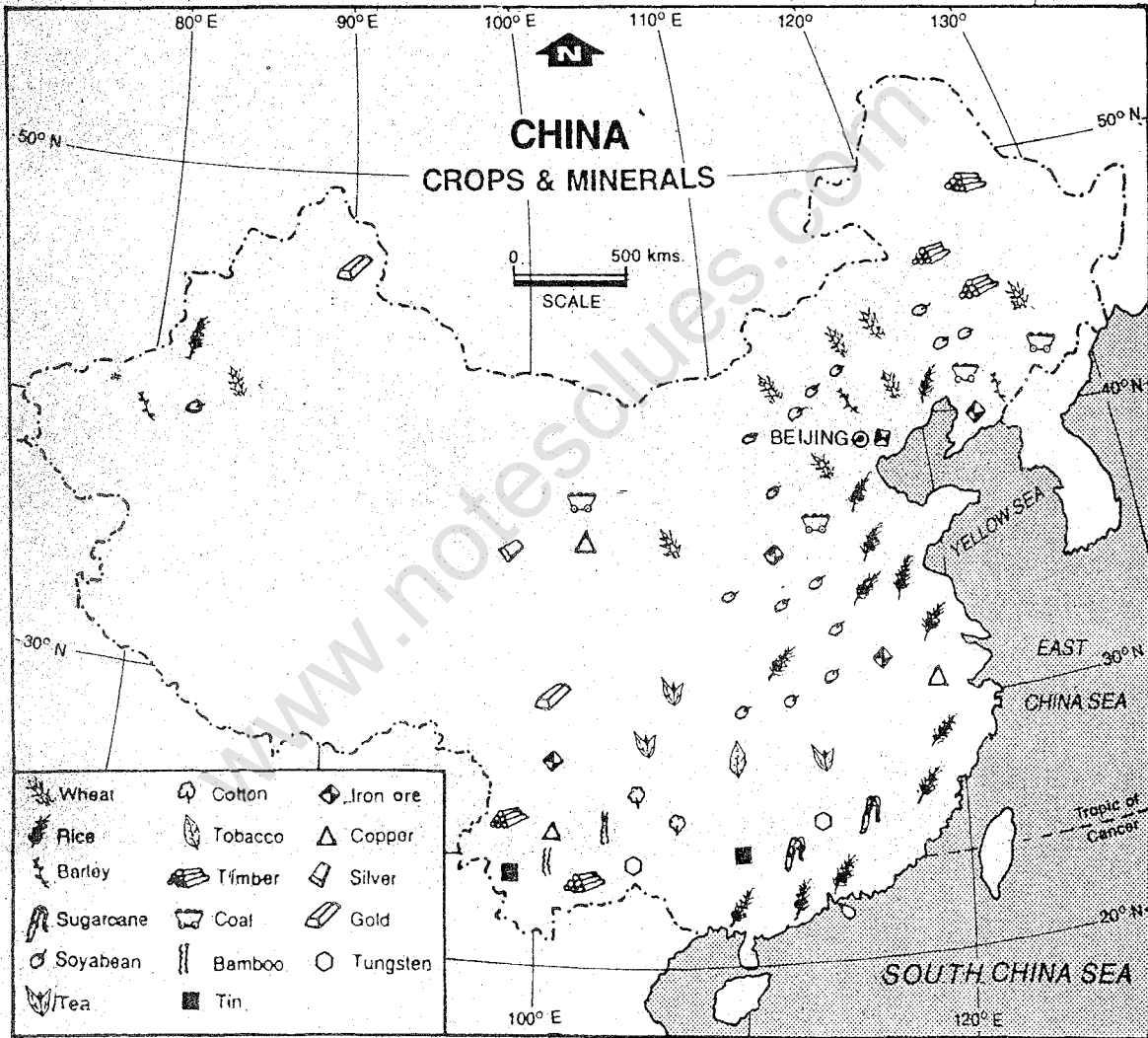


Fig. 11.2 China — Crops and Minerals

Note the distribution of major crops and minerals in China. Which parts of China grow rice and why?

methods of maintaining soil fertility. Present-day policy has averted the traditional threats from floods and droughts by soil conservation, afforestation, irrigation and drainage projects and has also increased the high stable yields by introducing fertilizers, pesticides and improved seeds.

Among crops, cereals are the most important. Rice is the main crop grown in southern and central China. Wheat, soyabean and millets are the main crops of northern China. China is a major producer of rice, wheat, maize and millets. Silk, cotton, tobacco and tea are important cash crops. Chinese silk and tea are world famous.

Pigs, chickens and ducks are widely reared in China as domestic animals and birds. Horses, camels, sheep and goats are raised in arid grasslands. However, cattle are few and dairying is not of much significance. Fishing is important both on the coast and in the flooded rice-fields.

- China is rich in several minerals, such as coal, iron ore, tin and tungsten. Most provinces of north China have coal-fields, largest being Hebei, Shanxi, Shandong and Jili. Iron ore deposits are abundant in the anthracite fields of Hebei, Shanxi and Shandong. There are on-shore oil-fields at Shengli, Dagang and Karamay. Natural gas is available in Canton and Sichuan provinces. Rich deposits of coal and iron have helped develop the iron and steel industry. Industrial development in China began with the manufacturing of cotton textiles followed by silk and steel. Chemicals, cement, machineries, agricultural implements, transport vehicles and paper are other important industries.

Nearly three-fourths of the energy is produced from coal. Oil and natural gas together contribute little over 20%. Hydro-electricity shares about 5%. There are small local units having an output of 30-60 mw.

Compared to the area and size of population, means of transport in China are rather inadequate. Rivers are used as natural means of transport. Roads and railways are being extended to have a better network.

Shanghai is the largest city of China. It is also the largest port and a big textile centre. Beijing is the capital and ranks second in population size. Other important cities are Tianjin, Shenyang, Wuhan and Guangzhou (Canton).

People

With 1,459 million population in 1998, China is the world's most populous country. It has almost one-fifth of the world's population. The average density of population is 142 persons per sq. km. However, the actual distribution is very uneven. Compare the distribution of population shown in Fig. 11.4 with Fig. 11.2 showing the relief of China. Discuss the factors which influence the pattern of population distribution.

The population of China has more than doubled since 1949. One hundred million population was added in China in over one hundred years from 1840 to 1949. Now this much population is added every six to seven years. China, therefore, has adopted the strictest population control programme in the world to check its fast growing population. Small families are encouraged by increasing

rights to education and work opportunities for women and by using economic rewards and penalties. China has achieved success in slowing down her population growth. But there are wide variations in population growth rates, and size of families among different provinces of China. Nevertheless, China is making great efforts to reduce its population and hopes to reach near-zero population growth rate very soon.

JAPAN

Japan is located in the Pacific Ocean to the east of the Asian mainland. No wonder it is called 'Nippon' in Japanese, which means 'land of the rising sun'. It is a country of about 3,900 islands. Of these, only four are large and important. In order of their size, they are Honshu, Hokkaido, Kyushu and Shikoku. The Japanese archipelago, (elongated chain of island) forms an arc. It extends over nearly 3,800 km from north to south. It covers an area of 378 thousand sq. km, which is less than 0.3% of the total land area of the world. Find out the northern and southern latitudes of the Japanese archipelago. Name the sea which separates Japan from the Asian mainland.

Physical Features

Mountains form the backbone of the Japanese archipelago. They account for 72 per cent of Japan's total land area. Most of its mountains are of volcanic origin. Mountain Fujiyama near Tokyo is the most famous of them. It has not erupted since 1707. However, it is still considered an active volcano because two or three hundred years is not a long period for a volcano to be called inactive.

A number of volcanoes in Japan were active in the recent past. They provide one of its most pleasant amenities — mineral hot-springs. In Japan, they are used for recreational purposes. Numerous hot-spring resorts are fed by these springs. The volcanic activity indicates the relatively young age of the Japanese islands. As such there are frequent earth tremors. Most of them go unnoticed by the people because of their mild nature. Sometimes, these earthquakes are strong enough to cause damage to life and property.

There are only a few lowland areas. The Kanto Plain on the eastern coast of Honshu is quite important. Look at the map (Figs. 11.4 and 11.5) and locate the cities of Tokyo and Yokohama on this plain.

Japan has a long but rocky coastline. It has many small but excellent harbours. They are used for shipping and fishing.

The Japanese topography in general provides beautiful landscape and at times dramatic scenery — snow-capped mountains, sparkling lakes, graceful waterfalls, deep gorges, swift flowing rivers, fine forests and bamboo groves. Perhaps closeness to natural beauty has inspired and developed a fine aesthetic sense, among the Japanese people.

Climate and Natural Vegetation

Japan lies mainly in the temperate zone. Its climate is generally mild. But it varies considerably from place to place. The northern part is colder than the south. Winds blowing from Siberian region dominate the winter weather. It causes heavy snow and

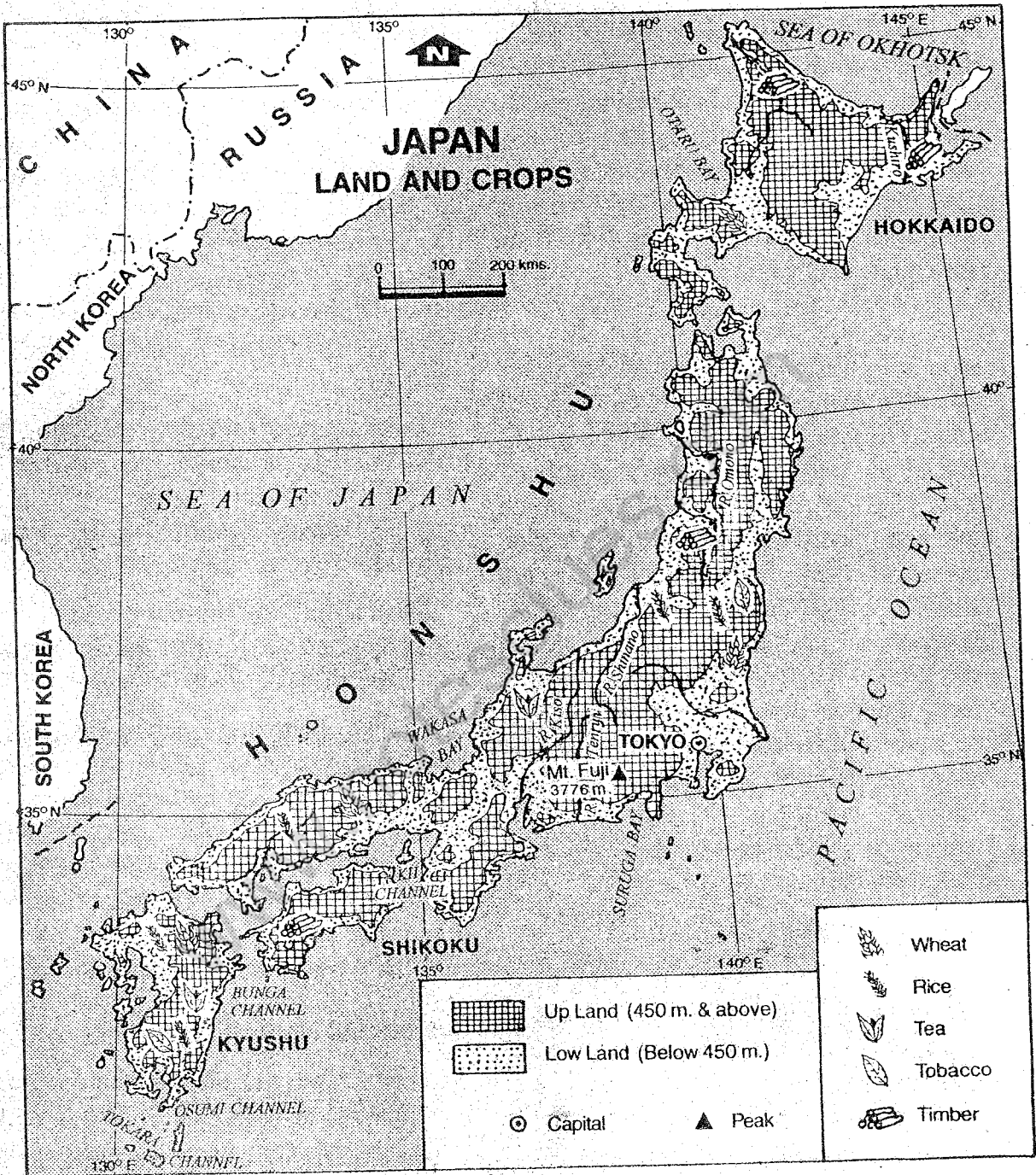


Fig. 11.4 Japan — Land and Crops

Note the four major islands of Japan and arrange them in descending order on the basis of their area. You will notice that crop production is limited to coastal areas.

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rain in the northern and western parts of the country. Snow-covered mountains in this region provide excellent sites for winter sports. In summer, the oceanic winds from the south-east bring rain to the eastern and southern parts of Japan. During September, violent tropical rain-storms originating in the Philippines Sea or in the neighbourhood of Caroline islands called *typhoons* strike the southern coast of Japan frequently. They often cause great loss to life and property.

Rainfall is abundant ranging between 100 to 250 cm a year. Japan also enjoys many hours of sunshine throughout the year. The combination of plentiful rainfall and a temperate climate produces rich forests and luxurious vegetation that cover the entire countryside.

The cold ocean current from the north and the warm ocean current from the south meet on the eastern coasts of Japan. It causes thick fog and creates ideal condition for fish to thrive. This area is, therefore, one of the major fishing grounds of the world.

Natural Resources and Economic Activities

Japan is a small island country with a large population of nearly 126 million in 1998 and average density of 337 persons per sq. km. Except forests and marine resources, it is poorly endowed with other natural resources. Despite these limitations, Japan has managed to become one of the leading industrial nations of the world today.

Agriculture

Owing to country's mountainous topography,

arable land is extremely limited. As such, all available land is put under crops. Terraced farming is widely practised on mountain slopes. Despite these efforts, only 14% of the total land in Japan is arable. Japanese farms are small in size. But they are intensively cultivated. Mechanised farm implements such as power tillers, tractors, rice planters and spraying machines are used for farming operation. This has reduced the number of farm labourers drastically. It now forms only about 10% of the total labour force. Advanced techniques, improved seeds and heavy use of fertilizers and pesticides have brought the Japanese farms among the most productive ones in the world.

Rice is the main crop. Though area under rice cultivation has reduced considerably, it still occupies about half of the total cultivated land. In value, it constitutes about one-third of the total agricultural produce. Wheat, barley and soyabeans are other important food crops.

Japan has diversified its agricultural production in the past several years. Animal husbandry and cultivation of fruits and vegetables have been accelerated. Though, Japan lacks good pasture land, attention is being paid to livestock rearing. It now occupies the second place in total agricultural production. Cultivation of fruits and vegetables has increased substantially in the past few years. Wide varieties of fruits and vegetables, such as mandarin, oranges, lettuce and strawberries are grown in Japan.

The Japanese diet underwent a remarkable westernisation after World War II. While consumption of meat and dairy

products, sugar, vegetables and fruits increased, the rice consumption decreased. In fact, this change led to the diversification of Japanese agriculture.

Nearly two-thirds of the total area of Japan is forested. The most popular species of trees are *sugi* or Japanese cedar, *hinoki* or Japanese cypress and *akamatsu* or Japanese red pine. These forests provide building-materials such as timber and pulp for paper production. However, Japan imports these products in substantial amount to meet its growing needs.

The seas surrounding Japan, especially in the east abound in all forms of marine life. The Japanese since time immemorial have taken a substantial proportion of their food supply from these seas. Thus, Japan has been one of the major fishing nations in the world. It contributes nearly 15% of the total fishing haul of the world. However, Japan is acutely conscious of the need for marine conservation. Several measures have been taken to regulate the major fisheries, such as carrying out artificial hatching and stocking of fish and shell fish and maintaining as well as increasing marine resources.

Japan lacks most of the minerals necessary to sustain modern industrial structure. Japan's main mineral resource is coal, which is of low grade. Hence, basic minerals such as mineral oil, iron ore, coking coal, and non-ferrous metal ores such as copper, nickel and bauxite have to be imported.

Japan depends on overseas sources to meet roughly 85% of its energy requirements. Mineral oil, coal, natural gas, nuclear power and hydro-electricity are the principal power resources.

Despite paucity of minerals, Japan is a highly industrialised country. Production of iron and steel has expanded remarkably since World War II. In recent years, the machinery industry has played the leading role in Japan's economic growth. It has diversified and set high technical standards in the international market. This includes electrical machinery and electronics (e.g., generators, televisions, music systems and calculators), ship building, automobiles and precision machinery such as optical goods industry including cameras, binoculars, microscopes, timepieces and watches. Chemicals including petro-chemicals is another important industry of Japan. Textile industry has declined gradually.

Japan is a major trading nation of the world. It imports raw materials such as iron ore, bauxite, nickel, copper-ore, crude oil, coal, natural gas, raw wool and cotton as well as foodstuffs. Japan's major exports are automobiles, steel, ships, various kinds of machines and electronic goods. Japan's biggest trading partner is the USA.

Japan has developed its transportation facilities immensely. It has introduced faster, safer and more economical means of transportation. Japan, for instance, has one of the world's fastest train services, some of the world's largest oil tankers and has also witnessed rapid expansion of international air routes.

People

Japan has a population of nearly 126 million. It ranks seventh in the world in terms of population. The average density of

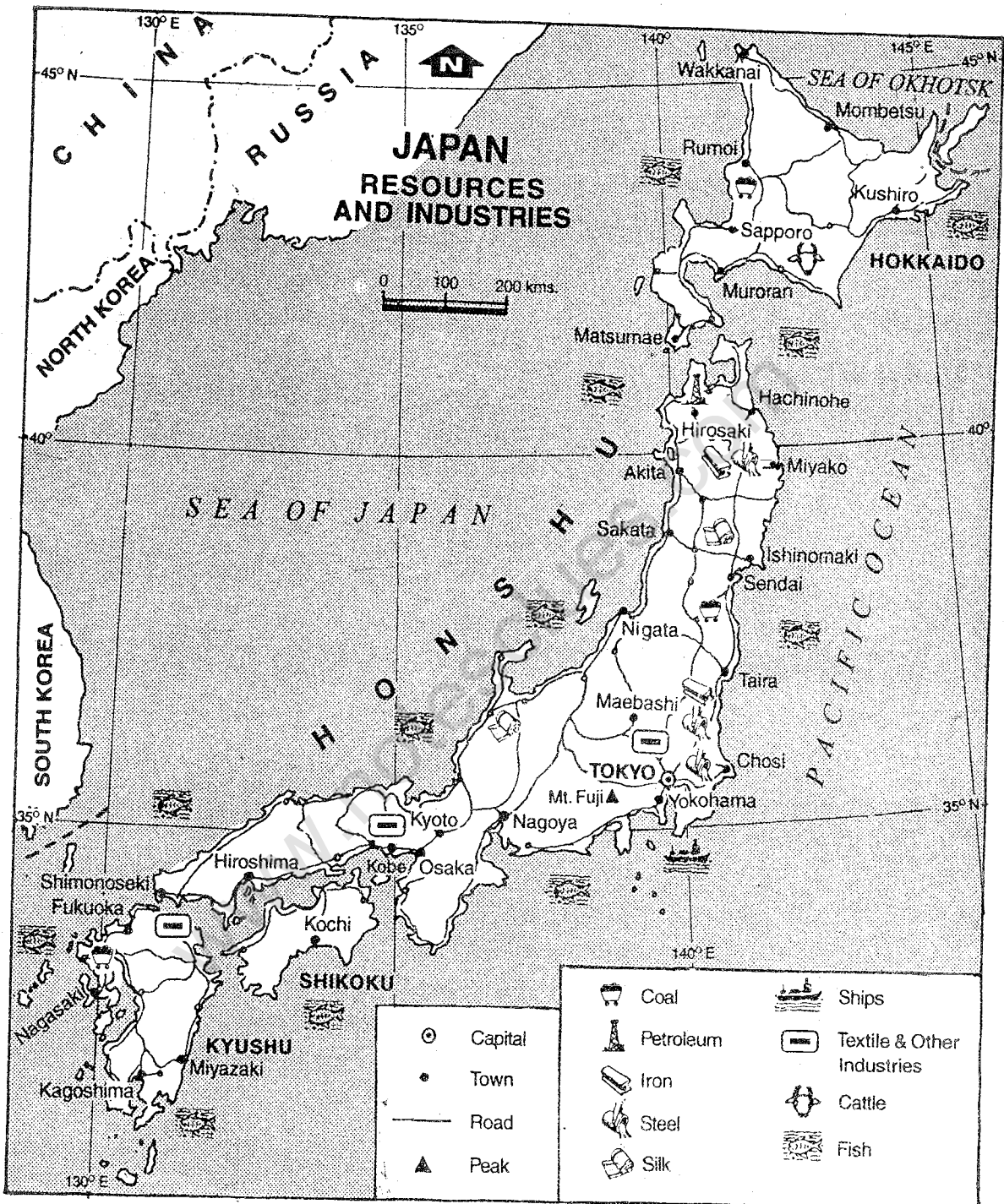


Fig. 11.5 Japan — Resources and Industries

Note the distribution of resources and industries in Japan. What are the major industries around Tokyo?

population is 337 persons per square kilometre. It is one of the most densely populated nations of the world.

Japan is also one of the most urbanised nations of the world. About three-fourths of its population lives in urban areas. About 60% of the total urban population is concentrated in the major metropolitan areas of Tokyo (the capital city), Yokohama, Osaka, Nagoya and Kitakyushu .

The Japanese society has undergone profound change since World War II. The

equal legal rights given to women in 1947 abolished the old patriarchal character of the society. The rapid growth of Japan's economy changed the mode of living. Use of modern household appliances increased. Mass production of instant food items, frozen food and various kinds of daily necessities brought changes in family or social life. Entire family especially women, who were earlier tied down to their daily household chores, found time for relaxation as well as educational and cultural pursuits.

EXERCISES

Review Questions

1. Answer the following questions briefly:

- (i) What is the most predominant relief feature of China?
- (ii) Name the three major rivers of China originating from the plateau of Tibet.
- (iii) Why did the river Huang He frequently flood the region? How has it been controlled now?
- (iv) Why does rainfall in China decrease from south to north and east to west?
- (v) What are the major cereal crops of China?
- (vi) Where are iron-deposits found in China?
- (vii) What is the main source of energy production in China?
- (viii) Name the four main islands of Japan.
- (ix) What is an 'archipelago'?
- (x) What does indicate the relatively young age of the Japanese islands?
- (xi) What are 'typhoons' ? Which part of Japan is frequently affected by them?
- (xii) Why has the number of farm labourers in Japan reduced drastically?
- (xiii) What changes have taken place in the Japanese diet?
- (xiv) Name Japan's three most popular species of trees.
- (xv) What measures have been taken by Japan to regulate its major fisheries?
- (xvi) Name three major exports of Japan.

2. Describe the three broad physical divisions of China.

CHINA AND JAPAN

3. What efforts have been made by China to control its population growth? What does it plan to achieve?
4. Discuss the methods used by the Chinese farmers to increase the per unit yield of crops and also maintain soil fertility?
5. What type of climate is found in Japan? Explain how winds and ocean currents control the climate of Japan.
6. What are the major natural resources of Japan? How has it become one of the most industrialised nations of the world despite few resources?
7. How and why has Japan diversified its agriculture production?
8. Discuss the major changes taking place in the Japanese society since World War II.

Skills in Geography

9. On an outline map of China, show the following:
 - (i) The rivers — Indus, Salween, Chang Jiang
 - (ii) The mountains — Greater Hinggan, Kunlun
 - (iii) The plateaus — Tibet, Yunnan-Guizhou
 - (iv) Basins — Tarim, Sichuan
10. On an outline map of Japan, show the following:
 - (i) The Kanto plain
 - (ii) Mt. Fujiyama
 - (iii) The cold and warm currents off its eastern coasts
 - (iv) Tokyo, Yokohama and Osaka

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UNIT FOUR

India

India is a well-knit geographical unit having an individuality of its own. The five physical divisions of India are interdependent and complementary to each other.

The annual cycle of seasons in India is dominated by the monsoons. The mighty Himalaya lends this country a distinct tropical touch and a monsoonal unity almost from one end of the country to the other.

India is rich in several natural resources such as soil, minerals, forests, wild life and water. Soil is the most important resource. We derive all our food and many of our necessities from soil directly or indirectly. These resources need to be utilised judiciously.

Progress in agriculture and industry has been phenomenal in India. We produce a variety of crops. We are also self-sufficient in food. A number of agro-based and mineral-based industries have developed in India.

The means of transport and communication serve as lifelines of our nation. They bring our people close to one another. There has been tremendous progress in these areas also.

Finally, it is the people who are the greatest resource of any country. It is not the quantity but the quality of our people that would make our country wealthy and prosperous, enabling us to raise the standard and quality of our living.

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CHAPTER 12

India : The Land

Our country India or Bharat is a vast country. Covering an area of 3.28 million sq. km it is the seventh largest country in the world. It accounts for nearly two per cent of the world's total area.

Location

Look at Fig. 12.1 showing location of India in the world. You will notice that our country occupies the south-central peninsula of Asia. Besides the mainland, two island groups, the Andaman and Nicobar islands in the Bay of Bengal and the Lakshadweep island in the Arabian Sea are parts of our country. India is situated at the head of the Indian Ocean. Arabian peninsula and African continent lie on the west and Myanmar, Malaysia and Indonesia in the east. Thus, it enjoys a strategic position especially with reference to the international trade route connecting the eastern and the western hemispheres.

The mainland of India extends between $8^{\circ} 4'$ and $37^{\circ} 6'$ North latitudes and $68^{\circ} 7'$ and $97^{\circ} 25'$ East longitudes. The Tropic of Cancer

($23^{\circ} 30' N$) divides India almost into two halves. India, thus lies entirely in the tropical and sub-tropical zones of the northern hemisphere. Because of great longitudinal extent, the difference in local time between eastern and western extremes of our country is of two hours. It means that the sun rises or sets two hours later at Dwarka than in the easternmost part of Arunachal Pradesh. In order to avoid the confusion with regard to the time at different places of our country, the local time along $82^{\circ} 30' E$ longitude is taken as the standard time of India, i.e., *Indian Standard Time (IST)*. This meridian is known as the *Standard Meridian of India*.

The Indian peninsula tapers southward. As such, the northern part of the Indian Ocean is divided into two expanses of water — the Bay of Bengal and the Arabian Sea. Look at the physical and political maps of Asia. You will notice that the lofty Himalayan ranges separate Pakistan, India, Nepal, Bhutan and Bangladesh from the rest of Asia.

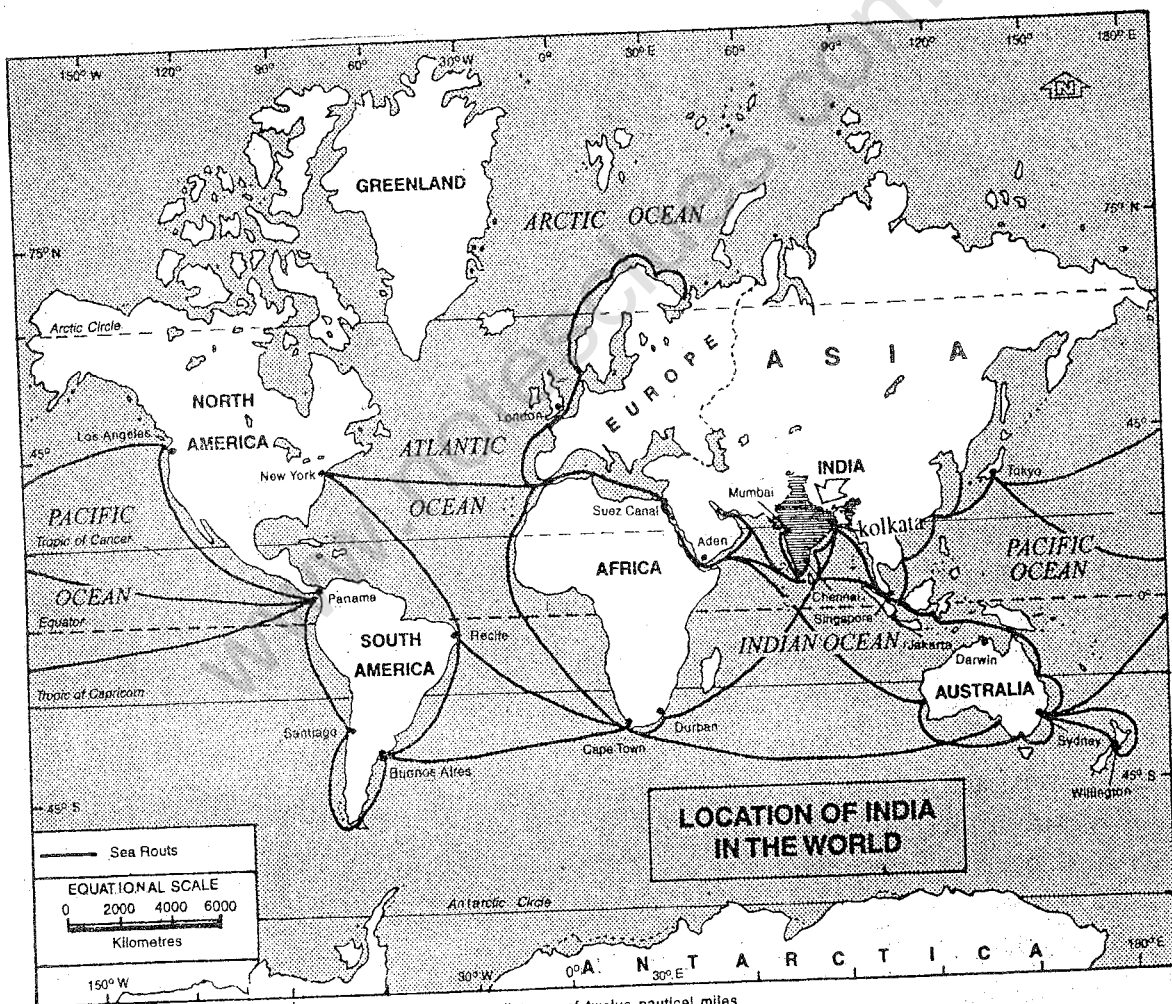
India has a land frontier of 15,200 km.

The total length of the coastline of the mainland and the islands is over 7,500 km. Study the map of India (Fig.12.2) and find out which countries have a common border with our country. You will notice that we share our boundaries with seven countries. They are Pakistan, Afghanistan, China, Nepal, Bhutan, Bangladesh and Myanmar. The island country of Sri Lanka is located towards the south in the Indian Ocean. A narrow stretch of water, namely, the Palk

Strait, separates it from the mainland of India.

The Republic of India is the world's largest democracy. It comprises of twenty-five States and seven Union Territories including the National Capital Region of Delhi.

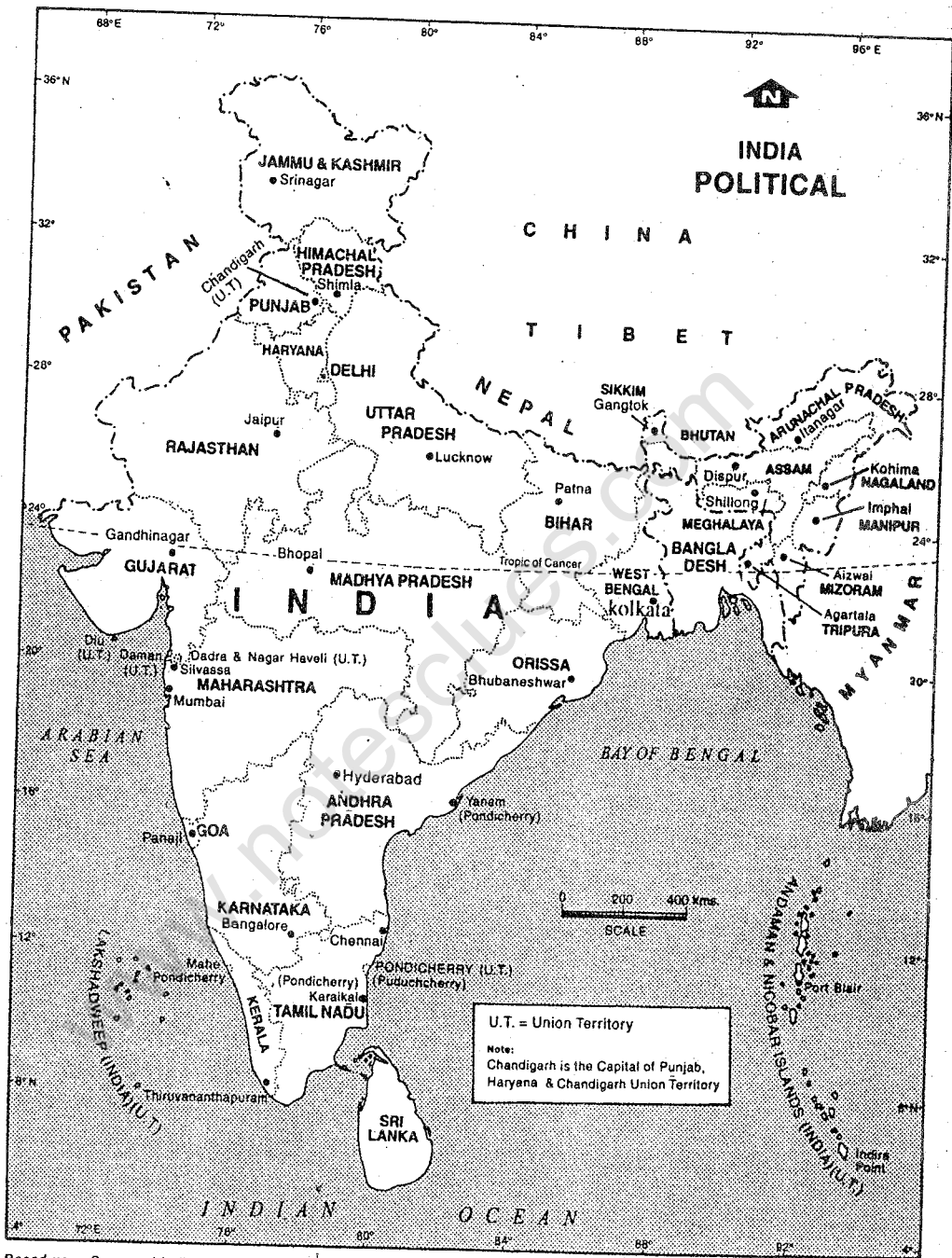
States and Union Territories are the administrative units in our country. They are further subdivided into districts for administrative convenience.



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

Fig. 12.1 Location of India in the World

Note the location of India in relation to international sea routes and air routes.



Based upon Survey of India map with the permission of the Surveyor General of India. The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line. © Govt. of India copyright, 1994

Fig. 12.2 India — Political

Note the States and Union Territories sharing border with our neighbouring countries. Name our southern neighbour.

ACTIVITY SHEET 1

1. With the help of information given in Appendix rank the States and the Union Territories area-wise and population-wise. Now answer the following questions:
 - a. Name the biggest and the smallest States in area.
 - b. Name the biggest and the smallest Union Territories in area.
 - c. Name the States having the largest and the smallest population respectively.
 - d. Name the Union Territories having the largest and the smallest population size.
 - e. Which State or Union Territory is the smallest in both area and population?
2. Study the political map of India and answer the following:
 - a. How is international boundary shown on the map?
 - b. How is State boundary shown?
 - c. Which four States of India share political boundaries with Pakistan?
 - d. Name the five States having common boundaries with Bangladesh.
 - e. Which four States of India have common boundaries with Myanmar?
 - f. Which four States are almost entirely located in the Himalayas?
 - g. Name five States and one Union Territory located on the west coast of India.
 - h. Which States and Union Territories are located on the east coast of India?
 - i. Which two States of India do not share any international boundary?

Physical Features

India has a great diversity of landforms. It has high mountains, deep valleys, extensive plains, wide plateaus and a number of islands. They have been formed in different ways at different periods of time. They are constantly being modified and reshaped by the internal and external forces of the earth.

India may be divided broadly into five physical units as follows:

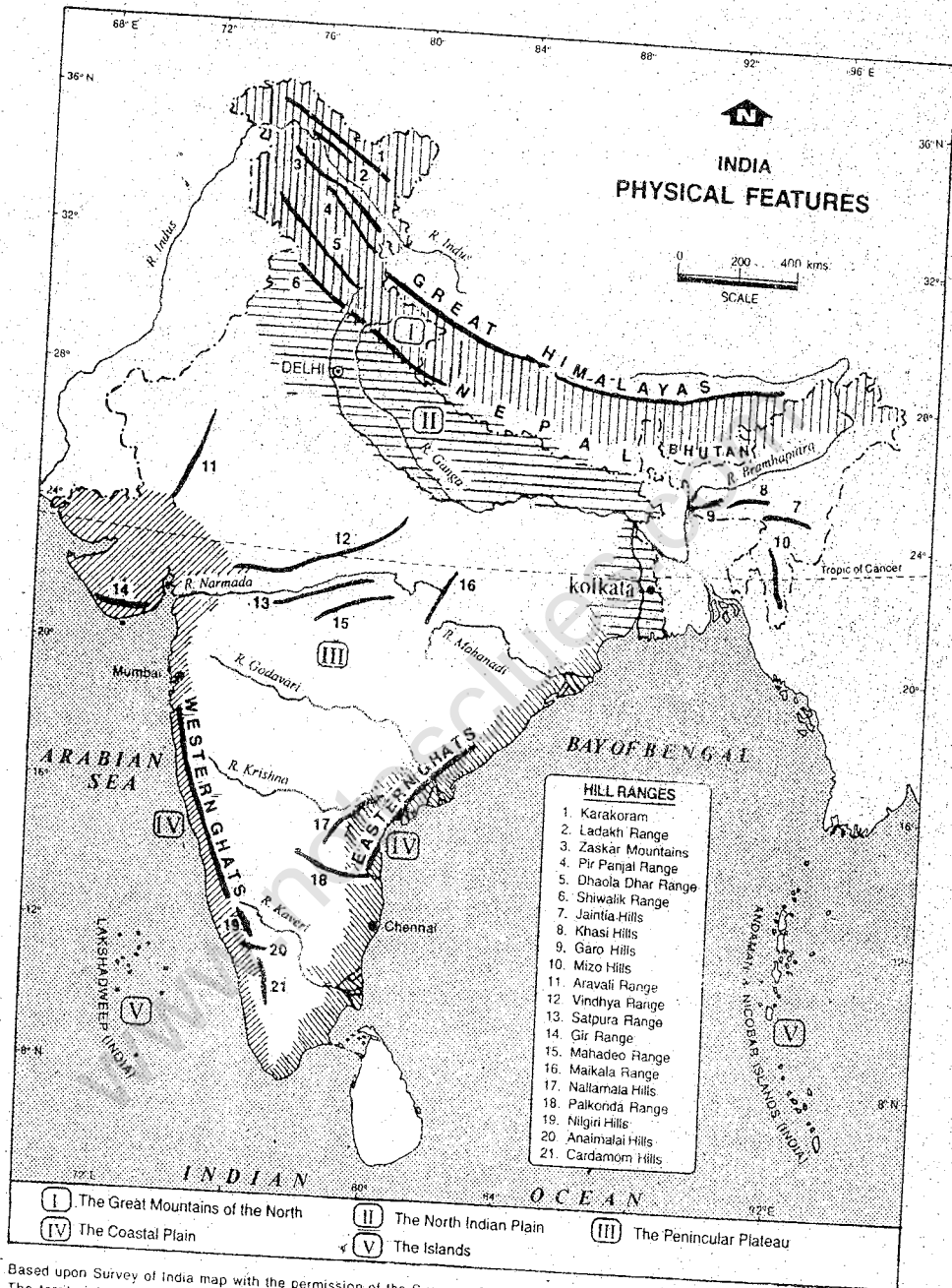
1. The Great Mountains of the North
2. The North Indian Plain
3. The Peninsular Plateau

4. The Coastal Plains
5. The islands

The Great Mountains of the North

Look at the physical map of India. You will notice a number of mountain ranges along the northern boundary of our country. From Pamir plateau in the west to the Indo-Myanmar border in the east, there is a chain of mountains. They stretch almost uninterruptedly for about 3,600 km and form an arc. The width of this mountain belt varies between 150 and 400 km.

The mountains extending between the



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Fig. 12.3 India — Physical Features

Note the five major physical divisions of India. Name the major hill ranges of Central India. Find out the name of the river which flows into the Arabian Sea.

Pamir plateau and the Indus river in Kashmir are known as the *Karakoram*. Those between the Indus and the Brahmaputra are called the *Himalayas*, meaning the 'abode of snow'. The eastern extension of these mountains along the border of Myanmar is known as the *Purvachal*.

The Karakoram mountains contain some of the world's largest mountain glaciers. The Baltoro and the Siachen are some of the examples. The world's second highest peak called K2 (Godwin Austin) belongs to this mountain range.

The Himalayas consist of three parallel ranges. The height of the ranges increase from south to north. The southernmost range, called the *Siwalik*, is the lowest. The average altitude of Siwalik range varies between 1,000 and 1,200 metres above the sea level. This range is made of unconsolidated materials such as mud, silt and soft rocks. This is not a continuous range and merges with other ranges in the east. Its width varies between 10-50 km. Some narrow valleys are found in this part. They are called 'duns'. Dehradun, for example, is situated in one such valley.

The ranges lying north of the Siwalik are known as the middle Himalayas, or the *Himachal*. They have an average height of 4,000 to 4,500 metres above the sea level. They extend over a width of about 80 km. Forests and meadows cover many slopes. Springs, waterfalls and numerous streams winding their ways through narrow valleys provide beautiful sights. The cool climate and scenic beauty of the region attract tourists from all over the world. Some of the places

are now famous hill resorts such as Dalhousie, Dharmashala, Shimla, Mussorie, Nainital and Darjeeling. Find out their locations from a physical map of India.

The northernmost ranges of the Himalayas, known as the *Himadri*, are the highest with an average height of more than 6,000 metres above the sea level. They contain some of the world's highest peaks. Several peaks are more than 8,000 metres above the sea level. Mt. Everest (8,848m) in Nepal is the world's highest peak. Kanchenjunga in Sikkim is the highest peak of the Himalayas, in India. Nanga Parbat, Nanda Devi and Dhaulagiri in Nepal are some other important peaks. Most of these peaks are perpetually covered with snow. Find out locations of all these peaks and their heights in metre.

The Purvachal in the north-east consist of the Patkai-Bum, the Garo-Khasi-Jaintia, and the Lushai hills.

The mountains of the north are characterised by their great heights, conical peaks, steep slopes and deep valleys. They were formed comparatively recently in the earth's history as a result of compression. The sediments beneath the ocean were folded due to compression and got uplifted. Therefore, they are known as young fold mountains. These mountains are still rising. Earthquake tremors, therefore, are felt occasionally in these as well as adjoining regions.

The North Indian Plain

To the south of the Great Mountains of the north, there is a vast plain extending over 2,500 km approximately from the Satluj in

the west to the Brahmaputra in the east. It is made up of the alluvium brought by the Indus, the Ganga and the Brahmaputra and their tributaries.

The *Indus* and the Brahmaputra rise beyond the Himalayas, very close to each other near Lake Mansarovar but flow in opposite directions. The Indus flowing westwards, enters Jammu and Kashmir and then takes a southward turn after entering Pakistan. It drains into the Arabian sea. Its main tributaries are the Jhelum, Chenab, Ravi, Beas and Satluj. Only a part of the Indus basin lies in India. An area drained by a major river along with its tributaries is called a *river basin*.

The *Brahmaputra*, on the other hand, flows eastward. It takes a sharp turn north of Arunachal Pradesh and enters India. After flowing through Arunachal Pradesh and Assam, it enters Bangladesh and joins the Ganga to form the largest delta in the world. Large part of this delta lies in Bangladesh.

The *Ganga* and its tributaries constitute the core of the northern plain. The Alaknanda and the Bhagirathi are the two source streams of the Ganga. They unite at Devprayag and henceforth derive the name Ganga. It is the longest river in India. The Yamuna, the Chambal and the Son are its main tributaries flowing from its south. A large number of tributaries join it from the north such as the Gomati, the Ghaghra, the Gandak and the Kosi. These rivers have been depositing alluvium in this region for thousands of years making it one of the most fertile plains of the world.

The Peninsula Plateau

To the south of the North Indian Plain lies the peninsular plateau. It is made of hard igneous and metamorphic rocks. It is the oldest part of India. As such, it has been undergoing the changes brought by the internal and external forces of the earth for hundreds of millions of years. Hills with lesser heights and rounded tops in this region present a contrast to the mountains of the north.

The peninsular plateau is broadly divided into the Central Highlands and the Deccan plateau. The northern part of the peninsula, north of the Vindhya, is known as the *Central Highlands*. It is bounded by the Aravalis in the north-west, merging gradually with the Ganga plains in the north. The Central Highlands consist of a series of plateaus from west to east. The western part of the Central Highlands is known as the *Malwa plateau*. Its eastern part in south Bihar is known as the *Chhotanagpur plateau*. Bundelkhand and Baghelkhand lie in between.

To the west of the Aravalis lies the Thar desert. It is a sandy and rocky desert which has covered the north-west extension of the plateau region. Few small streams draining this region either fall into salt lakes or disappear into sands. It is an area of *inland drainage*.

The *Deccan plateau* extends from the Vindhya in the north to the tip of the peninsula in the south.

The western edge of the plateau called the *Western Ghats* is comparatively

continuous and higher than the Eastern Ghats. The Western Ghats have an average height of 1,000 metres above the sea level and at places they rise above 1,600 metres. The Western Ghats consist of the Sahyadri, the Nilgiris, the Annamalai and the Cardamom hills. Height of the Western Ghats increases from north to south with an elevation of 2,695 metres above the sea level. Anai Mudi in Kerala is the highest peak of the peninsular India. Find out the height of Anai Mudi peak.

The Deccan plateau slopes gently towards the east. The eastern edge of the plateau called the *Eastern Ghats* consists of low discontinuous hills. The height of the Eastern Ghats varies from 300 to 900 metre above sea level. Hills and mountains of the peninsular India are remnants of the mountains of the past. Hence, they are characterised by low and rounded tops.

The north-western part of the Deccan plateau is made up of lava flows. This part is known as the *Deccan Trap*. It covers almost the whole of Maharashtra and parts of Gujarat and Madhya Pradesh.

The peninsular plateau is drained by several rivers. The Narmada and the Tapi rise in the hills of Central India. They flow westward and join the Arabian Sea. The Narmada flows through a narrow valley between the Vindhyas in the north and the Satpura ranges in the south. The Tapi flows south of the Satpura. All other major rivers—the Mahanadi, the Godavari, the Krishna and the Kaveri flow eastward and join the Bay of Bengal. The Godavari is the longest peninsular river. Find out the sources of these

rivers from the physical map of India in your atlas. Also find out which of these rivers do not make delta.

The Coastal Plains

The Deccan plateau is flanked by coastal plains on both sides. The western coastal plain is broadest in the north and includes the plain of Gujarat as well. It narrows down towards south. South of Gujarat, it is known as the Konkan coast. The southern part of the coast is known as the Malabar coast. The western coastline is slightly indented having estuaries of the Narmada and the Tapi in the north and lagoons or backwaters in Kerala. When a small portion of sea in the coastal area is separated from the main body of water by sand bars or spits, a salt water lake is formed along the coast. This is called a *lagoon or backwaters*.

The eastern coastal plain is wider and more levelled than the western coast. In the north this plain merges with the plains of the Ganga-Brahmaputra delta. The northern part of this coast is known as Northern Circar and the southern part as Coromandel Coast. Locate the four deltas on the eastern coast.

The Islands

To the west of the Kerala coast, there is a cluster of numerous small islands. They are collectively known as the Lakshadweep islands. They are of coral origin. You have read about coral polyps in Class VI with reference to the Great Barrier Reef of Australia.

The Andaman and Nicobar islands are located in the Bay of Bengal. They are bigger in size. While some of the islands are of volcanic origin, others are submerged hill ranges. The southernmost part of India, called the Indira Point, is located in Great Nicobar Island. Find out its location on the map.

The differences in the physical characteristics of these divisions are fairly sharp. The similarities are, however, no less striking. The peninsular plateau is the oldest

of all the physical units. It played an important role in the great mountain-building movements that led to the emergence of the Himalayas. The rocks of the Himalayas contain sediments similar to that of the rocks of the peninsular block. Rivers flowing from the Himalayas and the peninsular plateau have brought down sediments to make the North Indian Plain. All these physical divisions are interdependent and complementary to each other, making India a distinct geographical unit.

EXERCISES

Review Questions

1. Answer the following questions briefly:

- (i) How large is India in area as compared to other countries of the world?
- (ii) Why is India said 'to enjoy a strategic position with reference to the international trade route'?
- (iii) Which parallel of latitude divides the country into two halves?
- (iv) Which longitude serves as the Standard Meridian of India?
- (v) What is meant by Indian Standard Time?
- (vi) What are the five physical units of India?
- (vii) Name the three major rivers of India, which constitute the North Indian Plain.
- (viii) Name five major hill ranges constituting the 'Purvachal'.
- (ix) Why are the Himalayas called young mountains?
- (x) Which is the largest delta of the world?
- (xi) Which part of India is the oldest?
- (xii) What is a lagoon? Which state of India is known for it?

2. Distinguish between:

- (i) The Karakoram and the Himalayas
- (ii) The Himachal and the Himadri
- (iii) The Western Ghats and the Eastern Ghats

3. Describe the Great Mountains of the North highlighting their special features.
4. Write a note on the major rivers of India.
5. Describe the location, composition and the broad divisions of the peninsular Plateau.

Skills in Geography

6. On an outline map of India, draw the Tropic of Cancer and the Standard Meridian of India.
7. On an outline map (political) of India show the following:
 - (i) the States and Union Territories of India grouped under the northern, north-eastern, eastern, western and southern states. Use different shades for the various groups.
 - (ii) the largest and the smallest states.
8. On an outline map of India show the following:
 - (i) Ranges — Karakoram, Siwalik, Aravalis, Vindhya, Satpura, Nilgiri, Annamalai, Coromandel, Patkai-Bum
 - (ii) Peaks — Dhaulagiri, Kanchenjunga, Nanga Parbat, Nanda Devi, Anai Mudi
 - (iii) Rivers — Ganga, Yamuna, Brahmaputra, Godavari, Tapi and Kaveri
 - (iv) The Palk Strait, the Bay of Bengal and the Arabian Sea.

CHAPTER 13

The Climate

The climate of India like its land reflects a great variety. It varies from very cold conditions of the northern Himalayan belt to hot climate of Rajasthan desert to moderate or equable climate of the coastal areas. Similarly variations are noticeable not only in the amount of precipitation but also in the type of precipitation. The annual precipitation in Meghalaya exceeds 400 cm whereas it is less than 10 cm in Rajasthan desert and on

the north-west Himalayas, such as in the Ladakh region of Jammu and Kashmir. In some parts of the country, the precipitation is in the form of snowfall whereas in greater part of the country it takes place as rainfall.

Let us analyse these variations with the help of temperature and precipitation graphs (Fig. 13.1)

On the basis of the above analysis, it may be concluded that India experiences wide

ACTIVITY SHEET 1

Study the graph in Fig. 13.1 showing the temperature and precipitation for a few selected places of India.

Answer the following :

1. Which is the coldest place? What are the maximum and minimum temperatures of this place? Mention the months in which they were recorded.
2. Which is the hottest place? Note the highest and the lowest temperatures as well as the months in which they were recorded.
3. Which places record minimum variations in the highest and the lowest monthly temperature? What difference do you notice?
4. Which place shows the highest range of temperature, i.e., the difference

- between the maximum and the minimum temperature?
5. Which are the rainy months for most parts of India ?
 6. Which two places receive considerable amount of rainfall in winter?
 7. Name the driest place.
 8. Which places receive most of their rainfall during June-September?

variations in temperature and rainfall patterns. Let us now find out about the factors that influence the climate of India.

The Tropic of Cancer divides our country into almost two equal halves. While the southern part lies in the tropical zone, the northern part falls in the sub-tropical zone. As such temperature remains quite high during summer season all over the country except in the areas of high altitudes. But during winter, temperature falls considerably in the northern plains and records below freezing point in many parts of the Himalayan belt. However, it is low to moderate in rest of the country. Thus, India by and large enjoys a hot tropical climate. The Himalayas protect our country from biting cold winds of the north during winter.

A large part of south India because of its tapering shape and long coastline comes under the moderating influence of the sea. As such the difference between the temperature of day and night and that of summer and winter is not much. This is known as *equable climate*. However, interior of the peninsular India and large parts of

Northern plain, being away from the sea record much higher range of temperature. This is known as the *continental type of climate*.

Besides location and distance from the sea, relief is yet another factor which influences the climate of India. As you know, temperature decreases with increasing altitude. Hence, mountainous and plateau areas have low temperature even during summers. Several hill stations are, therefore, located in the Himalayan region and on the Deccan plateau. Shimla, Mussorie, Nainital and Darjeeling in the Himalayas, and Kodaikanal and Udagamandalam (Ooty) in the south are some of the famous hill stations of India.

Relief also influences rainfall. You have read about relief rainfall earlier. As you know, the windward side of a mountain receives heavy rainfall whereas its leeward side lies in the rainshadow area and receives less rainfall. This explains why Mahabaleshwar situated on windward side of the Western Ghats receives as much as 625 cm of annual rainfall. Pune, on the other hand, lies only a few kilometres to its north east on the leeward side and receives only one tenth of this amount.

On a larger scale, the whole country

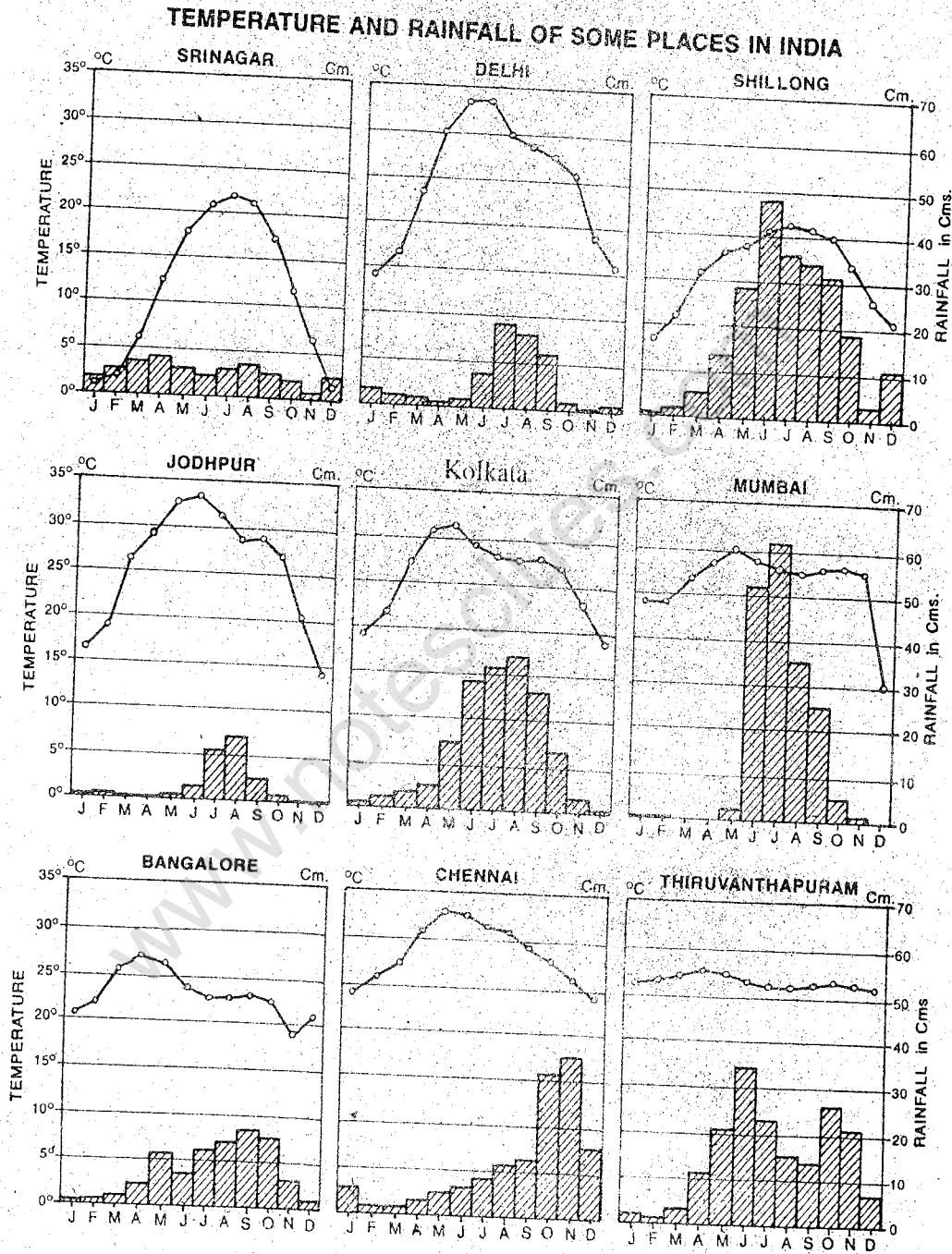


Fig. 13.1 India — Temperature and Precipitation
 Locate these places on a map of India. Make out pairs of places having opposite type of climate (a) Hot and Cold, (b) Arid and Rainy, (c) Equable and Extreme.

receives good amount of rainfall from the south-west monsoon.

Despite regional variations, the climate of India is broadly classified as of 'Monsoon type'. This word has been derived from an Arabic word 'mausam' which is characterised by seasonal reversal of wind pattern and associated weather changes over a large area.

Cycle of Seasons

Let us now examine the peculiar features of seasons which follow a rhythm or an annual cycle. There are four distinct seasons in India.

1. The cold weather season
2. The hot weather season
3. The season of the advancing monsoon
4. The season of the retreating monsoon

The Cold Weather Season

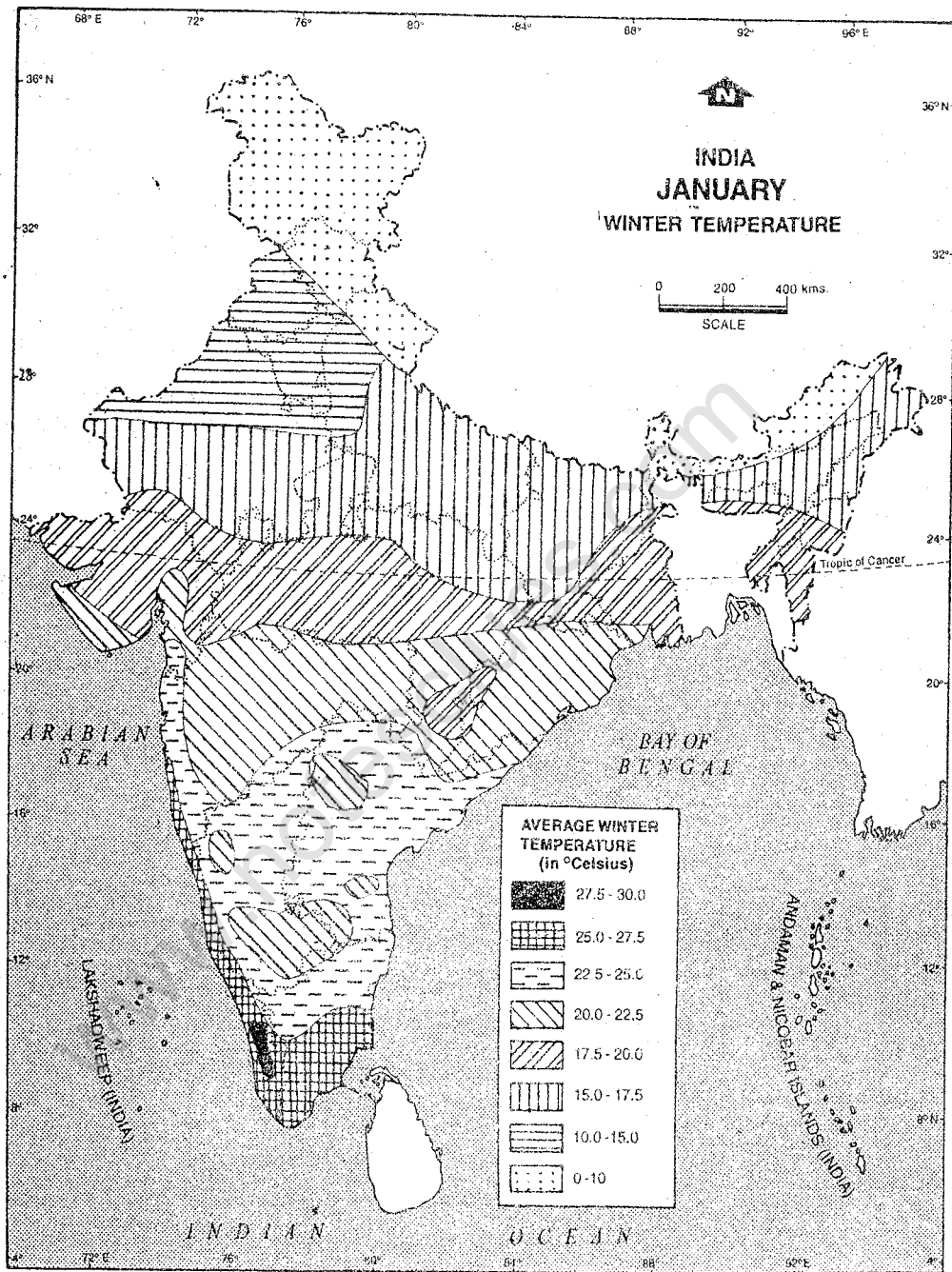
The cold weather season or winter begins in mid-November in north India. It gets well established all over the country by December and continues till February. Temperature remains quite low (mean monthly temperature being 15°C-20°C) during this period in most parts of the country. January is usually the coldest month when day temperature at times drops below 10°C in several parts of the country. However, the cold weather is more pronounced in the northern India. South India, including the coastal areas, enjoys a moderate climate as temperature is well above 20°C. The mean monthly temperature in January, for example, varies from -8.5°C in Leh (north-west

Himalayas), to 26.7°C in Thiruvananthapuram. India lies in the trade wind-belt of the northern hemisphere. As such north-east trades blow over India from land to sea and are, therefore, dry. While blowing over the Bay of Bengal, they pick up moisture and give rain on the Coromandel coast. These winds are called north-east monsoons.

During winter, the weather is generally pleasant with clear sky, low temperature, low humidity and cool breeze. It is, however, disturbed occasionally by shallow cyclonic depressions from the west. These depressions originate over the Mediterranean sea. Moving eastward they enter India. They cause precipitation over north-west India. It takes place as snowfall over the mountains and as rainfall in the plains. Such a weather condition lasts for a few days at a time. These depressions are known as *western disturbances*.

The Hot Weather Season

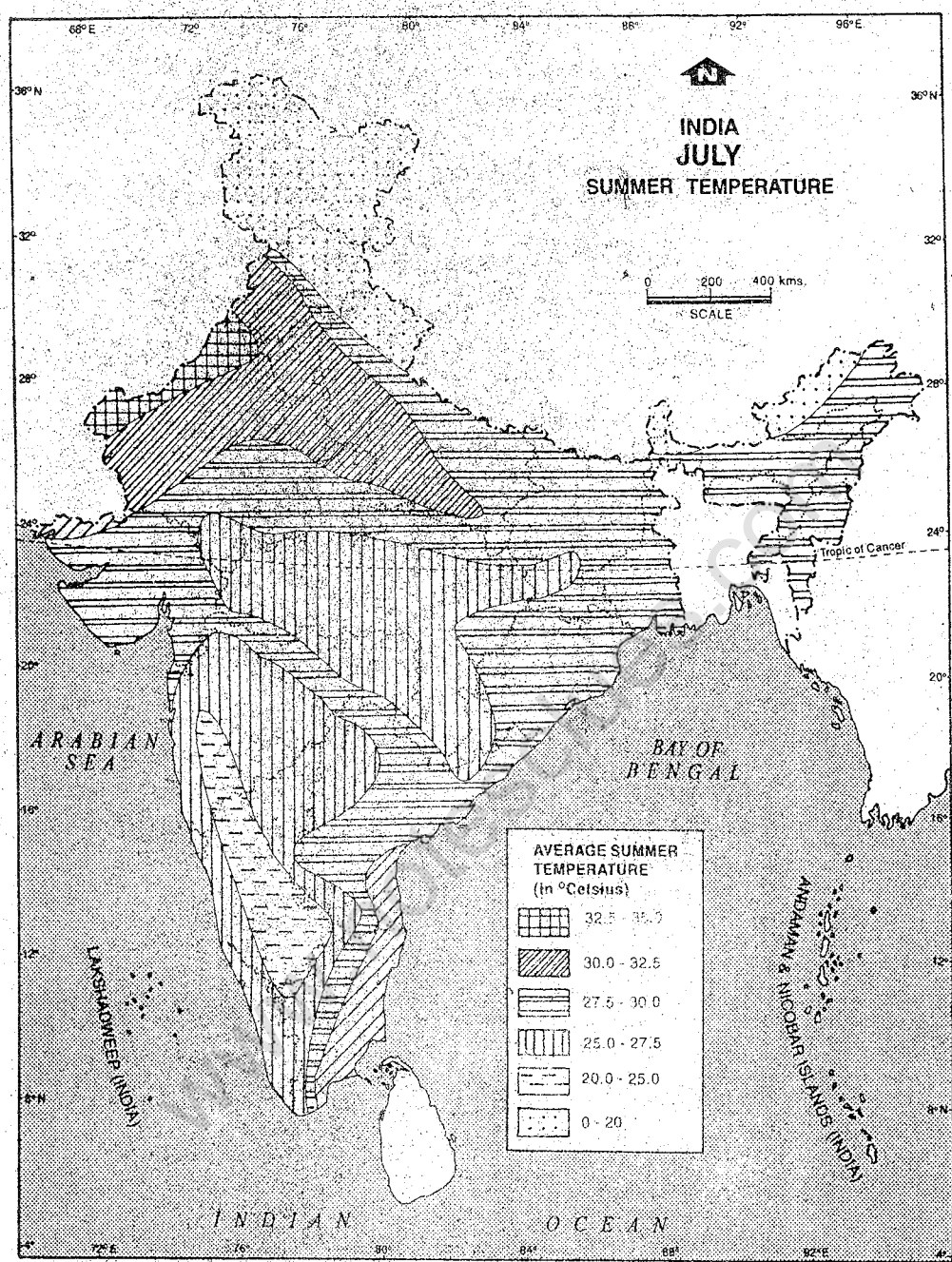
Weather starts changing during February-March in a progressive manner from south to north. Temperature starts rising. In March, maximum day temperature generally exceeds 35°C in areas south of the Vindhya. In April, the maximum day temperature exceeds 37°C in the northern plains of India. By mid-May, day temperature may touch 41°C-42°C in many parts of the country especially in the north-west plains and central India. Even minimum temperature does not go below 20°C. As a result nights also become quite hot. In the larger parts of the Ganga plains, the hot and dry winds called *loo* are common during this season. This is the hot



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 measured from the appropriate base line.

Fig. 13.2 India — Winter Temperature (January)

Note the area having maximum temperature. Why is it so? Which part is the coldest?



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Fig. 13.3 India — Summer Temperature (July)

Note that the area south of the 17°C — 20°C temperature zone generally enjoys moderate to low winter conditions, while the northern part has relatively colder conditions.

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weather season for India, which extends over March to May. Due to high temperature, air pressure decreases and often gives rise to locally formed duststorms and thunderstorms. At times they bring some rain and cool the atmosphere temporarily.

Season of Advancing Monsoon

Intense heating of the land during April-May causes the formation of a low pressure area over north-west India. As its intensity increases, the south-east trade winds, which blow towards the equatorial low pressure, get attracted towards it. After crossing the equator, they get deflected towards their right in the northern hemisphere and flow as south-west monsoon. This is the season of advancing monsoon. The Indian peninsula divides them into two main branches—the Arabian Sea branch and the Bay of Bengal branch. The Arabian Sea branch arrives at the west coast of India and moves northward. The Bay of Bengal branch strikes the Bengal coast and the southern face of the Shillong plateau. Then it gets deflected and flows westward along the Ganga-valley. Both the branches reach India by the beginning of June, which is known as 'onset of monsoon'. They gradually spread over the entire country in four to five weeks' time. Since these winds come from the ocean, they are full of moisture, hence they cause rainfall. The bulk of the annual rainfall in India is received from the south-west monsoon. The amount of rainfall is very high along the west coast and in the north-east. It gradually decreases away from the sea toward the interior. Tamil Nadu coast, however, remains mostly dry during this season as it falls in the rain-shadow area

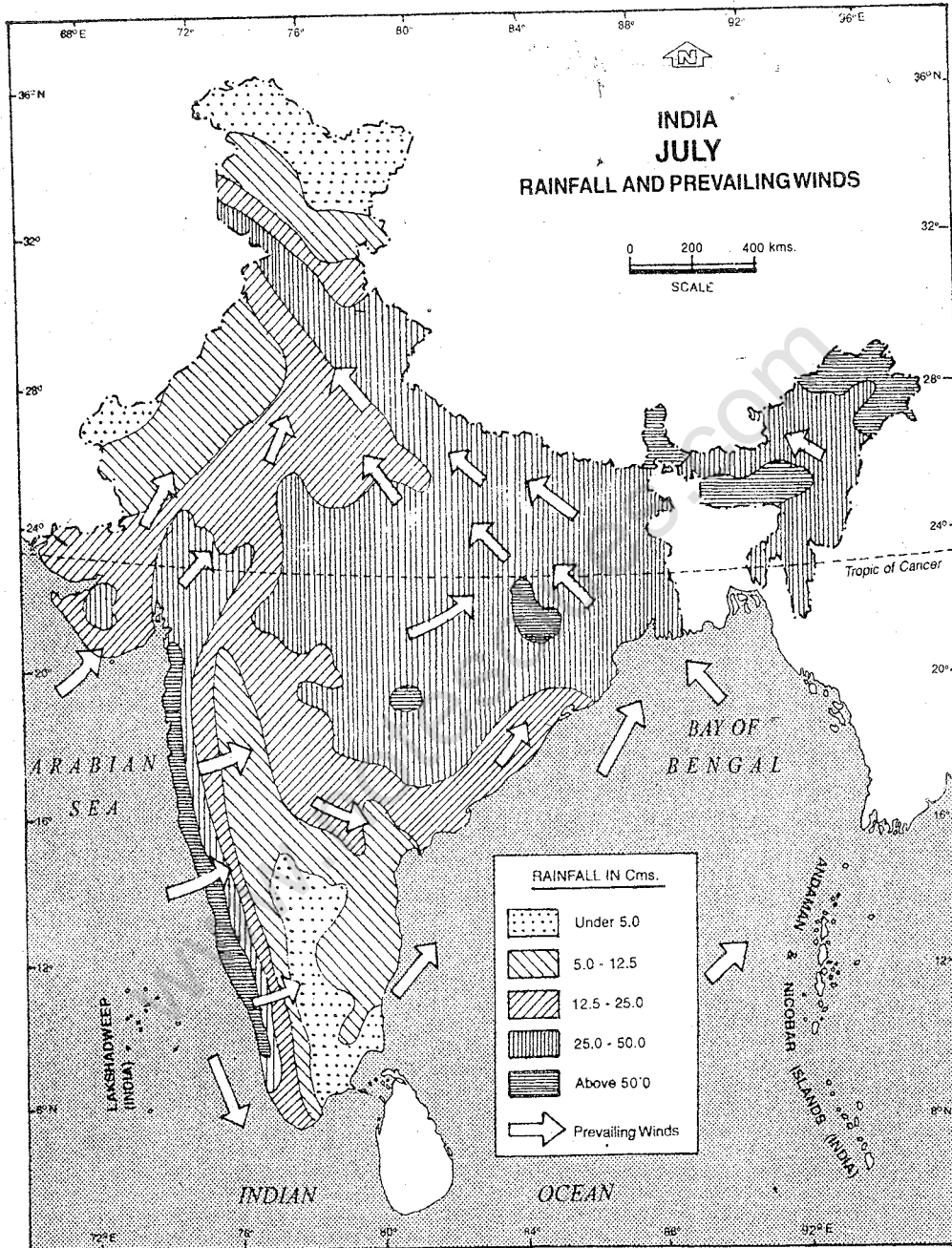
of the Arabian Sea branch and is parallel to the Bay of Bengal branch.

The first shower of rain begins rather suddenly and reduces the temperature substantially. Rainfall, however, does not take place continuously. After a few days of rainfall, a short spell of dry (rainless) days is quite common. Thus, the south-west monsoon season spreads over June to September in most parts of India.

The Season of the Retreating Monsoon

The south-west monsoon begins to retreat from the northern India by the second week of September. Unlike sudden arrival of the monsoon its departure or retreat is gradual. Retreat of the monsoon means weakening of the monsoon current. It withdraws from the Punjab plains in mid-September and the Ganga delta by mid-October. It retreats from the southern part of the peninsula by early November. Wind direction gradually changes with the weakening of the south-west monsoon. The north-east trade winds take over and it is commonly known as the north-east monsoon. Tamil Nadu coast receives most of its rainfall during this time, i.e., October-December.

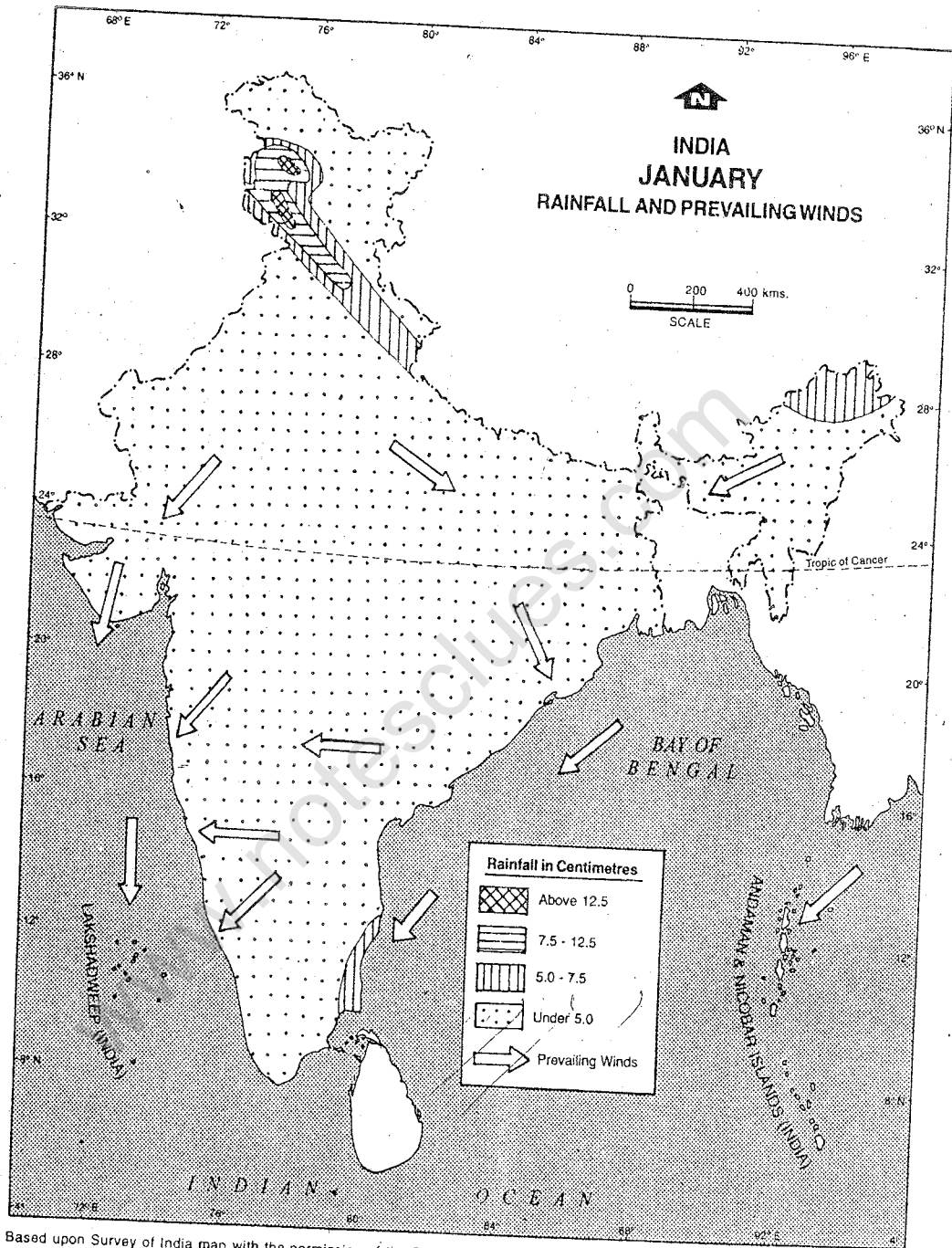
October and November are, thus, transitional months between hot rainy season and cold dry weather season. By this time low pressure area shifts from the north-western part of India to the Bay of Bengal. Cyclones originating over the Bay of Bengal reach the eastern coast of India. They cause heavy and widespread rain in the coastal areas of Orissa, Andhra Pradesh and Tamil Nadu. These cyclones are often very destructive



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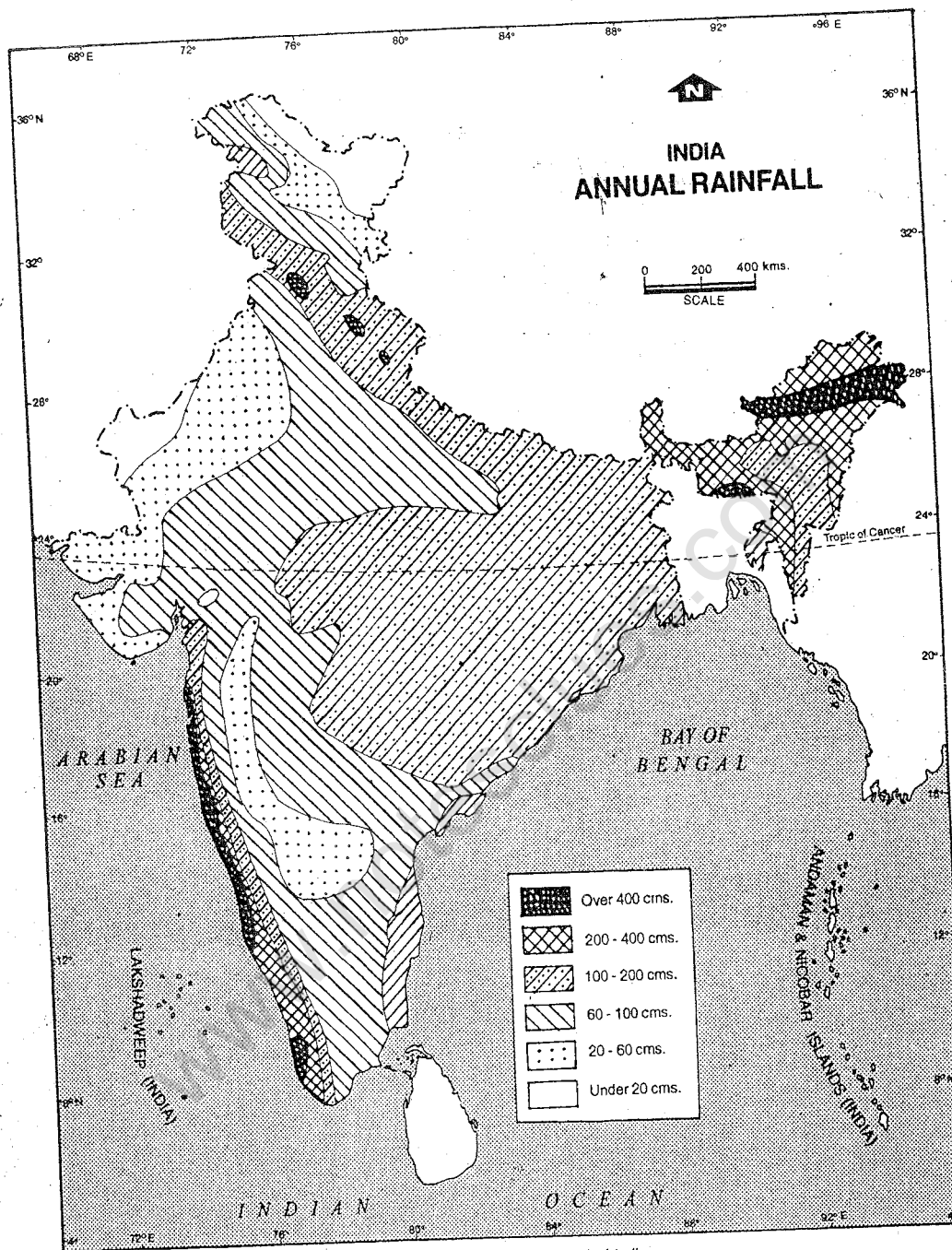
Fig. 13.4 (a) India — Rainfall and Prevailing Winds (July)

Note the direction of winds in July. Which areas have more than 50 cm of rainfall and why?



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Fig. 13.4 (b) India — Rainfall and Prevailing Winds (January)
 Note the direction of winds in January. Which areas receive more than 5 cm of rainfall? Why is it so?



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Fig. 13.5 India — Annual Rainfall

Note that most parts of India receive more than 60 cm of annual rainfall. Which areas receive less than 20 cm of rainfall and why?

rendering people homeless and damaging properties. The thickly populated deltas of the Godavari, Krishna and Kaveri experience such disasters frequently.

In the annual cycle of seasons the monsoons play a dominant role. After the scorching heat of the summer season people all over the country wait eagerly for the arrival of the monsoons. It brings new life in the country. The parched earth is filled with water again and the agricultural activities start in full swing. It seems as if the life of Indian people including their agricultural calendar and festivals revolve around the monsoons.

Distribution of Rainfall

Most of the precipitation in India is in the form of rainfall. It is concentrated within few months (June to September) in large parts of the country (Fig. 13.4 a). Only some parts such as north-west and north-east India and Tamil Nadu coast get rain during winter (Fig. 13.4 b). It would be clear from the Fig. 13.4a and 13.4b that the distribution of rainfall is closely linked with the wind direction. Since the south-west monsoon blows, from sea to land, it causes widespread rain in the areas lying on their paths. Similarly the north-east monsoon during winter picks up moisture over the Bay of Bengal and causes rainfall over the Tamil Nadu coast.

Distribution of rainfall varies from one place to another. There is a gradual decrease in rainfall from west and east coasts to the

interior in the peninsular India. In northern India, rainfall decreases from east to west (Fig. 13.5). This is mainly because of the relief of the land and the direction of the moisture-laden winds. The western parts of the Western Ghats receive heavy rainfall from the south-west monsoon whereas its eastern part falls in a rain shadow belt. Similarly the Shillong plateau and the Brahmaputra valley get heavy rainfall from the Bay of Bengal branch of the south-west monsoon as it gets trapped in the mountains, rises up, cools and drops the excess moisture along the Himalayan foothills. The world's heaviest rainfall is recorded around Mawsynram near Cherapunji in Meghalaya which is about 1,142 centimetres per annum. Low pressure area over north-west India attracts a large proportion of the Bay of Bengal branch of the south-west monsoon. As such, it flows in the Ganga valley from east to west.

The western part of Rajasthan, the northernmost areas of Ladakh in Kashmir and Kinnaur and Lahaul-Spiti in Himachal Pradesh receive a very scanty rainfall. In Rajasthan, the winds blowing from the sea get warmer while crossing the Rajasthan Desert and hence increase their capacity to retain moisture. Ladakh and Kinnaur regions, on the other hand, are beyond the reach of the monsoon. Winds that reach here, are completely dry. The western Himalayas, receive precipitation more in the form of snow from western disturbances.

EXERCISES**Review Questions**

1. Answer the following questions briefly:

- (i) What is the characteristic feature of the 'monsoon' type of climate?
- (ii) Why several hill stations in India are located in the Hamalayan region and on the Deccan plateau?
- (iii) Into how many seasons a year is divided to explain the climate of India?
- (iv) What is the name of the hot dry wind, which blows during summer in the Ganga plains?
- (v) What are 'Western disturbances'?
- (vi) What is meant by the 'retreat of monsoon'?
- (vii) What is the common form of precipitation in India?
- (viii) Why does rainfall decrease from east to west in northern India?
- (ix) Name the areas receiving scanty rainfall.

2. Distinguish between :

- (i) Equable climate and continental climate
- (ii) Windward and leeward sides of mountains
- (iii) The season of advancing monsoon and the season of retreating monsoon

3. Explain the factors that influence the climate of India.

4. Write in brief how and why India receives the bulk of its rainfall in the months from June to September.

Skills of Geography

5. On an outline map of India show the following :

- (i) A place having the world's highest rainfall
- (ii) A region receiving rainfall from the north-east trades or north-east monsoon
- (iii) Areas receiving rain from the western disturbances
- (iv) A place in India recording less than -8°C temperature in winter
- (v) Direction of the winds of the Bay of Bengal branch of the south-west monsoon

CHAPTER 14

Natural Resources

India is a country with diverse resources. Its diversity in relief, rocks and climatic conditions is reflected in the variety of soils, plants and animals found in the country. India has plenty of water. It is also rich in several minerals. These 'gifts of nature' are known as *natural resources*. They are used for meeting our various needs. Some of these resources are finite, i.e., once exhausted, they cannot be replenished soon, for example, minerals. On the other hand, water, forests etc., can be renewed. But the pace at which we are using some of the resources, they may be exhausted soon. As such, careful utilisation of these resources is necessary for enabling us to use them for a longer time.

Let us now look at the distribution of various natural resources in the country and find out how they are being used.

Soil

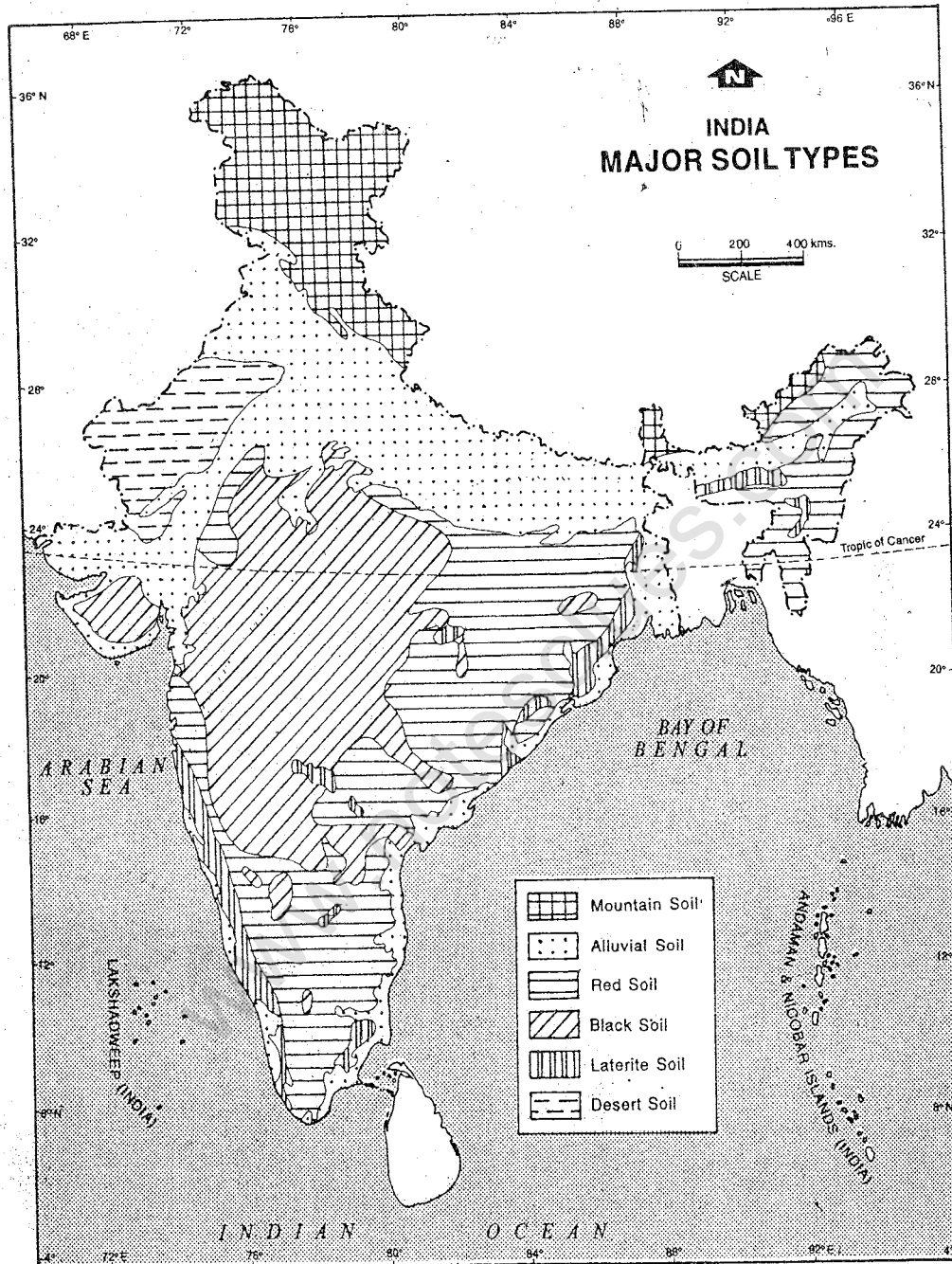
Soil is the most important resource because we get almost all our food directly or indirectly from it. Think of cereals — wheat,

rice and millets, pulses, oilseeds, beverages, vegetables and fruits, all are obtained from the soil. Other food items such as poultry, meat and milk are animal products. But these animals also feed on products derived from the soil. Besides food, timber, fibres, rubber, herbs and medicinal plants are also obtained from the soil.

Types of Soil

A variety of soils are found in India. the *alluvial soils* are made up of fine silt deposited by rivers. It is one of the most fertile soils of the world. These are found in the Northern Plains and the river-deltas. Very fine and relatively new alluvium found in the flood-plains and the delta of the Ganga-Brahmaputra is known as *khadar*. Relatively old and coarse alluvium is known as *bangar*. It is found on the upper sides of river valleys.

The *black soils* are made up of volcanic rocks of lava flows. They are clayey and retain moisture for a long period. These soils are fertile. They are found mainly in the



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Fig. 14.1 India — Soil Types

Note the distribution of the major types of soils found in India. Which kind of soil is associated with the northern Indian plain?

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Deccan Trap region of Maharashtra and parts of Madhya Pradesh and Gujarat. These soils are most suited for raising cotton crops. As such, they are also known as black cotton soil. Locally, these soils are called *regur soils*.

The *red soils* are derived from igneous rocks in the hot and relatively dry parts of the southern and the eastern parts of the Indian peninsula. These soils are less fertile. However, with the use of fertilizers they can yield good crops.

The *laterite soils* are found in hot and rainy climates of the hilly regions of the Western Ghats, the Chhota Nagpur plateau and some parts of the north-eastern states. Due to heavy rainfall, the nutrients of the top soil percolate downward. This process is known as *leaching*. These soils are deficient in humus and hence less fertile.

In the mountainous region of the Himalayas, soil cover is generally thin. Valleys have comparatively thicker cover. Soils of such regions are known as *mountainous soil*. Sandy soils found in the arid region of Rajasthan and Gujarat are classified as *desert soil*. These are loose in structure and lack soil-moisture.

Such a large variety of soils in India ensures a wide range of crops.

Minerals

All minerals are derived from rocks, which form the earth's crust. They are of different kinds, for example, salt, coal, petroleum, quartz, bauxite, iron, copper, gold and diamond. They are broadly grouped as

metallic and non-metallic. Mineral ores containing metals are known as *metallic minerals*. The remaining minerals are called *non-metallic*. Gold, copper, silver, tin, aluminium and iron are examples of metals. Most metals occur in combination with other substances. These economically important mineral components are called *ores*. Metals are separated from the ores by using heat. This process is known as *smelting*.

Metals are used for making various kinds of articles ranging from needles, knives, tools, machines, utensils, ornaments to aeroplanes and satellites. Similarly non-metallic minerals are also used in a variety of ways. Coal and petroleum are used as sources of energy. Quartz is used extensively in the production of glass, electronic circuits and silicon chips (a component of computer). Minerals are the most valuable natural resource of any country because of their indispensability in the modern world.

India is rich in several mineral resources. They, however, vary in quality and quantity. These minerals are distributed very unevenly. The vast alluvial plains of northern India is devoid of mineral deposits.

Most of the minerals are associated with the igneous and metamorphic rocks of the Deccan and parts of Bihar, Orissa, Madhya Pradesh, Rajasthan, and Assam as well as some parts of the Himalayan region.

Metallic Minerals

It is estimated that India has about one-fourth of the world's known iron-ore reserves. The iron-ore reserves of Bihar and Orissa are

among the best in the world. These two states together produce a major share of the country's total iron-ore production. Andhra Pradesh, Madhya Pradesh, Maharashtra, Tamil Nadu and Goa also have important reserves.

Manganese is used in the manufacture of special varieties of steel. It helps to harden steel. Major deposits of manganese are found in Karnataka, Orissa, Madhya Pradesh, Maharashtra and Goa. India is one of the largest producers of manganese in the world.

Bauxite deposits are found in Bihar, Madhya Pradesh, Gujarat, Orissa and Maharashtra. Aluminium is extracted from bauxite. This metal is light in weight and is used in the manufacture of aeroplanes and electric wire. Bihar and Madhya Pradesh are the major producers of bauxite in India.

Copper and gold deposits in India are comparatively small. Important copper deposits are located in Singhbhum district (Bihar), Balaghat (Madhya Pradesh) and Jhunjhunu and Alwar districts (Rajasthan). The domestic production of copper is much short of the requirements of the country. Gold is a precious metal. It is found mainly in Karnataka. Its Kolar gold mine is one of the deepest mines in the world.

Non-metallic Minerals

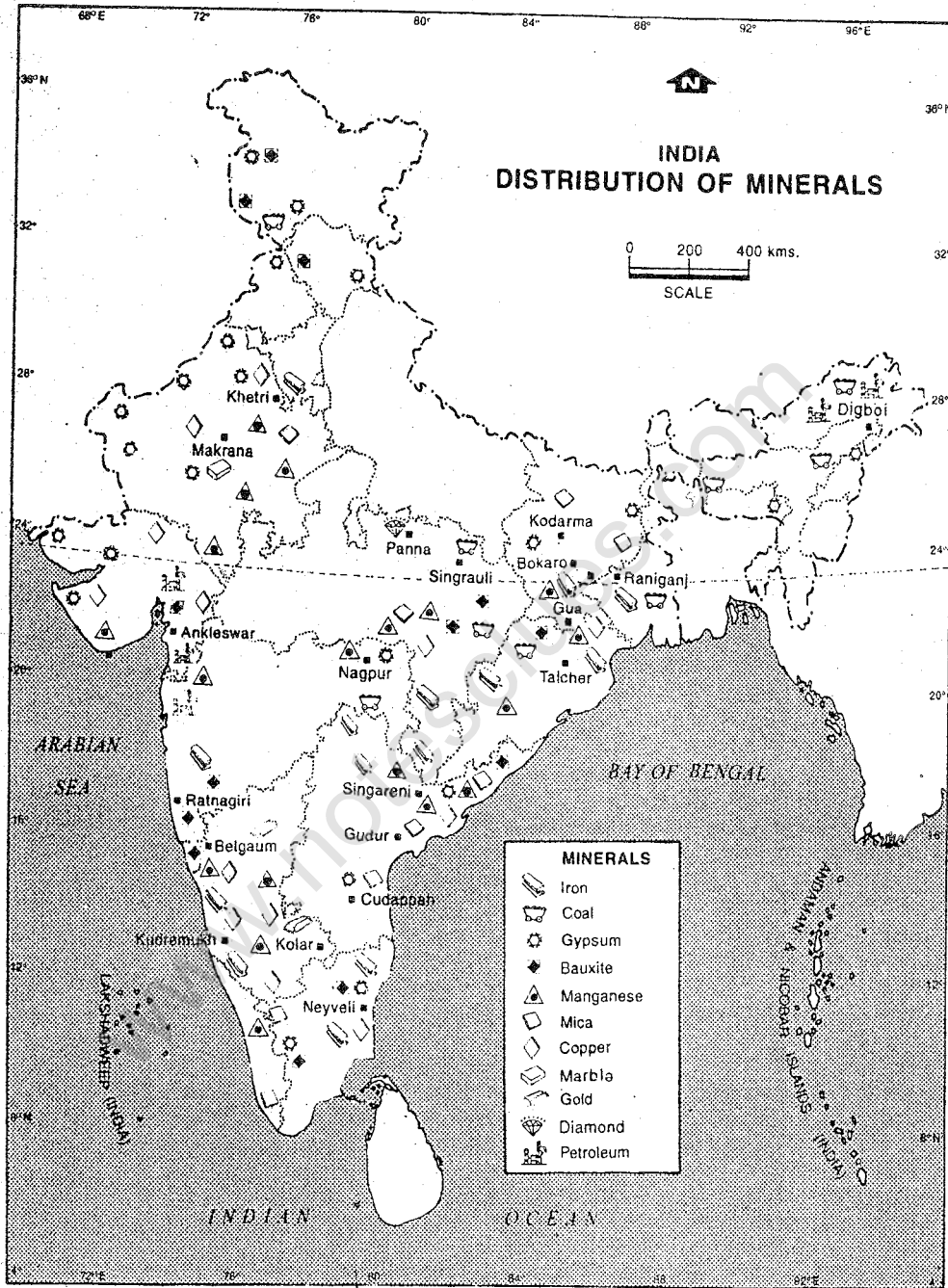
Mica, gypsum, limestone, diamond and salt are some important non-metallic minerals found in India. India is the world's leading producer of mica. Bihar, Andhra Pradesh and Rajasthan are the main producers. Gypsum is mainly used in the manufacture of fertilizers, cement and sulphuric acid. Nearly

four-fifths of it comes from the desert region of Rajasthan. Limestone is used in the smelting of iron ore as well as manufacturing of cement and mortar. It is mainly found in the states of Bihar, Orissa and Madhya Pradesh.

Diamond is a precious gemstone known for its brilliant lustre, transparency and hardness. They are used for industrial purposes as well as for making jewellery. They are found in Madhya Pradesh and Andhra Pradesh. India has acquired expertise in cutting and polishing of diamonds. It is one of the largest exporters of processed diamonds.

In India, salt is obtained from sea, lakes and rocks. Sea salt is obtained along the coasts of Gujarat, Maharashtra, Tamil Nadu and Andhra Pradesh. More than half of sea salt is made along the Gujarat coast. The lake salt comes from Sambhar and Didwana lakes. Rock salt comes mainly from Mandi district in Himachal Pradesh.

Coal and petroleum are the most important sources of energy in today's world. Being associated with fossils which were once part of living organisms, they are also called *fossil fuels*. Coal is formed from decayed plants buried long long ago in swamps. Fresh plant matter is 80 per cent water and 20 per cent carbon. During the process of change from wood to coal, the concentration of carbon gradually increases. Peat is the first stage of coal development. It is dark brown in colour. It has about 35 per cent carbon content. Lignite is the next stage of coal formation, which has nearly 50 per cent carbon. If the process continues,



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Fig. 14.2 India — Distribution of Minerals

Note the variety of minerals found in India. Which states have deposits of coal and petroleum?

lignite becomes sub-bituminous, bituminous and eventually anthracite coal. Anthracite has more than 85 per cent carbon. It is the best quality of coal. It is very hard, compact, black in colour, ignites slowly and burns with a short blue flame.

Major consumption of coal in India is mainly in industries such as iron and steel, cement, brick manufacturing units, chemicals, papers and fertilizers; thermal power plants and is also used as domestic fuel. To meet the present need, the coal deposits of the country are fairly extensive. The major coalfields are located in Bihar, West Bengal, Orissa, Madhya Pradesh, Maharashtra, Andhra Pradesh and Tamil Nadu. Inferior variety of coal is more widely distributed. India produces nearly sufficient coal for domestic requirement. It is the third largest producer of coal in the world.

Petroleum or mineral oil is found in the pores of sedimentary rocks. It has an organic origin, i.e., from animal and plant matters contained in shallow marine sediments such as sand, silt and clay. In India, petroleum is found in Gujarat, Maharashtra and the Brahmaputra and the Surma valleys in Assam. It is believed that oil-bearing strata may also be located in other parts of the country such as the deltas of the Ganga, the Mahanadi, the Godavari, the Krishna and the Kaveri. The Bombay High, 160 km away from Mumbai in the Arabian Sea, is the largest producer of petroleum in the country.

Atomic Minerals

Uranium and thorium are the important sources of atomic energy. We have large

deposits of uranium in Bihar and Rajasthan. The monazite sands found along the coast of Kerala yield thorium.

Our country is thus endowed with rich mineral resources. They provide necessary raw materials for industry and power to run them. However, it must be remembered that mineral resources once used are lost forever. We should, therefore, use them economically.

Forests

The original plant cover in India consisted of mainly forests. However, these have now been removed from many populated areas. Today only 19 per cent of our land is forested whereas ideally one-third of a country's total area should be under forest cover.

Due to a wide variety of relief, soil and climatic conditions, different kinds of forests are found here. They may be broadly classified as (i) the tropical rain forests (ii) the tropical deciduous forests, (iii) the thorn forests, (iv) the tidal forests, and (v) the forests of the Himalayan region. The bulk of the forest land is under deciduous trees. Only one-third of the total forested area is under coniferous trees.

The tropical rain forests are found in the areas where temperature is high and evenly distributed throughout the year, rainfall is above 200 centimetres and dry season is short. Rainy slopes of the Western Ghats, wetter parts of Assam and Meghalaya, Andaman and Nicobar Islands and parts of West Bengal and Orissa have these types of forests. These forests yield hardwood. Teak, sal, rosewood and ebony are found in these forests.

NATURAL RESOURCES

The tropical deciduous forests are also known as monsoon forests as they are the most typical of the monsoon region. They are found in areas having rainfall between 100 and 200 centimetres per annum. Owing to a long dry spell, trees shed their leaves for about six to eight weeks in summer. Each species has its own time of shedding leaves. As such the entire forest does not appear barren at any time. Teak, sal, sandalwood, sisam, mahua and bamboo are important trees of economic importance. These forests are found in pockets in the area extending from the Western Ghats in the south to the Siwalik in the north.

The thorn forests are confined to the regions having an annual rainfall of less than 80 centimetres. It consists of trees, scrubs (stunted trees) and bushes. *Babul*, *kikar* and wild palms are found in areas having a moderate rainfall. Scrubs are confined to areas having scanty rainfall. Trees and scrubs have deep roots, thick skin and long thorns. They help them to obtain moisture from deep beneath the earth as well as to check moisture loss. Dry areas of Rajasthan, Punjab, Haryana, Gujarat, Madhya Pradesh and the Deccan region have this type of vegetation.

The tidal forests are common to the areas flooded by the tides of the sea. Mangroves and the sundari trees of the Sundarban in Bengal are the examples of this type of vegetation.

The forests of the Himalayan region vary with height. The foot-hills of the Himalayas are covered with tropical deciduous trees. Sal is the most important tree in this belt. Further up, sub-tropical hill vegetation consisting of

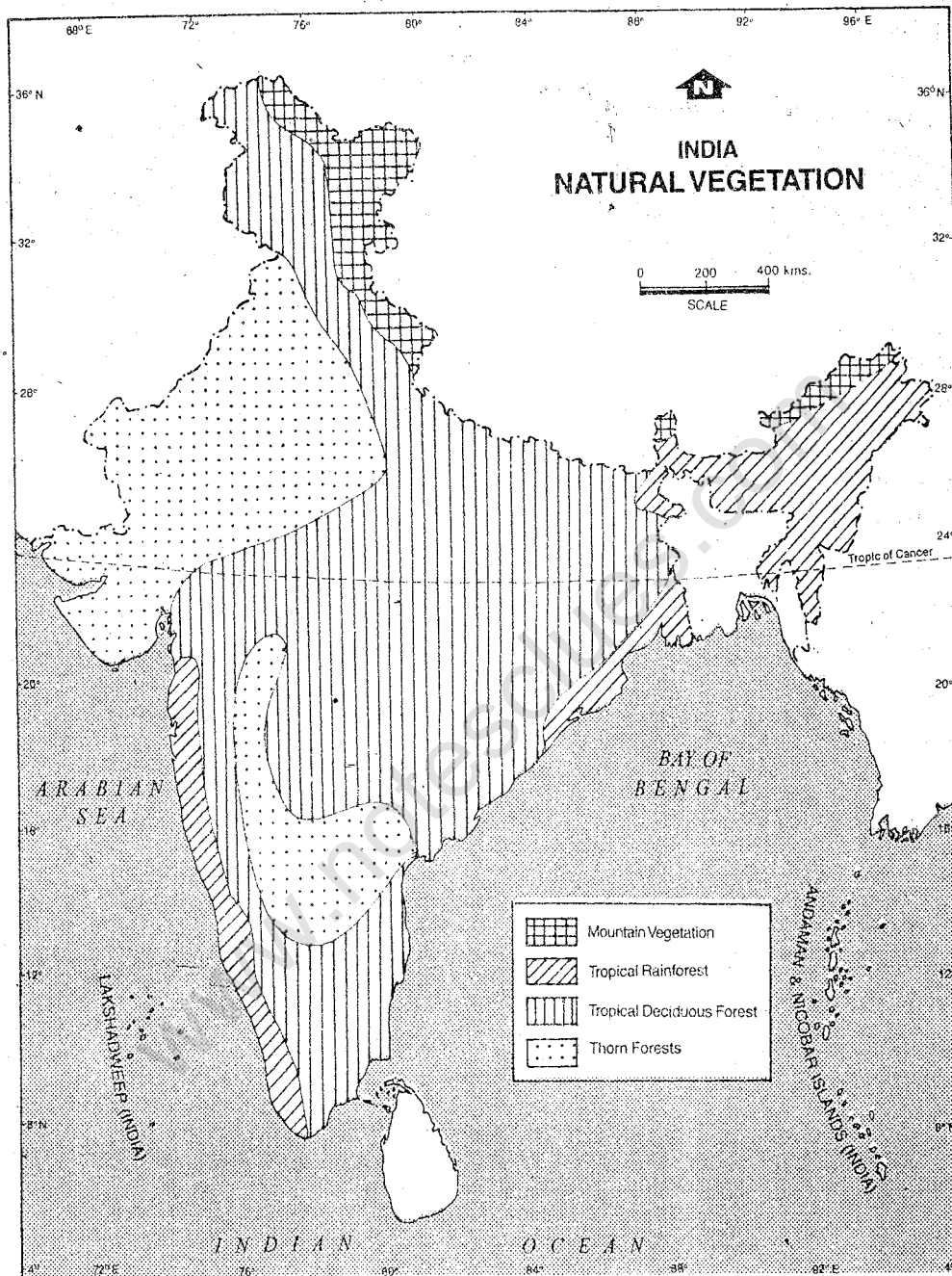
evergreen oaks, chestnuts and chir-pine trees, is found. A belt of coniferous trees—blue pines, cedars, silver firs and deodars are found at an altitude of 1,600 to 3,300 metres. Thereafter the alpine vegetation consisting of scrubs and grasses are found till the permanent snowline.

Forests yield a variety of products. They are divided into two categories : major products and minor products. Wood is the major product of the forests, which is used for timber and fuel. The coniferous forests of the Himalayas, have several commercially useful species of trees. Pine, spruce, silver fir and deodar are the prized soft woods of these forests. They are used for making furniture, railway sleepers, paper, newsprint and cellulose as well as for building houses and bridges.

Sal and teak trees of the deciduous forests yield hard and durable wood. They are widely used as timber. Sandalwood is used for making decorative items. It has a fine scent. Rosewood is used for making furniture and caned articles. Bamboos are used for making houses, baskets, furniture, pulp and paper.

Minor products of our forests are lac, resins, gums, medicinal herbs, *kattha*, fodder, tendu leaves for making *bidis* and grass. Lac is the secretion of an insect living on the sap of certain trees like *palash* and *kusum*. It is used in making seals, bangles and electrical instruments. Resins are obtained from the pines. It is used for making turpentine. *Kattha* is obtained from *khair* trees by boiling their chips.

Forests play an important role in the



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Fig. 14.3 India — Natural Vegetation

Compare Fig. 14.3 with Fig. 13.5. What relationship do you notice between the kind of vegetation and the amount of rainfall?

economy of our country. They also help in maintaining ecological balance and checking soil erosion. In order to maintain a steady supply of wood for fuel and timber and other minor products, we should plant more trees than what we fell. We need to take care of forests on scientific lines so that we can improve their quality and extent.

Wild Life

Various kinds of wild animals and birds are found in the Indian forests. Important among them are the elephants, tigers, leopards, lions, rhinoceros, deer and antelopes. Several species of animals have become extinct in our country due to their reckless hunting. Rhinoceros, cheeta, lion, musk deer and the Great Indian bustard are found only in small numbers. We should preserve these precious assets of our country.

In order to preserve wild life in its natural setting, national parks and sanctuaries have been set up. A *national park* is a reserved area meant for preserving its natural vegetation, wild life and natural beauty. A *sanctuary* is a reserved area meant for preservation and development of endangered species. At present, there are 83 national parks and 447 sanctuaries covering 4.5% of the total geographical area of the country. We observe wild life week in the first week of October every year.

Water

Water is important for the survival of all forms of life. A major portion of the earth's surface is covered with oceans. However, the fresh water is limited in supply, which

we require for our domestic, agricultural and industrial uses. Fresh water in our country is obtained from the ground as well as lakes and rivers on the surface of the earth.

For our fast growing population, we need to grow more food. Most of the arable land has already been brought under cultivation. Hence, crop production can be increased only if we are able to get higher yield. It is possible only through timely and adequate supply of water. The use of fertiliser also helps in this regard provided water is available for irrigation. In fact, more than one crop can be obtained from the same piece of land if it is irrigated.

Tanks, wells, tubewells and canals are the major sources of irrigation in our country. In the peninsular India, where terrain is rocky and uneven, rainwater gets collected in natural hollows. Tanks are constructed at these sites for storing this water. The water from the tank is used for irrigating crops in dry seasons. Tank irrigation accounts for about 8 per cent of the net irrigated area in our country. It is more common in Andhra Pradesh and Tamil Nadu.

Wells and tubewells utilise ground water. A well is an open hole dug in the ground to reach the ground water level. Water is drawn from the well with the help of some mechanical device or pumping sets using mineral oil or electricity. Wells are easy and less expensive to be constructed. In addition, well-water is within easy reach as wells are not very deep from the earth's surface. But the ground water level goes down during dry season and many wells may get dry. Bigger reserves of sub-soil water is available at

considerable depth. It has been possible to tap this reserve by constructing tubewells.

A very deep bore dug into the earth with a drilling machine through which water is drawn out with the help of electricity is known as a *tubewell*. In the alluvial plains of north India, i.e., in Bihar, Uttar Pradesh, Haryana and Punjab, there are huge ground water reserves. Therefore, tubewells in these regions have proved very useful to farmers in providing timely and assured supply of water. Wells and tubewells together account for about 48 per cent of the net irrigated area in India.

Canals are yet another source of irrigation. Water of a river or a stream is stored in an artificial lake by constructing a dam across the river bed. Water from the stored lake is diverted to the fields through small channels called *canals*. About 39% of the net irrigated area in India is benefited from canal irrigation. This type of irrigation is very useful in the arid parts of north-west India, where rainfall is very uncertain.

As you know, our country is situated in the monsoon region. The distribution of rainfall over a year is uneven. Nearly three-fourths of the total annual precipitation is concentrated only in a short period of three to four months. Most of this amount is lost to oceans through surface run-off.

The amount of rainfall also varies from one part to the other. Nearly one-tenth of the total area of our country receives an annual rainfall of over 200 cm. On the other hand, almost one-third of its total area receives an annual rainfall between 0 to 10 centimetres. As a result, some parts of the

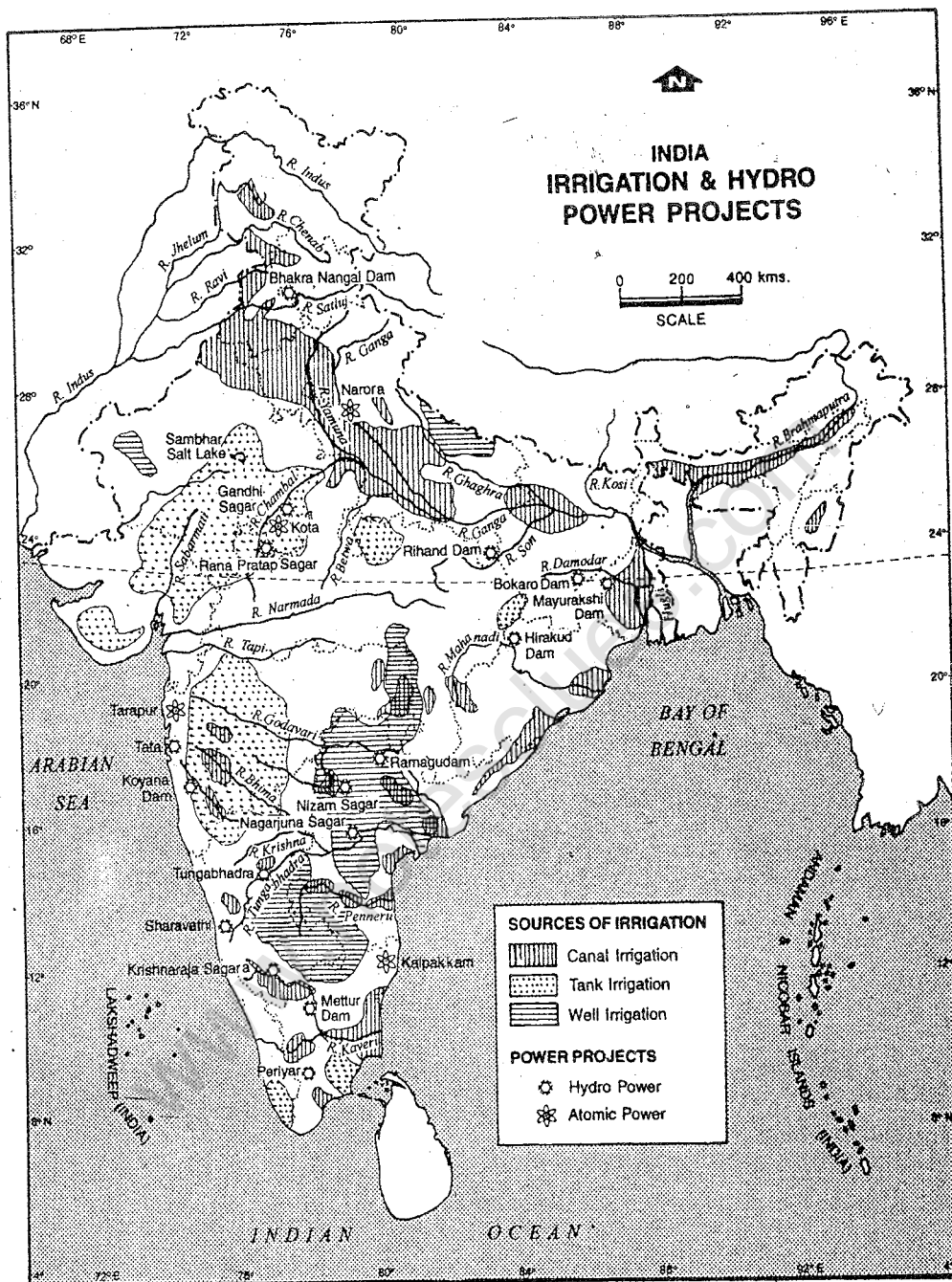
country are affected by floods while others have scanty rainfall leading to drought conditions.

The monsoons are highly uncertain and are far from reliable. There is a lot of variation in the total amount of rainfall as well as in its duration from year to year. Hence farmers cannot always depend on monsoon rain and irrigation becomes necessary.

Thus, we need to make a wiser use of the available water. Problems of floods and drought are interconnected. They can be tackled at the national and regional levels through cooperation. Water can be stored in artificial lakes in the areas of high rainfall. It may be diverted through canals to those parts where rainfall is scanty.

With a view to tackle these problems in an integrated manner, several river-valley projects have been completed since independence. They are known as *multi-purpose* projects because they serve several purposes at a time.

In a multi-purpose river-valley project, one or several big dams are constructed for storing water. These dams help in checking floods. The stored water is utilised for irrigation when it is in demand. Canals are constructed out for carrying water to those areas where it is needed. Wherever possible, these canals are also used for navigation. The reservoirs are used for fishing. These lakes and dams also attract tourists. In the catchment area of a river, an intensive programme of planting trees is undertaken. It is known as *afforestation*. It helps in conserving both water and soil. Water falling



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Fig. 14.5 India — Irrigation and Hydro-power projects

Which part of India has more of canal irrigation? Name the rivers on which major hydro-projects are located. Also name the places where major atomic power plants are located.

downstream from the dams is used for turning turbines. It in turn produces electricity, called *hydro-electricity*. This is an inexhaustible source of electricity at low-cost, which is clean and non-polluting.

The Damodar valley project in Bihar and West Bengal was the first multi-purpose river-valley project in independent India. The Bhakra Nangal is another major project on the river Satluj. The Bhakra Dam with a height of 225 metres is the world's highest gravity dam. The states of Himachal Pradesh, Punjab, Haryana, Rajasthan and Delhi are benefitted by this project.

Find out the names of other important projects and the rivers associated with them (Fig. 14.5). Some projects such as the Beas, the Kosi, the Hirakud, the Chambal and the Tungabhadra are multi-purpose in nature. In addition, there are a number of irrigation projects and water power projects. An effort is being made to develop a *national water grid* linking the Himalayan and the Peninsular rivers so that water can be transferred from water-surplus to water-deficit river basins. Though we have plenty of water resources, we have not been able to utilise them fully.

EXERCISES

Review Questions

1. Answer the following questions briefly:

- (i) What are the major natural resources of India?
- (ii) What are the six types of soil found in India?
- (iii) What is meant by 'smelting'?
- (iv) Why are coal and petroleum called fossil fuels?
- (v) Name two important sources of atomic energy found in India.
- (vi) What are the major types of forests found in India?
- (vii) Where are tidal forests found in India?
- (viii) What are the four major sources of irrigation in our country?
- (ix) Which part of India is known for tank irrigation?
- (x) What is a multi-purpose project?

2. Distinguish between:

- (i) Khadar and bangar
- (ii) Metallic and non-metallic minerals
- (iii) Tropical rain-forests and tropical deciduous forests
- (iv) A National Park and a sanctuary
- (v) A well and a tubewell

3. Make correct pairs from the following two columns:
- | | |
|---------------|------------------|
| (a) Iron-ore | (i) Kolar |
| (b) Copper | (ii) Bombay High |
| (c) Gold | (iii) Kerala |
| (d) Petroleum | (iv) Jhunjhunu |
| (e) Thorium | (v) Orissa |
| | (vi) Gujarat |
4. Describe the major characteristics and distribution of the soils in India.
5. Write a note on the distribution of metallic minerals in India.
6. How are coal and petroleum formed? Give a brief account of the distribution-pattern of major coal-fields and oil-fields in India.
7. What are the major and minor forest products of India?
8. Why have certain species of animals become extinct in our country? What is being done to preserve wild life?
9. Why is irrigation necessary in our country? How can we make a wise use of the available water?

Skills in Geography

10. On an outline map of India show the following:
- The black soil region
 - One National park and one wild life sanctuary
 - A lake in Rajasthan from where salt is obtained
 - States where tubewell irrigation is popular
 - The Damodar Valley project and the Bhakra Nangal project

CHAPTER 15

Agriculture

Cultivation of crops (farming) including horticulture, rearing of animals, forestry and fishing are collectively called *agriculture*. The factors of physical environment determine the cropping pattern and the livestock farming in a region. As such, relief, soil and climate are the three main influences on agriculture. This explains why wheat is the major crop of the temperate region and rice of the monsoon Asia. Similarly you can also relate why sheep and cattle are reared in the mountains and most of the crops are grown in the plains.

Agricultural Seasons

Agricultural operations in India begin with the arrival of the monsoon rains in June. There are three crops season: *kharif*, *rabi* and *zaid*. The *kharif* season starts with the onset of the monsoon. Crops such as rice, maize, jowar, cotton, sugarcane, groundnut and urad are sown during this cropping season. They are harvested in autumn. The *rabi* season begins in autumn. Important crops grown in this season are wheat, barely, jowar, gram,

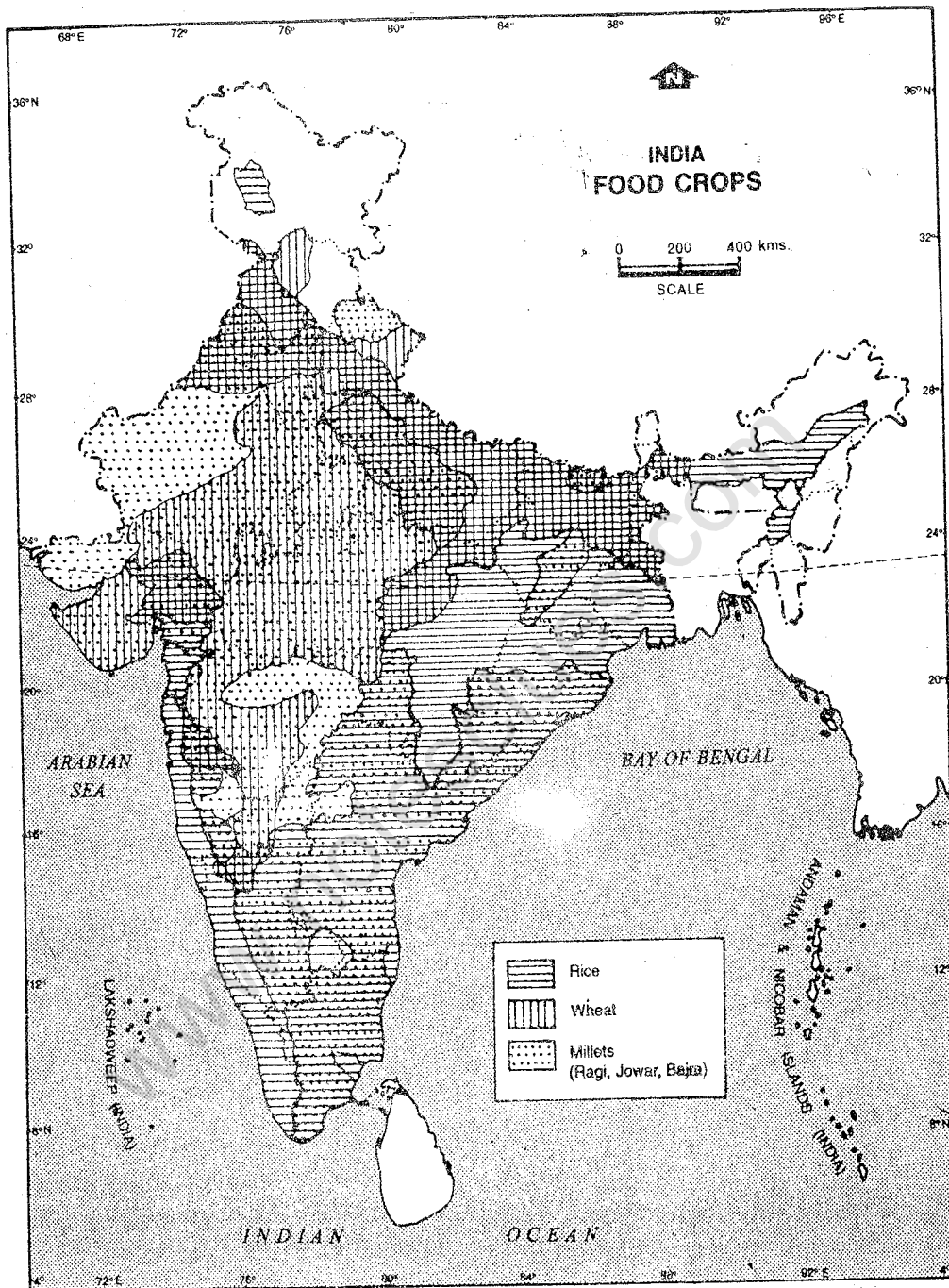
mustard and linseed. The *zaid* is the summer crop season. Rice, maize, vegetables, sunflower and groundnut are grown during this season.

Major Crops

In India, climatic conditions are ideal for the cultivation of a wide range of crops. These crops may be broadly classified into two groups—foodgrains and non-foodgrains. As the name suggests foodgrains include cereals such as rice, wheat, maize, jowar and bajra, and pulses like tur, masur, urad and gram. Non-foodgrains may further be subdivided into oilseeds such as groundnut, mustard, rapeseed and sunflower; fibres such as cotton and jute; plantation crops such as tea, coffee and rubber, and others including sugarcane, potato, etc. India also produces a variety of fruits, nuts, flowers, spices and tobacco.

Food Crops

Rice is mainly a *kharif* crop. It is the most important crop in India both in terms of total cropped area and total production.



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Fig. 15.1 India — Food Crops

Note the distribution of major food crops in India. You may notice that rice is the most predominant single crop grown in some parts such as Assam and in a belt covering parts of states in the east and on the western coast. Find out areas where two and in some cases three crops are important.

Rice requires, uniformly high temperature and plenty of water throughout its growth. Areas having more than 100 cm of rainfall or assured supply of water through irrigation are able to grow this crop successfully. For example, Punjab and Haryana grow this crop with the help of irrigation. Clayey soil, which retains water for a longer time, is suitable for rice cultivation. Standing water in the field is required during its period of growth. As such, bunds are made in the rice fields. On the hill slopes, it is grown in terraced fields.

Rice is grown almost throughout the country. However, the humid eastern part, i.e., areas getting more than 100 cm rainfall, river valleys and deltas are the rice-growing areas. West Bengal, Uttar Pradesh, Andhra Pradesh, Bihar, Punjab, Madhya Pradesh, Tamil Nadu and Kerala are the major producers of rice. Punjab with its irrigation facilities has become one of the leading producers of rice in the country.

Although India is one of the largest producer of rice in the world, most of it is consumed within the country.

Wheat is a rabi crop. It requires well-drained soil, moderate temperature and 50-75 cm of rainfall. It requires water during early period of growth, but at the time of ripening, weather should be warm and sunny. It grows well in the north-western parts of India, i.e., Punjab, Haryana and Western Uttar Pradesh, where winter is relatively longer and rainier. Water requirement is also met with irrigation. After rice, it is the second most important cereal in the country, both in area and production.

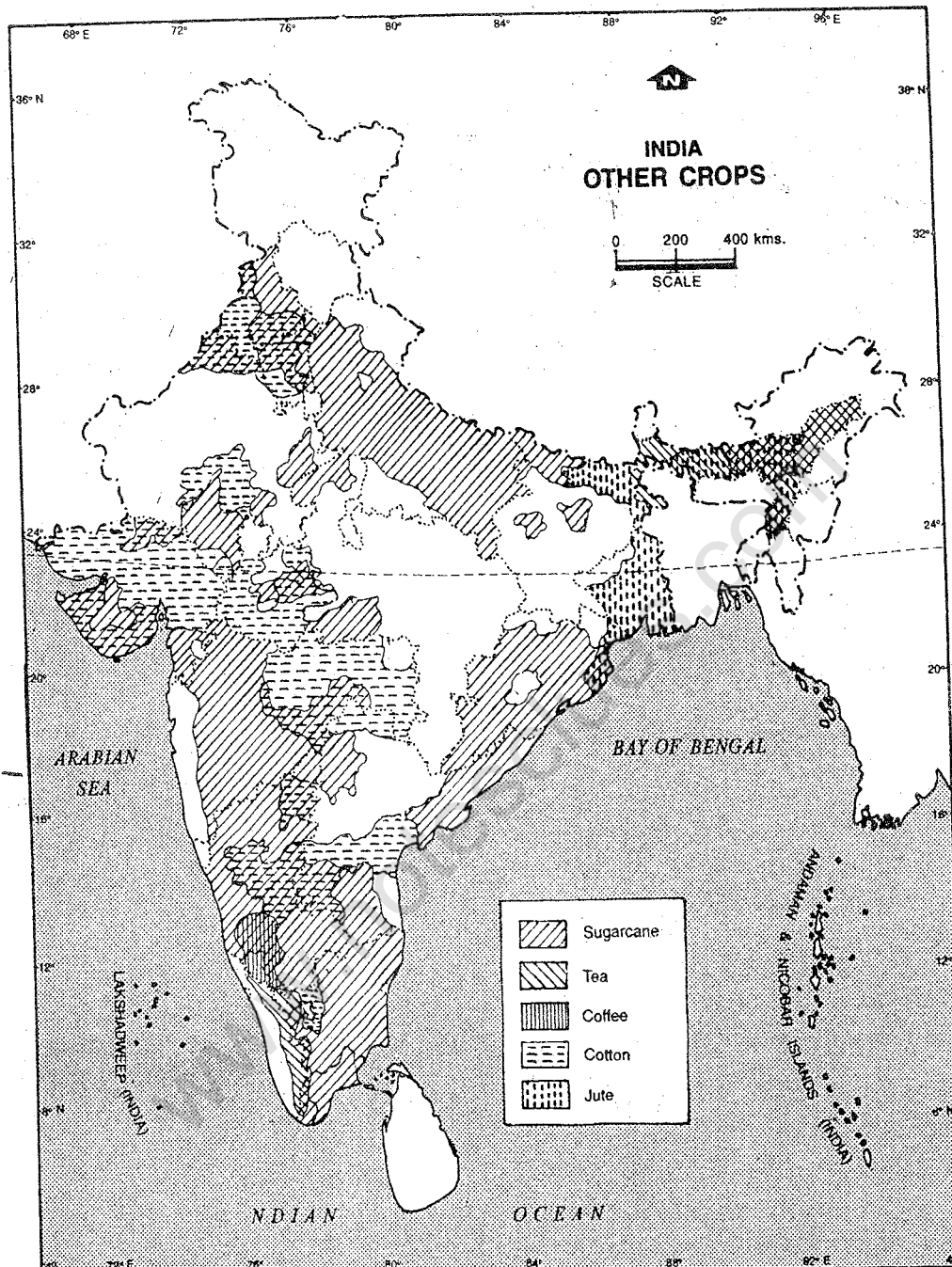
Millets (ragi, jowar and bajra), maize and barely are collectively called *coarse grains*. They are grown in drier areas where rainfall is inadequate. Maharashtra, Karnataka, Madhya Pradesh, Rajasthan, Gujarat and some parts of Uttar Pradesh are the major producers of coarse grains.

Besides cereals, pulses form another item of foodgrains. They are the major source of protein in our diet. Gram, *arhar* or *tur*, lentil (masur), black gram (urad), moong and peas are the important varieties. These crops are grown almost all over India except the areas with very high rainfall. Pulses are leguminous plants, which help to restore fertility of the soil in which they are grown. Hence, they are mostly grown in the same fields where other crops have been harvested or are grown in combination with others. For example, in some areas wheat and gram are grown together in the same field. Similarly, after cereals, the fields are generally devoted to pulses or other such crops which help in restoring those nutrients lost earlier.

Non-foodgrains

Oilseeds: The oilseeds include groundnut, rapeseed, mustard, sesame seeds, linseed, castorseed, niger seed, sunflower, and soyabean. Traditionally rapeseed and mustard are used as cooking medium in eastern and northern India, groundnut in western India and coconut in southern India. However, groundnut and sunflower oil are gaining popularity all over the country.

Fibres : Cotton and jute are the two important crops which provide fibres. Cotton grows well in the black lava soil of the



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Fig. 15.2 India — Other Crops

Note the distribution of some other important crops of India. Which is the most widely grown crop? What pattern do you observe in the distribution of tea and coffee as well as cotton and jute and why is it so?

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AGRICULTURE

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Deccan plateau. It requires high temperature and sufficient rainfall during the growing period. But at the time of ripening bright sunshine is required. Long staple cottons grown in Punjab, Haryana and adjoining areas. Maharashtra, Andhra Pradesh, Madhya Pradesh, Gujarat and Rajasthan grow short and medium staple varieties of cotton. *Jute* plant needs high temperature, plenty of water and rich soil that needs to be continually renewed. *Jute* is, therefore, grown mainly in the Ganga delta in West Bengal, Orissa, Assam, Bihar and eastern U.P. also grow *jute*. A variety of products such as *jute* bags, carpets, and other handicrafts are manufactured from *jute*.

Plantation Crops

Tea and coffee are two popular beverages grown in India. *Tea* grows well in deep fertile and well drained soils. Warm and moist climate with a rainfall of over 200 cm well distributed throughout the year is the most suitable factor. *Tea* leaves are plucked by hand and hence, requires skilled female labour. *Tea* is grown in the Brahmaputra and the Surma valleys in Assam, slopes of the Himalayas in the West Bengal, Kangra and Kumaon in the north and also on the slopes of the Nilgiris in the south. India is one of the leading exporters of *tea* in the world.

Coffee is grown in well-drained soil and requires warm climate and moderate rainfall. It grows best in the tropical highlands. Karnataka, Kerala and Tamil Nadu are its major producers. Nearly three-fourths of the production is exported.

Natural rubber is obtained from the latex

of the rubber tree. This plant grows well in areas of high temperature and high rainfall, well distributed throughout the year. Kerala and Tamil Nadu are the major rubber producing states.

India is believed to be the homeland of *sugarcane*. It requires high temperature, plenty of water and well-drained fertile soil. *Sugarcane* is cultivated in several parts of the country. Its major producers are Uttar Pradesh, Punjab, Haryana, Bihar, Maharashtra, Karnataka, Tamil Nadu and Andhra Pradesh. The yield per hectare is high in the southern states.

Horticulture

Fruits, vegetables, tuber crops such as potatoes, flowers, medicinal plants, spices, etc. are covered under horticulture. They are grown in the diverse climatic conditions of India.

There has been a substantial increase in the area and production of these crops in India. As a result India has achieved first position in the world in the production of cashewnuts and second position in the production of fruits, vegetables and coconut.

Among fruits, apples, peaches, plums, almonds, apricots, and cherries are grown in the temperate climate of Jammu and Kashmir and Himachal Pradesh. Tropical fruits such as bananas, litchis, mangoes, pineapples, oranges and papayas are grown more widely. Cashewnuts are grown in Kerala, Goa, Karnataka, Andhra Pradesh and Tamil Nadu. Cultivation of flowers is getting importance as there is a great demand both within and outside the country.

Agricultural Development

India is primarily an agricultural country. About 64 per cent of the labour force is employed in agriculture for its livelihood. Since independence, there has been a steady decline in this percentage. It reflects progress in the other two sectors of economy, i.e., industry and service. It also means progress in agriculture as, with less people, we are able to produce more. Agriculture contributes about one-third of the Gross Domestic Product (GDP). GDP refers to the total value of goods and services produced by a country over a period of time, normally a year. Agriculture shares about 18% of the total value of the country's exports.

Because of favourable land and climate, India has about 44% of its land under cultivation. It is quite high compared to several other countries. However, fast increasing population has created other demands on the valuable agricultural land such as need for housing, transport and industry. Villages and towns have grown in size usurping surrounding agricultural lands. It may have far reaching impact on our food production. We need to plan our developmental activities to check this trend.

At the time of independence, agriculture was not so developed. The production of crops was so low that India suffered food-shortage quite frequently. Hence, planned efforts were made to improve the situation. Major irrigation projects, agricultural research and development programmes were started. We still face some constraint. For example, most of our land-holdings are small in size. The number of landless and small

farmers is too large. Either they do not have their own lands or their holdings are too small to meet their own requirements. Besides, most of the farmers do not have sufficient money to buy seeds, fertilisers and agricultural machinery. Most of our crop production is still dependent on monsoon rains which is highly variable. Yet, India has achieved remarkable success in agriculture.

With the help of irrigation, improved seeds, use of fertilisers, manures and pesticides, and by adopting scientific methods of farming, production of crops has increased substantially. This is known as *green revolution*. Yields of all crops especially wheat, rice, maize and ragi have increased several times. By providing irrigation and fertilisers, less fertile and cultivable waste lands have also been brought under cultivation. In addition, quick ripening (maturing) varieties of seeds help the farmers in taking more than one crop from their fields in a year. The farmers are also given loans from banks and cooperative societies to purchase seeds, fertilisers and farm machineries as well as to construct wells/tubewells for irrigation.

The farmers are encouraged to grow certain foodgrains such as major cereals, oilseeds and pulses as well as a few other crops like sugarcane and cotton. It is done by fixing some minimum support price for these crops so that they get some profit.

As a result of these measures, certain changes in the pattern of cropping is noticeable. Some crops are now being grown in non-traditional areas also. For example, Punjab, known for wheat cultivation, now

grows large quantity of rice mainly for export. Similarly cultivation of groundnut, cotton and other crops have spread to wider areas. Because of irrigation and improved varieties of seeds, farmers grow more than one crop in a year. For the second crop, they give preference to commercial varieties. Therefore, area under commercial crop has increased.

The major achievement of India is in the field of foodgrain production. After green revolution, it became almost self-sufficient in food — even producing small surplus at times.

Animal Husbandry

Animal husbandry programmes like rearing of cattle, buffaloes, sheep, goats, pigs and poultry are of great importance in India. It is a subsidiary occupation for a large number of people, who live in drought prone, hilly and tribal areas. Since agricultural land is not enough, this activity supplements their income. It may also be a full time activity for those who do not have any other source of income.

India has about 204 million cattle, 83 million buffaloes, 115 million goat, 51 million sheep, 13 million pigs, 3 million pack-animals (horses, mules, donkey etc.) and 307 million poultry-birds. You can, thus, imagine the size of our animal resource. India has made significant progress in improving the quality of the breed of animals and providing nutritious feed and fodder to them.

Besides, giving financial assistance,

people are given training to run animal farms. As a result, such schemes have provided self-employment opportunities to a large number of people from the poorer sections of the society. Dairy development has brought a white revolution in the country. The milk production has increased steadily. India is the largest producer of milk in the world. The per capita availability of milk has been about 204 grams per day in 1997-98. Besides, milk and milk products, production of mutton, chicken, eggs, etc., has also increased.

Fisheries

India has a long coastline. It has, therefore, access to wide fishing areas in the sea. Herring, sardines, tuna, salmon and mackerel are some of the common varieties of fish found here. In coastal areas, fishing is an important economic activity. It provides an important source of food supply and gives employment to people. With modern fishing boats, better fishing nets, improved cold storage and processing facilities, marine fisheries has developed tremendously.

Inland fishery, i.e., fish caught in fresh water—lakes, tanks, reservoirs and rivers, is also very important in India. Prawn, shellfish and finfish having commercial importance are being promoted. Fish production has increased from 0.75 million tonnes at the time of independence to over 5 million tonnes now. Slightly less than half comes from fresh water and rest is contributed by marine fishery. About 10% of the marine products is exported.

EXERCISES**Review Questions**

1. Answer the following questions:

- (i) What is agriculture?
- (ii) Name the two most important cereals of India.
- (iii) Which crops mainly constitute the coarse grains?
- (iv) Name two oilseeds.
- (v) Name four non-foodcrops, each one from a different category.
- (vi) What is horticulture?
- (vii) Why India is called an agricultural country?
- (viii) What is meant by inland fishery?

2. Distinguish between:

- (i) Rabi crops and kharif crops
- (ii) Green revolution and white revolution

3. Discuss the physical factors influencing agriculture.

4. Describe the soil and climatic conditions required for growing rice and wheat. Which are the major rice and wheat producing states of the country?

5. State the measures taken by the government to improve the agriculture in India?

6. What changes have taken place in the pattern of cropping and why? Elaborate with the help of few examples.

7. How animal husbandry has benefited people especially the poorer sections of the society? Discuss.

8. What are the two types of fisheries in India? Discuss the growth of fisheries in India.

Skills in Geography

9. On an outline map of India, show the major areas growing following crops:

- (i) Cereals — rice, wheat, maize and jowar
- (ii) Fibres — jute and cotton
- (iii) Beverages — tea and coffee
- (iv) Oilseeds — groundnut
- (v) Sugarcane

10. Study the following table and answer the questions given below it.

Table 1.1 Population and Food Production 1951-91

Year	Population (Million)	Net Production* of Foodgrains (Million Tonnes)	Foodgrain (Kg/Person)
1951	363.2	48.1	132
1961	442.4	72.0	162
1971	551.3	94.9	172
1981	688.5	113.4	165
1991	851.7	154.3	180

Note : * Net production has been taken as 87.5% of the gross production, 12.5% being provided for seeds, feed requirement and wastage.

Source : Directorate of Economics.

- (i) Draw line graphs to show the changes in population, production of foodgrains and amount of grain available per head of population.
- (ii) Explain why the large growth in the production of foodgrains has led to only a small increase in the amount of food grown per head of population.

CHAPTER 16

Industries

You have earlier read about various products, which we get directly from nature. Crops, fruits and vegetables are obtained from the soil. We get products like timber, medicinal herbs, resins, gums and lac from forests. Animals provide us milk, meat and hides. Similarly different kinds of minerals are obtained from beneath the earth's surface. All these products, which are obtained from nature directly, are called *primary products*. Forestry, farming, mining, animal rearing and fishing are concerned with production of raw materials for food and industrial uses. Hence, they are called *primary activities*.

Many primary products cannot be utilised unless they are processed, e.g., wheat, cotton, and iron ore. Primary products after being processed and transformed into utilities, are called *secondary products*. The activities related to the transformation of primary products into secondary products are called *secondary activities*. Processed goods are more valuable than their raw forms.

These two groups of activities are linked

by the *tertiary activities*. They include transport, trading of commodities and provision of personal services such as education, health and construction.

What is an industry? Often the term 'industry' is used in a very general manner e.g., the fishing industry, the tourism industry and the steel industry. But now you may realise that the above represents a different kind of economic activity. The term 'industry' refers to secondary activities, and especially to manufacturing process.

Growth of Modern Industry

The processing and manufacturing of secondary products were earlier done with the help of simple tools. It used manual labour and muscle or animal power. Such activities were generally confined to individual's home. India has a long tradition of making a variety of products such as clothes, potteries and jewelleryes.

Gradually, simple tools were replaced by more and more sophisticated powerful

machines. They run with the help of energy derived from water, coal or mineral oil. These machines required big space and large workplace. Thus, mills or factories were established. Goods could be produced faster and there was uniformity in quality.

The use of machine called for specialisation and division of labour. The entire process was divided into a number of small steps following a definite sequence. Each worker was responsible for only a small part of the job which he could do more quickly and efficiently.

Over the years, manual labour is being replaced by machines. In big factories most of the activities are now performed by automatic machines.

Classification of Industries

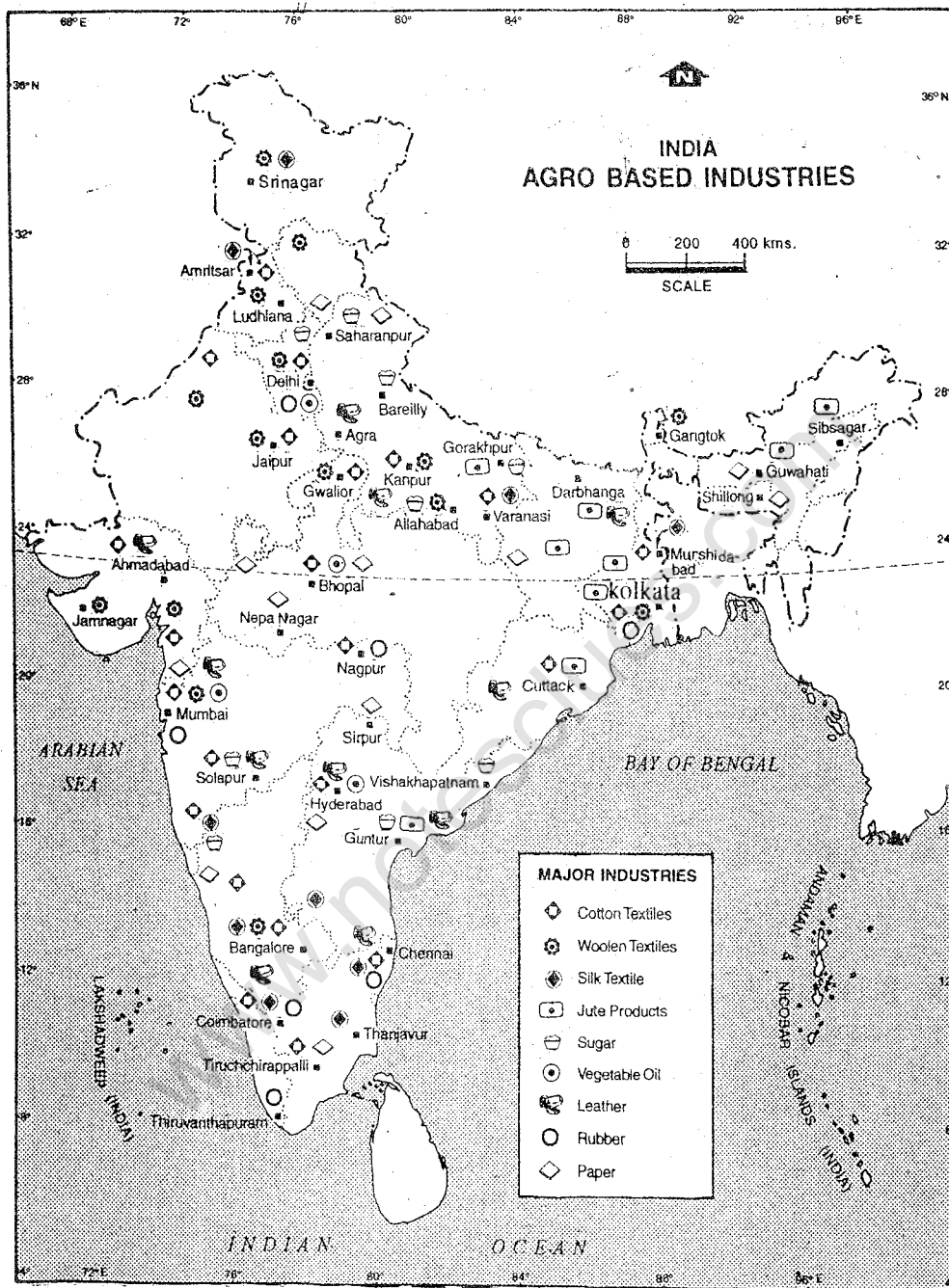
Industries are classified in different ways—on the basis of the raw materials, size of the industrial unit and ownership.

Industries are grouped under two broad categories on the basis of the raw materials they use. Industries obtaining raw materials from agriculture are called *agro-based*. Food-processing, sugar and cotton industries are some examples. The other group of industries, using minerals as their raw materials, are called *mineral-based industries* such as iron and steel, aluminium, cement and copper industries.

Industries may also be classified on the basis of the size of industrial units both in terms of the number of employees and the amount of money invested in setting up the plant and the running cost. Accordingly,

there are *large, medium* and *small-scale* industries. Iron and steel, cotton textiles and oil refining are examples of large scale industries. Most of the industrial units in India come under the category of medium and small-scale industries. If the industrial unit is small, having very few people employed and the amount of money invested is also not very high, it is called a *small-scale industry*. A variety of industries such as leather goods, paper, glass and vegetable oil, depending upon the size of the industrial unit, may appear under all categories. A wide variety of goods such as carving on woods, making of cane furniture and other items, weaving of cloth or handlooms, making pickles etc. are produced in very small units—mostly in homes with the help of family members only. These industries are known as *cottage industries*.

Depending upon the nature of ownership, the industries may be classified as *private, cooperative, public* and *joint-sector* industries. An industry owned and managed by an individual or a group of individuals is called a *private sector industry*. If the ownership of an industry belongs to cooperatives, it is called a *cooperative sector* (formed by a group of people) industry. If the government — Central or the State — is the owner of an industry, it is called a *public sector industry*. Industries set up, owned and managed in cooperation between the government and the private initiative are called *joint sector industries*. In recent years, a number of industries have been set up in collaboration with foreign investors. They are called *multinational companies* (MNCs).



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Fig. 16.1 India — Agro-based Industries

Note the distribution of various kinds of agro-based industries in India. You will notice that these industries are mostly located close to their raw materials.

Major Industries

India has a wide variety of agricultural produce, which provide raw materials for a large number of industries. Textiles, sugar, food-processing, vegetable oil, milk products, production of processed fruits and vegetables are some of the important industries.

Textiles industry: Cotton, jute, silk, wool and synthetic are different varieties of fibres providing raw material for the textile industry. In India, cotton textile is one of the oldest industries. The first modern cotton textile industry was set up in India in Mumbai (Bombay) in 1854. In our economy, it has an unique place as it contributes a significant portion of the total industrial production. It provides employment to millions of people. It also shares about one-third of the total export earnings.

Since independence, there has been a tremendous progress in the production of cotton fabrics. In recent years, production of blended fabrics, i.e., mix of cotton and synthetic fibres or wool and synthetics have increased. Synthetic fibres are man-made, developed through chemical processes. Rayon, nylon and terene are its examples. Of the total fabric production, 60% is contributed by cotton and the remaining is blended or non-cotton. There are over 1,500 cotton man-made fibre mills. Most of them are in the private sector. The cotton and the man-made fibre industry is concentrated mainly in Maharashtra, Tamil Nadu and Gujarat. A substantial production is also obtained from the handloom sector.

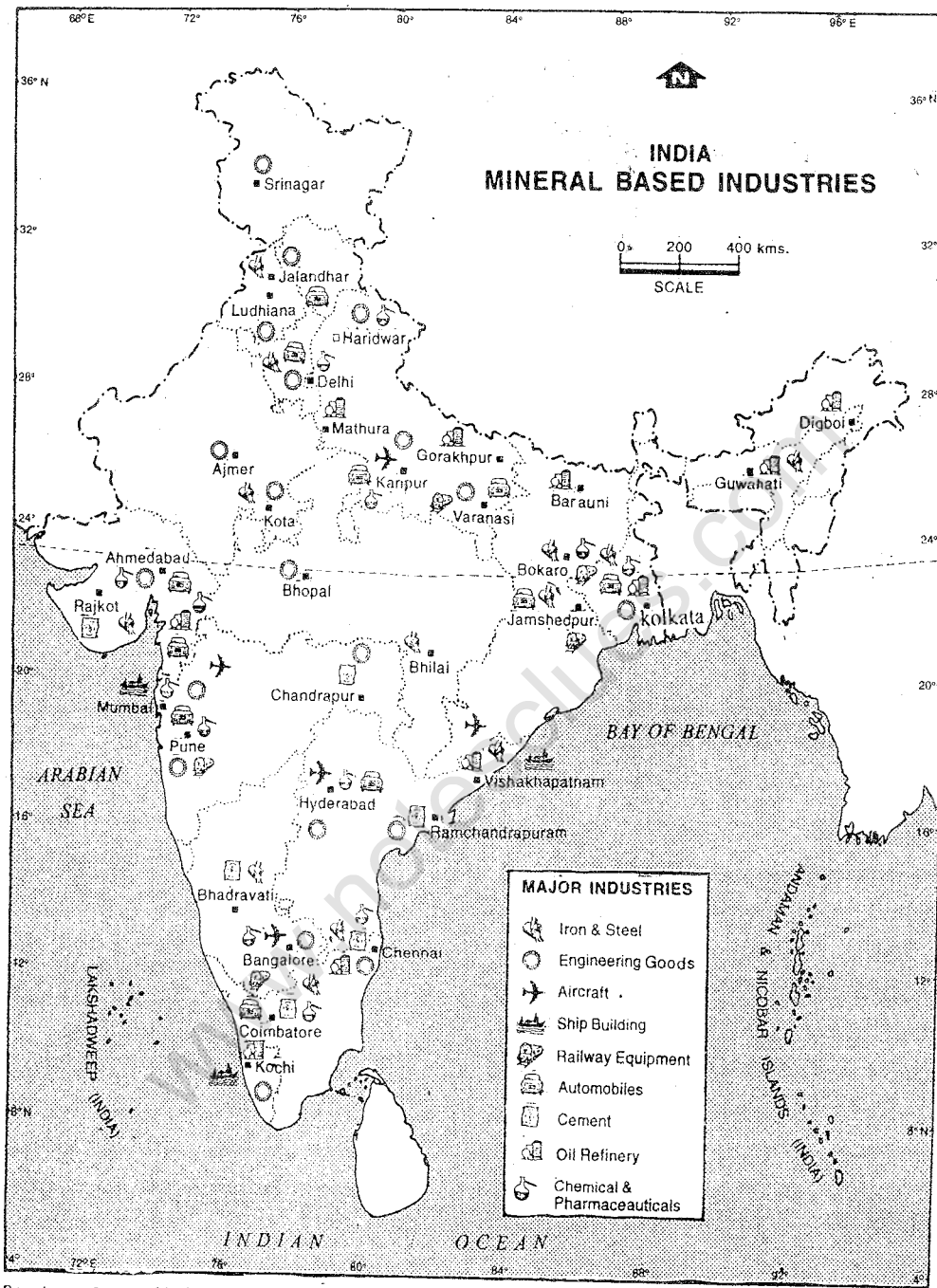
The jute industry in our country is traditionally export-oriented. Jute packaging materials are facing tough competition from the low-priced synthetic substitutes. Attempts are being made by the Government to produce different kinds of goods of better quality e.g., carpets, bags, fabrics etc. from jute to counter the challenge. This industry is located mostly in West Bengal on both sides of the river Hugli.

The woollen and silk industries have comparatively small percentage of share in the total output of fabrics. The woollen textile mills are located in Amritsar, Dhariwal, Srinagar, Mumbai, Jamnagar, Kanpur and Bangalore. The silk industry is located in Murshidabad, Varanasi, Srinagar, Kanchipuram and Mysore.

Sugar industry: The sugarcane is the raw material for this industry. After harvesting the crop, it needs to be sent to the mill immediately for crushing. Storing can reduce the sucrose content as the juice dries. Hence, these mills are located in the sugar cultivating areas. These industries are operative only during the harvesting season of the sugarcane.

Maharashtra is an important producer of sugarcane. Here the cultivation of sugarcane and the sugar industry are under cooperative sector. India is one of the major sugar producers of the world.

Food processing industry: In recent years, production of processed fruits and vegetables have increased very fast. Production of different varieties of milk products and animal fats and oils have also grown. Value of export from milk products has almost doubled between 1995-96 and 1996-97.



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Fig. 16.2 India — Mineral-based Industries

Note the various kinds of mineral-based industries found in India. You may notice concentration of industries in few pockets. Find out the major areas and types of industries located there.

Iron and Steel industry : The modern iron and steel industry was set up in Kulti, West Bengal in 1870. However, the first large scale plant got underway with the establishment of Tata Iron and Steel Company (TISCO) in 1907 at Jamshedpur. We have iron and steel plants at Burnpur, Bhadravati, Vijainagar, Durgapur, Bhilai, Rourkela, Bokaro and Vishakhapatnam. Besides, there is an alloy steel plant at Durgapur and stainless steel plant at Salem. Except for TISCO, all other steel plants are owned and managed by the Government.

The iron and steel industry is considered as a basic industry because it provides iron and steel for manufacturing tools and machines for various purposes — construction, auto industry and infrastructure projects etc. The production of finished steel in 1997-98 was over 22 million tonnes. Iron and steel is also exported now.

Engineering industries: Over the years, engineering industries have registered a phenomenal growth. A wide range of products such as heavy machineries and machine tools for power projects, fertiliser plants, cement plants, mining equipment, petro-chemical plants, vehicles etc. are manufactured within the country.

The Hindustan Machine Tools produces a large variety of big and small machines. Its plants are located in Bangalore, Pinjore, Hyderabad, Kalamassery (Kerala) and Srinagar (Jammu and Kashmir).

Oil refining : India imports more oil (about 54 million tonnes in 1996-97) than what it produces (about 33 million tonnes in

1996-97). Mineral oil is a valuable resource of a country as it is used as one of the most important sources of energy. India imports crude oil from a number of West Asian countries.

In order to refine crude oil, several oil refineries have been set up in different parts of the country. The oldest refinery is Digboi in Assam. Other oil refineries are at Noonmati, Haldia, Bongaigaon, Barauni, Mathura, Vishakhapatnam, Chennai, Kochi, Mumbai and Koyali (Vadodara).

Chemical industry : India produces a wide variety of chemicals such as sulphuric acid, soda ash, caustic soda, phenol and dyes. These chemicals are used in a number of industries. It contributes about 12% of the total export from India.

In addition to above mentioned industries, India has several other important industries such as paper, rubber goods, cement, fertilisers, heavy electricals, automobiles, ship-building, railway engines, coaches and wagons, electronics, consumer goods such as soaps and detergents, leather goods, drugs and pharmaceuticals.

The growth of industrial production has increased since independence. But its rate of growth has varied. For the development of a nation, industrial growth needs to be monitored properly.

If you look at the distribution of various industries described earlier, you will notice some patterns. Distributions of cotton textiles, sugar, iron and steel industry, for example, point towards the concentration of these industries near the source of their raw materials. On the other hand, engineering

industry, oil refining and food-processing are either near the raw materials or the market. There are other factors also which influence the location of industries. There are good transport facilities, skilled labour and other commercial services.

EXERCISES

Review Questions

1. Answer the following questions briefly:

- (i) What is an industry?
- (ii) What are the different bases for classifying industries?
- (iii) Which are the major agro-based industries in India?
- (iv) Why is iron and steel industry called a basic industry?
- (v) Name four large scale industries.
- (vi) What is meant by cottage industries?

2. Distinguish between:

- (i) Primary and secondary activities
- (ii) Private sector and public sector industries
- (iii) Agro-based and mineral-based industries

3. Make out correct pairs from the two columns:

- | | |
|--------------------------------------------------------------------------|-------------------|
| (i) The place where first modern cotton industry was set up | (a) Amritsar |
| (ii) The state known for jute industry | (b) Uttar Pradesh |
| (iii) The place where stainless steel plant is located | (c) Mathura |
| (iv) An important woollen textile centre | (d) West Bengal |
| (v) An oil refining centre | (e) Salem |
| (vi) The place where one of the Hindustan Machine Tools plant is located | (f) Mumbai |
| (vii) The state having maximum sugar mills | (g) Bangalore |

4. Describe the special features of the modern industry.

5. Discuss the distribution of cotton textile and sugar industries in India.

6. Explain the factors influencing the location of industries.

INDUSTRIES

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Skills in Geography

7. On an outline map of India show the following:

- (i) Oldest iron and steel city
- (ii) Two centres each of woollen and silk industries
- (iii) Two oil refineries
- (iv) Three states having concentration of cotton industry
- (v) Two states known for sugar industry

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CHAPTER 17

Trade, Transport and Communication

Trade

Exchange of goods and services among people and nations is referred to as *trade*. Think of the various articles we use in our daily lives. Do we produce or manufacture everything that we need? No, we buy these goods from others. Thus, products obtained at different levels, i.e., primary, secondary and tertiary are sold in the market. Individuals purchase these goods according to their needs. Buying and selling of goods and services within a country is called *domestic trade*. When such exchanges take place between nations, it is called *international trade*. Selling goods and services to other countries is known as *export*. On the other hand buying products from other countries is called *import*. If the amount of import and export roughly equals or export is more than import, the country is supposed to have a *balanced trade* or *favourable trade*. In a way, it indicates towards the good condition of a country's economy.

In the previous two chapters, you have

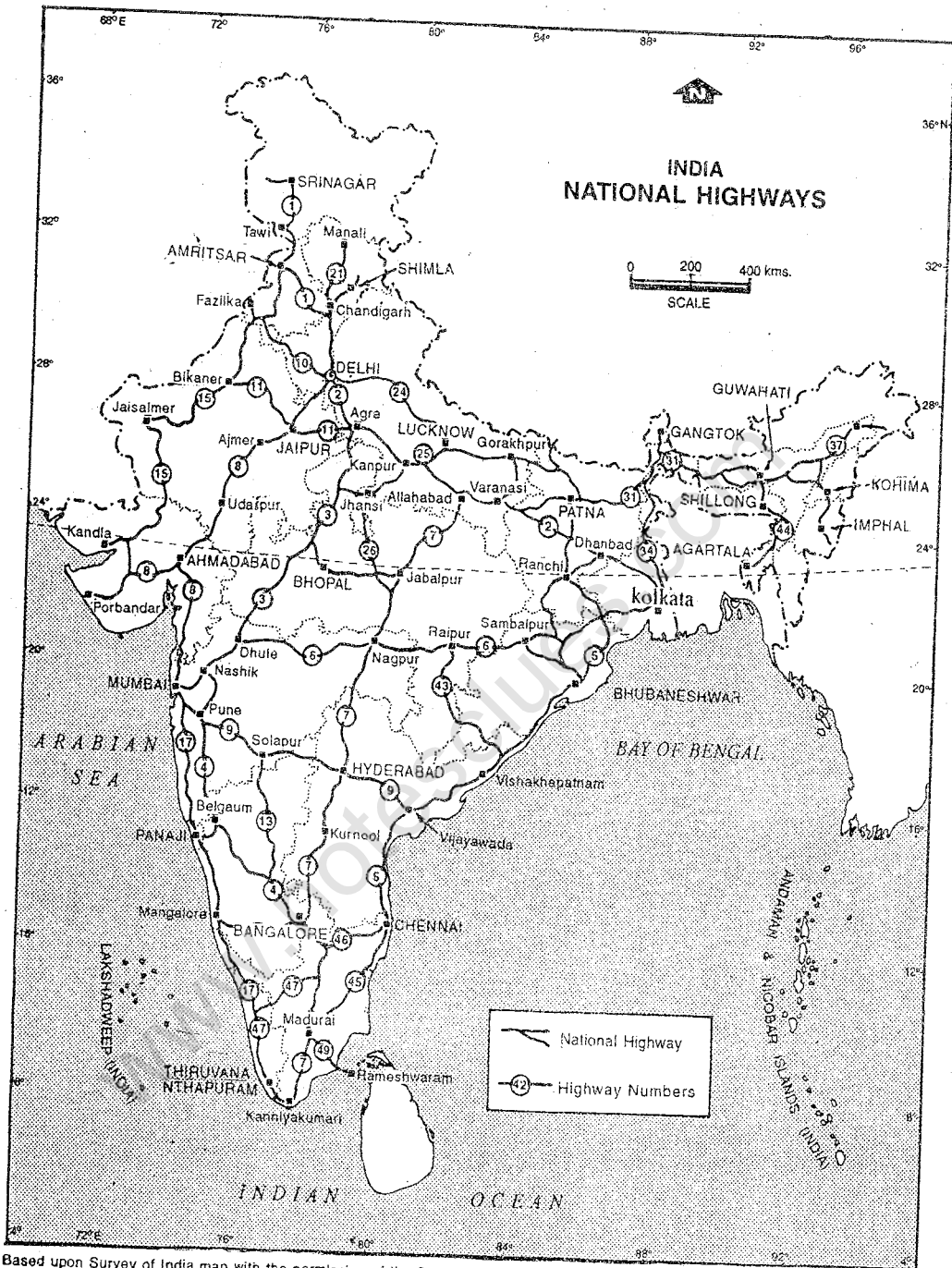
read about various agricultural and industrial products, that are imported or exported by our country. A variety of items constitute the total export. India mainly exports agricultural and allied products such as tea, coffee, spices, cashewnuts and fish products as well as manufactured goods like textiles, handicrafts, gems and jewellery, chemicals and allied products, machineries and metals. Of the total export, about 20% is shared by agricultural produce and 74% by manufactured goods.

India's major imports are mineral oil, chemicals, pearls, gems, non-ferrous metals and iron and steel.

The composition of exports has changed during 1990s. The share of ores and agricultural produce declined whereas the share of manufactured goods increased. The composition of imports did not show substantial change.

Transport

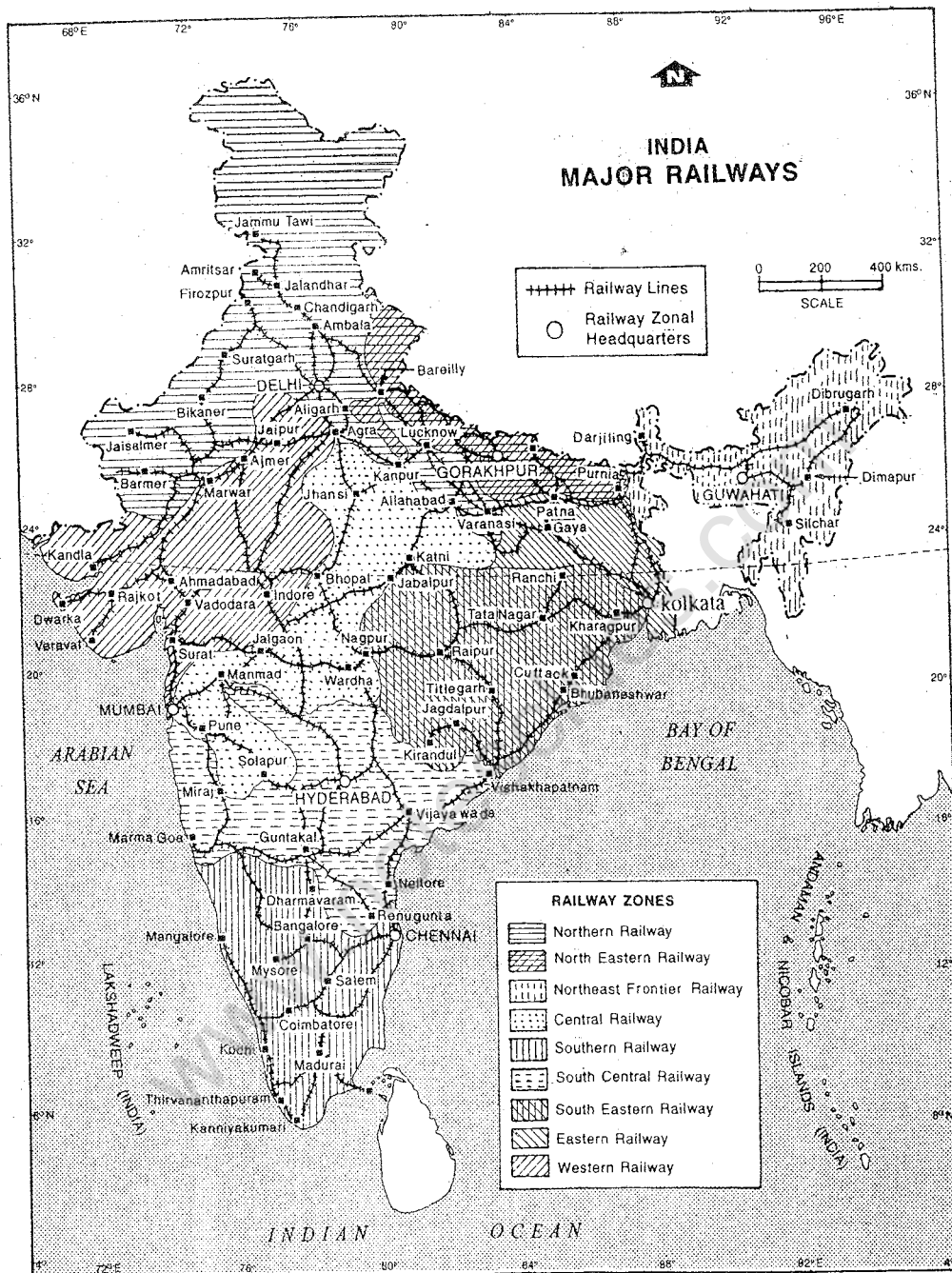
The movement of people and goods from one



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Fig. 17.1 India — National Highways

Note that India has fairly good network of Roads/National Highways. Which parts of India are not very well connected by roads and why? Name the towns situated along NH7 and NH8.



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 measured from the appropriate base line.

Fig. 17.2 India — Major Railways

Note that railways have a good network in the entire country except mountains and hilly terrains. Name the four extreme points in India, one each in north, south, east and west connected with railway.

place to another is now very convenient and fast. It is possible because of the modern means of transport. The roads, railways, waterways (inland and coastal) and airways connect places not only within the country but also of the other countries.

Roads

Roads are the most important means of transport. Compared to railways, they can be constructed more easily and cheaply. Besides, they provide maximum accessibility as they can reach smallest settlements.

Total length of roads in India is over 30 lakh kilometres. It includes both metalled (surface) and unmetalled (unsurfaced) roads. Thus, in terms of road length, India has one of the largest road network in the world. It is, however, inadequate considering the country's total area and its population.

Major roads connecting different parts of the country, passing through several states, are known as *national highways*. They account for less than 2% of the total road network. But they carry about 40 per cent of the movement of goods and passengers. They are constructed and maintained by the Central Government. India has a long land boundary. In these border areas, roads have been constructed even at high altitudes. Some of these roads connect India with Tibet through the mountain passes.

Some of the important roads developed and maintained by the State Governments within a state are called *state highways*.

There are more roads in the plains. In contrast, roads are fewer in mountainous areas. Currently, 80% of the passenger

movement and 60% of the goods movement depend on roads.

Railways

The first train steamed off from Mumbai to Thane, a distance of 34 km in 1853. Now, the total rail route length is about 63,000 km. Of this, about 13,000 km is electrified.

Our railways carry over 11 million passengers and 11 lakh tonnes of goods everyday. Indian railways are divided into three categories according to the width of the railway gauge — broad gauge (1.69 metres), metre gauge (1 metre) and narrow gauge (0.77 metre). The narrow gauge is confined to hilly areas only having about 4,000 km of railway track. Even the metre gauge railway tracks (17,000 km) are being gradually converted into broad gauge (42,000 km).

Railways are the most important means of transport for a majority of people, for long distance travel. Even for bulky and heavy commodities, this is a faster mode of transport. Coal, foodgrains, raw materials for steel plants, finished iron and steel products, cement, fertilisers and mineral oil are the most important goods carried by the railways. Travel by railway in India is still cheaper which is on an average less than 20 paise per km per passenger.

For a vast country like ours, railways link one end to the other and thus help in bringing people together. There are several long distance trains in India. The longest distance of 3,574 km is covered by the train, which connects Guwahati in the north-east and Thiruvananthapuram in the south-west. The major important trunk routes having a major

traffic flow is between the metro cities of Kolkata, Delhi, Mumbai and Chennai.

With the gradual electrification of railway routes, the number of steam engines has reduced drastically. Electric and diesel engines ensure fast and clean journeys. Several trains with very high speed have been introduced. Rajdhani Express and Shatabdi Express are such trains. State capitals are linked with the national capital by Rajdhani Express.

Waterways

India has a long coastline. About 90 per cent of the sea borne trade is handled through 11 major ports. They are Kandla, Mumbai, Nhava Sheva, Marmagao and Kochi on the western coast and Tuticorin, Chennai, Visakhapatnam, Paradwip, Haldia and Kolkata on the eastern coast of India. The total cargo handled by these ports is about 228 million tonnes.

Although India has a number of rivers, inland navigation is almost insignificant. The Ganga and the Brahmaputra are the two navigable rivers of India. The lower course of the Godavari and the Krishna are also navigable. The Buckingham canal in Tamil Nadu, Andhra Pradesh and West Coast canal of Kerala are navigable. Inland waterways are used mostly for passenger traffic. The percentage of goods traffic through inland waterways is insignificant.

Airways

Air travel in recent years has become very important. It has reduced distance and made most parts of the country accessible. For

reaching difficult terrain in the hilly and mountainous areas as well as islands in the Bay of Bengal and the Arabian Sea, it is the fastest mode of travelling. As such, the air transport is especially of great value in the north-eastern states. Besides, the air links help maintaining constant supplies to army who guard our borders. They help in carrying passengers, cargo and air mail.

Domestic air services in the country are provided by the *Indian Airlines* (public sector) and also by some private airlines. Around 34% of the domestic air transport is being handled by private airlines. The Indian Airlines has international flights to a few destinations in neighbouring countries.

International air transport service is provided by *Air India*. There are several international and domestic airports in the country. Mumbai, Kolkata, Chennai and Delhi are the four major international airports.

Communications

The means of transport and communication are closely related to each other. Together they act as the lifelines of a country. Postal services, telecommunications and several means of mass communication such as radio and television bring people closer.

The Indian postal network with about 1.5 lakh post offices is the largest in the world. The telecommunication network with over 22,000 telephone exchanges and 158 lakh connections has grown very fast. Every village is to be provided with one public telephone. About one-third of the total

villages have now this facility. Electronic mail and internet services provide cheaper and quicker communication. It has been possible because of the satellites launched by India for improving communication facilities.

Radio and television are the most important means of mass communication even in the remotest part of the country. These facilities are being used successfully for educating the masses and creating awareness.

EXERCISES

Review Questions

1. Answer the following questions briefly:
 - (i) What is trade?
 - (ii) What are the two important means of land transport?
 - (iii) Name the four means of transport.
 - (iv) Which are the two main navigable rivers of India?
 - (v) Which are the two important means of communication?
2. Distinguish between:
 - (i) A national highway and a state highway
 - (ii) Export and import
 - (iii) Broad gauge and metre gauge
3. What are the lifelines of a country? Why are they so called?
4. Why is railway transport very important in our country? Also mention how railway journeys have become faster now?
5. Why does air transport have special significance in a difficult terrain?
6. Write a short note on development of communication system in India.

Skills in Geography

7. On an outline map of India show the following:
 - (i) A railway route between Delhi and Mumbai with an important junction on the way
 - (ii) One major port each on the western and the eastern coast of India
 - (iii) Any two international airports of India, one from the northern and the other from the southern part of India
 - (iv) Two important inland waterways

CHAPTER 18

Human Resources

Population of a country is its greatest asset. Merely having a vast area or a number of natural resources is not enough for a country to make it developed. These resources can be transformed into wealth only by human efforts. The size of population and its quality measured in terms of certain attributes such as health, education, abilities and aspirations help in generating wealth. Hence, population is often referred to as *human resources*.

With an area of 3.28 million sq. km, India is the seventh largest country in the world. But in population, it is only next to China. It has a population of over 1 billion. In May, 2000, it has crossed a billion mark. Thus, it contains only 2.4% of the world's total area, but more than 16% of its total population. The pressure of population on land is generally very high.

Distribution of Population

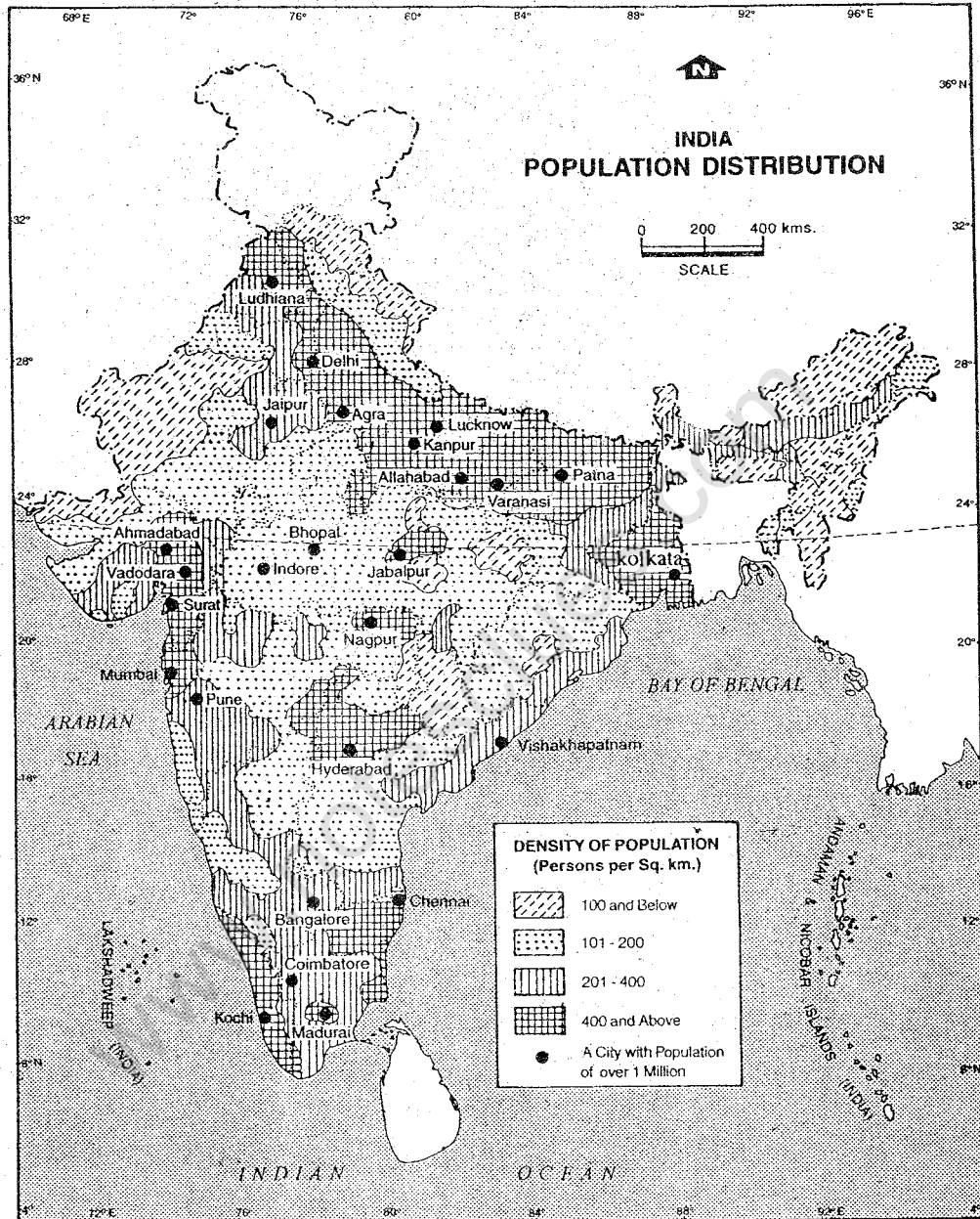
Population of our country is not evenly distributed. One means of describing the pattern of population distribution is to refer to the population density, i.e., the number of

people per sq. km. The average density of population is about 300 persons per sq. km. But actual population distribution varies from this figure.

The fertile plains, river valleys and deltas are densely populated. In these areas density of population is much higher than the national average. West Bengal and Kerala, for example, have a density of more than 750 persons per sq. km.

The hills, mountains and deserts have less number of people per sq. km. Arunachal Pradesh, for example, has a density of only 10 persons per sq. km. In rest of India, over the large part of plateau region, distribution of population is moderate.

Thus, it is quite clear that environmental factors such as high altitude, extreme cold and aridity are the major influences upon population distribution. Besides, relief, climate, soil, vegetation types, mineral, energy resources and technological and economic advancements also influence population distribution.



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Fig. 18.1 India — Population Distribution

Note the distribution of population in India. Which parts have the highest density of population? Name the state having the largest number of cities with more than one million population.

Growth of Population

Our country has witnessed a rapid population growth. In 1921, total population was 251 million. In 78 years, it has grown to 988 million. The growth rate of our population was 1.01% per annum during 1921 and 1931. It shot up to 2.1% per annum between 1981 and 1991. It has now come down to 1.7% per annum.

The *population growth* refers to the natural increase in the population plus any net gain from migration. The difference between births and deaths in the country is called *natural increase*. The balance between people leaving from and people moving into a country is known as *net migration*.

In our country, the major factor for the growth of population has been natural increase. Due to improved health facilities, a number of diseases and epidemics have been controlled. Life expectancy of people has increased from 20 years in 1920 to about 65 years now. The death rate, i.e., number of deaths per thousand people has decreased significantly. However, the number of births per thousand person (birth rate) has not been lowered much. As a result, the population is growing so fast.

Composition of Population

Population of a country is composed of males and females — children, young and old. They live either in villages or towns. These characteristics of population are studied as part of population composition.

The population is usually divided into three age-groups — children (0-14 years),

adults (15-59 years) and aged (60 and over). This is known as *age-group of population*. The proportion of adult population is the least variable in the three groups. The main difference is found in the population of children and old people. India like other developing countries has a large proportion of children (about 36%) in the total population. It has about 7% of old people.

In developed countries like Sweden, the proportion of children is quite low. The proportion of old people is high in countries like Japan.

The *sex ratio*, i.e., the number of females per thousand males is low in our country. This ratio has gradually declined. Only Kerala is an exception with a higher number of females per thousand males.

A person who is above 7 years and can read and write any language with understanding is called a *literate*. *Literacy*, i.e., the percentage of literate people, is one of the indicators of the quality of population.

The literacy rate in our country has gradually increased. It is about 52% (1991). Kerala with more than 90% of literacy is the most literate state in the country.

The percentage of people living in urban areas has also grown constantly. Still only one-fourth of population lives in towns and cities. Large number of people from rural areas move to towns and cities in search of jobs. As such the number of towns and cities has increased. There are now twenty-three cities with more than one million population.

Towards a Qualitative Growth

The ability to absorb a large increase in population depends upon a number of factors especially in relation to a country's resources and economy. Our country has made tremendous progress in all fields of human endeavour since independence. Our production has increased in both agriculture and industry. But the rate of development is not sufficient to match the rate of population growth. As a result, the percentage of people living below poverty line has decreased over the years. But the absolute number of people

below poverty line is still very large. Poverty refers to the economic condition of a person, i.e., a person having little money to fulfil his/her minimum needs. A country's development is measured in terms of human development. It has economic as well as social components. Life expectancy, literacy, birth rate and death rate are some of the basic indicators of human development. India's position in human resource development is comparatively low. We need to make concerted efforts to improve the overall quality of life of our people.

EXERCISES

Review Questions

1. Answer the following questions briefly :

- (i) Why is population considered the greatest asset of a country?
- (ii) What is population density?
- (iii) Why Arunachal Pradesh has a density of less than 10 persons per sq. km.
- (iv) What is meant by population growth?
- (v) Which state in India has the highest literacy?
- (vi) Why is population in urban areas growing fast?
- (vii) What are the basic indicators of human development?

2. Distinguish between:

- (i) Population growth and natural increase
- (ii) Rural and Urban population

3. Discuss the distribution of population in India with special reference to the factors influencing distribution.

4. What is the cause of fast population growth in India? Discuss with examples.

5. How composition of population is helpful in understanding the quality of population? Explain with the help of suitable examples.

Skills in Geography

6. Study the following table and answer the questions given below it:

Years	Literacy Rate (in percentage)		Expectation of Life at Birth (Year)	
	Male	Female	Male	Female
1950-51	27.2	8.8	32.4	31.7
1960-61	40.4	15.3	41.8	40.6
1970-71	45.9	21.9	46.4	44.7
1980-81	56.3	29.7	50.9	50.0
1990-91	64.1	39.2	55.9	55.9

- (i) Prepare two graphs, one for literacy rate and the other for showing life expectancy.
- (ii) Which year recorded equal life expectancy for male and female?
- (iii) Compare the graphs of life expectancy for both male and female. What changes do you notice over the years.
- (iv) Compare the graphs of literacy rate for male and female. What are the special features of these two graphs?

APPENDIX

Population of States and Union Territories, 1991

<i>States</i>	<i>Area (sq. km)</i>	<i>Population in 1991</i>
1. Andhra Pradesh	2,75,068	66508008
2. Arunachal Pradesh	83,743	864558
3. Assam	78,438	22414322
4. Bihar	1,73,877	86374465
5. Goa	3,702	1169793
6. Gujarat	1,96,024	41309582
7. Haryana	44,212	16463648
8. Himachal Pradesh	55,673	5170877
9. Jammu and Kashmir	2,22,236	7718700
10. Karnataka	1,91,791	44977201
11. Kerala	38,863	29098518
12. Madhya Pradesh	4,43,446	66181000
13. Maharashtra	3,07,713	78937187
14. Manipur	22,327	1837149
15. Meghalaya	22,429	1774778
16. Mizoram	21,081	689756
17. Nagaland	16,579	1209546
18. Orissa	1,55,707	31659736
19. Punjab	50,362	20281969
20. Rajasthan	3,42,239	44005990
21. Sikkim	7,096	406457
22. Tamil Nadu	1,30,058	55858946
23. Tripura	10,491	2757205
24. Uttar Pradesh	2,94,411	139112287
25. West Bengal	88,752	67982732
<i>Union Territories</i>		
26. Andaman and Nicobar Islands	8,249	280661
27. Chandigarh	114	750000
28. Dadar and Nagar Haveli	491	138477
29. Daman and Diu	112	101586
30. Delhi	1,483	9420644
31. Lakshadweep	32	51681
32. Pondicherry	492	807785
INDIA	32,87,263	846302690

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