7 Human Environment–Settlement, Transport and Communication

In Chapter 1 you have learnt that early human beings depended entirely on nature for food, clothing and shelter; but with time they learnt new skills to grow food, build homes and develop better means of transport and communication. In this way they modified the environment where they lived.

Settlements are places where people build their homes. Early human beings lived on trees and in caves. When they started to grow crops it became necessary to have a permanent home. The settlements grew near the river valleys as water was available and land was fertile. With the development of trade, commerce and manufacturing, human settlements became larger. Settlement flourished and civilizations developed near river valleys. Do you recall the names of civilization that grew along the banks of rivers Indus, Tigris, Nile and Hwang-He.

Settlements can be **permanent** or **temporary**. Settlements which are occupied for a short time are called **temporary settlements**. The people living in deep forests, hot and cold deserts and mountains often dwell in such temporary settlements. They practice hunting, gathering, shifting cultivation and transhumance. However more and more settlements today are **permanent settlements**. In these settlements, people build homes to live in.

Do you know?

The place where a building or a settlement develops is called its **site**.

The natural conditions for selection of an ideal site are-

1. favourable climate
2. availability of water
3. suitable land
4. fertile soil

Fig. 7.1: Human Settlement

Glossary

Transhumance: It is a seasonal movement of people. People who rear animals move in search of new pastures according to changes in seasons.

It was Mary's birthday party. She and her friends were waiting for Gurpreet to arrive so that Mary could cut the cake. At last Gurpreet arrived- tired, coughing and wheezing. She explained that the traffic jam was terrible. Mary's mother Mrs.Thomas patted Gurpreet's back and sighed, "Oof! The pollution in our city!" Prasad had recently come from his village. He asked, "Why do we have such traffic jams and such pollution in the cities?" "The number of vehicles is increasing day by day due to the growing population in the cities", Mary's father, Mr. Thomas replied. Mary asked, "Then why are people coming to the cities?" Her mother replied, "They come looking for jobs, better education and medical facilities." Mary further enquired, "If so many people keep coming to cities, where will all the people live?" Mr. Thomas said, "That is why you see so many slums and squatter settlements where people stay in congested and unhygienic conditions. Shortage of power and water supply are common problems in the cities". Prasad said, "Our villages may not have big cinema halls, well-equipped schools and good hospitals, but we have lot of open spaces and fresh air to breathe in. When my grandfather was sick we had to rush him to the city hospital."

Fig. 7.2: *Compact Settlement*

Fig. 7.3: *Scattered Settlement*

From the above conversation we can identify two different pictures of settlements – the rural and the urban settlements. The villages are rural settlement where people are engaged in activities like agriculture, fishing, forestry, crafts work and trading etc. Rural settlements can be compact or scattered. A compact settlement is a closely built area of dwellings, wherever flat land is available (Fig. 7.2). In a scattered settlement dwellings are spaced over an extensive area. This type of settlement is mostly found in hilly tracts, thick forests, and regions of extreme climate (Fig. 7.3).

In rural areas, people build houses to suit their environment. In regions

of heavy rainfall, they have slanting roofs. Places where water accumulates in the rainy season the houses are constructed on a raised platform or stilts (Fig. 7.4).

Thick mud walled houses with thatched roofs are very common in areas of hot climate. Local materials like stones, mud, clay, straw etc are used to construct houses.

Fig. 7.4: House on Stilts

The towns are small and the cities are larger urban settlements. In urban areas the people are engaged in manufacturing, trading, and services. Name some of the villages, towns and cities of your state.

Where do you find dwellings made of ice? Who makes them and what are they called?

Transport

Transport is the means by which people and goods move. In the early days it took a great deal of time, to travel long distances. People had to walk and used animals to carry their goods. Invention of the wheel made transport easier. With the passage of time different means of transport developed but even today people use animals for transport (Fig. 7.5).

Fig. 7.5: Horse cart as a mode of transportation

In our country donkeys, mules, bullocks and camels are common. In the Andes Mountains of South America, llamas are used, as are yaks in Tibet. The early traders from other countries used to take several months to reach India. They took either the sea route or the land route. Airplanes have made travel faster. Now it takes only 6-8 hours to travel from India to Europe. Modern means of transport thus saves time and energy.

Let's do

List the different modes of transport used by the students of your class while coming to school.

Do you know?

There are several National and State highways in India. The latest development in India is the construction of Express Ways. The Golden Quadrilateral connects Delhi, Mumbai, Chennai and Kolkata.

The four major means of transport are roadways, railways, waterways and airways.

Roadways

The most commonly used means of transport especially for short distances are roads. They can be **metalled** (*pucca*) and **unmetalled** (*kutcha*) (Fig. 7.6 and 7.7). The plains have a dense network of roads. Roads have also been build in terrains like deserts, forests and even high mountains. Manali-Leh highway in the Himlayan Mountains is one of the highest roadways in the world. Roads built underground are called **subways/under paths**. Flyovers are built over raised structures.

Fig. 7.6: Metalled Road

Fig. 7.7: Unmetalled Road

Do you know?

The train from Xining to Lhasa runs at an altitude of 4,000m above sea level and the highest point is 5,072 m

Railways

The railways carry heavy goods and people over long distances quickly and cheaply. The invention of the steam engine and the Industrial Revolution helped in speedy development of rail transport. Diesel and electric engines have largely replaced the steam engines. In places **super fast trains** have been introduced to make the journey faster. The railway network is well developed over the plain areas. Advanced technological skills have enabled laying of railway lines in difficult mountain terrains also. But these are much fewer in number. Indian railway network is well developed. It is the largest in Asia.

Do you know?

The Trans-Siberian Railway is the longest railway system connecting St. Petersburg in Western Russia to Vladivostok on the Pacific coast.

Trans – Siberian Railway

Waterways

You have already learnt that since early days waterways were used for transportation. Waterways are the cheapest for carrying heavy and bulky goods over long distances. They are mainly of two types – **inland waterways** and **sea routes**.

Navigable rivers and lakes are used as inland waterways. Some of the important inland waterways are the Ganga-Brahmaputra river system, the Great Lakes in North America and the river Nile in Africa.

Sea routes and oceanic routes are mostly used for transporting merchandise and goods from one country to another. These routes are connected with the ports. Some of the important ports of the world are Singapore and Mumbai in Asia, New York, Los Angeles in North America, Rio de Janerio in South America, Durban and Cape Town in Africa, Sydney in Australia, London and Rotterdam in Europe (Fig. 7.11). Can you name some more ports of the world?

***Fig. 7.8:** Inland Waterways*

Airways

This is the fastest way of transport developed in the early twentieth century. It is also the most expensive due to high cost of fuels. Air traffic is adversely affected by bad weather like fog and storms. It is the only mode of transport to reach the most remote and distant areas especially where there are no roads and railways. Helicopters are extremely useful in most inaccessible areas and in time of calamities for rescuing people and distributing food, water, clothes and medicines (Fig. 7.9). Some of the important airports are Delhi, Mumbai, New York, London, Paris, Frankfurt and Cairo (Fig. 7.11).

Fig. 7.9: A Helicopter

Let's do

Find out the names of some newspapers and TV news channels in English, Hindi and a regional language.

Communication

Communication is the process of conveying messages to others. With the development of technology humans have devised new and fast modes of communication. The Fig. 7.10 explains the evolution of the communication system.

The advancement in the field of communication has brought about an information revolution in the world. Different modes of communication are used to provide information, to educate as well as to entertain. Through newspapers, radio and television we can communicate with a large number of people. They are therefore called **mass media**. The satellites have made communication even faster. Satellites have helped in oil exploration, survey of forest, underground water, mineral wealth, weather forecast and disaster warning. Now we can send electronic mails or e-mails through Internet. Wireless telephonic communications through cellular phones have become very popular today. Internet not only provides us with worldwide information and interaction but has also made our lives more comfortable. Now we can reserve tickets for railways, airways and even cinemas and hotels sitting at home. With this kind

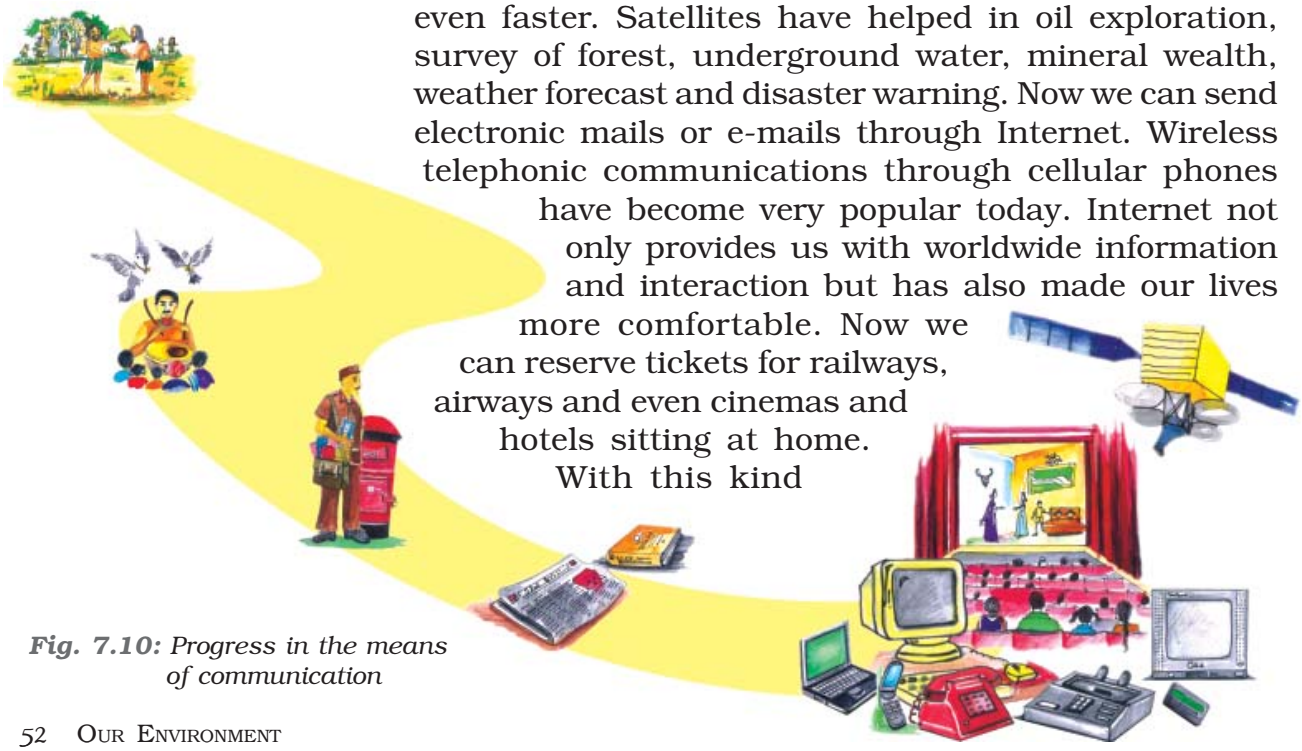


Fig. 7.10: Progress in the means of communication

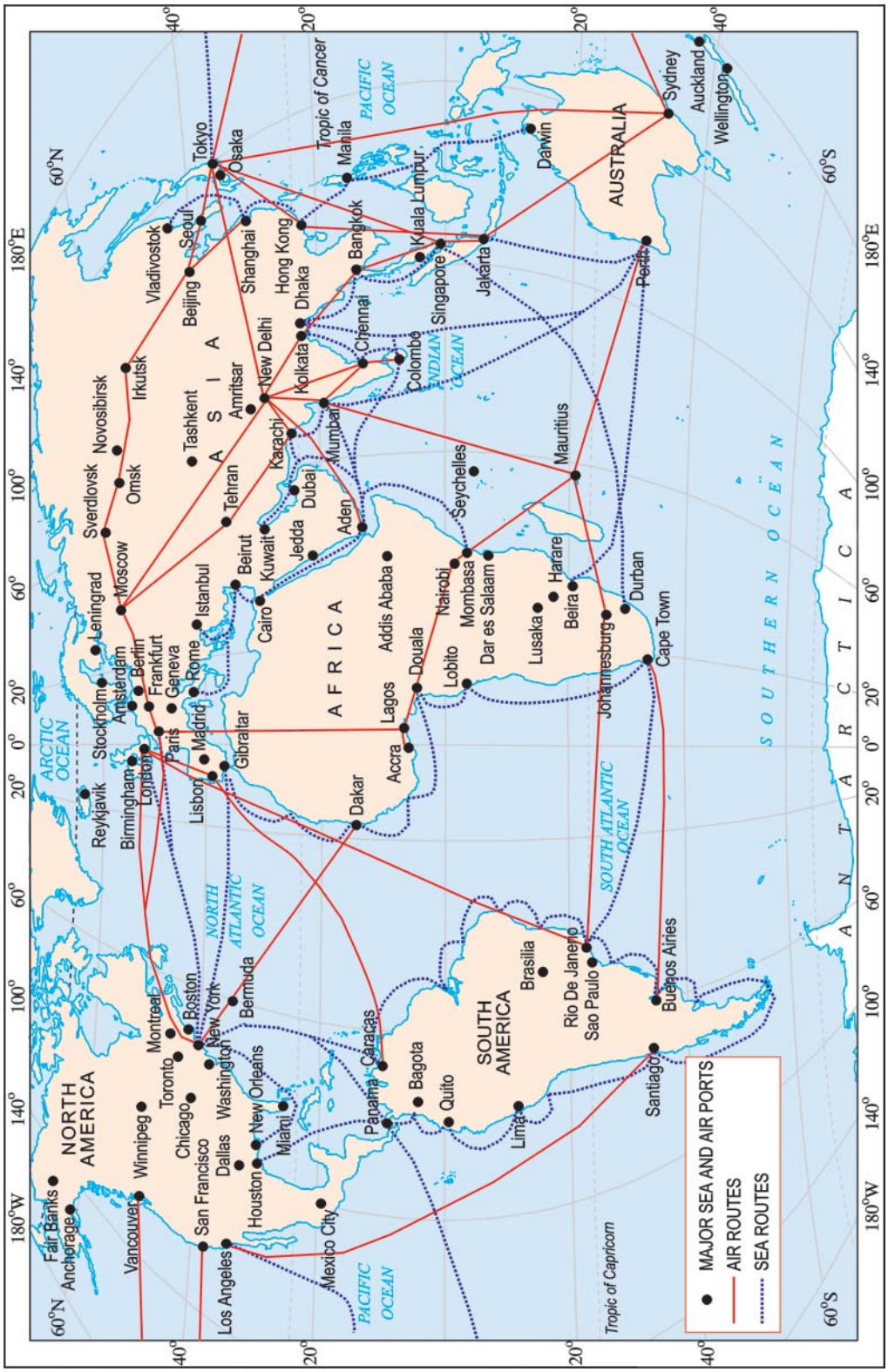


Fig. 7.11: World – Major Sea Ports and Airports

of inter connectivity of people, services and institutions – across the world, we are a large global society.

1. Answer the following questions.

(i) What are the four means of transport?

(ii) What do you understand by the term 'settlement'?

(iii) Which are the activities practised by the rural people?

(iv) Mention any two merits of railways.

(v) What do you understand by communication?

(vi) What is mass media?

2. Tick the correct answer.

(i) Which is **NOT** a means of communication?
(a) telephone (b) books (c) table

(ii) Which type of road is constructed under the ground?
(a) fly over (b) expressways (c) subways

(iii) Which mode of transport is most suitable to reach an island?
(a) ship (b) train (c) car

(iv) Which vehicle does not pollute the environment
(c) cycle (b) bus (c) airplane

3. Match the following.

(i) Internet	(a) areas where people are engaged in manufacturing, trade and services
(ii) Canal route	(b) closely built area of houses
(iii) Urban areas	(c) inland waterway
(iv) Compact settlement	(d) a means of communication

4. Give reasons.

(i) Today's world is shrinking.

5. For fun.

(i) Conduct a survey in your locality and find out how people commute to their respective workplaces using –
(a) more than two modes of transport
(b) more than three modes of transport
(c) stay within walking distance.

(ii) Mention which mode of communication you will prefer most in the following situations –
(a) Your grandfather has suddenly fallen ill. How will you inform the doctor?
(b) Your mother wants to sell the old house. How will she spread this news?
(c) You are going to attend the marriage of your cousin for which you will be absent from the school for the next two days. How will you inform the teacher?
(d) Your friend has moved out with his/her family to New York. How will you keep in touch on a daily basis?

8 Human Environment Interactions
The Tropical and the Subtropical Region

Renuka was excited. Shrikant Uncle was home after a gap of nearly four months. He was a wildlife photographer and travelled widely. Renuka's interest in wildlife and forests began at an early age, when her uncle introduced her to books on nature. Pictures of distant lands and people, who lived there, always fascinated her.

Fig. 8.1: *People from various parts of the world*

"In these pictures Renuka, you can see people from different parts of the world – some from dry deserts, some from frozen lands and some from hot wet rainforests." "They look so different from me", observed Renuka. "They may look different, but they share the same basic needs of life – food, clothing and shelter", explained Shrikant Uncle. "Their children do the same things as you probably do, play games, quarrel sometimes and then make-up, sing, dance and help the families with various things that need to be done. They live closer to nature and very early in their lives have learnt to care for nature. They learn how to catch fish and how to collect material from the forests."

In Chapters 8, 9 and 10, you will learn about the life of people in the different natural regions of the world.

Do you know?

When Spanish explorers discovered Amazon river, they were attacked by a group of local tribes wearing headgears and grass skirts. These people reminded them of the fierce tribes of women warriors known in ancient Roman Empire as the Amazons. Hence the name Amazon.

Life in the Amazon Basin

Before learning about the Amazon basin, let us look at the map (Fig. 8.2). Notice that the tropical region lies very close to the equator; between 10 N and 10 S. So, it is referred to as the **equatorial** region. The river Amazon flows through this region. Notice how it flows from the mountains to the west and reaches the Atlantic Ocean to the east.

The place where a river flows into another body of water is called the river's **mouth**. Numerous tributaries join the Amazon River to form the Amazon basin. The river basin drains portions of Brazil, parts of Peru, Bolivia, Ecuador, Columbia and a small part of Venezuela.

Name the countries of the basin through which the equator passes.

Glossary

Tributaries: These are small rivers that join the main river. The main river along with all its tributaries that drain an area form a river basin or the catchment area. The Amazon Basin is the largest river basin in the world.

Fig. 8.2: Amazon Basin in South America

Climate

As you now know, the Amazon Basin stretches directly on the equator and is characterized by hot and wet climate throughout the year. Both day and nights are almost equally hot and humid. The skin feels sticky. It rains almost everyday, that too without much warning. The day temperatures are high with very high humidity. At night the temperature goes down but the humidity remains high.

Rainforests

As it rains heavily in this region, thick forests grow (Fig. 8.3). The forests are in fact so thick that the dense "roof" created by leaves and branches does not allow the sunlight to reach the ground. The ground remains dark and damp. Only shade tolerant vegetation may grow here. Orchids, bromeliads grow as plant parasites.

Fig. 8.3 Amazon Forest

Fig. 8.4 Toucans

The rainforest is rich in fauna. Birds such as toucans (Fig. 8.4), humming birds, bird of paradise with their brilliantly coloured plumage, oversized bills for eating make them different from birds we commonly see in India. These birds also make loud sounds in the forests. Animals like monkeys, sloth and ant-eating tapirs are found here (Fig. 8.5). Various species of reptiles and snakes also thrive in these jungles. Crocodiles, snakes, pythons abound. Anaconda and boa constrictor are some of the species. Besides, the basin is home to thousands of species of insects. Several species of fishes including the flesh-eating Piranha fish is also found in the river. This basin is thus extraordinarily rich in the variety of life found there.

Fig. 8.5 Tapir

People of the Rainforests

People grow most of their food in small areas after clearing some trees in the forest. While men hunt and fish along the rivers, women take care of the crops. They mainly grow

Do you know?

Bromeliads are special plants that store water in their leaves. Animals like frogs use these pockets of water for laying their eggs.

Let's do

Some TV channels broadcast documentaries on the wildlife of the world. Try to watch some of the films and share your experience with the class.

Do you know?

Slash and Burn is a way of cultivating land where farmers clear a piece of land by slashing or cutting down trees and bushes. These are then burnt, which releases the nutrients into the soil. Now crops are grown in this cleared field for a few years.

After repeatedly using the patch of land, the soil looses its nutrients. So it is abandoned. Then they clear another plot of land to plant. In the mean time young trees grow in the old field. In this way soil fertility is restored. People can then return to it and start cultivating it again.

tapioca, pineapple and sweet potato. As hunting and fishing are uncertain it is the women who keep their families alive by feeding them the vegetables they grow. They practice "slash and burn agriculture". The staple food is manioc, also known as cassava that grows under the ground like the potato. They also eat queen ants and egg sacs. Cash crops like coffee, maize and cocoa are also grown.

The rainforests provide a lot of wood for the houses. Some families live in thatched houses shaped like beehives. There are other large apartment-like houses called "Maloca" with a steeply slanting roof.

Life of the people of the Amazon basin is slowly changing. In the older days the heart of the forest, could be reached only by navigating the river. In 1970 the Trans Amazon highway made all parts of the rainforest accessible. Aircrafts and helicopters are also used for reaching various places. The indigenous population was pushed out from the area and forced to settle in new areas where they continued to practice their distinctive way of farming.

The developmental activities are leading to the gradual destruction of the biologically diverse rainforests. It is estimated that a large area of the rainforest has been disappearing annually in the Amazon basin. You can see that this destruction of forests has a much wider implication (Fig. 8.6). The topsoil is washed away as the rains fall and the lush forest turns into a barren landscape.

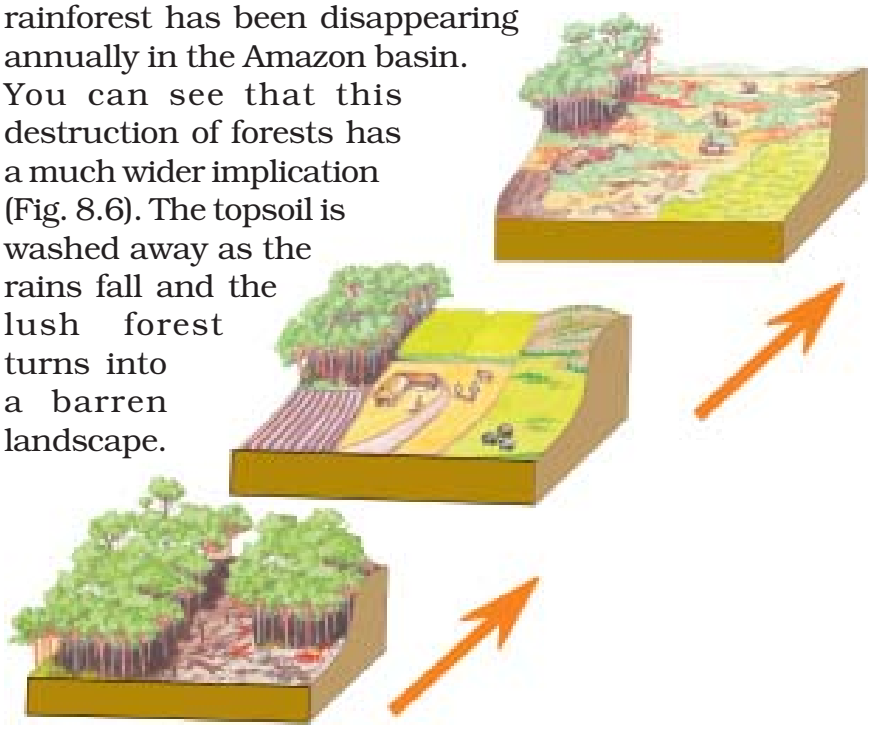


Fig. 8.6: Gradual Destruction of Forests

Life in the Ganga-Brahmaputra Basin

The tributaries of rivers Ganga and Brahmaputra together form the Ganga-Brahmaputra basin in the Indian subcontinent (Fig. 8.8). The basin lies in the sub-tropical region that is situated between 10 N to 30 N latitudes. The tributaries of the River Ganga like the Ghaghra, the Son, the Chambal, the Gandak, the Kosi and the tributaries of Brahmaputra drain it. Look at the atlas and find names of some tributaries of the River Brahmaputra.

Fig. 8.7 Brahmaputra river

The plains of the Ganga and the Brahmaputra, the mountains and the foothills of the

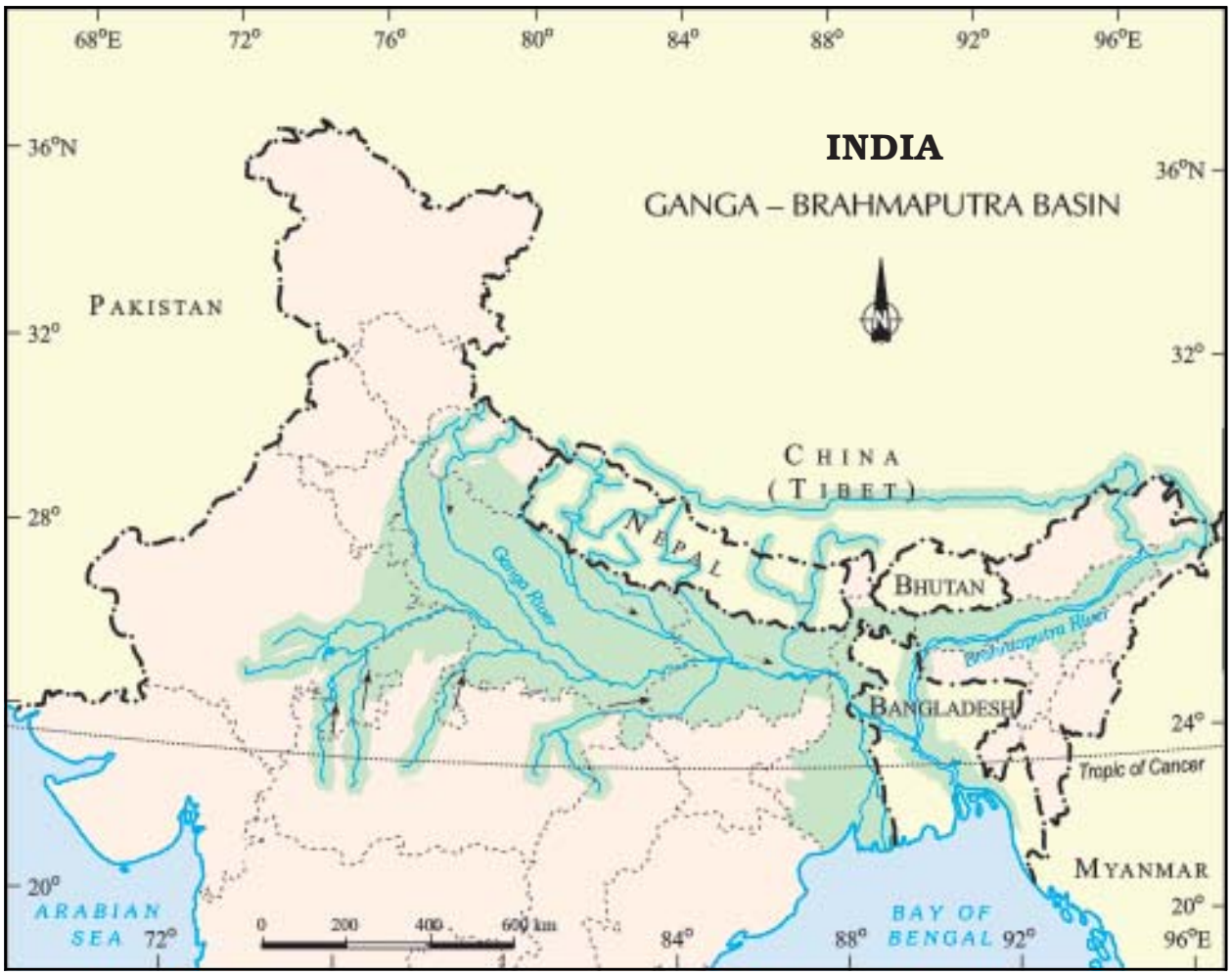


Fig. 8.8: Ganga-Brahmputra Basin

Let's do

River Brahmaputra is known by different names in difference places. Find the other names of the river.

Glossary

Population density: It means the number of persons that live in one sq. km. of area e.g. the population density of Uttaranchal is 159 while the density of West Bengal is 904 and that of Bihar is 880.

Activity

Collect some handicrafts made from jute, bamboo and silk. Display them in the class. Find out in which area they were made in?

Himalayas and the Sundarbans delta are the main features of this basin. Ox-bow lakes dot the plain area. The area is dominated by monsoon climate. The monsoon brings rains from mid-June to mid-September. The summers are hot and the winters cool.

Look at the map of India (Fig. 8.8). Find out the states in which the Ganga-Brahmputra basin lies.

The basin area has varied topography. The environment plays a dominant role in the distribution of the population. The mountain areas with steep slopes have inhospitable terrain. Therefore less number of people live in the mountain area of the Ganga-Brahmaputra basin. The plain area provides the most suitable land for human habitation. The soil is fertile. Agriculture is the main occupation of the people where flat land is available to grow crops. The density of population of the plains is very high. The main crop is paddy (Fig. 8.9). Since cultivation of paddy requires sufficient water, it is grown in the areas where the amount of rainfall is high.

Wheat, maize, sorghum, gram and millets are the other crops that are grown. Cash crops like sugarcane and jute are also grown. Banana plantations are seen in some areas of the plain. In West Bengal and Assam tea is grown in plantations (Fig. 8.10). Silk is produced through the cultivation of silk worms in parts of Bihar and Assam. In the mountains and hills, where the slopes are gentle, crops are grown on terraces.

The vegetation cover of the area varies according to the type of landforms. In the Ganga and Brahmaputra plain tropical deciduous trees grow, along with teak, sal and peepal. Thick bamboo groves are common in the Brahmaputra plain. The delta area is covered with the

Fig. 8.9 Paddy Cultivation

Fig. 8.10 Tea Garden in Assam

mangrove forests. In parts of Uttaranchal, Sikkim and Arunachal Pradesh, coniferous trees like pine, deodar and fir can be seen because the climate is cool and the slopes are steep.

There is a variety of wildlife in the basin. Elephants, tigers, deer and monkeys are common. The one-horned rhinoceros is found in the Brahmaputra plain. In the delta area, Bengal tiger, crocodiles and alligator are found. Aquatic life abounds in the fresh river waters, the lakes and the Bay of Bengal Sea. The most popular varieties of the fish are the rohu, catla and hilsa. Fish and rice is the staple diet of the people living in the area.

Fig. 8.11 One horned rhinoceros

Fig. 8.12 Crocodiles

Lake: A source of livelihood

(A case study)

A clean lake

Binod is a fisherman living in the Matwali Maun village of Bihar. He is a happy man today. With the efforts of the fellow fishermen – Ravindar, Kishore, Rajiv and others, he cleaned the maun or the ox-bow lake to cultivate different varieties of fish. The local weed (vallineria, hydrilla) that grows in the lake is the food of the fish. The land around the lake is fertile. He sows crops such as paddy, maize and pulses in these fields. The buffalo is used to plough the land. The community is satisfied. There is enough fish catch from the river – enough fish to eat and enough fish

Terraces are built on steep slopes to create flat surfaces on which crop are grown. The slope is removed so that water does not run off rapidly.

Terrace Farming

In the fresh waters of River Ganga and River Brahmaputra, a variety of dolphin locally called *Susu* (also called blind dolphin) is found. The presence of *Susu* is an indication of the health of the river. The untreated industrial and urban wastes with high amount of chemicals are killing this species.

Blind Dolphin

to sell in the market. They have even begun supply to the neighbouring town. The community is living in harmony with nature. As long as the pollutants from nearby towns do not find their way into the lake waters, the fish cultivation will not face any threat.

A Polluted Lake

Fig. 8.13: *Varanasi along the River Ganga*

The Ganga-Brahmaputra plain has several big towns and cities. The cities of Allahabad, Kanpur, Varanasi, Lucknow, Patna and Kolkata all with the population of more than ten lakhs are located along the River Ganga (Fig. 8.13). The wastewater from these towns and industries is discharged into the rivers. This leads to the pollution of the rivers.

All the four ways of transport are well developed in the Ganga-Brahmaputra basin. In the plain areas the roadways and railways transport the people from one place to another. The waterways, is an effective means of transport particularly along the rivers. Kolkata is an important port on the River Hooghly. The plain area also has a large number of airports.

Fig. 8.14: *Tiger in Manas Wildlife sanctuary*

Tourism is another important activity of the basin. Taj Mahal on the banks of River Yamuna in Agra, Allahabad on the confluence of the Rivers Ganga and Yamuna, Buddhists stupas in Uttar Pradesh and Bihar, Lucknow with its Imambara, Assam with Kaziranga and Manas with wild life sanctuaries and Arunachal Pradesh with a distinct tribal culture are some of the places worth a visit (Fig. 8.14).

1. Answer the following questions.

(i) Name the continent in which the Amazon Basin is located.

(ii) What are the crops grown by the people of the Amazon Basin.

(iii) Name the birds that you are likely to find in the rainforests of the Amazon.

(iv) What are the major cities located on the River Ganga.

(v) Where is the one-horned rhinoceros found?

2. Tick the correct answer.

(i) Toucans are a type of
(a) birds (b) animals (c) crops

(ii) Manioc is the staple food of
(a) Ganga Basin (b) Africa (c) Amazon

(iii) Kolkata is located on the river
(a) Orange (b) Hooghly (c) Bhagirathi

(iv) Deodars and firs are a type of
(a) Coniferous trees (b) Deciduous trees (c) shrubs

(v) Bengal tiger is found in
(a) mountains (b) delta area (c) Amazon

3. Match the following.

(i) Cotton textile	(a) Assam
(ii) Maloca	(b) Sericulture
(iii) Piranha	(c) Slanting roof
(iv) Silk worm	(d) Ganga plain
(v) Kaziranga	(e) Fish

4. Give reasons.

(i) The rainforests are depleting.

(ii) Paddy is grown in the Ganga-Brahmaputra plains.

5. Map skills.

(i) On an outline map of Indian Sub-continent, draw the rivers Ganga and Brahmaputra from the source to the mouth. Also show the important tributaries of both the rivers.

(ii) On the political map of the South America, draw the equator. Mark the countries located on the equator.

6. For fun.

Make a collage to show places of attractions in India. You can divide the class in different groups to show attractions based on mountain landscapes, coastal beaches, wildlife sanctuaries and places of historical importance.

7. Activity.

Collect under mentioned material and observe how destruction of trees effect the soil cover.

Material

(i) Three small flowerpots or food cans (e.g., cold drinks tin cans),

(ii) one big can with holes punched in the bottom (this will act as a sprinkling can),

(iii) twelve coins or bottle caps

(iv) soil.

Process

Take three small cans or pots. Fill them with soil till the top. Press the soil to make it level with the top of the can. Now put four coins or bottle caps on the soil of each can. Take the big can that has been punched with holes and fill it with water. You can also take the sprinkling can from your garden. Now, sprinkle water on the three cans. On the first can sprinkle water very slowly so that no soil splashes out. Let moderate amount of water be sprinkled on the second can. On the third can, sprinkle the water heavily. You will observe that unprotected soil splashes out. Where the 'rain' is heavy the amount of soil that splashes out is the maximum and least in case of the first can. The coins or caps represent the tree covers. It is clear that if the land is cleared completely of the vegetation, the soil cover will quickly disappear.

9 Life in the Temperate Grasslands

Just as a forest can be defined as the place where trees are the main type of vegetation, grassland can be defined as a region where grasses form the dominant type of plant life. Grasslands make up almost a quarter of the total land surface. The types of plants that grow here greatly depend on what the climate and soil are like. As climate plays an important role in the formation of grasslands, it is generally used as a basis to divide the **world's grasslands** into two broad categories: those that occur in the **temperate region** and those that occur in the **tropical regions**.

The Prairies

The temperate grasslands of North America are known as the Prairies (Fig. 9.1). It is a region of flat, gently sloping or hilly land. For the most part, prairies are treeless but, near the low lying plains, flanking river valleys, woodlands can be found. Tall grass, upto two metres high, dominates, the landscape. It is actually a "sea of grass."

Word Origin

The word Prairie originated from Latin word priata which means meadow.

The prairies are bound by the Rocky Mountains in the West and the Great Lakes in the East. Look at the map of North America (Fig. 9.2). You can see that the prairies cover parts of United States of America and parts of Canada. In the USA, the area is drained by the tributaries of Mississippi and the Canadian prairies are drained by the tributaries of Saskatchewan Rivers.

Fig. 9.1: The Prairies

Fig. 9.2: The Prairies in North America

Do you know?

The grasslands of Prairies were the home of American Indians, more popularly known as 'Blackfoot Indians'. The Prairies were home of other tribes also like the Apache, the Crow, the Cree and the Pawnee.

Do you know?

Chinook is a hot wind that blows in winter and therefore raises the temperature in a short time. This increase in temperature results in the melting of snow, making pasture land available for grazing of animals.

Climate

Being located in the heart of a continent, the climate is of continental type with extreme temperatures. The summers are warm with temperatures of around 20 C, while in winter -20 C has been recorded in Winnipeg, Canada. In winters a thick blanket of snow covers this region.

The annual rainfall is moderate and is ideal for the growth of grass. Due to the absence of the north-south barrier, a local wind "Chinook" blows here.

Flora and Fauna

Prairies are practically tree-less. Where water is available, trees such as willows, alders and poplars grow. Places that receive rainfall of over 50 cm, are suitable for farming as the soil is fertile. Though the major crop of this area is maize, other crops including potatoes, soybean, cotton and alfa-alfa is also grown. Areas where rainfall is very little or unreliable, grasses are short and sparse. These areas are suitable for cattle rearing. Large cattle farms called **ranches** are looked after by sturdy men called cowboys (Fig. 9.3). **Bison** or the American buffalo is the most important animal of this region (Fig. 9.4). It nearly got extinct due to its indiscriminate hunting and is now a protected species. The other animals found in this region are rabbits, coyotes, gophers and Prairie dog.

Fig. 9.3: Cowboy

Fig. 9.4: Bison

People

The people of this region are very hardworking. They have successfully harnessed technology to utilise their rich natural resources. Two of the most developed countries in the world - the USA and Canada are located in this region. Scientific methods of cultivation and use of tractors, harvesters and combines has made North America a surplus food producer. The Prairies are also known as the "Granaries of the world," due to the huge surplus of wheat production.

Dairy farming is another major industry. The dairy belt extends from the Great Lakes to the Atlantic Coast in the east. Dairy farming and extensive agriculture both promote setting up of food processing industries.

Large mineral deposits particularly coal and iron and a good network of roads, railways and canals in this region have made it the most industrialised region in the world.

Glossary

Combine: A machine which can sow, plough and work as thresher all by itself.

Do you know?

Important cities in the USA are Chicago, Minneapolis, Indianapolis Kansas and Denver. In Canadian prairies the important cities are Edmonton, Saskatoon, Calgary and Winnipeg.

Do you know?

The Veld name was given by the Dutch settlers before South Africa was colonised by the British.

The Velds

The temperate grasslands of South Africa are called the **velds** (Fig. 9.5). Velds are rolling plateaus with varying heights ranging from 600 m to 1100 m. It is bound by the Drakensburg Mountains on the east. To its west lies the Kalahari desert. On the northeastern part, "high velds" are located that attain a height of more than 1600 m, in some places. Look at the map of Africa. Name the countries that are covered by the Velds. The tributaries of rivers Orange and Limpopo drain the region.

Fig. 9.5: Veld in Africa

Let's do

Some type of grass grows on almost every surface of the earth. List names of places where you have observed grass growing, e.g., lawns, cricket field, between cracks of a side walk etc.

Let's do

Velds lie in the Southern hemisphere. When it is summers in velds, what season would it be in the prairies?

Climate

The velds have a mild climate due to the influence of the Indian Ocean. Winters are cold and dry. Temperatures vary between 5 C and 10 C and July is the coldest month. Summers are short and warm. Johannesburg records about 20 C temperature in the summer.

The velds receive rainfall mainly in the summer months from November to February. This is mainly because of the warm ocean currents that wash the shores of the velds. If the rainfall is scanty in the winter months from June till August, drought may occur.

Flora and Fauna

The vegetation cover is sparse. Grasses dominate the landscape. Red grass grows in bush velds. In the high velds acacia and maroola are seen to be growing. The animals of the velds are primarily lions, leopards, cheetah and kudu (Fig. 9.6).

Fig. 9.6: Leopard

People

Velds are known for cattle rearing and mining. The soils are not very fertile in the velds due to the presence of discontinuous grasses exposing barren surface. However where the land is fertile crops are grown. The main crops are maize, wheat, barley, oats and potato. Cash crops like tobacco, sugarcane and cotton are also grown.

Sheep rearing is the most important occupation of the people. Sheep is bred mainly for wool and has given rise to the wool industry in the velds. Merino sheep is a popular species and their wool is very warm. Dairy farming is the next important occupation. Cattle are reared in the warmer and wetter regions and the dairy products like butter, cheese are produced for both domestic supply and also for export.

The velds have rich reserve of minerals. Iron and steel industry has developed where coal and iron are present. Gold and diamond mining are major occupations of people of this region. Johannesburg is known for being the gold capital of the world. Kimberley is famous for its diamond mines (Fig. 9.7). Mining of diamond and gold in South Africa led to the establishment of trade ties with Britain and gradually South Africa became a British Colony. This mineral rich area has a well-developed network of transport.

Fig. 9.7: Diamond Mine, Kimberley

1. Answer the following questions.

(i) What are the Temperate Grasslands of North America called?

(ii) What are the cattle farms in the North American Grasslands known as?

(iii) Name the rivers that drain the Velds.

(iv) When is the rainy season in the Velds?

(v) What is the major occupation of the people of the South African grasslands?

2. Tick the correct answer.

(i) River Mississippi drains

(a) Canada (b) Africa (c) USA

(ii) Drakensberg Mountains bound the

(a) Prairies (b) Velds (c) Pampas

(iii) Merino is a species of

(a) fish (b) elephant (c) sheep

(iv) Kimberley is famous for

(a) diamonds (b) silver (c) platinum

3. Match the following.

(i) Cowboys	(a) Iron and Steel
(ii) Gold	(b) Prairies
(iii) Kudu	(c) Hot wind
(iv) Chinook	(d) Johannesberg
(v) Coal	(e) Animal

4. Give reasons.

(i) The Prairies are known as the 'Granaries of the World'.

(ii) Rise of wool industry in the Velds.

5. Map skills.

On an outline map of North America, mark the Rocky mountains, the Great Lakes, river Mississippi, river Saskatchewan, the cities – Chicago and Winnipeg.

6. For fun.

Make a grass whistle

You will require a blade of grass about 5 cm in length. Be sure to choose the grass blade longer than your thumbs. The thickness of the grass should be about 0.5 to 0.7 cm. Choose the grass that is broad and wide. Narrow blade is difficult to hold. Put your thumbs together as your nails are facing you. Stretch the blade of grass lengthwise between the thumbs and the base of the hand. Your hands should be cupped to create a hollow or a narrow opening between your palms. You should just be able to see the edge of the grass only through the narrow opening. Place your lips over the opening and blow gently into the palm. You may even feel the grass blade vibrating as you blow. As you gradually blow you will hear sound of whistle created by grass.

10 Life in the Deserts

In Chapter 5, you have seen that water means life to plants, animals and people. It is difficult for anyone to live in places where there is no water to drink, where there is no grass for their cattle to feed on and where there is no water to help the crops to grow.

We will now learn about the places in the world where people have learned to cope with extreme harsh temperatures; in some places as hot as fire and some as cold as ice. These are the desert areas of the world. These are characterised by low rainfall, scanty vegetation and extreme temperatures. Depending on the temperatures there can be hot deserts or cold deserts. The people inhabit these lands wherever little water is available to practise agriculture.

Glossary

Desert: It is an arid region characteriesed by extremely high or low temperatures and has scarce vegetation.

The Hot Desert – Sahara

Look at the map of the world and the continent of Africa. Locate the Sahara desert covering a large part of North Africa. It is the world's largest desert. It has an area of around 8.54 million sq. km. Do you recall that India has an area of 3.2 million sq. km? The Sahara desert touches eleven countries. These are Algeria, Chad, Egypt, Libya, Mali, Mauritania, Morocco, Niger, Sudan, Tunisia and Western Sahara.

Fig. 10.1: The Sahara Desert

When you think of a desert the picture that immediately comes to your mind is that of sand. But besides the vast stretches of sands, that Sahara desert is covered with, there are also gravel plains and elevated plateaus with bare rocky surface. These rocky surfaces may be more than 2500m high at some places.

Do you know?

You will be surprised to know that present day Sahara once used to be a lush green plain. Cave paintings in Sahara desert show that there used to be rivers with crocodiles. Elephants, lions, giraffes, ostriches, sheep, cattle and goats were common animals. But the climate has changed it to a very hot and dry region.

Fig. 10.2: Sahara in Africa

Do you know?

Al Azizia in Sahara desert, south of Tripoli, Libya recorded the highest temperature of 57.7 C in 1922.

Climate

The climate of the Sahara desert is scorching hot and parch dry. It has a short rainy season. The sky is cloudless and clear. Here, the moisture evaporates faster than it accumulates. Days are unbelievably hot. The temperatures during the day may soar as high as 50 C, heating up the sand and the bare rocks, which in turn radiates heat making everything around hot. The nights may be freezing cold with temperatures nearing zero degrees.

Flora and Fauna

Vegetation in the Sahara desert includes cactus, date palms and acacia. In some places there are oasis – green islands with date palms surrounding them. Camels, hyenas, jackals, foxes, scorpions, many varieties of

snakes and lizards are the prominent animal species living there.

Fig. 10.3: Oasis in the Sahara Desert

Scientists have actually found skeletons of fish in this desert. What could have happened?

People

The Sahara desert despite its harsh climate has been inhabited by various groups of people, who pursue different activities. Among them are the Bedouins and Tuaregs. These groups are nomadic tribes rearing livestock such as goats, sheep, camels and horses. These animals provide them with milk, hides from which they make leather for belts, slippers, water bottles; hair is used for mats, carpets, clothes and blankets. They wear heavy robes as protection against dust storms and hot winds.

The oasis in the Sahara and the Nile Valley in Egypt supports settled population. Since water is available, the people grow date palms. Crops such as rice, wheat, barley and beans are also grown. Egyptian cotton, famous worldwide is grown in Egypt.

The discovery of oil – a product in great demand throughout the world, in Algeria, Libya and Egypt is constantly transforming the Sahara desert. Other minerals of importance that are found in the area include iron, phosphorus, manganese and uranium.

The cultural landscape of the Sahara is undergoing change. Gleaming glass cased office buildings tower over mosques and superhighways crisscross the ancient camel paths. Trucks are replacing camels in the salt trade. Tuaregs are seen acting as guides to foreign tourists. More and more nomadic herdsmen are taking to city life finding jobs in oil and gas operations.

Depressions are formed when the wind blows away the sands. In the depressions where underground water reaches the surface, an oasis is formed. These areas are fertile. People may settle around these water bodies and grow date palms and other crops. Sometimes the oasis may be abnormally large. Tafilalet Oasis in Morocco is a large oasis with an area of about 13,000 sq.km.

Word Origin

Ladakh is made up of two words – La meaning mountain pass and Dak meaning country

Do you know?

Drass, one of the coldest inhabited places on earth is located in Ladakh.

The Cold Desert - Ladakh

Ladakh is a **cold desert** lying in the Great Himalayas, on the eastern side of Jammu and Kashmir (Fig. 10.4). The **Karakoram Range** in the north and the **Zanskar mountains** in the south enclose it. Several rivers flow through Ladakh, **Indus** being the most important among them. The rivers form deep valleys and gorges. Several glaciers are found in Ladakh, for example the **Gangri** glacier.

The altitude in Ladakh varies from about 3000m in **Kargil** to more than 8,000m in the Karakoram. Due to its high altitude, the climate is extremely cold and dry. The air at this altitude is so thin that the heat of the sun can be felt intensely. The day temperatures in summer are just above zero degree and the night temperatures well below 30 C. It is freezing cold in the winters when the temperatures may remain below 40 C for most of the time. As it lies

Fig. 10.4: Ladakh

in the rain shadow of the Himalayas, there is little rainfall, as low as 10 cm every year. The area experiences freezing winds and burning hot sunlight. You will be surprised to know that if you sit in the sun will your feet in the shade, you may suffer from both sunstroke and frost bite at the same time.

Do you know?

Ladakh is also known as **Khapa-chan** which means snow land.

Flora and Fauna

Due to high aridity, the vegetation is sparse. There are scanty patches of grasses and shrubs for animals to graze. Groves of willows and poplars are seen in the valleys. During the summers, fruit trees such as apples, apricots and walnuts bloom. Several species of birds are sighted in Ladakh. Robins, redstarts, Tibetan snowcock, raven and hoopoe are common. Some of these are migratory birds. The animals of Ladakh are wild goats, wild sheep, yak and special kinds of dogs. The animals are reared to provide for the milk, meat and hides. Yak's milk is used to make cheese and butter. The hair of the sheep and goat is used to make woollens.

Do you know?

The Chiru or the Tibetan antelope is an endangered species. It is hunted for its wool known as *shahtoosh*, which is light in weight and extremely warm.

People

Do you find any resemblance between the people of Ladakh and the inhabitants of Tibet and Central Asia? The people here are either Muslims or Buddhists. In fact several Buddhists monasteries dot the Ladakhi landscape with their traditional 'gompas'. Some famous monasteries are Hemis, Thiksey, Shey and Lamayuru (Fig. 10.5).

Do you know?

The finest cricket bats are made from the wood of the willow trees.

In the summer season the people are busy cultivating barley, potatoes, peas, beans and turnip. The climate in winter months is so harsh that people keep themselves engaged in festivities and ceremonies. The women are very hard working. They work not only in the house and fields, but also manage small business and shops. Leh, the capital of Ladakh is well connected both by road and air. The National Highway 1A connects Leh to Kashmir Valley through the Zoji la Pass. Can you name some more passes in the Himalayas?

Fig. 10.5 Thiksey Monastery

Manali - Leh highway crosses four passes, Rohtang la, Baralacha la Lungalacha la and Tanglang la. The highway opens only between July and September when snow is cleared from the road.

Baralacha la

Tourism is a major activity with several tourists streaming in from within India and abroad. Visits to the gompas, treks to see the meadows and glaciers, witnessing ceremonies and festivities are important activities.

Fig. 10.6. Ladakhi Women in Traditional Dress

Life of people is undergoing change due to modernisation. But the people of Ladakh have over the centuries learned to live in balance and harmony with nature. Due to scarcity of resources like water and fuel, they are used with reverence and care. Nothing is discarded or wasted.

1. Answer the following questions.

(a) What are the two types of deserts found in the world?

(b) In which continent is the Sahara desert located?

(c) What are the climatic conditions of the Ladakh desert?

(d) What mainly attracts tourists to Ladakh?

(e) What type of clothes the people of the Sahara desert wear?

(f) Name the trees that grow in Ladakh.

2. Tick the correct answer.

(i) Sahara is located in which part of Africa

(a) eastern (b) northern (c) western

(ii) Sahara is what type of desert

(a) cold (b) hot (c) mild

(iii) The Ladakh desert is mainly inhabited by

(a) Christians and Muslims

(b) Buddhists and Muslims

(c) Christians and Buddhists

(iv) Deserts are characterised by

(a) scanty vegetation

(b) heavy precipitation

(c) low evaporation

(v) Hemis in the Ladakh is a famous
(a) temple (b) church (c) monastery

(vi) Egypt is famous for growing
(a) wheat (b) maize (c) cotton

3. Match the following.

(i) Oasis	(a) Libya
(ii) Bedouins	(b) monastery
(iii) Oil	(c) glacier
(iv) Gangri	(d) depressions with water
(v) Lamayuru	(d) Sahara

4. Give reasons.

(i) There is scanty vegetation in the deserts.

(ii) People of the Sahara desert wear heavy robes.

5. Map skills.

(i) On the outline map of Africa, mark the Sahara desert.

(ii) On the outline map of India, mark the Karakoram Range, Zanskar Range, Ladakh and Zoji La pass.

6. For fun.

Desert Game

This is a class room activity involving all the students. The teacher will create a list of desert creatures. The number of the creatures should be same as the number of students in the class. The creatures can be picked up from the categories of mammals, birds and reptiles. Mammals can include – camel, yak, fox, sheep, goat, antelope…
Birds – raven, eagle, vulture, turkey…
Reptiles – snakes …

Assign one desert creature to each student. Ask the student to write three characteristics of the creature on plain sheet of paper. (students can use index cards of size 10 cm 15 cm). Questions such as - in what type of deserts it is found? Major adaptation? Use to man?

These characteristics will be used as clues in the guessing game. On the board make three columns – mammals, birs and reptiles. Paste a sheet of paper in the column under the particular category. The class can be divided in three to four groups. They will compete against each other in the 'desert game'. Each group now takes turn in guessing the correct answer. Explain to the class that they have to guess what animal matches the characteristics listed on the paper.
For example:

- Animal of hot desert
- Has double set of eyelashes to keep away the sand
- The hide is used for making water bottles

The correct answer is 'camel'. Within the group there will be a student who has prepared the card. That student should not answer. Ten points are awarded for the correct answer.

This game will enable students to understand the desert. You can play the same game by taking different types of fruits, flora and the clothes the people wear.

Some Internet Sources for More Information

http://school.discovery.com/

http://nationalgeographic.com/

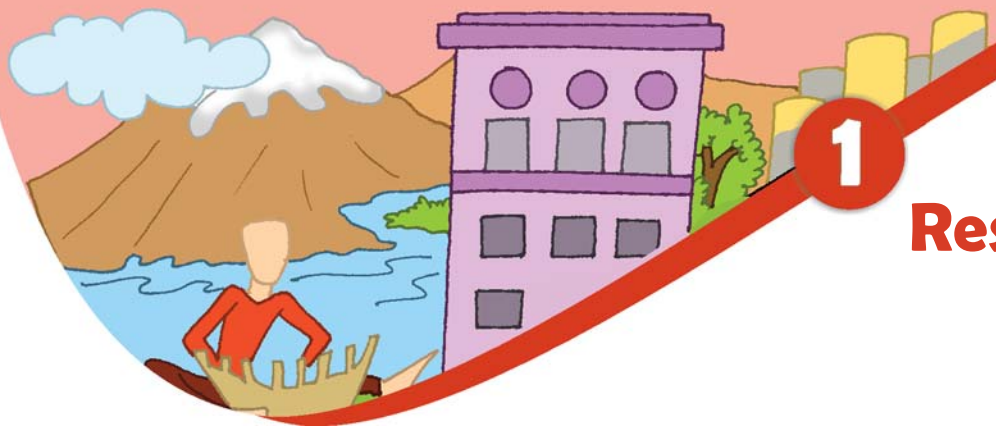
http://www.incredibleindia.org/

http://www.wikipedia.org/

http://www.greenpeace.org/

http://www.britannica.com/

http;//www.animalplanet.co.uk/



1 Resources

Mona and Raju were helping Amma to clean their house. "Look at all these things…. clothes, utensils, foodgrains, combs, this bottle of honey, books…..Each of these has a use," said Mona. "That is why they are important," said Amma. "These are resources…..". "What is a resource?" was Raju's question to Amma. "Anything that can be used to satisfy a need is a resource", replied amma. "Look around you and observe, you will be able to identify many types of resources. The water you drink when you are thirsty, the electricity you use in your house, the rickshaw you use to get home from school, the textbook you use to study are all resources. Your father has prepared a tasty snack for you. The fresh vegetables he has used are also a resource".

Let's do

List out five resources you use in your home and five you use in your classroom.

Water, electricity, rickshaw, vegetable and textbook have something in common. They have all been used by you, so they have **utility**. Utility or usability is what makes an object or substance a resource.

*"How does something become a resource?" Raju now wanted to know. Amma told the children that things become resources only when they have a value. "Its use or utility gives it a value. All resources have some **value**." said Amma.*

Value means worth. Some resources have economic value, some do not. For example, metals may have an economic value, a beautiful landscape may not. But both are important and satisfy human needs.

Glossary

Patent: It means the exclusive right over any idea or invention.

Some resources can become economically valuable with time. Your grandmother's home remedies have no commercial value today. But if they are patented and sold by a medical firm tomorrow, they could become economically valuable.

Glossary

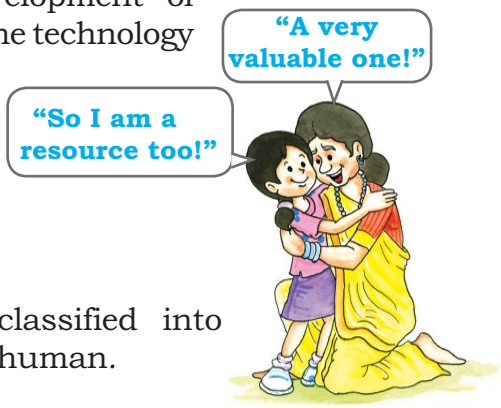
Technology: It is the application of latest knowledge and skill in doing or making things.

Activity

Circle those resources from Amma's list that have no commercial value as yet.

Amma's List
Cotton cloth
Iron ore
Intelligence
Medicinal plants
Medical knowledge
Coal deposits
Beautiful scenery
Agricultural land
Clean environment
Old folk songs
Good weather
Resourcefulness
A good singing voice
Grandmother's home remedies
Affection from friends and family

Time and technology are two important factors that can change substances into resources. Both are related to the needs of the people. People themselves are the most important resource. It is their ideas, knowledge, inventions and discoveries that lead to the creation of more resources. Each discovery or invention leads to many others. The discovery of fire led to the practice of cooking and other processes while the invention of the wheel ultimately resulted in development of newer modes of transport. The technology to create hydroelectricity has turned energy in fast flowing water into an important resource.



Types of Resources

Resources are generally classified into natural, human made and human.

Natural Resources

Resources that are drawn from Nature and used without much modification are called **natural resources**. The air we breathe, the water in our rivers and lakes, the soils, minerals are all natural resources. Many of these resources are free gifts of nature and can be used directly. In some cases tools and technology may be needed to use a natural resource in the best possible way.

Natural resources are classified into different groups depending upon their **level of development** and **use**; **origin**; **stock** and **distribution**.

On the basis of their development and use resources can be classified into two groups, **actual** resources and **potential** resources.

Actual resources are those resources whose quantity is known. These resources are being used in the present. The rich deposits of coal in Ruhr region of Germany and petroleum in the West Asia, the dark soils of the Deccan plateau in Maharashtra are all actual resources.

Potential resources are those whose entire quantity may not be known and these are not being used at

present. These resources could be used in the future. The level of technology we have at present may not be advanced enough to easily utilise these resources. The uranium found in Ladakh is an example of potential resource that could be used in the future. High speed winds were a potential resource two hundred years ago. Today they are an actual resource and wind farms generate energy using windmills like in Netherlands. You will find some in Nagercoil in Tamil Nadu and on the Gujarat coast.

Fig. 1.1: Windmills

Based on their **origin**, resources can be **abiotic** or **biotic**. Abiotic resources are non-living while biotic resources are living. Soils, rocks and minerals are abiotic but plants and animals are biotic resources.

Natural resources can be broadly categorised into **renewable** and **non-renewable** resources.

Renewable resources are those which get renewed or replenished quickly. Some of these are unlimited and are not affected by human activities, such as solar and wind energy. Yet careless use of certain renewable resources like water, soil and forest can affect their stock. Water seems to be an unlimited renewable resource. But shortage and drying up of natural water sources is a major problem in many parts of the world today.

Glossary

Stock of Resource
It is the amount of resources available for use.

Non-renewable resources are those which have a limited stock. Once the stocks are exhausted it may take thousands of years to be renewed or replenished. Since this period is much more than human life spans, such resources are considered non-renewable. Coal, petroleum and natural gas are some examples.

Let's do

Think of a few renewable resources and mention how their stock may get affected by overuse.

On the basis of their distribution resources can be **ubiquitous** or **localised**. Resources that are found everywhere like the air we breathe, are ubiquitous. But those which are found only in certain places are localised, like copper and iron ore.

The distribution of natural resources depends upon number of physical factors like terrain, climate and altitude. The distribution of resources is unequal because these factors differ so much over the earth.

Let's do

Make a list of five human made resources that you can observe around you.

Do you know?

Human Resource refer to the number (quantity) and abilities (mental and physical) of the people. Though, there are differing views regarding treatment of humans as a resource, one cannot deny the fact that it is the abilities of human that help in transfering the physical material into valuable resource.

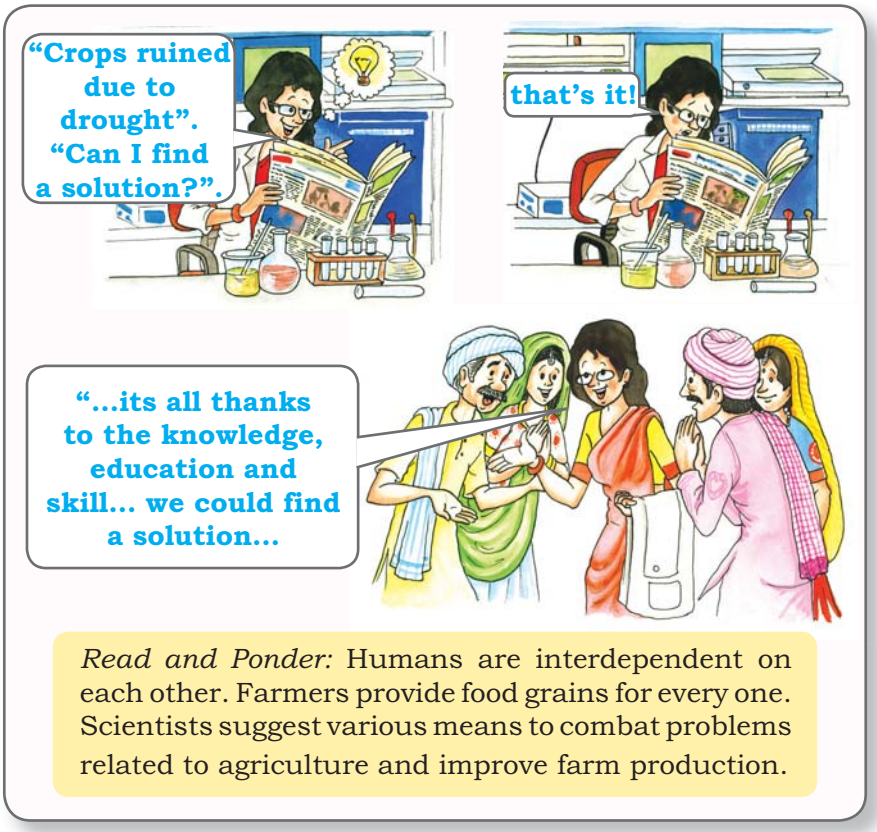
Human Made Resources

Sometimes, natural substances become resources only when their original form has been changed. Iron ore was not a resource until people learnt to extract iron from it. People use natural resources to make buildings, bridges, roads, machinery and vehicles, which are known as **human made resources**. Technology is also a human made resource.

"So people like us use natural resources to make human made resources," said Mona nodding in understanding. "Yes," said Raju.

Human Resources

People can make the best use of nature to create more resources when they have the knowledge, skill and the technology to do so. That is why human beings are a special resource. **People are human resources**. Education and health help in making people a valuable resource. Improving the quality of people's skills so that they are able to create more resources is known as **human resource development**.



Read and Ponder: Humans are interdependent on each other. Farmers provide food grains for every one. Scientists suggest various means to combat problems related to agriculture and improve farm production.

Conserving Resources

Mona had a nightmare. She dreamt that all the water on the earth had dried up and all the trees cut down. There was no shade and nothing to eat or drink. People were suffering and roaming around desperately looking for food and shade.

She told her mother about the dream. "Amma can this really happen?" she asked.

"Yes," Amma replied. "If we are not careful then even renewable resources can become very scarce and the non- renewable ones can definitely get exhausted". "What can we do about it," Raju asked. "Lots," replied Amma.

Using resources carefully and giving them time to get renewed is called **resource conservation**. Balancing the need to use resources and also conserve them for the future is called **sustainable development**. There are many ways of conserving resources. Each person can contribute by reducing consumption, recycling and reusing thing. Ultimately it makes a difference because all our lives are linked.

Glossary

Sustainable Development
Carefully utilising resources so that besides meeting the requirements of the present, also takes care of future generations.

That evening the children and their friends made packets and shopping bags out of old newspapers, discarded clothes and baskets from bamboo sticks. "We will give a few to every family we know," said Mona. "After all it is for a very good cause," said Mustafa, "To save our resources and to keep our earth alive".

"I am going to be very careful not to waste paper," said Jessy. "Many trees are cut down to make paper," she explained.

"I will see that electricity is not wasted in my house," shouted Mustafa. "Electricity comes from water and coal."

Some Principles of Sustainable Development

- Respect and care for all forms of life
- Improve the quality of human life
- Conserve the earth's vitality and diversity
- Minimise the depletion of natural resources
- Change personal attitude and practices toward the environment
- Enable communities to care for their own environment.

"I will make sure that water is not wasted at home," said Asha. "Every drop of water is precious"

"Together we can make a difference!" chorused the children.

These are some of the things Mona, Raju and their friends did. What about you? How are you going to help in conserving resources?

The future of our planet and its people is linked with our ability to maintain and preserve the life support system that nature provides. Therefore it is our duty to ensure that.

- all uses of renewable resources are sustainable
- the diversity of life on the earth is conserved
- the damage to natural environmental system is minimised.

Exercises

1. Answer the following questions.

(i) Why are resources distributed unequally over the earth?

(ii) What is resource conservation?

(iii) Why are human resources important?

(iv) What is sustainable development?

2. Tick the correct answer.

(i) Which one of the following does NOT make substance a resource?

(a) utility (b) value (c) quantity

(ii) Which one of the following is a human made resource?

(a) medicines to treat cancer

(b) spring water

(c) tropical forests

(iii) Complete the statement.

Biotic resources are

(a) derived from living things

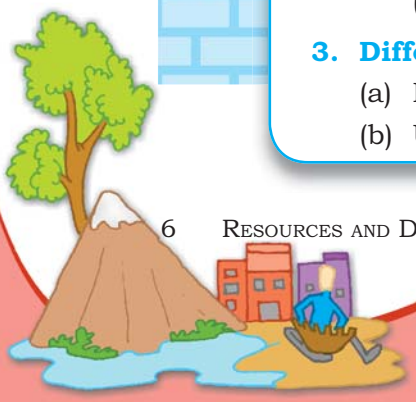
(b) made by human beings

(c) derived from non-living things

3. Differentiate between the followings.

(a) Potential and actual resources

(b) Ubiquitous and localised resources



4. Activity

"*Rahiman paani raakhiye,*
Bin paani sab soon.
Paani gaye na ubere
Moti, manus, choon..."

[Says Rahim, keep water, as without water there is nothing. Without water pearl, swan and dough cannot exist.]

These lines were written by the poet Abdur Rahim Khankhana, one of the nine gems of Akbar's court. What kind of resource is the poet referring to? Write in 100 words what would happen if this resource disappeared?

For Fun

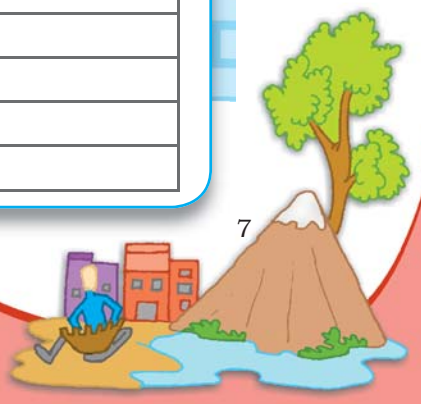
1. Pretend that you live in the prehistoric times on a high windy plateau. What are the uses you and your friends could put the fast winds to? Can you call the wind a resource?

   Now imagine that you are living in the same place in the year 2138. Can you put the winds to any use? How? Can you explain why the wind is an important resource now?

2. Pick up a stone, a leaf, a paper straw and a twig. Think of how you can use these as resources. See the example given below and get creative!

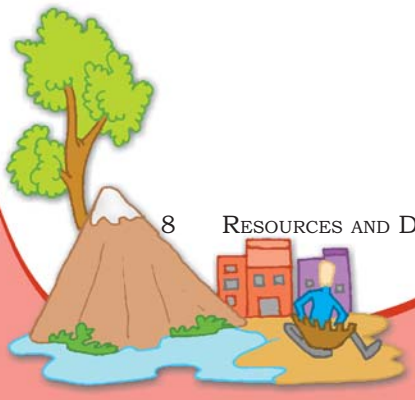
You can use a stone... 	**Use/Utility**
To play *stapu*	toy
As a paper-weight	tool
To crush spices	tool
To decorate your garden/room	decoration piece
To open a bottle	tool
In a catapult	weapon

You can use a leaf... 	**Use/Utility**



You can use a straw... 	Use/Utility

You can use a twig... 	Use/Utility



3 Mineral and Power Resources

Fig. 3.1: *Uploading of a truck in a coal mine*

Kiri is visiting Sukant in his native place near Dhanbad. Kiri is amazed to see that large areas were black. "Sukant, why is this place so black and dusty?" "This is because of the coal mines nearby. Do you see the trucks? They are carrying the mineral coal".

"What are minerals?," asks Kiri. Sukant says, "Have you ever seen a baker baking biscuits? The flour, milk, sugar and sometimes eggs are mixed together. While eating the baked biscuits can you see these ingredients separately? Just as in the biscuits, there are a number of things that you cannot see, rocks on this earth have several materials called minerals mixed in them. These minerals are scattered throughout the earth's rocky crust".

A naturally occurring substance that has a definite chemical composition is a **mineral**. Minerals are not evenly distributed over space. They are concentrated in a particular area or rock formations. Some minerals are found in areas which are not easily accessible such as the Arctic ocean bed and Antarctica.

Minerals are formed in different types of geological environments, under varying conditions. They are created by natural processes without any human interference. They can be identified on the basis of their physical properties such as colour, density, hardness and chemical property such as solubility.

Do you know?
The salt in your food and graphite in your pencil are also minerals.

Types of Minerals

There are over three thousand different minerals. On the basis of composition, minerals are classified mainly as metallic and non-metallic minerals (Fig. 3.2).

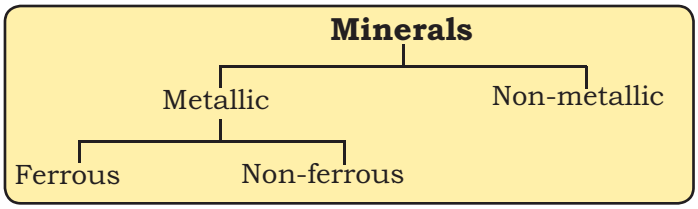


Fig. 3.2: Classification of Minerals

The **metallic** minerals contain metal in raw form. Metals are hard substances that conduct heat and electricity and have a characteristic lustre or shine. Iron ore, bauxite, manganese ore are some examples. Metallic minerals may be ferrous or non-ferrous. **Ferrous** minerals like iron ore, manganese and chromites contain iron. A **non-ferrous** mineral does not contain iron but may contain some other metal such as gold, silver, copper or lead.

The **non-metallic** minerals do not contain metals. Limestone, mica and gypsum are examples of such minerals. The mineral fuels like coal and petroleum are also non-metallic minerals.

Minerals can be extracted by mining, drilling or quarrying (Fig 3.3).

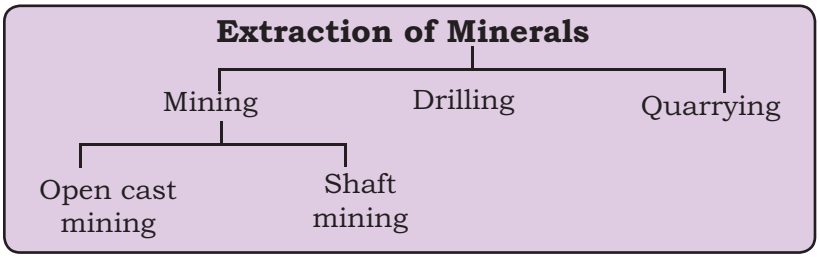


Fig. 3.3: Extraction of Minerals

The process of taking out minerals from rocks buried under the earth's surface is called **mining**. Minerals that lie at shallow depths are taken out by removing the surface layer; this is known as **open-cast mining**. Deep bores, called **shafts**, have to be made to reach mineral deposits that lie at great depths. This is called **shaft mining**. Petroleum and natural gas occur far below the earth's surface. Deep wells are bored to take them out, this is called **drilling** (Fig 3.4). Minerals that lie near the surface are simply dug out, by the process known as **quarrying**.

Do you know?

A **rock** is an aggregate of one or more minerals but without definite composition of constituent of mineral. Rocks from which minerals are mined are known as **ores**. Although more than 2,800 types of minerals have been identified, only about 100 are considered **ore** minerals. Thus one can easily notice that all minerals are rocks but all rocks are not minerals.

Fig. 3.4: Off shore drilling of oil

Distribution of Minerals

Minerals occur in different types of rocks. Some are found in igneous rocks, some in metamorphic rocks while others occur in sedimentary rocks. Generally, metallic minerals are found in igneous and metamorphic rock formations that form large plateaus. Iron-ore in north Sweden, copper and nickel deposits in Ontario, Canada, iron, nickel, chromites and platinum in South Africa are examples of minerals found in igneous and metamorphic rocks. Sedimentary rock formations of plains and young fold mountains contain non-metallic minerals like limestone. Limestone deposits of Caucasus region of France, manganese deposits of Georgia and Ukraine and phosphate beds of Algeria are some examples. Mineral fuels such as coal and petroleum are also found in the sedimentary strata.

Do you know?

You can always tell if a rock contains copper because then the rock looks blue in colour.

Asia

China and India have large iron ore deposits. The continent produces more than half of the world's tin.

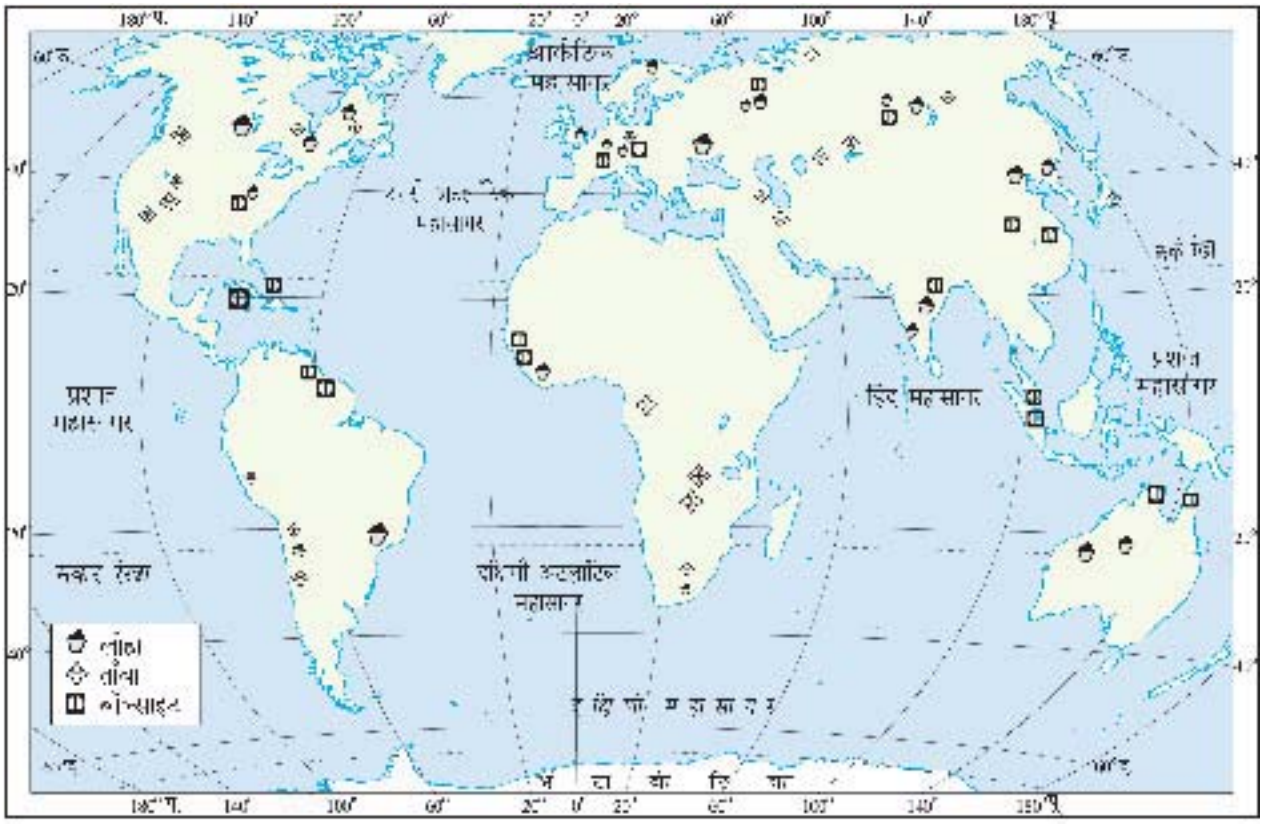


Fig. 3.5: World: Distribution of Iron, Copper and Bauxite

China, Malaysia and Indonesia are among the world's leading tin producers. China also leads in production of lead, antimony and tungsten. Asia also has deposits of manganese, bauxite, nickel, zinc and copper.

Europe

Europe is the leading producer of iron-ore in the world. The countries with large deposits of iron ore are Russia, Ukraine, Sweden and France. Minerals deposits of copper, lead, zinc, manganese and nickel are found in eastern Europe and European Russia.

Do you know?
Switzerland has no known mineral deposit in it.

North America

The mineral deposits in North America are located in three zones: the Canadian region north of the Great Lakes, the Appalachian region and the mountain ranges of the west. Iron ore, nickel, gold, uranium and copper are mined in the Canadian Shield Region, coal in the Appalachians region. Western Cordilleras have vast deposits of copper, lead, zinc, gold and silver.

Let's do
Identify Canadian Shield, Appalachians, Western Cordilleras and Lake Superior with the help of an atlas.

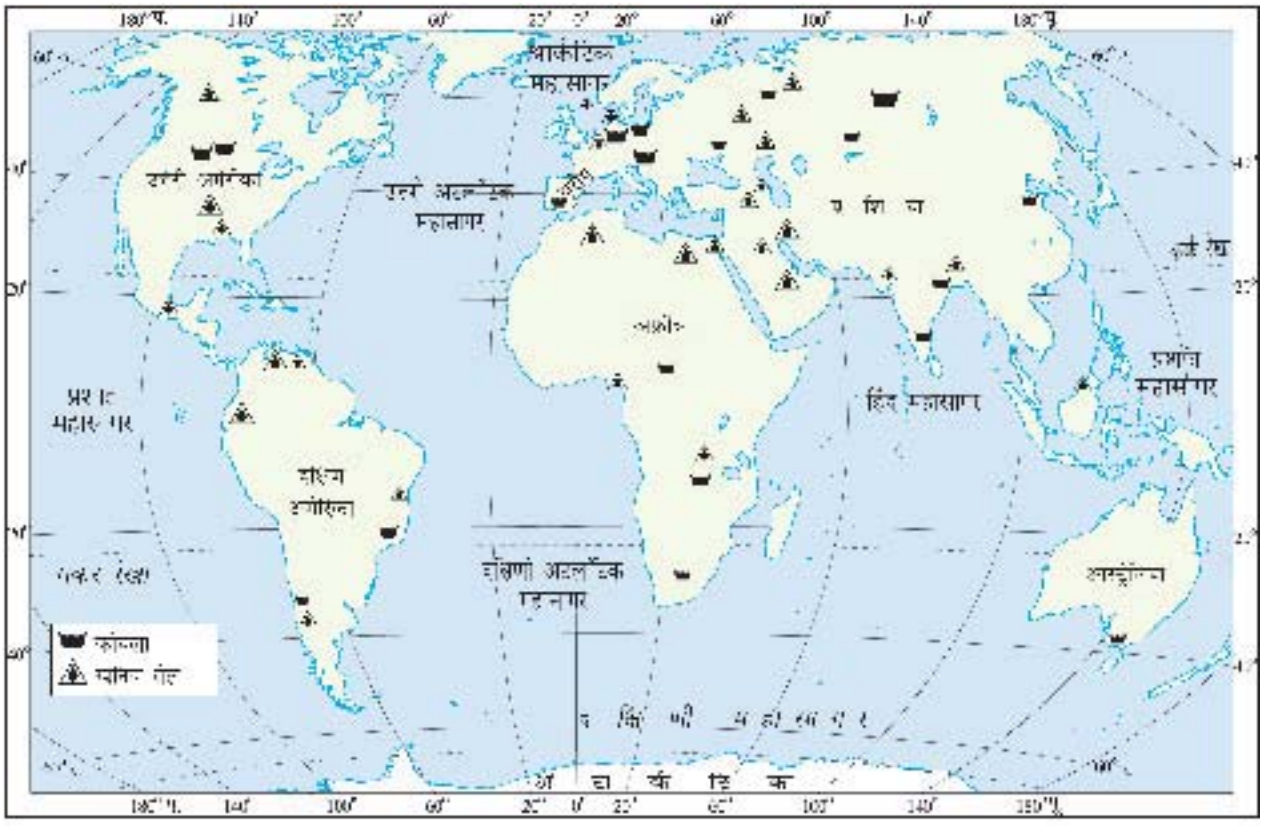


Fig 3.6: World: Distribution of Mineral Oil and Coal

South America

Brazil is the largest producer of high grade iron-ore in the world. Chile and Peru are leading producers of copper. Brazil and Bolivia are among the world's largest producers of tin. South America also has large deposits of gold, silver, zinc, chromium, manganese, bauxite, mica, platinum, asbestos and diamond. Mineral oil is found in Venezuela, Argentina, Chile, Peru and Columbia.

Do you know?

- A green diamond is the rarest diamond.
- The oldest rocks in the world are in Western Australia. They date from 4,300 million years ago, only 300 million years after the earth was formed.

Africa

Africa is rich in mineral resources. It is the world's largest producer of diamonds, gold and platinum. South Africa, Zimbabwe and Zaire produce a large portion of the world's gold. The other minerals found in Africa are copper, iron ore, chromium, uranium, cobalt and bauxite. Oil is found in Nigeria, Libya and Angola.

Australia

Australia is the largest producer of bauxite in the world. It is a leading producer of gold, diamond, iron ore, tin and nickel. It is also rich in copper, lead, zinc and manganese. Kalgoorlie and Coolgardie areas of western Australia have the largest deposits of gold.

Activity

On an outline map of India, mark the distribution of iron, bauxite, manganese and mica with the help of an atlas.

Antarctica

The geology of Antarctica is sufficiently well known to predict the existence of a variety of mineral deposits, some probably large. Significant size of deposits of coal in the Transantarctic Mountains and iron near the Prince Charles Mountains of East Antarctica is forecasted. Iron ore, gold, silver and oil are also present in commercial quantities.

Distribution in India

Iron: India has deposits of high grade iron ore. The mineral is found mainly in Jharkhand, Orissa, Chhattisgarh, Madhya Pradesh, Goa, Maharashtra and Karnataka.

Bauxite: Major bauxite producing areas are Jharkhand, Orissa, Chhattisgarh, Madhya Pradesh, Gujarat, Maharashtra and Tamil Nadu.

Mica: Mica deposits mainly occur in Jharkhand, Bihar, Andhra Pradesh and Rajasthan. India is the largest producer and exporter of mica in the world.

Copper: It is mainly produced in Rajasthan, Madhya Pradesh, Jharkhand, Karnataka and Andhra Pradesh.

Manganese: India's manganese deposits lie in Maharashtra, Madhya Pradesh, Chhattisgarh, Orissa, Karnataka and Andhra Pradesh.

Limestone: Major limestone producing states in India are Bihar, Jharkhand, Orissa, Madhya Pradesh, Chhattisgarh, Rajasthan, Gujarat and Tamil Nadu.

Gold: Kolar in Karnataka has deposits of gold in India. These mines are among the deepest in the world which makes mining of this ore a very expensive process.

Salt: It is obtained from seas, lakes and rocks (Fig 3.8). India is one of the world's leading producers and exporters of salt.

Fig. 3.7: *Quarrying of limestone*

Fig. 3.8: *Extraction of salt from Sambhar lake in Rajasthan*

Uses of Minerals

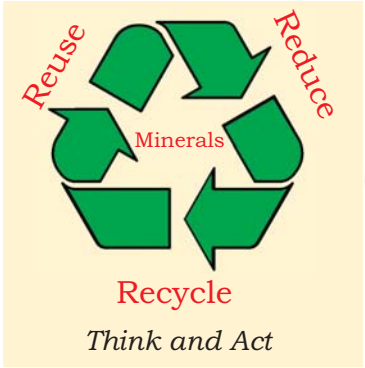
Minerals are used in many industries. Minerals which are used for gems are usually hard. These are then set in various styles for jewellery. Copper is another metal used in everything from coins to pipes. Silicon, used in the computer industry is obtained from quartz. Aluminum obtained from its ore bauxite is used in automobiles and airplanes, bottling industry, buildings and even in kitchen cookware.

Let's do

List uses of any five minerals.

Conservation of Minerals

Minerals are a non-renewable resource. It takes thousands of years for the formation and concentration of minerals. The rate of formation is much smaller than the rate at which the humans consume these minerals. It is necessary to reduce wastage in the process of mining. Recycling of metals is another way in which the mineral resources can be conserved.



Think and Act

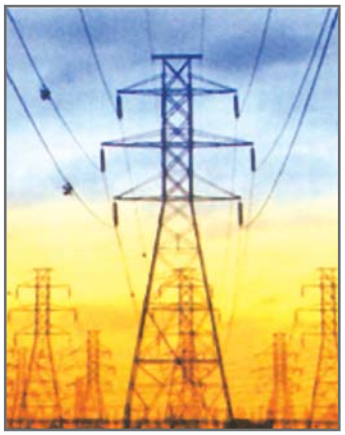


Fig. 3.9: National Power Grid to supply Electricity

Power Resources

Sunny's mother begins her day by switching on the geyser. She irons Sunny's school uniform before waking him up. She then rushes to the kitchen to prepare a glass of orange juice for him in the blender.

"Sunny, have you finished taking bath? Come and have your breakfast", calls out mother while preparing breakfast on the gas stove for Sunny.

While going to school Sunny forgets to switch off lights and fans. When mother switches them off she thinks that life in the cities may be more comfortable, but its dependency on more and more gadgets all of which consume energy has led to a wide gap between the demand and the supply. With the advent of science and technology the life styles are changing very fast.

Power or energy plays a vital role in our lives. We also need power for industry, agriculture, transport, communication and defense. Power resources may be broadly categorised as conventional and non-conventional resources.

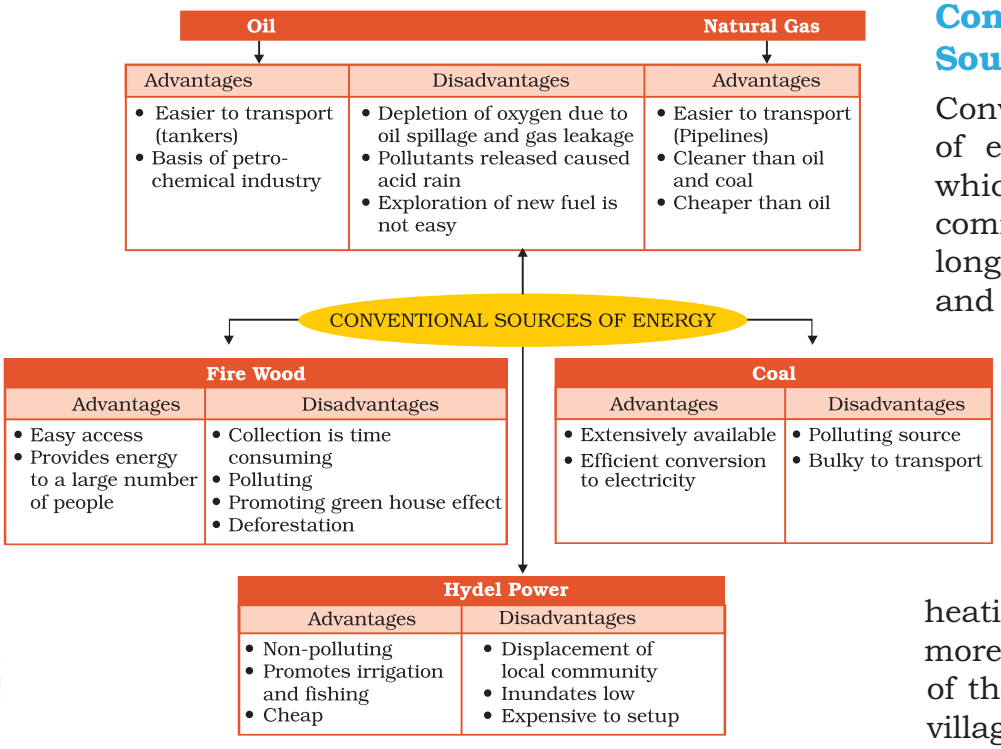


Fig 3.10: Conventional Sources of Energy

Conventional Sources

Conventional sources of energy are those which have been in common use for a long time. Firewood and fossil fuels are the two main conventional energy sources.

Firewood

It is widely used for cooking and heating. In our country more than fifty per cent of the energy used by villagers comes from fire wood.

Remains of plants and animals which were buried under the earth for millions of years got converted by the heat and pressure into fossil fuels. **Fossil fuel** such as coal, petroleum and natural gas are the main sources of conventional energy. The reserves of these minerals are limited. The rate at which the growing world population is consuming them is far greater than the rate of their formation. So, these are likely to be exhausted soon.

Fig 3.11: *A woman carrying firewood in North East India*

Coal

This is the most abundantly found fossil fuel. It is used as a domestic fuel, in industries such as iron and steel, steam engines and to generate electricity. Electricity from coal is called **thermal power**. The coal which we are using today was formed millions of years ago when giant ferns and swamps got buried under the layers of earth. Coal is therefore referred to as **Buried Sunshine**.

The leading coal producers of the world are China, USA, Germany, Russia, South Africa and France. The coal producing areas of India are Raniganj, Jharia, Dhanbad and Bokaro in Jharkhand.

Fig 3.12: *A view of a Thermal Power Station*

Petroleum

The petrol that keeps your car running as well as the oil that keeps your cycle from squeaking, both began as a thick black liquid called Petroleum. It is found between the layers of rocks and is drilled from oil fields located in off-shore and coastal areas. This is then sent to refineries which process the crude oil and produce a variety of products like diesel, petrol, kerosene, wax, plastics and lubricants. Petroleum and its derivatives are called **Black Gold** as they are very valuable. The chief petroleum producing countries are Iran, Iraq, Saudi Arabia and Qatar. The other major producers are USA, Russia, Venezuela, and Algeria. The leading producers in India are Digboi in Assam, Bombay High in Mumbai and the deltas of Krishna and Godavari rivers.

Fig 3.13: *Crude Oil*

Word Origin

The word petroleum is derived from Latin words –*Petra* meaning rock, *oleum* meaning oil. So, petroleum means rock oil.

Natural Gas

Natural gas is found with petroleum deposits and is released when crude oil is brought to the surface. It can be used as a domestic and industrial fuel. Russia, Norway, UK and the Netherlands are the major producers of natural gas.

In India Jaisalmer, Krishna Godavari delta, Tripura and some areas off shore in Mumbai have natural gas resources. Very few countries in the world have sufficient natural gas reserves of their own.

The sharp increase in our consumption of fossil fuels has led to their depletion at an alarming rate. The toxic pollutants released from burning these fuels are also a cause for concern. Unchecked burning of fossil fuel is like an unchecked dripping tap which will eventually run dry. This has led to the tapping of various non-conventional sources of energy that are cleaner alternatives to fossil fuels.

Do you know?

Compressed natural gas (CNG) is a popular eco-friendly automobile fuel as it causes less pollution than petroleum and diesel.

Hydel Power

Rain water or river water stored in dams is made to fall from heights. The falling water flows through pipes inside the dam over turbine blades placed at the bottom of the dam. The moving blades then turn the generator to produce electricity. This is called hydro electricity. The water discharged after the generation of electricity is used for irrigation. One fourth of the world's electricity is produced by hydel power. The leading producers of hydel power in the world are Paraguay, Norway, Brazil, and

Do you know?

Norway was the first country in the world to devlop hydroelectricity.

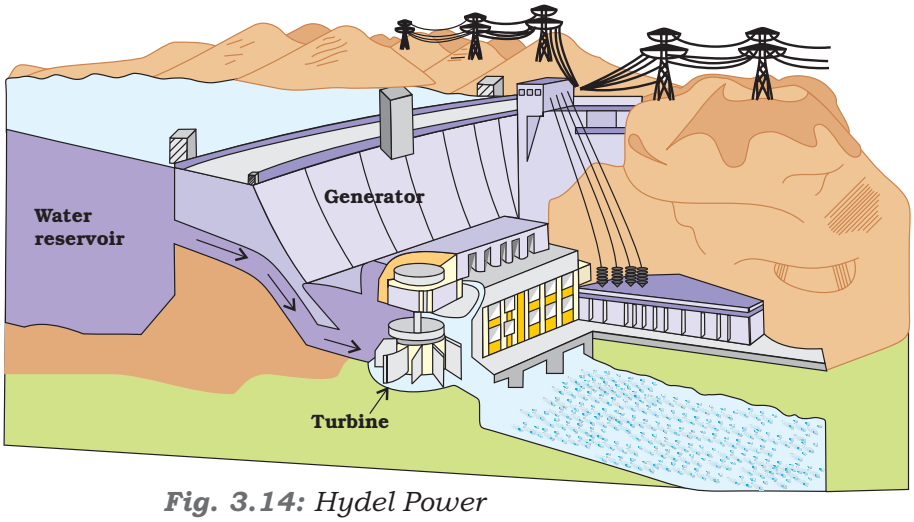


Fig. 3.14: Hydel Power

China. Some important hydel power stations in India are Bhakra Nangal, Gandhi Sagar, Nagarjunsagar and Damodar valley projects.

Fig. 3.15: Salal Hydroelectric Project Jammu and Kashmir

Non-conventional Sources of Energy

The increasing use of fossil fuels is leading to its shortage. It is estimated that if the present rate of consumption continues, the reserves of these fuel will get exhausted. Moreover, their use also causes environmental pollution. Therefore, there is need for using non-conventional sources such as solar energy, wind energy, tidal energy which are renewable.

Solar energy

Sun's heat and light energy can be felt by us every day. Solar energy trapped from the sun can be used

Wind Energy

Advantages	Disadvantages
• Non-polluting • Low cost production of electricity once setup • Safe and clean	• Noise pollution • Wind mills costly to setup • Disturbs radio and T.V . reception • Harmful to birds

Solar Energy

Advantages	Disadvantages
• Inexhaustible • Non polluting	• Expensive • Diffused source, so gets wasted

Tidal Energy

Advantages	Disadvantages
• Non-polluting • Inexhaustible	• Destroys wildlife habitat • Difficult to harness

NON- CONVENTIONAL SOURCES OF ENERGY

Nuclear Energy

Advantages	Disadvantages
• Emits large amount of energy	• Generates radioactive waste • Expensive

Bio Gas

Advantages	Disadvantages
• Low Cost • Easy to operate • Makes use of bio waste	• Causes green house effect

Geothermal Energy

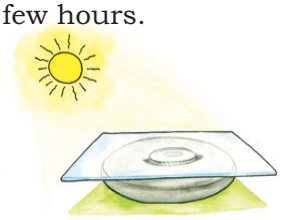
Advantages	Disadvantages
• Clean ecofriendly and always available	• Located far away from cities and so costly to transport the electricity

Fig 3.16: Non-conventional Sources of Energy

Activity

Solar Worker

Take an old car tube. Inflate it and keep it on a wooden platform. Paint an aluminium vessel black from outside and add 1 cup rice with 2 cups of water to it. Close the vessel with a lid and place the vessel in the inner circle of the tube. Now place a glass frame over the tube and keep the set out in sun. After the glass frame is placed, air can neither come in or go out but the sun rays coming into the closed cavity enclosed by the tube, get trapped and cannot escape. The temperature increases slowly cooking the rice over few hours.



in solar cells to produce electricity. Many of these cells are joined into solar panels to generate power for heating and lighting purpose. The technology of utilising solar energy benefits a lot of tropical countries that are blessed with abundant sun shine. Solar energy is also used in solar heaters, solar cookers, solar dryers besides being used for community lighting and traffic signals.

Fig 3.17: *Solar Panels to trap solar energy*

Wind Energy

Wind is an inexhaustible source of energy. Wind mills have been used for grinding grain and lifting water since times immemorial. In modern time wind mills, the high speed winds rotate the wind mill which is connected to a generator to produce electricity. Wind farms having clusters of such wind mills are located in coastal regions and in mountain passes where strong and steady winds blow. Windfarms are found in Netherlands, Germany, Denmark, UK, USA and Spain are noted for their wind energy production.

Nuclear Power

Nuclear power is obtained from energy stored in the nuclei of atoms of naturally occurring radio active elements like uranium and thorium. These fuels undergo nuclear fission in nuclear reactors and emit power. The greatest producers of nuclear power are USA and Europe. In India Rajasthan and Jharkhand have large deposits of Uranium. Thorium is found in large quantities in the Monozite sands of Kerala. The nuclear power stations in India

Fig. 3.18 *: Nuclear power station , Kalpakkam*

Do you know?

The site of the world's first solar and wind powered bus shelter is in Scotland.

are located in Kalpakkam in Tamilnadu, Tarapur in Maharastra, Ranapratap Sagar near Kota in Rajasthan, Narora in Uttar Pradesh and Kaiga in Karnataka.

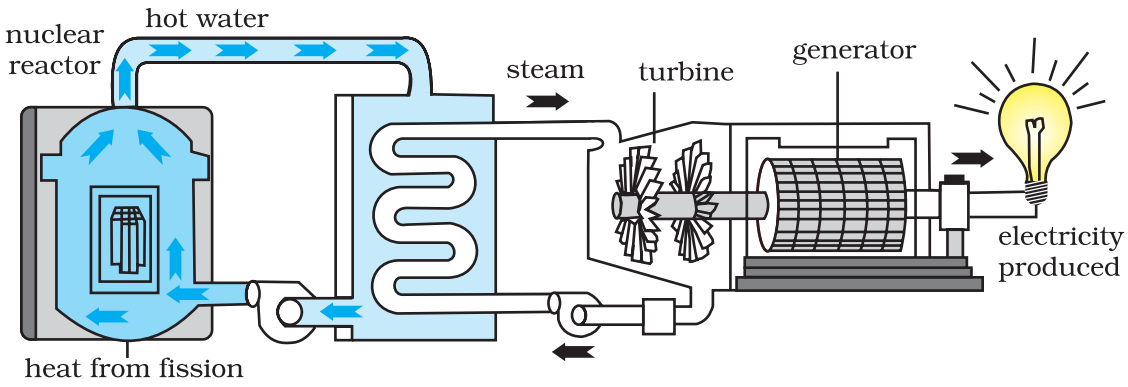


Fig. 3.19 : Nuclear Energy

Geothermal Energy

Heat energy obtained from the earth is called **geothermal energy**. The temperature in the interior of the earth rises steadily as we go deeper. Some times this heat energy may surface itself in the form of hot springs. This heat energy can be used to generate power. Geothermal energy in the form of hot springs has been used for cooking, heating and bathing for several

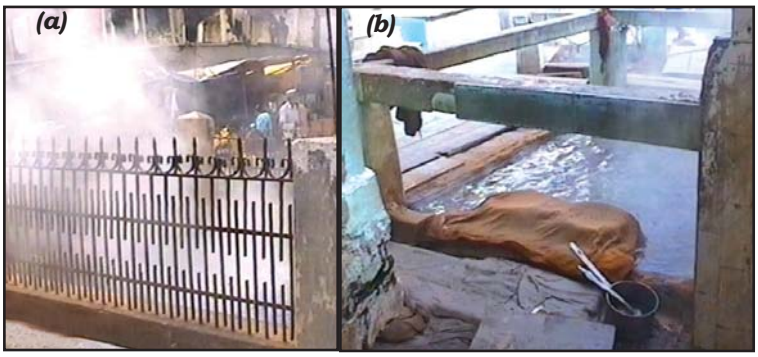


Fig. 3.20 : ***(a)*** *Geothermal Energy in Manikaran*
(b) *Cooking food with the help of Geothermal Energy*

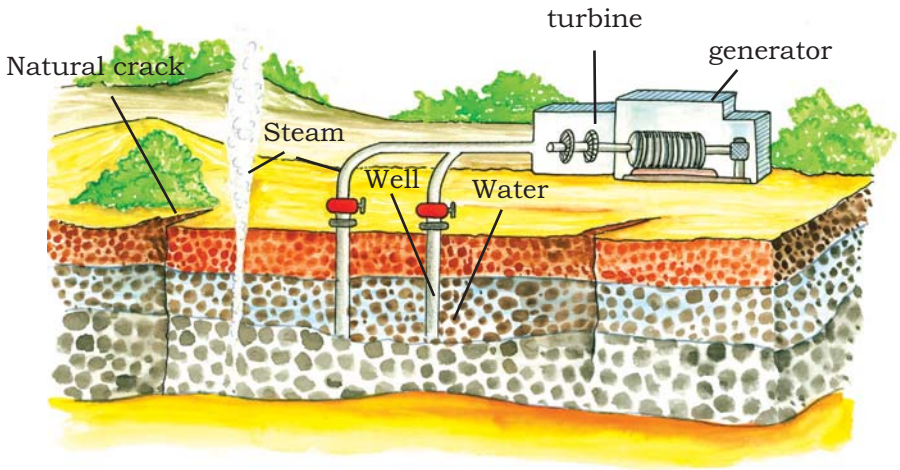


Fig. 3.21 : Geothermal Energy

years. USA has the world's largest geothermal power plants followed by New Zealand, Iceland, Philippines and Central America. In India, geothermal plants are located in Manikaran in Himachal Pradesh and Puga Valley in Ladakh.

Tidal Energy

Energy generated from tides is called **tidal energy**. Tidal energy can be harnessed by building dams at narrow openings of the sea. During high tide the energy of the tides is used to turn the turbine installed in the dam to produce electricity. Russia, France and the Gulf of Kachchh in India have huge tidal mill farms.

Low tidal energy is used to produce electricity

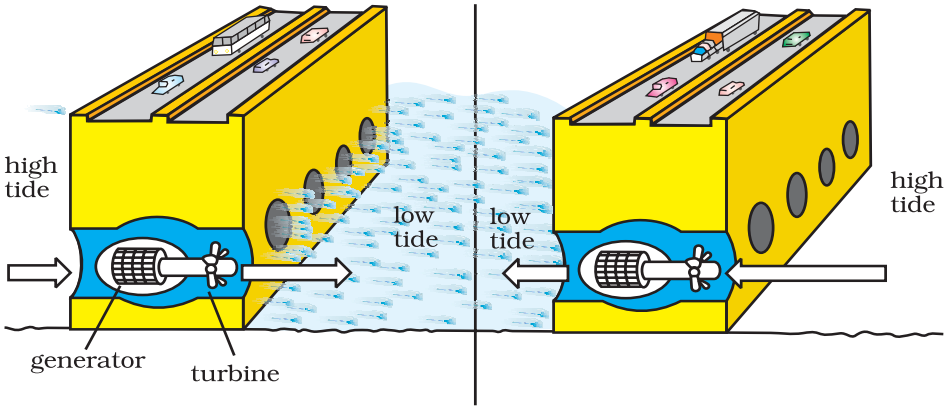


Fig. 3.22: Tidal Energy

Biogas

Organic waste such as dead plant and animal material, animal dung and kitchen waste can be converted into a gaseous fuel called biogas. The organic waste is decomposed by bacteria in biogas digesters to emit biogas which is essentially a mixture of methane and carbon dioxide. Biogas is an excellent fuel for cooking and lighting and produces huge amount of organic manure each year.

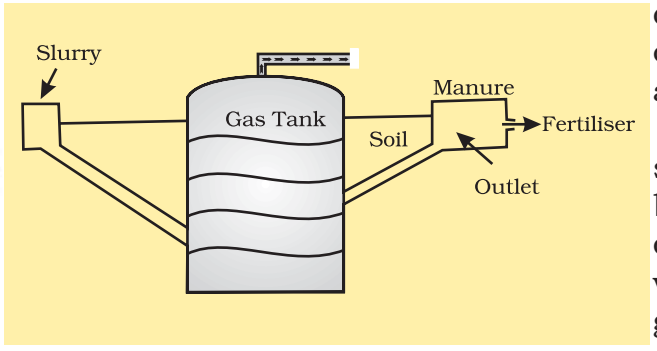


Fig. 3.23 : Biogas

Energy is everywhere but we can see that harnessing this energy is both difficult as well as costly. Each one of us can make a difference by not wasting energy. Energy saved is energy generated. Act now and make brighter energy future.

Exercises

1. Answer the following questions.

(i) Name any three common minerals used by you every day.

(ii) What is an ore? Where are the ores of metallic minerals generally located?

(iii) Name two regions rich in natural gas resources.

(iv) Which sources of energy would you suggest for

(a) rural areas (b) coastal areas (c) Arid regions

(v) Give five ways in which you can save energy at home.

2. Tick the correct answer.

(i) Which one of the following is NOT a characteristic of minerals?

(a) They are created by natural processes.

(b) They have a definite chemical composition.

(c) They are inexhaustible.

(d) Their distribution is uneven.

(ii) Which one of the following is NOT a producer of mica?

(a) Jharkhand (c) Rajasthan

(b) Karnataka (d) Andhra Pradesh

(iii) Which one of the following is a leading producer of copper in the world?

(a) Bolivia (c) Chile

(b) Ghana (d) Zimbabwe

(iv) Which one of the following practices will NOT conserve LPG in your kitchen.

(a) Soaking the dal for some time before cooking it.

(b) Cooking food in a pressure cooker.

(c) Keeping the vegetables chopped before lighting the gas for cooking.

(d) Cooking food in an open pan kept on low flame.

3. Give reasons.

(i) Environmental aspects must be carefully looked into before building huge dams.

(ii) Most industries are concentrated around coal mines.

(iii) Petroleum is referred to as "black gold".

(iv) Quarrying can become a major environmental concern.

4. Distinguish between the followings.

(i) Conventional and non conventional sources of energy

(ii) Biogas and natural gas

(iii) Ferrous and nonferrous minerals

(iv) Metallic and nonmetallic minerals

5. Activity

(i) Use pictures from old magazines to show different kinds of fuels used by us in our lives and display them on your bulletin board.

(ii) Design a poster highlighting energy conservation tips you would take for your school.

(iii) Salma's class took up an action campaign to do an energy audit of their school by surveying electricity consumption.They prepared survey sheets for the students of the school.

Electricity Audit

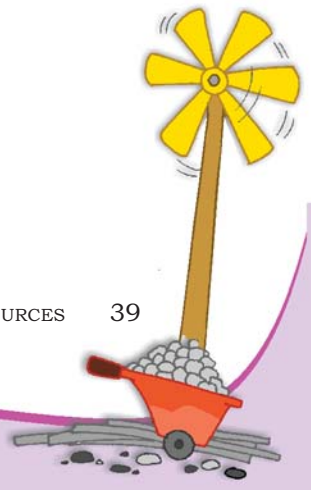
Sl. No.	**Appliance**	**Quantity (No. being used)**	**Usage Time (Approx. No. of working hours)**	**Quantity (No. actual-ly needed)**	**Is it switched on even when not in use (Yes or No)**
1.	Fluorescent Tube light 40 W				
2.	Incandescent Bulb 40 W / 60 W				
3.	Co-impact fluorescent lamps				
4.	Fans				
5.	Exhaust Fans				
6.	Electric Bell / Buzzer				
7.	TV				
8.	Computers				
9.	Air Conditioners				
10.	Refrigerators				
11.	Oven / Hot Case				
12.	Public Address System				
13.	Water Pump / Water Cooler				
14.	Overhead Projector				
15.	Photostat Machine				
16.	Any other				

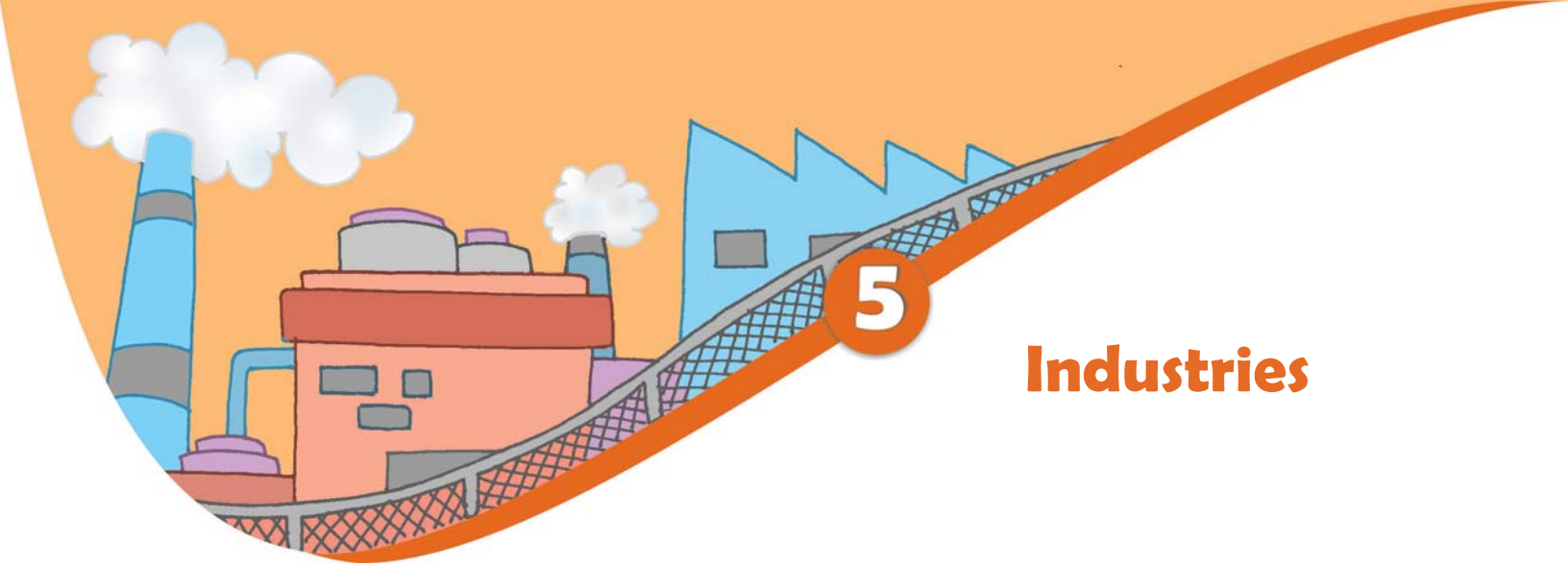
Using the data collected during the survey, students calculated the units consumed for one month and the approximate expenditure and compared it with the electricity bill of the previous month. They also calculated the approximate cost of electricity consumed by fans, lights and other appliances not switched off. Thus, they highlighted the amount that could be saved and suggested simple energy conservation habits like

- Switching off the appliances when not in use.
- Minimal usage as per requirement.
- Maximising the use of natural breeze and light by keeping the windows open.
- Keeping the lights dust free.
- The appropriate maintenance and usage of appliances as per the given instructions.

Can you add some more tips to this list?

You could conduct a similar survey at home and then extend it to your appartment and make your neighbours also energy wise.





5 Industries

Journey begins...

...paper made...
...recycle...

Have you ever given a thought to the fact that the note book you use for writing has come to you after a long process of manufacturing. It started its life as part of a tree. It was cut down and transported to the pulp mill. There the wood of the tree was processed and converted into wood pulp. The wood pulp was mixed with chemicals and finally changed into paper by machines. This paper found its way to the press where ink made from chemicals was used to print the lines on the pages. The pages were then bound in the form of a note book, packed and sent to the market for sale. Finally, it reached your hands.

Secondary activities or **manufacturing** change raw materials into products of more value to people. As you have seen pulp was changed into paper and paper into a note book. These represent the two stages of the manufacturing process.

The paper made from pulp and cloth made from cotton have had value added to them at each stage of the manufacturing process. In this way the finished product has more value and utility than the raw material that it is made from.

Industry refers to an economic activity that is concerned with production of goods, extraction of minerals or the provision of services. Thus we have iron and steel industry (production of goods), coal mining industry (extraction of coal) and tourism industry (service provider).

Activity

Trace the journey of your shirt from a cotton field to your wardrobe.

Classification of Industries

Industries can be classified on the basis of raw materials, size and ownership.

Raw Materials: Industries may be agro based, mineral based, marine based and forest based depending on the type of raw materials they use. **Agro based industries** use plant and animal based products as their raw materials. Food processing, vegetable oil, cotton textile, dairy products and leather industries are examples of agro-based industries. **Mineral based industries** are primary industries that use mineral ores as their raw materials. The products of these industries feed other industries. Iron made from iron ore is the product of mineral based industry. This is used as raw material for the manufacture of a number of other products, such as heavy machinery, building materials and railway coaches. **Marine based industries** use products from the sea and oceans as raw materials. Industries processing sea food or manufacturing fish oil are some examples. **Forest based industries** utilise forest produce as raw materials. The industries associated with forests are pulp and paper, pharmaceuticals, furniture and buildings.

Activity

Give some examples of agro based industries.

Size: It refers to the amount of capital invested, number of people employed and the volume of production. Based on size, industries can be classified into **small scale** and **large scale industries**. Cottage or household industries are a type of small scale industry where the products are manufactured by hand, by the artisans. Basket weaving, pottery and other handicrafts are examples of cottage industry. Small scale industries use lesser amount of capital and technology as compared to large scale industries that produce large volumes of products. Investment of capital is higher and the technology used is superior in large scale industries. Silk weaving and food processing industries are small scale industries(Fig 5.1). Production of automobiles and heavy machinery are large scale industries.

Fig 5.1: *Stages in food processing of Gorgon nut (makhana)*

Ownership: Industries can be classified into private sector, state owned or public sector, joint sector and cooperative sector. **Private sector industries** are owned and operated by individuals or a group of individuals. The public sector industries are owned and operated by the government, such as Hindustan Aeronautics Limited

Fig 5.2: Sudha dairy in Co-operative sector

and Steel Authority of India Limited. **Joint sector industries** are owned and operated by the state and individuals or a group of individuals. Maruti Udyog Limited is an example of joint sector industry. **Co-operative sector** industries are owned and operated by the producers or suppliers of raw materials, workers or both. Anand Milk Union Limited and Sudha Dairy are a success stories of a co-operative venture.

Factors Affecting Location of Industries

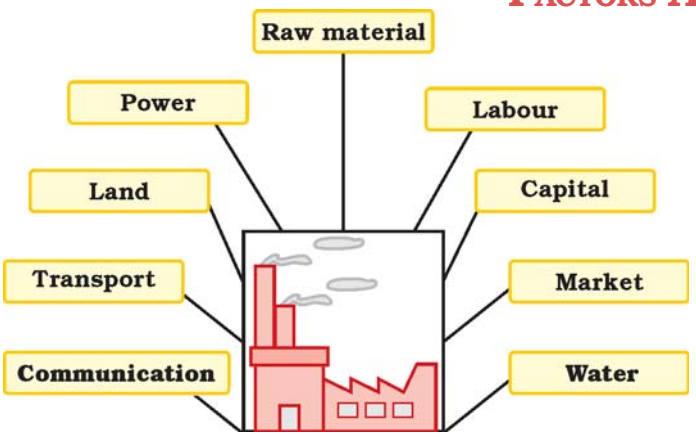


Fig 5.3: Locational factors of industries

The factors affecting the location of industries are the availability of raw material, land, water, labour, power, capital, transport and market. Industries are situate d where some or all of these factors are easily available. Sometimes, the government provides incentives like subsidised power, lower transport cost and other infrastructure so that industries may be located in backward areas. Industrialisation often leads to development and growth of towns and cities.

Industrial System

An industrial system consists of inputs, processes and outputs. The inputs are the raw materials, labour and costs of land, transport, power and other infrastructure. The processes include a wide range of activities that convert the raw material into finished products. The outputs are the end product and the income earned from it. In case of the textile industry the inputs may be cotton, human labour, factory and transport cost. The processes include ginning, spinning, weaving, dyeing and printing. The output is the shirt you wear.

Activity

Find out the inputs, outputs and processes involved in the manufacture of a leather shoe.

Industrial Regions

Industrial regions emerge when a number of industries locate close to each other and share the benefits of their closeness. Major industrial regions of the world are eastern North America, western and central Europe, eastern Europe and eastern Asia (Fig 5.4). Major

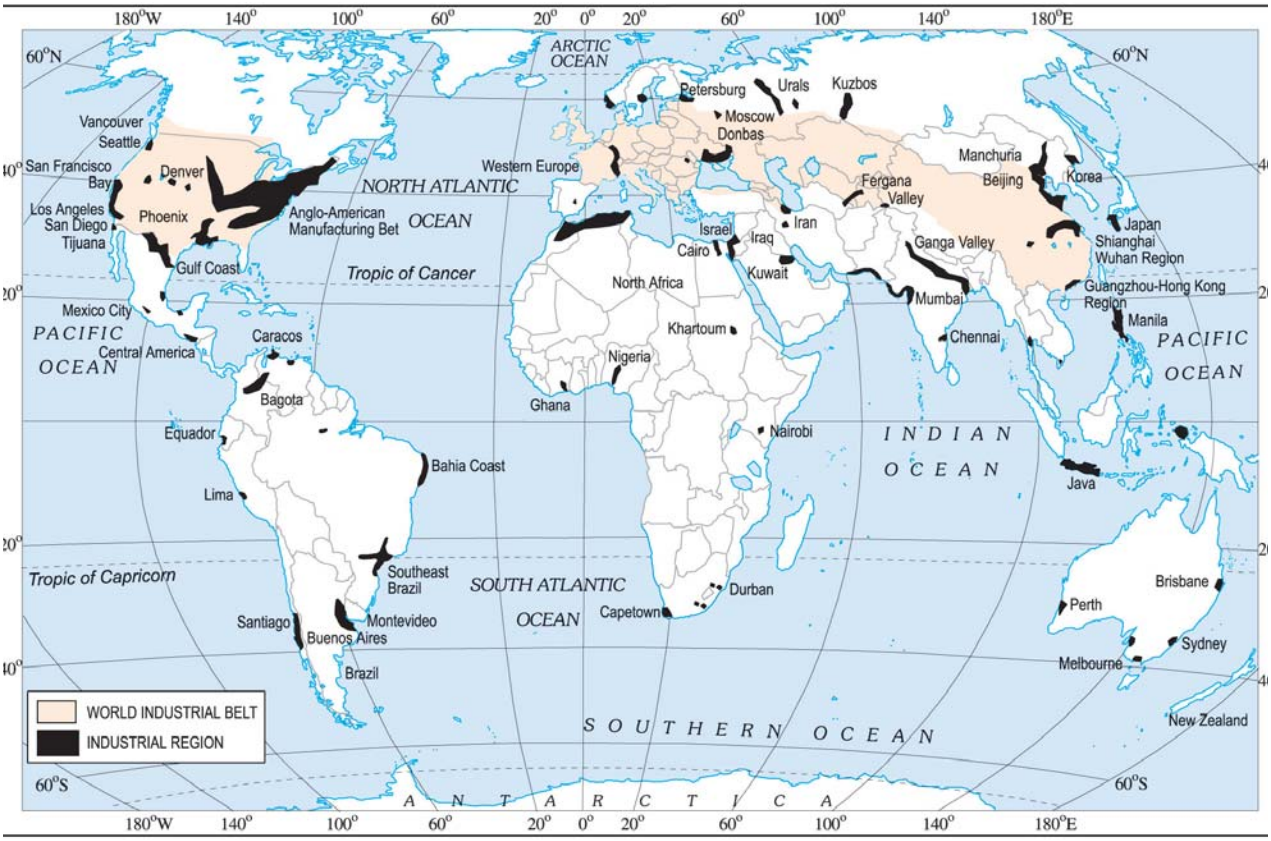


Fig 5.4: *World's Industrial Regions*

industrial regions tend to be located in the temperate areas, near sea ports and especially near coal fields.

India has several industrial regions like Mumbai-Pune cluster, Bangalore-Tamil Nadu region, Hugli region, Ahmedabad-Baroda region, Chottanagpur industrial belt, Vishakhapatnam-Guntur belt, Gurgaon-Delhi-Meerut region and the Kollam-Thiruvanathapuram industrial cluster.

Industrial Disaster

In industries, accidents/disaster mainly occur due to technical failure or irresponsible handling of hazardous material.

One of the worst industrial disasters of all time occurred in Bhopal on 3 December 1984 around 00:30 a.m. It was a technological accident in which highly poisonous Methyl Isocynate (MIC) gas along with Hydrogen Cyanide and other reaction products leaked out of the pesticide factory of Union Carbide. The official death toll was 3,598 in 1989. Thousands, who survived still suffer from one or many ailments like blindness, impaired immune system, gastrointestinal disorders etc.

Union Carbide Factory

In another incident, on 23 December 2005, due to gas well blowout in Gao Qiao, Chongging, China, 243 people died, 9,000 were injured and 64,000 were evacuated. Many people died because they were unable to run after the explosion. Those who could not escape in time suffered burns to their eyes, skin and lungs from the gas.

Rescue operation in Gao Qiao

Risk Reduction Measures

1. Densely populated residential areas should be separated far away from the industrial areas.
2. People staying in the vicinity of industries should be aware of the storage of toxins or hazardous substances and their possible effects in case if an accident occurs.
3. Fire warning and fighting system should be improved.
4. Storage capacity of toxic substances should be limited.
5. Pollution dispersion qualities in the industries should be improved.

Do you know?
Emerging industries are also known as 'Sunrise Industries'.These include Information technology, Wellness, Hospitality and Knowledge.

Distribution Of Major Industries

The world's major industries are the iron and steel industry, the textile industry and the information technology industry. The iron and steel and textile industry are the older industries while information technology is an emerging industry.

The countries in which iron and steel industry is located are Germany, USA, China, Japan and Russia. Textile industry is concentrated in India, Hong Kong, South Korea, Japan and Taiwan. The major hubs of Information technology industry are the Silicon valley of Central California and the Bangalore region of India.

Glossary
Smelting
It is the process in which metals are extracted from their ores by heating beyond the melting point

Iron and Steel Industry

Like other industries iron and steel industry too comprises various inputs, processes and outputs. This is a feeder industry whose products are used as raw material for other industries.

The inputs for the industry include raw materials such as iron ore, coal and limestone, along with labour, capital, site and other infrastructure. The process of converting iron ore into steel involves many stages. The raw material is put in the blast furnace where it undergoes smelting (Fig 5.6). It is then refined. The output obtained is steel which may be used by other industries as raw material.

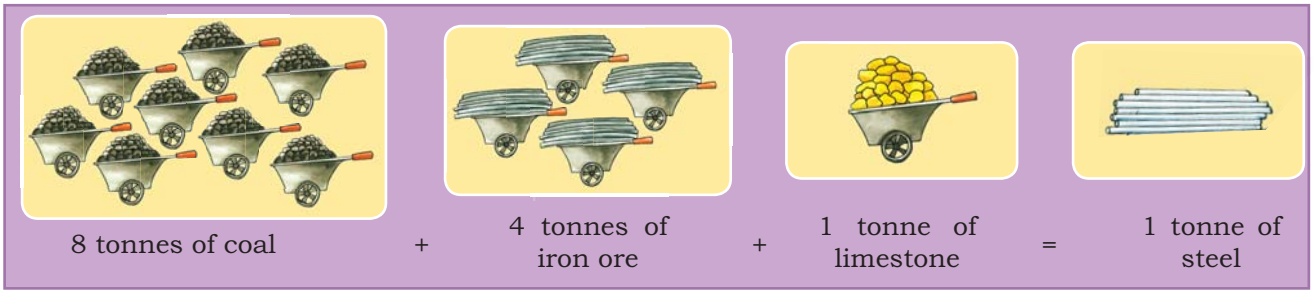


Fig 5.5: Manufacturing of steel

Steel is tough and it can easily be shaped, cut, or made into wire. Special alloys of steel can be made by adding small amounts of other metals such as aluminium, nickel, and copper. Alloys give steel unusual hardness, toughness, or ability to resist rust.

Steel is often called the backbone of modern industry. Almost everything we use is either made of iron or steel or has been made with tools and machinery of these metals. Ships, trains, trucks, and autos are made largely of steel. Even the safety pins and the needles you use are made from steel. Oil wells are drilled with steel machinery. Steel pipelines transport oil. Minerals are mined with steel equipment. Farm machines are mostly steel. Large buildings have steel framework.

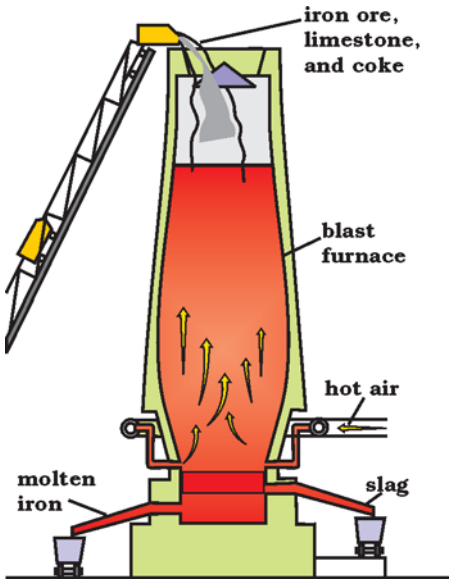


Fig. 5.6: From iron ore to steel in a blast furnace

Before 1800 A.D. iron and steel industry was located where raw materials, power supply and running water were easily available. Later the ideal location for the industry was near coal fields and close to canals and railways. After 1950, iron and steel industry began to be located on large areas of flat land near sea ports. This is because by this time steel works had become very large and iron ore had to be imported from overseas (Fig 5.7).

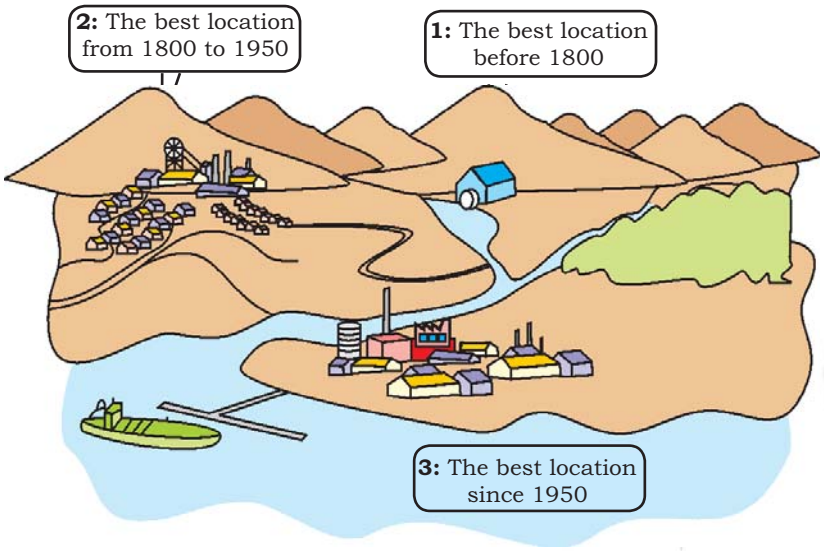


Fig 5.7: The changing location of the iron and steel industry

In India, iron and steel industry has developed taking

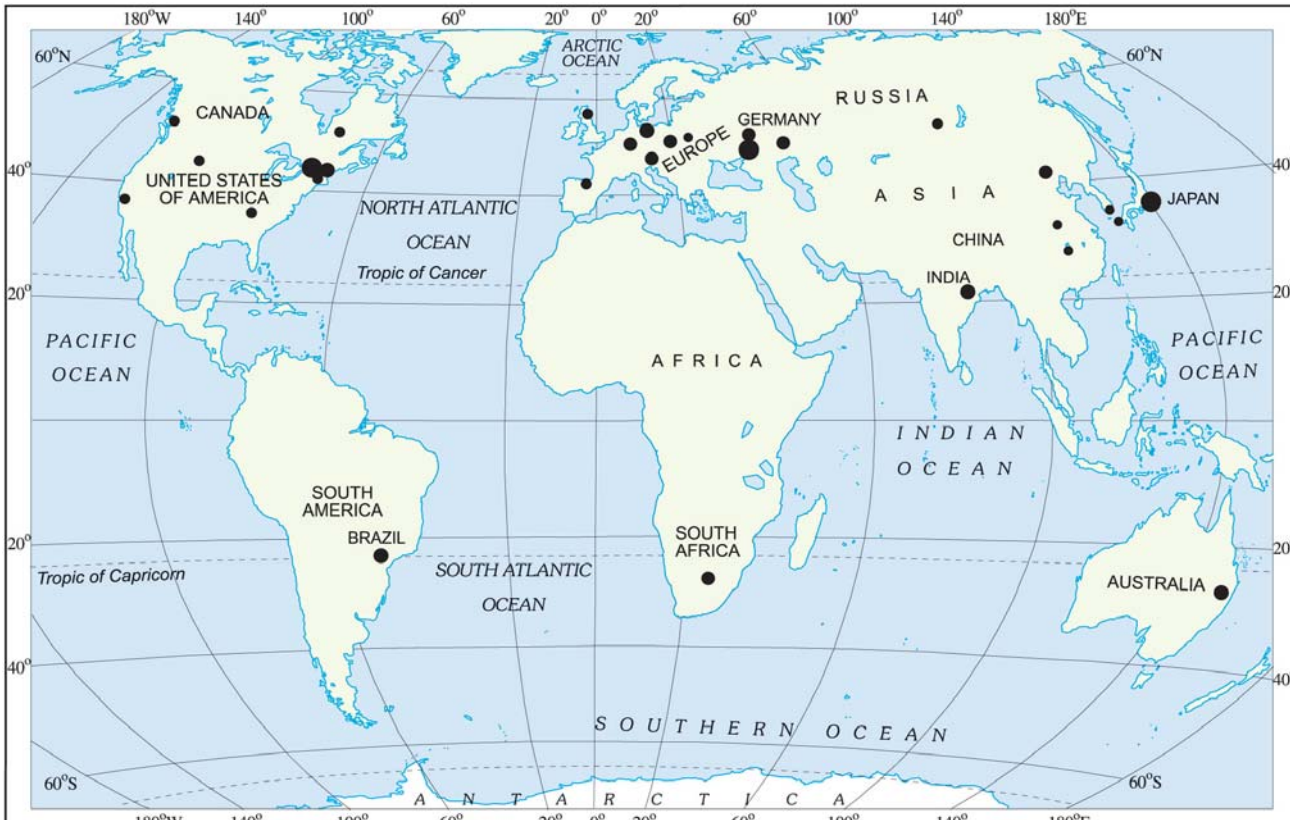


Fig 5.8: *World: Major Iron Ore Producing Areas*

advantage of raw materials, cheap labour, transport and market. All the important steel producing centres such as Bhilai, Durgapur, Burnpur, Jamshedpur, Rourkela, Bokaro are situated in a region that spreads over four states — West Bengal, Jharkhand, Orissa and Chhattisgarh. Bhadravati and Vijay Nagar in Karnataka, Vishakhapatnam in Andhra Pradesh, Salem in Tamil Nadu are other important steel centres utilising local resources. India's steel production increased from one million tonne in 1947 to 30 million tonnes in 2002.

Tata Iron and Steel Company, Jamshedpur

Before 1947, there was only one iron and steel plant in the country – Tata Iron and Steel Company Limited (TISCO). It was privately owned. After Independence, the government took the initiative and set up several iron and steel plants. TISCO was started in 1907 at Sakchi, near the confluence of the rivers Subarnarekha and Kharkai in Jharkhand. Geographically, Jamshedpur is the most conveniently situated iron and steel centre in the country.

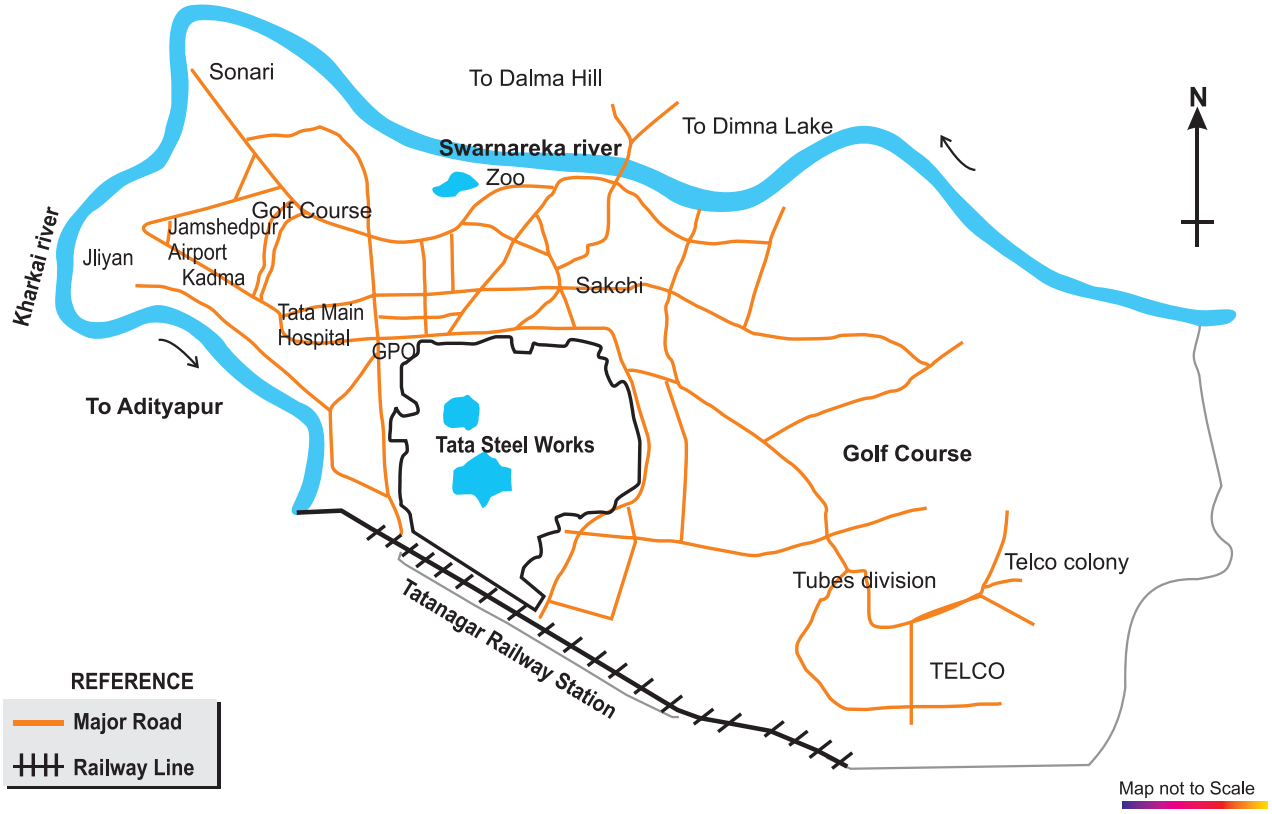


Fig 5.9: *Location of iron and steel industry in Jamshedpur*

Sakchi was chosen to set up the steel plant for several reasons. This place was only 32 km away from Kalimati station on the Bengal-Nagpur railway line. It was close to the iron ore, coal and manganese deposits as well as to Kolkata, which provided a large market. TISCO, gets coal from Jharia coalfields, and iron ore, limestone, dolomite and manganese from Orissa and Chhattisgarh. The Kharkai and Subarnarekha rivers ensured sufficient water supply. Government initiatives provided adequate capital for its later development.

Let's do

On an outline map of India, locate the places that supply raw material to TISCO.

In Jamshedpur, several other industrial plants were set up after TISCO. They produce chemicals, locomotive parts, agricultural equipment, machinery, tinplate, cable and wire.

The development of the iron and steel industry opened the doors to rapid industrial development in India. Almost all sectors of the Indian industry depend heavily on the iron and steel industry for their basic infrastructure. The Indian iron and steel industry consists of large integrated steel plants as well as mini

steel mills. It also includes secondary producers, rolling mills and ancillary industries.

Pittsburgh : It is an important steel city of the United States of America. The steel industry at Pittsburgh enjoys locational advantages. Some of the raw material such as coal is available locally, while the iron ore comes from the iron mines at Minnesota, about 1500 km from Pittsburgh. Between these mines and Pittsburgh is one of the world's best routes for shipping ore cheaply – the famous Great Lakes waterway. Trains carry the ore from the Great Lakes to the Pittsburgh area. The Ohio, the Monogahela and Allegheny rivers provide adequate water supply.

Today, very few of the large steel mills are in Pittsburgh itself. They are located in the valleys of the Monogahela and Allegheny rivers above Pittsburgh and along the Ohio River below it. Finished steel is transported to the market by both land and water routes.

The Pittsburgh area has many factories other than steel mills. These use steel as their raw material to make many different products such as railroad equipment, heavy machinery and rails.

Do you know?

The name of great lakes are Superior, Huron, Ontario, Michigan and Erie. Lake Superior is the largest of these five lakes. It lies higher upstream then others.

Cotton Textile Industry

Weaving cloth from yarn is an ancient art. Cotton, wool, silk, jute, flax have been used for making cloth. The textile industry can be divided on the basis of raw materials used in them. Fibres are the raw material of textile industry. Fibres can be natural or man-made. Natural fibres are obtained from wool, silk, cotton, linen and jute. Man made fibres include nylon, polyester, acrylic and rayon.

The cotton textile industry is one of the oldest industries in the world. Till the industrial revolution in the 18th century, cotton cloth was made using hand spinning techniques (wheels) and looms. In 18th century power looms facilitated the development of cotton textile industry, first in the Great Britain and later in other parts of the world. Today India, China, Japan and USA are the important producers of cotton textiles.

India has a glorious tradition of producing good quality cotton textiles. Before the British rule, Indian hand spun

Word Origin

The term 'textile' is derived from Latin word *texere* which means to weave.

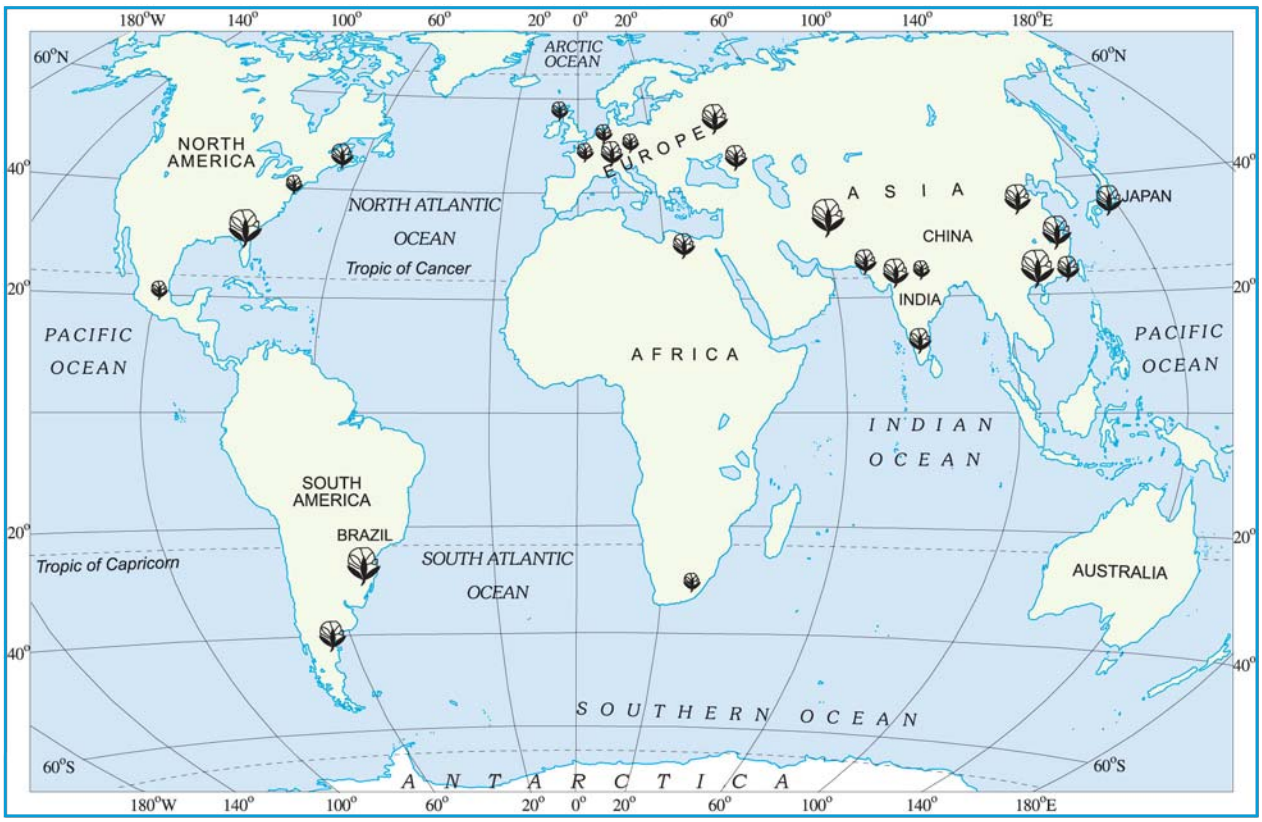


Fig 5.10: *World : Major cotton textile manufacturing regions*

and hand woven cloth already had a wide market. The *Muslins* of Dhaka, *Chintzes* of Masulipatnam, *Calicos* of Calicut and Gold-wrought cotton pieces of Burhanpur, Surat and Vadodara were known worldwide for their quality and design. But the production of hand woven cotton textile was expensive and time consuming. Hence, traditional cotton textile industry could not face the competition from the new textile mills of the West, which produced cheap and good quality fabrics.

The first successful modern textile mill was established in Mumbai in 1854. The warm, moist climate, port for importing machinery, availability of raw material and skilled labour resulted in rapid expansion of the industry in the region.

Initially this industry flourished in the states of Maharashtra and Gujarat because of favourable humid climate. But today, humidity can be created artificially, and raw cotton is a pure and not weight losing raw material, so this industry has spread to other parts

Do you know?

The first textile mill in the country was established at Fort Gloster near Kolkata in 1818 but it closed down after some time.

Do you know?
About one-third of the Indian textiles industry's total production is exported.

Activity
Collect different types of cloth pieces from the tailor's shop and classify them under cotton, silk, synthetic and woollen. Find out the raw materials used in their manufacturing.

Let's do
On an outline map of the world map mark the places which provide raw material to cotton textile industry of Osaka

of India. Coimbatore, Kanpur, Chennai, Ahmedabad, Mumbai, Kolkata, Ludhiana, Pondicherry and Panipat are some of the other important centres.

Ahmedabad : It is located in Gujarat on the banks of the Sabarmati river. The first mill was established in 1859. It soon became the second largest textile city of India, after Mumbai. Ahmedabad is often referred to as the 'Manchester of India'. Favourable locational factors were responsible for the development of the textile industry in Ahmedabad. Ahmedabad is situated in the heart of a cotton growing area. This ensures easy availability of raw material. The humid climate is ideal for spinning and weaving. The flat terrain and easy availability of land is suitable for the establishment of the mills. The densely populated states of Gujarat and Maharashtra provide both skilled and semi-skilled labour. Well developed road and railway network permits easy transportation of textiles to different parts of the country, thus providing easy access to the market. Mumbai port nearby facilitates import of machinery and export of cotton textiles.

But in the recent years, Ahmedabad textile mills have been having some problems. Several textile mills have closed down. This is primarily due to emergence of new textile centres in the country as well as non-upgradation of machines and technology in the mills of Ahmedabad.

Osaka : It is an important textile centre of Japan, also known as the 'Manchester of Japan'. The textile industry developed in Osaka due to several geographical factors. The extensive plain around Osaka ensured that land was easily available for the growth of cotton mills. Warm humid climate is well suited to spinning and weaving. The river Yodo provides sufficient water for the mills. Labour is easily available. Location of port facilitates import of raw cotton and for exporting textiles. The textile industry at Osaka depends completely upon imported raw materials. Cotton is imported from Egypt, India, China and USA. The finished product is mostly exported and has a good market due to good quality and low price. Though it is one of the important textile cities in the country, of late, the cotton textile industry of Osaka has been replaced by other industries, such as

iron and steel, machinery, shipbuilding, automobiles, electrical equipment and cement.

Information Technology (IT)

Imagine how much could be accomplished if companies could operate on a twenty-four hour workday. Some software companies in the United States of America and in Bangalore, India have joined hands to achieve this. There are many ways in which this form of shift work across oceans. For example, two software professionals, Danny in Silicon Valley, California and Smitha in Bangalore are working on a joint project. While Smitha in Bangalore sleeps, Danny in California is working. At the end of his workday, he sends a message to Smitha, updating his progress. When she arrives at work in Bangalore, a couple of hours later, she notices that a message awaits her. She gets to work on the project straight away. By the end of her workday she relays the results of her efforts back to California. By the way they communicate and work together, it is as if they were sitting in adjoining offices.

Fig 5.11: *A View of an IT industry*

The **information technology** industry deals in the storage, processing and distribution of information. Today, this industry has become global. This is due to a series of technological, political, and socio-economic events. The main factors guiding the location of these industries are resource availability, cost and infrastructure. The major hubs of the IT industry are the Silicon Valley, California and Bangalore, India.

Bangalore is located on the Deccan Plateau from where it gets the name 'Silicon Plateau'. The city is known for its mild climate throughout the year. Silicon Valley, is a part of Santa Clara Valley, located next to the Rocky Mountains of North America. The area has temperate climate with the temperatures rarely dropping below 0 degrees centigrade. The locational advantages of the Silicon plateau, Bangalore and Silicon Valley, California are discussed on the next page. You may notice the similarities between the two cities.

There are other emerging information technology hubs in metropolitan centres of India such as Mumbai,

Activity

Bangalore has some important public sectors and research institutions. Find out the full forms of the organisations listed below.
BEL, BHEL, HAL, NAL, DRDO, ISRO, ITI , IISc, NCBS and UAS

Do you know?

Why do high technology industries group together?

- They can be located near main road/ highways for an easy access.
- Firms can benefit from exchange of knowledge.
- Services and facilities such as roads, car parks and waste disposal can be organised efficiently.

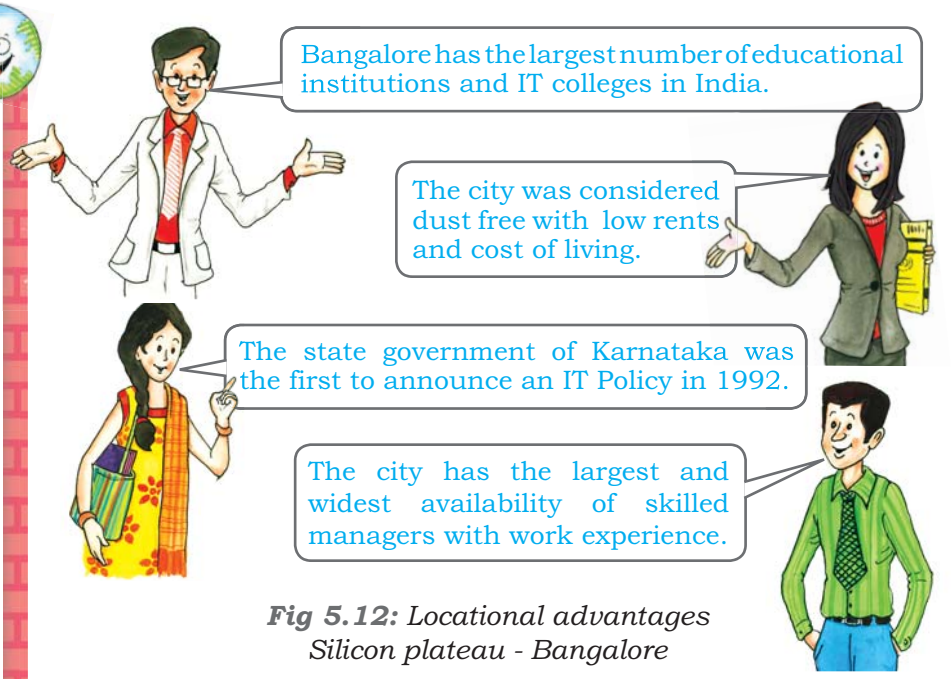


Fig 5.12: *Locational advantages Silicon plateau - Bangalore*

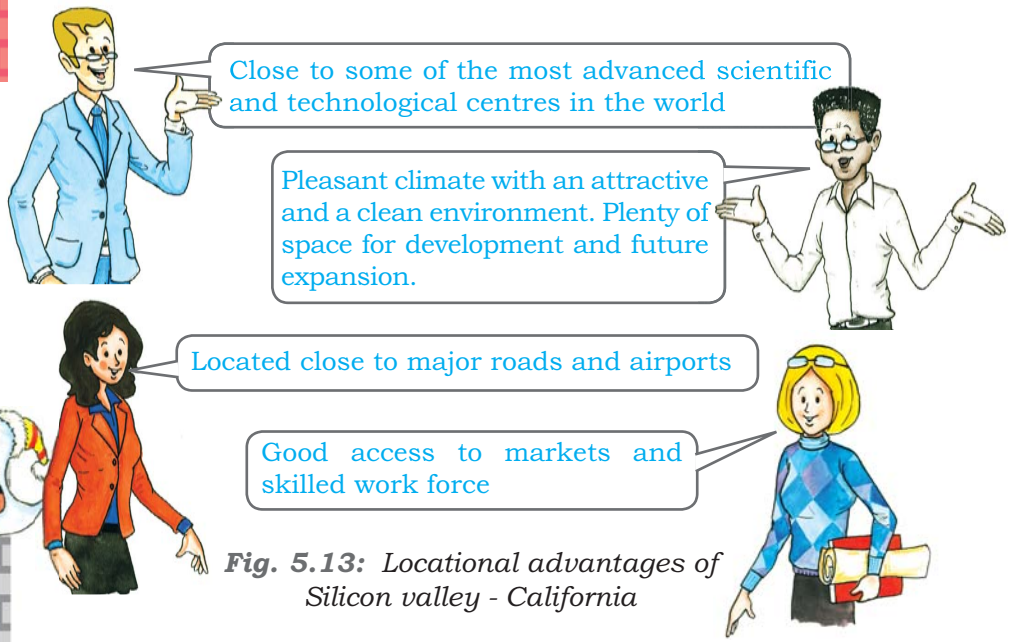


Fig. 5.13: *Locational advantages of Silicon valley - California*

Interesting Fact

Being Bangalored... means to lose one's job to someone in the city of Bangalore. Few years ago many IT jobs in the USA were outsourced to countries like India where equally skilled labour was available at lower salaries.

New Delhi, Hyderabad and Chennai. Other cities such as Gurgaon, Pune, Thiruvanthapuram, Kochi and Chandigarh are also important centres of the IT industry. However, Bangalore has always had a unique advantage, as a city with highest availability of middle and top management talent.

Exercises

1. Answer the following questions.

(i) What is meant by the term 'industry'?

(ii) Which are the main factors which influence the location of an industry?

(iii) Which industrty is often referred to as the backbone of modern industry and why?

(iv) Why cotton textile industry rapidly expanded in Mumbai?

(v) What are the similarities between information technology industry in Bangalore and California?

2. Tick the correct answer.

(i) Silicon Valley is located in

(a) Bangalore

(b) California

(c) Ahmedabad

(ii) Which one of the following industries is known as sunrise industry?

(a) Iron and steel indstury

(b) Cotton textile

(c) Information technology

(iii) Which one of the following is a natural fibre?

(a) nylon

(b) jute

(c) acryclic

3. Distinguish between the followings.

(i) Agro-based and mineral based industry

(ii) Public sector and joint sector industry

4. Give two examples of the following in the space provided.

(i) Raw Materials: _____ and _____

(ii) End product: _____ and _____

(iii) Tertiary Activities: _____ and _____

(iv) Agro-based Industries: _____ and _____

(v) Cottage Industries: _____ and _____

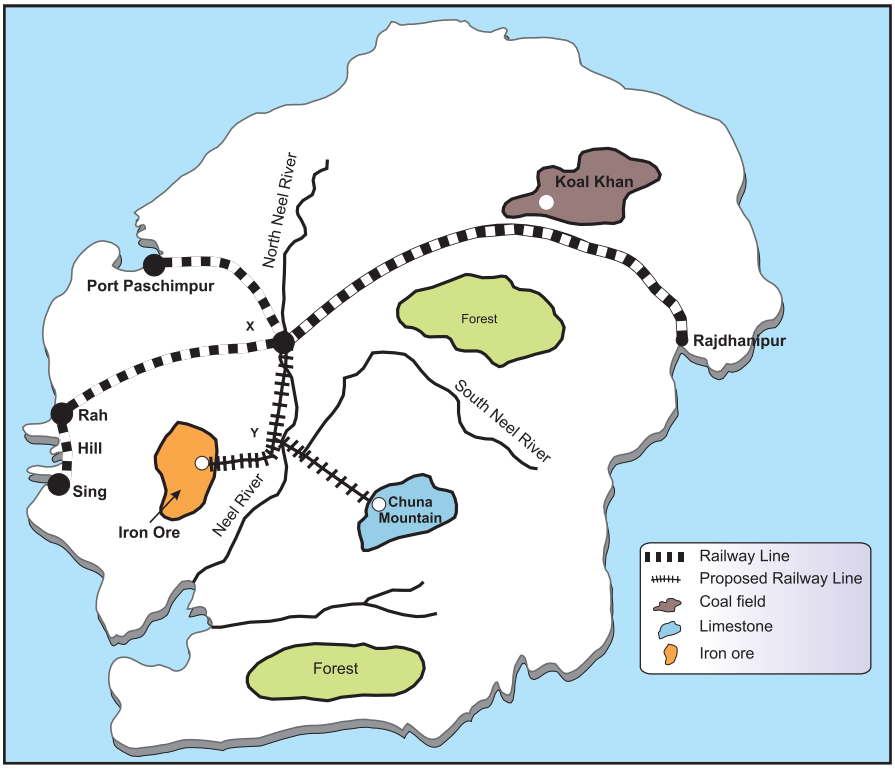
(vi) Co-operatives: _____ and _____

5. Activity

How to identify a location for establishing an industry —

Divide your class into groups. Each group is a Board of Directors faced with the problem of choosing a suitable site for an iron and steel plant of Developen Dweep. A team of technical experts have submitted a report with notes and a map. The team considered access to iron ore, coal, water and limestone, as well as the main market, sources of labour and port facilities. The team has suggested two sites, X and Y. The Board of Directors have to take the final decision of where to locate the steel plant.

- Read the report submitted by the team.
- Study the map to find out the distances of the resources from each site.
- Give each resource a 'weight' from 1 to 10, according to its importance. The greater the 'pull' of the factor on the industry the higher the weight from 1 to 10.
- Complete the table below.
- The site with the lowest total should be the most satisfactory site.
- Remember each group of directors can decide differently.



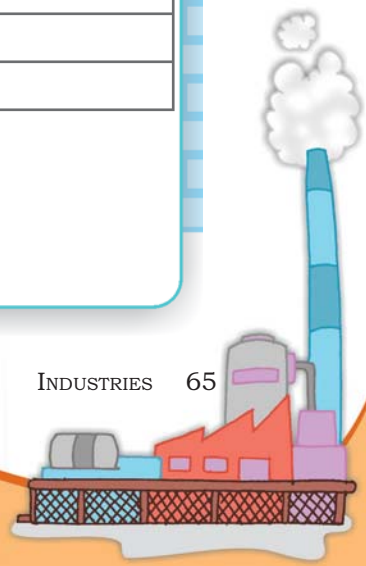
Report

Factors/Resources affecting the location of a proposed Iron and Steel Plant on Developen Dweep.

- ***Iron ore***: This is a very large deposit of low grade iron ore. Long distance transportation of the ore would be uneconomic.
- ***Coal***: The only coalfield contains rich deposits of high grade coal. Transportation of the coal is by railway, which is relatively cheap.
- ***Limestone***: This is widely available over the island, but the purest deposits are in the Chuna Mountains.
- ***Water***: Both the tributaries of River Neel carry sufficient water to supply a large iron and steel plant in all seasons. The sea water because of its high salt content is unsuitable.
- ***Market***: It is expected that the chief market for the Plant's products will be the engineering works of Rajdhanipur. Transport costs for the products- mainly small steel bars and light steel plates would be relatively low.
- ***Labour supply***: This will have to be recruited mainly from the unskilled workers in the 3 fishing villages of Hil, Rah and Sing. It is expected that most workers will commute daily from their present homes.
- ***Port facilities***: These are at present minimal. There is a good, deep natural harbour at port Paschimpur developed to import metal alloys.

Resource	Distance from X	Distance from Y	Weighting* 1-10	Distance X weight for site X	Distance X weight for site Y
Iron ore					
Coal					
Limestone					
Water					
Chief market					
Labour supply					
			Total =		

* the larger the pull, the higher the weighting



6

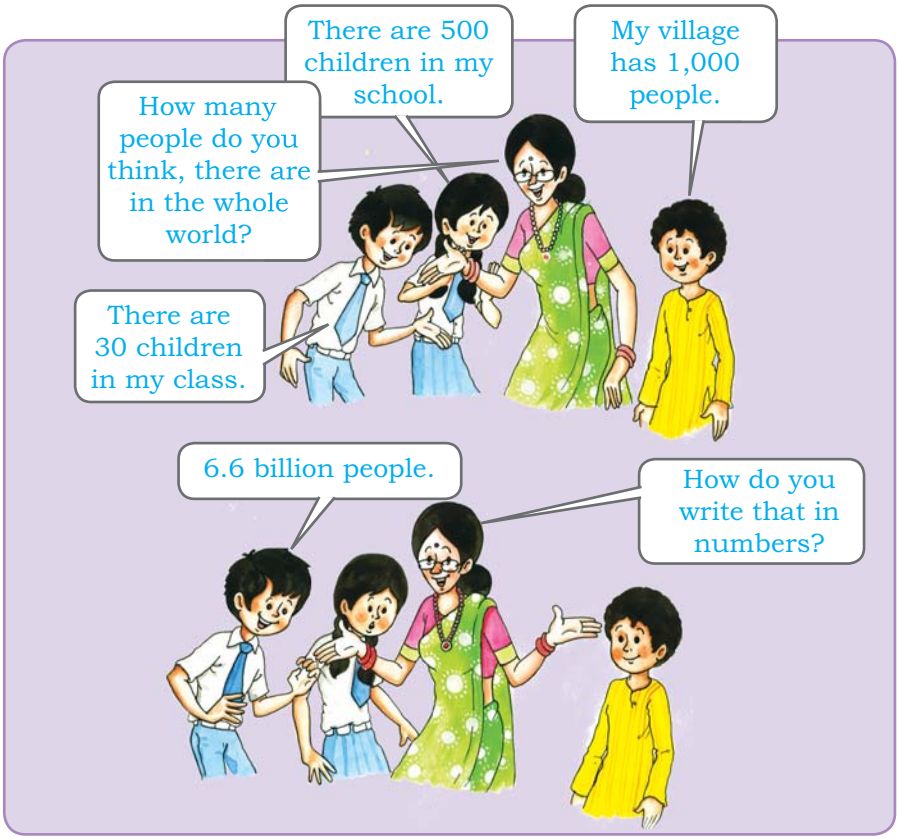
Human Resources

People are a nation's greatest resource. Nature's bounty becomes significant only when people find it useful. It is people with their demands and abilities that turn them into 'resources'. Hence, **human resource** is the ultimate resource. Healthy, educated and motivated people develop resources as per their requirements.

Human resources like other resources are not equally distributed over the world. They differ in their educational levels, age and sex. Their numbers and characteristics also keep changing.

Do you know?

The Government of India has a Ministry of Human Resource Development. The Ministry was created in 1985 with an aim to improve people's skills. This just shows how important people are as a resource for the country.



Distribution of Population

The way in which people are spread across the earth surface is known as **the pattern of population distribution**. More than 90 per cent of the world's population lives in about 10 per cent of the land surface. The distribution of population in the world is extremely uneven.

Some areas are very crowded and some are sparely populated. The crowded areas are south and south east Asia, Europe and north eastern North America. Very few people live in high latitude areas, tropical deserts, high mountains and areas of equatorial forests.

Many more people live north of the Equator than south of the Equator. Almost three-quarters of the world's people live in two continents Asia and Africa.

Sixty per cent of the world's people stay in just 10 countries. All of them have more than a 100 million people.

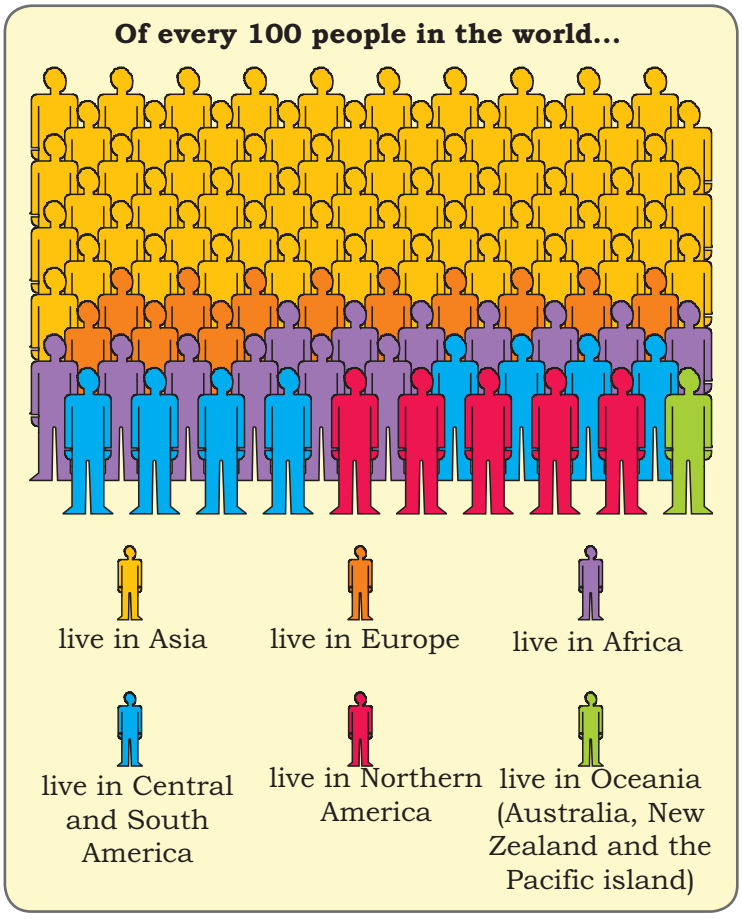


Fig. 6.1: World population by continents

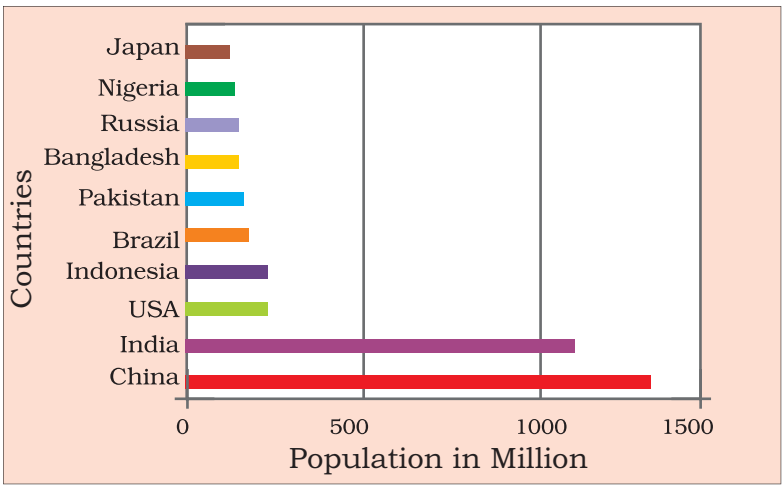


Fig. 6.2: World's most populous countries

Activity

Study Fig. 6.1 and find out :
of the world's total population which continent has —
(a) only 5 per cent
(b) only 13 per cent
(c) only 1 per cent
(d) only 12 per cent

Population in Million

Do you know?
Average density of population in India is 324 persons per square km.

Density of Population

Population density is the number of people living in a unit area of the earth's surface. It is naormally expressed as per square km. The average density of population in the whole world is 45 persons per square km. South Central Asia has the highest density of population followed by East and South East Asia

When all the 30 students are present, our classroom seems very crowded. But when the same class is seated in the school assembly hall, it seems so open and empty. Why?

Because the size or area of the hall is much larger than that of the classroom. However, when all the students of the school come into the hall, the hall too starts looking crowded.

Factors Affecting Distribution of Population

Geographical Factors

Topography: People always prefer to live on plains rather than mountains and plateaus because these areas are suitable for farming, manufacturing and service activities. The Ganga plains are the most densely populated areas of the world while mountains like Andes, Alps and Himalayas are sparsely populated.

Climate: People usually avoid extreme climates that are very hot or very cold like Sahara desert, polar regions of Russia, Canada and Antarctica.

Soil: Fertile soils provide suitable land for agriculture. Fertile plains such as Ganga and Brahmaputra in India, Hwang-He, Chang Jiang in China and the Nile in Egypt are densely populated.

Water: People prefer to live in the areas where fresh water is easily available. The river valleys of the world are densely populated while deserts have spare population.

Minerals: Areas with mineral deposits are more populated. Diamond mines of South Africa and discovery of oil in the Middle east lead to settling of people in these areas.

Activity
Look at Fig 6.2 and find out:
of these countries how many are in Asia? Colour them on a world map.

Social, Cultural and Economic Factors

Social: Areas of better housing, education and health facilities are more densely populated e.g., Pune.

Cultural: Places with religion or cultural significance attract people. Varanasi, Jerusalem and Vatican city are some examples.

Economic: Industrial areas provide employment opportunities. Large number of people are attracted to these areas. Osaka in Japan and Mumbai in India are two densely populated areas.

Glossary

Life expectancy
It is the number of years that an average person can expect to live.

Population Change

The population change refers to change in the number of people during a specific time. The world population has not been stable. It has increased manifold as seen in the Fig 6.3. Why? This is actually due to changes in the number of births and deaths. For an extremely long period of human history, until the 1800s, the world's population grew steadily but slowly. Large numbers of babies were born, but they died early too. This was as there were no proper health facilities. Sufficient food was not available for all the people. Farmers were not able to produce enough to meet the food requirements of all the people. As a result the total increase in population was very low.

In 1820, the world's population reached one billion. A hundred and fifty years later, in the early 1970s, the world's population reached 3 billion. This is often called population explosion. In 1999, less than 30 years later, the population doubled to 6 billion. The main reason for this growth was that with better food supplies and medicine, deaths were reducing, while the number of births still remained fairly high.

Births are usually measured using the **birth rate** i.e. the number of live births per 1,000 people. Deaths are usually measured using the **death rate** i.e. the number of deaths per 1,000 people. **Migrations** is the movement of people in and out of an area.

Births and deaths are the natural causes of population change. The difference between the birth rate and the death rate of a country is called the **natural growth rate**.

The population increase in the world is mainly due to rapid increase in natural growth rate.

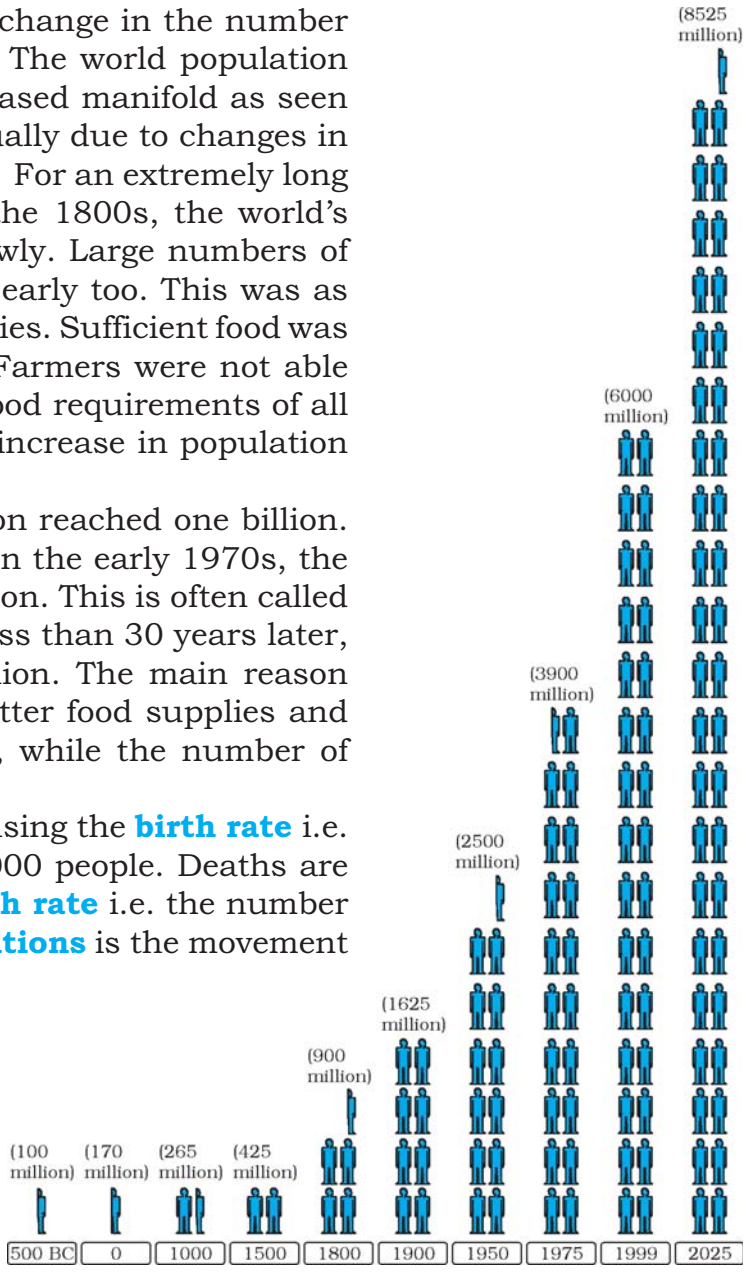
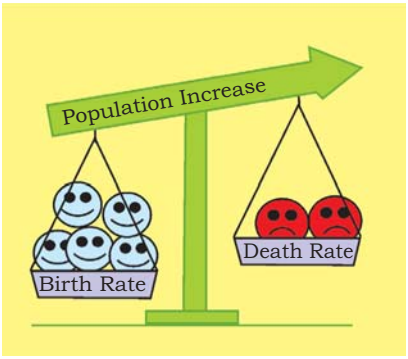
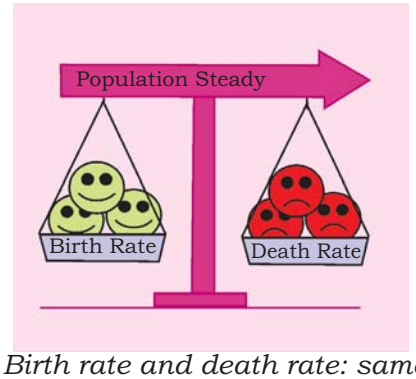


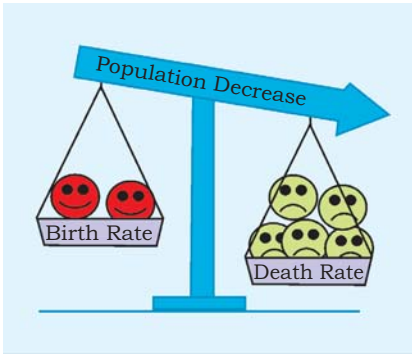
Fig 6.3: World Population Growth



Birth rate more than death rate: population increase



Birth rate and death rate: same population stays the same



Death rate more than birth rate:population decreases

Fig 6.4: *Balance of Population*

Glossary

Immigration
When a person enters a new country.

Emigration
When a person leaves a country.

Migration is another way by which population size changes. People may move within a country or between countries. **Emigrants** are people who leave a country; **Immigrants** are those who arrive in a country.

Countries like the United States of America and Australia have gained in-numbers by **in-migration** or **immigration**. Sudan is an example of a country that has experienced a loss in population numbers due to **out-migration** or **emigration**.

The general trend of international migrations is from the less developed nations to the more developed nations in search of better employment opportunities. Within countries large number of people may move from the rural to urban areas in search of employment, education and health facilities.

Patterns of Population Change

Rates of population growth vary across the world (Fig 6.5). Although, the world's total population is rising rapidly, not all countries are experiencing this growth. Some countries like Kenya have high population growth rates. They had both high birth rates and death rates. Now, with improving health care, death rates have fallen, but birth rates still remain high leading to high growth rates.

In other countries like United Kingdom, population growth is slowing because of both low death and low birth rates.

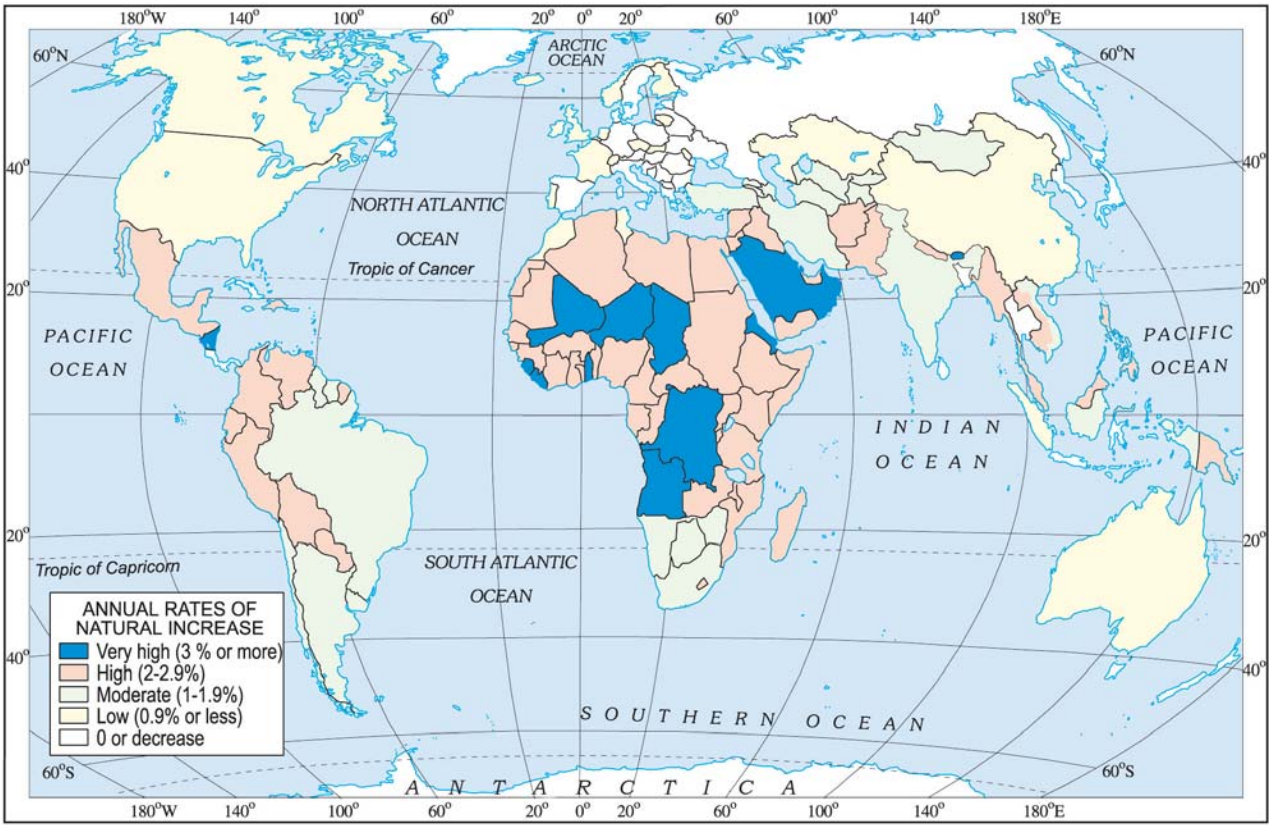


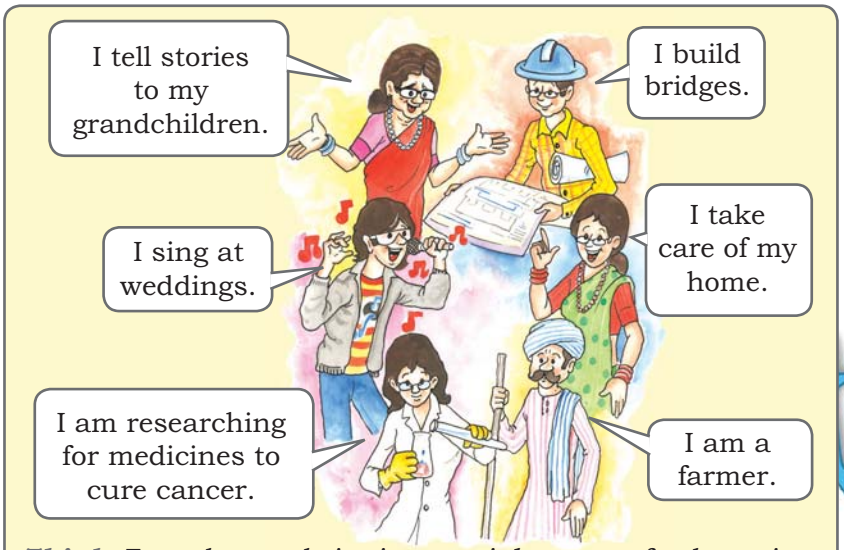
Fig. 6.5: *World: Differing rates of population growth*

Population Composition

How crowded a country is, has little to do with its level of economic development. For example, both Bangladesh and Japan are very densely populated but Japan is far more economically developed than Bangladesh.

To understand the role of people as a resource, we need to know more about their qualities. People vary greatly in their age, sex, literacy level, health condition, occupation and income level. It is essential to understand these characteristics of the people. Population composition refers to the structure of the population.

The composition of population helps us to know



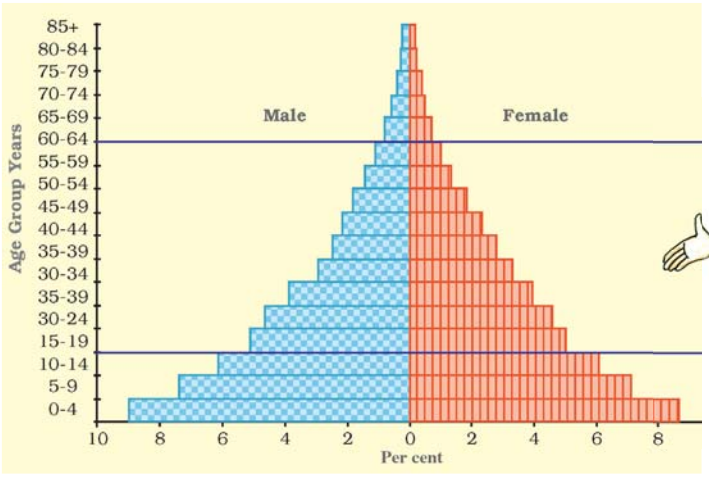
Think*: Every human being is potential resource for the society. What will be your contribution as a human resource?*

how many are males or females, which age group they belong to, how educated they are and what type of occupations they are employed in, what their income levels and health conditions are.

An interesting way of studying the population composition of a country is by looking at the population pyramid, also called an age-sex pyramid.

A population pyramid shows

- The total population divided into various age groups, e.g., 5 to 9 years, 10 to 14 years.
- The percentage of the total population, subdivided into males and females, in each of those groups.



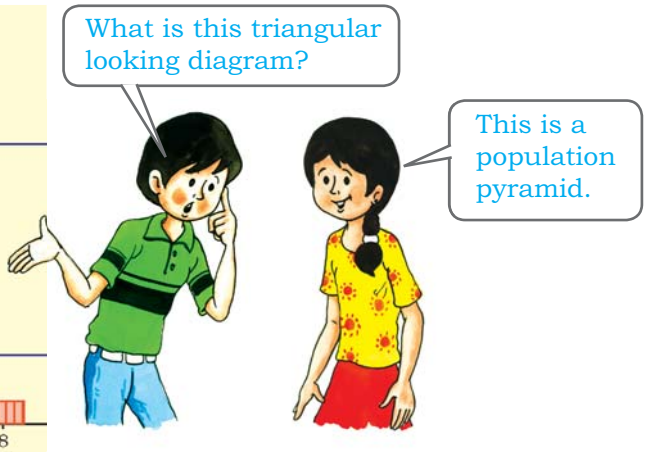


Fig. 6.6: Population Pyramid

The shape of the population pyramid tells the story of the people living in that particular country. The numbers of children (below 15 years) are shown at the bottom and reflect the level of births. The size of the top shows the numbers of aged people (above 65 years) and reflects the number of deaths.

The population pyramid also tells us how many dependents there are in a country. There are two groups of dependents — young dependents (aged below 15 years) and elderly dependents (aged over 65 years). Those of the working age are the economically active.

The population pyramid of a country in which birth and death rates bothe are high is broad at the base and rapidly narrows towards the top. This is because although, many children are born, a large percentage of them die in their infancy, relatively few become adults and there are very few old people. This situation is typified by the pyramid shown for Kenya (Fig 6.7).

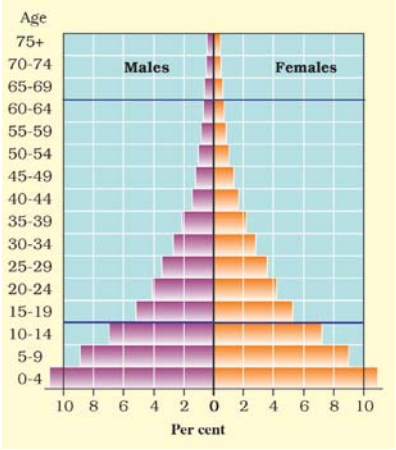


Fig. 6.7: Population Pyramid of Kenya

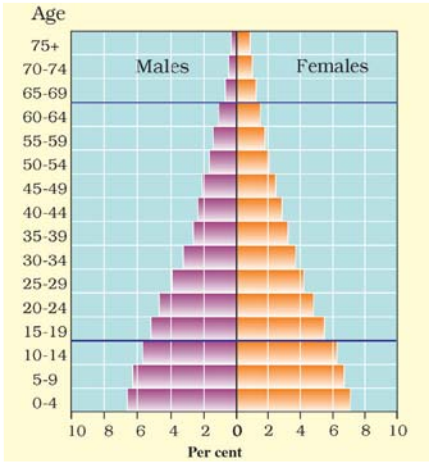


Fig. 6.8: Population Pyramid of India

In countries where death rates (especially amongst the very young) are decreasing, the pyramid is broad in the younger age groups, because more infants survive to adulthood. This can be seen in the pyramid for India (Fig 6.8). Such populations contain a relatively large number of young people and which means a strong and expanding labour force.

In countries like Japan, low birth rates make the pyramid narrow at the base (Fig 6.9). Decreased death rates allow numbers of people to reach old age.

Skilled, spirited and hopeful young people endowed with a positive outlook are the future of any nation. We in India are fortunate to have such a resource. They must be educated and provided skills and opportunities to become able and productive.

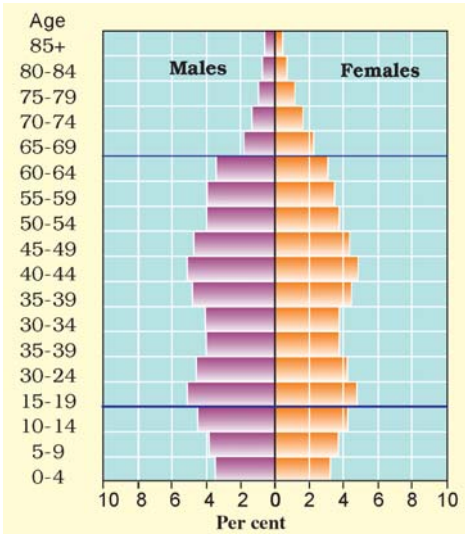


Fig. 6.9: Population Pyramid of Japan

Exercise

1. Answer the following questions.

(i) Why are people considered a resource?

(ii) What are the causes for the uneven distribution of population in the world?

(iii) The world population has grown very rapidly. Why?

(iv) Discuss the role of any two factors influencing population change.

(v) What is meant by population composition?

(vi) What are population pyramids? How do they help in understanding about the population of a country?

2. Tick the correct answer.

(i) Which does the term population distribution refer to?

(a) How population in a specified area changes over time.

(b) The number of people who die in relation to the number of people born in a specified area.

(c) The way in which people are spread across a given area.

(ii) Which are three main factors that cause population change?

(a) Births, deaths and marriage

(b) Births, deaths and migration

(c) Births, deaths and life expectancy

(iii) In 1999, the world population reached

(a) 1 billion (b) 3 billion (c) 6 billion

(iv) What is a population pyramid?

(a) A graphical presentation of the age, sex composition of a population.

(b) When the population density of an area is so high that people live in tall buildings.

(c) Pattern of population distribution in large urban areas.

3. Complete the sentences below using some of the following words.

sparsely, favourable, fallow, artificial, fertile, natural, extreme, densely

When people are attracted to an area it becomes ..... populated

Factors that influence this include ..... climate; good supplies of ..... resources and ..... land.

4. Activity

Discuss the characteristics of a society with 'too many under 15s' and one with 'too few under 15s'.

Hint : need for schools; pension schemes, teachers, toys, wheel chairs, labour supply, hospitals.

Some Internet Sources for More Information

www.ndmindia.nic.in
www.environmentdefense.org
www.freefoto.com
www.worldgame.org/worldmeters
www.cseindia.org
www.mnes.nic.in
www.undp.org/popin

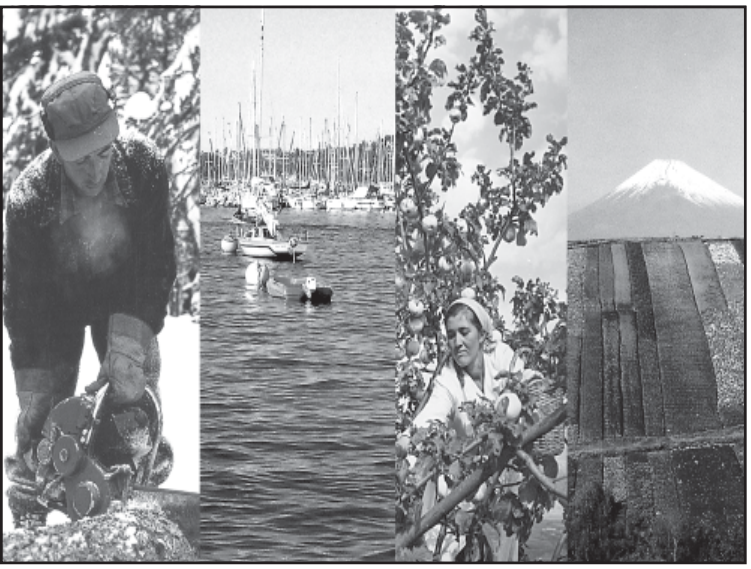
Notes

Unit-I

Chapter-1

Human Geography

Nature and Scope



You have already studied 'Geography as a Discipline' in Chapter I of the book, *Fundamentals of Physical Geography* (NCERT, 2006). Do you recall the contents? This chapter has broadly covered and introduced you to the nature of geography. You are also acquainted with the important branches that sprout from the body of geography. If you re-read the chapter you will be able to recall the link of human geography with the mother discipline i.e. geography. As you know geography as a field of study is integrative, empirical, and practical. Thus, the reach of geography is extensive and each and every event or phenomenon which varies over space and time can be studied geographically. How do you see the earth's surface? Do you realise that the earth comprises two major components: nature (physical environment) and life forms including human beings? Make a list of physical and human components of your surroundings. Physical geography studies physical environment and human geography studies "the relationship between the physical/natural and the human worlds, the spatial distributions of human phenomena and how they come about, the social and economic differences between different parts of the world".[1]

You are already aware of the fact that the core concern of geography as a discipline is to understand the earth as home of human beings and to study all those elements which have sustained them. Thus, emphasis is on study of nature and human beings. You will realise that geography got subjected to dualism and the wide-ranging debates started whether geography as a discipline should be a **law making/theorising** (nomothetic) or **descriptive** (idiographic). Whether its subject matter should be organised and approach of the study should be **regional** or **systematic**? Whether geographical phenomena be interpreted theoretically or through historic-institutional approach? These have been issues for intellectual exercise but finally you will appreciate that the dichotomy between physical and human is not a very valid one because nature and human are inseparable elements and should be seen holistically. It is interesting to note that both physical and human

[1] Agnew J. Livingstone, David N. and Rogers, A.; (1996) Blackwell Publishing Limited, Malden, U.S.A. p. 1 and 2.

phenomena are described in metaphors using symbols from the human anatomy.

We often talk of the 'face' of the earth, 'eye' of the storm, 'mouth' of the river, 'snout' (nose) of the glacier, 'neck' of the isthmus and 'profile' of the soil. Similarly regions, villages, towns have been described as 'organisms'. German geographers describe the 'state/country' as a 'living organism'. Networks of road, railways and water ways have often been described as "arteries of circulation". Can you collect such terms and expressions from your own language? The basic questions now arises, can we separate nature and human when they are so intricately intertwined?

Human Geography Defined

- "Human geography is the synthetic study of relationship between human societies and earth's surface". Ratzel

Synthesis has been emphasised in the above definition.

- "Human geography is the study of "the changing relationship between the unresting man and the unstable earth."

Ellen C. Semple

Dynamism in the relationship is the keyword in Semple's definition.

- "Conception resulting from a more synthetic knowledge of thephysical laws governing our earth and of the relations between the living beings which inhabit it".

Paul Vidal de la Blache

Human geography offers a new conception of the interrelationships between earth and human beings.

NATURE OF HUMAN GEOGRAPHY

Human geography studies the inter-relationship between the physical environment and socio-cultural environment created by human beings through mutual interaction with each other. You have already studied the elements of physical environment in class XI in the book entitled *Fundamentals of Physical Geography* (NCERT 2006). You know that these elements are landforms, soils, climate, water, natural vegetation and diverse flora and fauna. Can you make a list of elements which human beings have created through their activities on the stage provided by the physical environment? Houses, villages, cities, road-rail networks, industries, farms, ports, items of our daily use and all other elements of material culture have been created by human beings using the resources provided by the physical environment. While physical environment has been greatly modified by human beings, it has also, in turn, impacted human lives.

Naturalisation of Humans and Humanisation of Nature

Human beings interact with their physical environment with the help of technology. It is not important what human beings produce and create but it is extremely important 'with the help of what tools and techniques do they produce and create'.

Technology indicates the level of cultural development of society. Human beings were able to develop technology after they developed better understanding of natural laws. For example, the understanding of concepts of friction and heat helped us discover fire. Similarly, understanding of the secrets of DNA and genetics enabled us to conquer many diseases. We use the laws of aerodynamics to develop faster planes. You can see that knowledge about Nature is extremely important to develop technology and technology loosens the shackles of environment on human beings. In the early stages of their interaction with their natural environment humans were greatly influenced by it. They adapted to the dictates of Nature. This is so because the level of technology was very low and the stage of human social development was also primitive. This type of interaction between primitive human society and strong forces of nature was termed as **environmental determinism**. At that stage of very low technological development we can imagine the presence of a naturalised human, who listened to Nature, was afraid of its fury and worshipped it.

The Naturalisation of Humans

Benda lives in the wilds of the Abujh Maad area of central India. His village consists of three huts deep in the wilds. Not even birds or stray dogs that usually crowd villages can be seen in these areas. Wearing a small loin cloth and armed with his axe he slowly surveys the *penda* (forest) where his tribe practices a primitive form of agriculture called shifting cultivation. Benda and his friends burn small patches of forest to clear them for cultivation. The ash is used for making the soil fertile. Benda is happy that the Mahua trees around him are in bloom. How lucky I am to be a part of this beautiful universe, he thinks as he looks up to see the Mahua, Palash and Sal trees that have sheltered him since childhood. Crossing the penda in a gliding motion, Benda makes his way to a stream. As he bends down to scoop up a palmful of water, he remembers to thank Loi-Lugi, the spirit of the forest for allowing him to quench his thirst. Moving on with his friends, Benda chews on succulent leaves and roots. The boys have been trying to collect Gajjhara and Kuchla, from the forest. These are special plants that Benda and his people use. He hopes the spirits of the forest will be kind and lead him to these herbs. These are needed to barter in the madhai or tribal fair coming up the next full moon. He closes his eyes and tries hard to recall what the elders had taught him about these herbs and the places they are found in. He wishes he had listened more carefully. Suddenly there is a rustling of leaves. Benda and his friends know it is the outsiders who have come searching for them in the wilds. In a single fluid motion Benda and his friends disappear behind the thick canopy of trees and become one with the spirit of the forest.

The story in the box represents the direct relationship of a household belonging to an economically primitive society with nature. Read about other primitive societies which live in complete harmony with their natural environment. You will realise that in all such cases nature is a powerful force, worshipped, revered and conserved. There is direct dependence of human beings on nature for resources which sustain them. The physical environment for such societies becomes the "Mother Nature".

The people begin to understand their environment and the forces of nature with the passage of time. With social and cultural development, humans develop better and more efficient technology. They move from a state of necessity to a state of freedom. They create possibilities with the resources obtained from the environment. The human activities create cultural landscape. The imprints of human activities are created everywhere; health resorts on highlands, huge urban sprawls, fields, orchards and pastures in plains and rolling hills, ports on the coasts, oceanic routes on the oceanic surface and satellites in the space. The earlier scholars termed this as **possibilism**. Nature provides opportunities and human being make use of these and slowly nature gets humanised and starts bearing the imprints of human endeavour.

Humanisation of Nature

Winters in the town of Trondheim mean fierce winds and heavy snow. The skies are dark for months. Kari drives to work in the dark at 8 am. She has special tyres for the winter and keeps the headlights of her powerful car switched on. Her office is artificially heated at a comfortable 23 degrees Celsius. The campus of the university she works in is built under a huge glass dome. This dome keeps the snow out in winter and lets in the sunshine in the summer. The temperature is controlled carefully and there is adequate lighting. Even though fresh vegetables and plants don't grow in such harsh weather, Kari keeps an orchid on her desk and enjoys eating tropical fruits like banana and kiwi. These are flown in from warmer areas regularly. With a click of the mouse, Kari can network with colleagues in New Delhi. She frequently takes a morning flight to London and returns in the evening in time to watch her favourite television serial. Though Kari is fifty-eight years old, she is fitter and looks younger than many thirty-year- olds in other parts of the world.

Can you imagine what has made such a life style possible? It is technology that has allowed the people of Trondheim and others to overcome the constraints imposed by nature. Do you know about some other such instances? Such examples are not difficult to find.

A geographer, Griffith Taylor introduced another concept which reflects a middle path (Madhyam Marg) between the two ideas of **environmental determinism** and **possibilism**. He termed it as **Neodeterminism** or **stop and go determinism**. Those of you who live in cities and those who have visited a city, might have seen that traffic is regulated by lights on the cross-roads. Red light means 'stop', amber light provides a gap between red and green lights 'to get set' and green light means 'go'. The concept shows that neither is there a situation of absolute necessity (environmental determinism) nor is there a condition of absolute freedom (possibilism). It means that human beings can conquer nature by obeying it. They have to respond to the red signals and can proceed in their pursuits of development when nature permits the modifications. It means that possibilities can be created within the limits which do not damage the environment and there is no free run without accidents. The free run which the developed economies attempted to take has already resulted in the green house effect, ozone layer depletion, global warming, receding glaciers and degrading lands. The neo-determinism conceptually attempts to bring a balance nullifying the 'either' 'or' dichotomy.

Human Geography through the Corridors of Time

The process of adaptation, adjustment with and modification of the environment started with the appearance of human beings over the surface of the earth in different ecological niches. Thus, if we imagine the beginning of human geography with the interaction of environment and human beings, it has its roots deep in history. Thus, the concerns of human geography have a long temporal continuum though the approaches to articulate them have changed over time. This dynamism in approaches and thrusts shows the vibrant nature of the discipline. Earlier there was little interaction between different societies and the knowledge about each other was limited. Travellers and explorers used to disseminate information about the areas of their visits. Navigational skills were not developed and voyages were fraught with dangers. The late fifteenth century witnessed attempts of explorations in Europe and slowly the myths and mysteries about countries and people started to open up. The colonial period provided impetus to further explorations in order to access the resources of the regions and to obtain inventorised information. The intention here is not to present an in-depth historical account but to make you aware of the processes of steady development of human geography. The summarised Table 1.1 will introduce you to the broad stages and the thrust of human geography as a sub-field of geography.

- Welfare or humanistic school of thought in human geography was mainly concerned with the different aspects of social well-being of the people. These included aspects such as housing, health and education. Geographers have already introduced a paper as Geography of Social well-being in the Post Graduate curriculum'.
- Radical school of thought employed Marxian theory to explain the basic cause of poverty, deprivation and social inequality. Contemporary social problems were related to the development of capitalism.
- Behavioural school of thought laid great emphasis on lived experience and also on the perception of space by social categories based on ethnicity, race and religion, etc.

Fields and Sub-fields of Human Geography

Human geography, as you have seen, attempts to explain the relationship between all elements of human life and the space they occur over. Thus, human geography assumes a highly inter-disciplinary nature. It develops close

Table 1.1: Broad Stages and Thrust of Human Geography

Period	Approaches	Broad Features
Colonial period	Exploration and description	Imperial and trade interests prompted the discovery and exploration of new areas. An encyclopaedic description of the area formed an important aspect of the geographer's account.
Colonial period	Regional analysis	Elaborate description of all aspects of a region were undertaken. The idea was that all the regions were part of a whole, ie (the earth); so, understanding the parts in totality would lead to an understanding of the whole.
1930s through the inter-War period	Areal differentiation	The focus was on identifying the uniqueness of any region and understanding how and why it was different from others.
Late 1950s to the late 1960s	Spatial organisation	Marked by the use of computers and sophisticated statistical tools. Laws of physics were often applied to map and analyse human phenomena. This phase was called the quantitative revolution. The main objective was to identify mappable patterns for different human activities.
1970s	Emergence of humanistic, radical and behavioural schools	Discontentment with the quantitative revolution and its dehumanised manner of doing geography led to the emergence of three new schools of thought of human geography in the 1970s. Human geography was made more relevant to the socio-political reality by the emergence of these schools of thought. Consult the box below to know a little bit more about these schools of thought.
1990s	Post-modernism in geography	The grand generalisations and the applicability of universal theories to explain the human conditions were questioned. The importance of understanding each local context in its own right was emphasised.

interface with other sister disciplines in social sciences in order to understand and explain human elements on the surface of the earth. With the expansion of knowledge, new sub-fields emerge and it has also happened to human geography. Let us examine these fields and sub-fields of Human Geography (Table 1.2).

You would have noticed that the list is large and comprehensive. It reflects the expanding realm of human geography. The boundaries between sub-fields often overlap. What follows in this book in the form of chapters will provide you a fairly widespread coverage of different aspects of human geography. The exercises, the activities and the case studies will provide you with some empirical instances so as to have a batter understanding of its subject matter.

Table 1.2: Human Geography and Sister Disciplines of Social Sciences

Fields of Human Geography	***Sub-fields***	***Interface with Sister Disciplines of Social Sciences***
Social Geography	—	Social Sciences – Sociology
	Behavioural Geography	Psychology
	Geography of Social Well-being	Welfare Economics
	Geography of Leisure	Sociology
	Cultural Geography	Anthropology
	Gender Geography	Sociology, Anthropology, Women's Studies
	Historical Geography	History
	Medical Geography	Epidemology
Urban Geography	—	Urban Studies and Planning
Political Geography	—	Political Science
	Electoral Geography	Psephology
	Military Geography	Military Science
Population Geography	—	Demography
Settlement Geography	—	Urban/Rural Planning
Economic Geography	—	Economics
	Geography of Resources	Resource Economics
	Geography of Agriculture	Agricultural Sciences
	Geography of Industries	Industrial Economics
	Geography of Marketing	Business Studies, Economics, Commerce
	Geography of Tourism	Tourism and Travel Management
	Geography of International Trade	International Trade

EXERCISES

1. Choose the right answer from the four alternatives given below.

(i) Which one of the following statements does not describe geography?

(a) an integrative discipline

(b) study of the inter-relationship between humans and environment

(c) subjected to dualism

(d) not relevant in the present time due to the development of technology.

(ii) Which one of the following is not a source of geographical information?

(a) traveller's accounts

(b) old maps

(c) samples of rock materials from the moon

(d) ancient epics

(iii) Which one of the following is the most important factor in the interaction between people and environment?

(a) human intelligence (c) technology

(b) people's perception (d) human brotherhood

(iv) Which one of the following is not an approach in human geography?

(a) Areal differentiation (c) Quantitative revolution

(b) Spatial organisation (d) Exploration and description

2. Answer the following questions in about 30 words.

(i) Define human geography.

(ii) Name some sub-fields of human geography.

(iii) How is human geography related to other social sciences?

3. Answer the following questions in not more than 150 words.

(i) Explain naturalisation of humans.

(ii) Write a note on the scope of human geography.

Unit-II

Chapter-2

The World Population

Distribution, Density and Growth

Not gold but only (Wo)men can make a people great and strong.

(Wo)men who for truth and honour's sake, stand fast and suffer long (Wo)men who toil while others sleep – who dare while others flee – they build a nation's pillars deep and lift it to the sky.

Ralph Waldo Emerson

The people of a country are its real wealth. It is they who make use of the country's resources and decide its policies. Ultimately a country is known by its people.

It is important to know how many women and men a country has, how many children are born each year, how many people die and how? Whether they live in cities or villages, can they read or write and what work do they do? These are what you will study about in this unit.

The world at the beginning of 21st century recorded the presence of over 6 billion population. We shall discuss the patterns of their distribution and density here.

Why do people prefer to live in certain regions and not in others?

The population of the world is unevenly distributed. The remark of George B. Cressey about the population of Asia that "Asia has many places where people are few and few place where people are very many" is true about the pattern of population distribution of the world also.

PATTERNS OF POPULATION DISTRIBUTION IN THE WORLD

Patterns of population distribution and density help us to understand the demographic characteristics of any area. The term population distribution refers to the way people are spaced over the earth's surface. Broadly, 90 per cent of the world population lives in about 10 per cent of its land area.

The 10 most populous countries of the world contribute about 60 per cent of the world's population. Of these 10 countries, 6 are located in Asia. Identify these six countries of Asia.

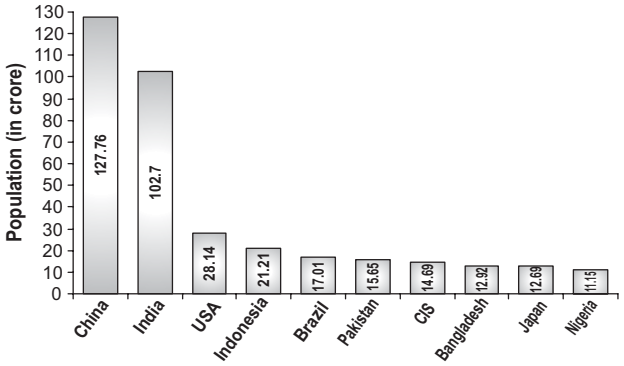


Fig. 2.1: Most Populous Countries

DENSITY OF POPULATION

Each unit of land has limited capacity to support people living on it. Hence, it is necessary to understand the ratio between the numbers of people to the size of land. This ratio is the density of population. It is usually measured in persons per sq km

$$\text{Density of Population} = \frac{\text{Population}}{\text{Area}}$$

For example, area of Region X is 100 sq km and the population is 1,50,000 persons. The density of population is calculated as:

$$\text{Density} = \frac{1,50,000}{100}$$

= 1,500 person/sq km

What does this tell you about Region X?

Look at the map given below:

Do you observe that some areas are really crowded? These are the densely populated parts of the world with more than 200 persons on every sq km. These are the North -Eastern part of U.S.A., North-Western part of Europe, South, South-East and East Asia.

Other areas like those near the North and South Poles, the hot and the cold deserts and high rainfall zones near the Equator have very low density of population. These are the sparsely populated regions of the world with less than 01 person per sq km.

In between these two types are the areas of medium density. There are 11 to 50 persons per sq km in these areas. Western China, Southern India in Asia, Norway, Sweden in Europe are some examples. Look at the Fig. 2.2 and identify some other areas.

FACTORS INFLUENCING THE DISTRIBUTION OF POPULATION

I. Geographical Factors

(i) *Availability of water:* It is the most important factor for life. So, people prefer

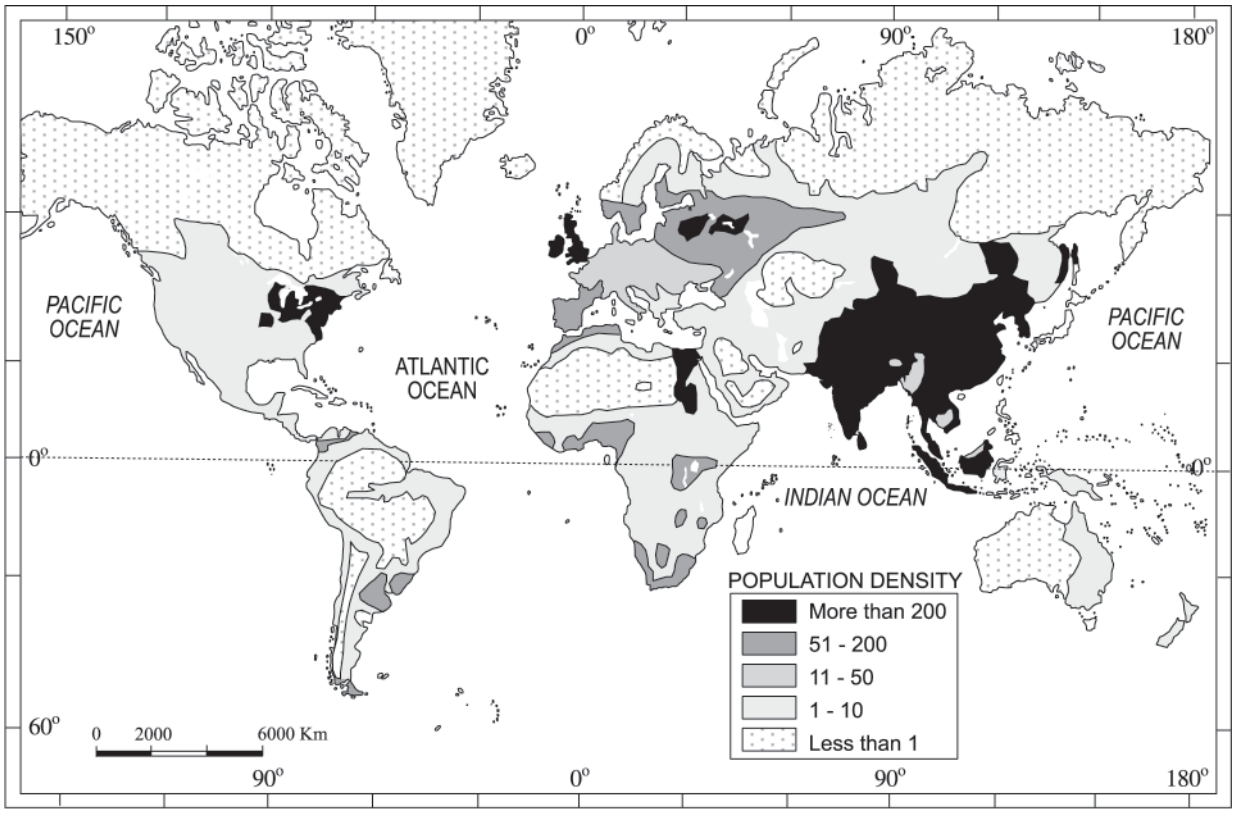


Fig. 2.2: World Density of Population, 2001

to live in areas where fresh water is easily available. Water is used for drinking, bathing and cooking – and also for cattle, crops, industries and navigation. It is because of this that river valleys are among the most densely populated areas of the world.

(ii) *Landforms:* People prefer living on flat plains and gentle slopes. This is because such areas are favourable for the production of crops and to build roads and industries. The mountainous and hilly areas hinder the development of transport network and hence initially do not favour agricultural and industrial development. So, these areas tend to be less populated. The Ganga plains are among the most densely populated areas of the world while the mountains zones in the Himalayas are scarcely populated.

(iii) *Climate:* An extreme climate such as very hot or cold deserts are uncomfortable for human habitation. Areas with a comfortable climate, where there is not much seasonal variation attract more people. Areas with very heavy rainfall or extreme and harsh climates have low population. Mediterranean regions were inhabited from early periods in history due to their pleasant climate.

(iv) *Soils:* Fertile soils are important for agricultural and allied activities. Therefore, areas which have fertile loamy soils have more people living on them as these can support intensive agriculture. Can you name some areas in India which are thinly populated due to poor soils?

II. Economic Factors

(i) *Minerals:* Areas with mineral deposits attract industries. Mining and industrial activities generate employment. So, skilled and semi–skilled workers move to these areas and make them densely populated. Katanga Zambia copper belt in Africa is one such good example.

(ii) *Urbanisation:* Cities offer better employment opportunities, educational and medical facilities, better means of transport and communication. Good civic amenities and the attraction of city life draw people to the cities. It leads to rural to urban migration and cities grow in size. Mega cities of the world continue to attract large number of migrants every year.

Yet city life can be very taxing.... think of some of the unpleasant aspects of city life.

(iii) *Industrialisation:* Industrial belts provide job opportunities and attract large numbers of people. These include not just factory workers but also transport operators, shopkeepers, bank employees, doctors, teachers and other service providers. The Kobe-Osaka region of Japan is thickly populated because of the presence of a number of industries.

III. Social and Cultural Factors

Some places attract more people because they have religious or cultural significance. In the same way – people tend to move away from places where there is social and political unrest. Many a times governments offer incentives to people to live in sparsely populated areas or move away from overcrowded places. Can you think of some examples from your region?

POPULATION GROWTH

The population growth or population change refers to the change in number of inhabitants of a territory during a specific period of time. This change may be positive as well as negative. It can be expressed either in terms of absolute numbers or in terms of percentage. Population change in an area is an important indicator of economic development, social upliftment and historical and cultural background of the region.

Some Basic Concepts of Population Geography

Growth of Population : Change of population in particular area between two points of time is known as growth of

population. For example, if we deduct the population of India 1991 (84.63 crore) from population of 2001 (102.70 crore) then we shall get the growth of population (18.07 crores) in actual numbers.

Growth Rate of Population **:** This is the change of population expressed in percentage.

Natural Growth of Population**:** This is the population increased by difference between births and deaths in a particular region between two points of time.

Natural Growth = Births – Deaths

Actual Growth of Population **:** This is

Births – Deaths + In Migration – Out Migration

Positive Growth of Population**:** This happens when the birth rate is more than the death rate between two points of time or when people from other countries migrate permanently to a region.

Negative Growth of Population**:** If the population decreases between two points of time it is known as negative growth of population. It occurs when the birth rate falls below the death rate or people migrate to other countries.

Components of Population Change

There are three components of population change – births, deaths and migration.

The crude birth rate (CBR) is expressed as number of live births in a year per thousand of women. It is calculated as:

$$CBR = \frac{Bi}{P} \times 1000$$

Here, CBR = Crude Birth Rate; Bi = live births during the year; P=Mid year population of the area.

Death rate plays an active role in population change. Population growth occurs not only by increasing births rate but also due to decreasing death rate. Crude Death Rate (CDR) is a simple method of measuring mortality of any area. CDR is expressed in terms of number of deaths in a particular year per thousand of population in a particular region.

CDR is calculated as:

$$CDR = \frac{D}{P} \times 1000$$

Here, CDR=Crude Death Rate; D= Number of deaths; P=Estimated mid-year population of that year.

By and large mortality rates are affected by the region's demographic structure, social advancement and levels of its economic development.

Migration

Apart from birth and death there is another way by which the population size changes.

When people move from one place to another, the place they move from is called the **Place of Origin** and the place they move to is called the **Place of Destination**. The place of origin shows a decrease in population while the population increases in the place of destination. Migration may be interpreted as a spontaneous effort to achieve a better balance between population and resources.

Migration may be permanent, temporary or seasonal. It may take place from rural to rural areas, rural to urban areas, urban to urban areas and urban to rural areas.

Do you realise that the same person is both an immigrant and an emigrant?

Immigration: Migrants who move into a new place are called Immigrants.

Emigration: Migrants who move out of a place are called Emigrants.

Can you think of reasons why people migrate?

People migrate for a better economic and social life. There are two sets of factors that influence migration.

The **Push** factors make the place of origin seem less attractive for reasons like unemployment, poor living conditions, political turmoil, unpleasant climate, natural disasters, epidemics and socio-economic backwardness.

The **Pull** factors make the place of destination seem more attractive than the place

Activity

Observe the news items and think of some reasons why certain countries become attractive destinations for migrants.

Migration to cities are traditionally age and sex selective i.e. more men of working age groups move to cities. Can you think of some reason why 22 per cent of migrants to Mumbai are kids?

of origin for reasons like better job opportunities and living conditions, peace and stability, security of life and property and pleasant climate.

TRENDS IN POPULATION GROWTH

The population on the earth is more than six billion. It has grown to this size over centuries. In the early periods population of the world grew very slowly. It is only during the last few hundred years that population has increased at an alarming rate.

Fig. 2.3 tells the story of population growth. After the evolution and introduction of agriculture about 8,000 to 12,000 years ago, the size of population was small – roughly 8 million. In the first century A.D. it was below

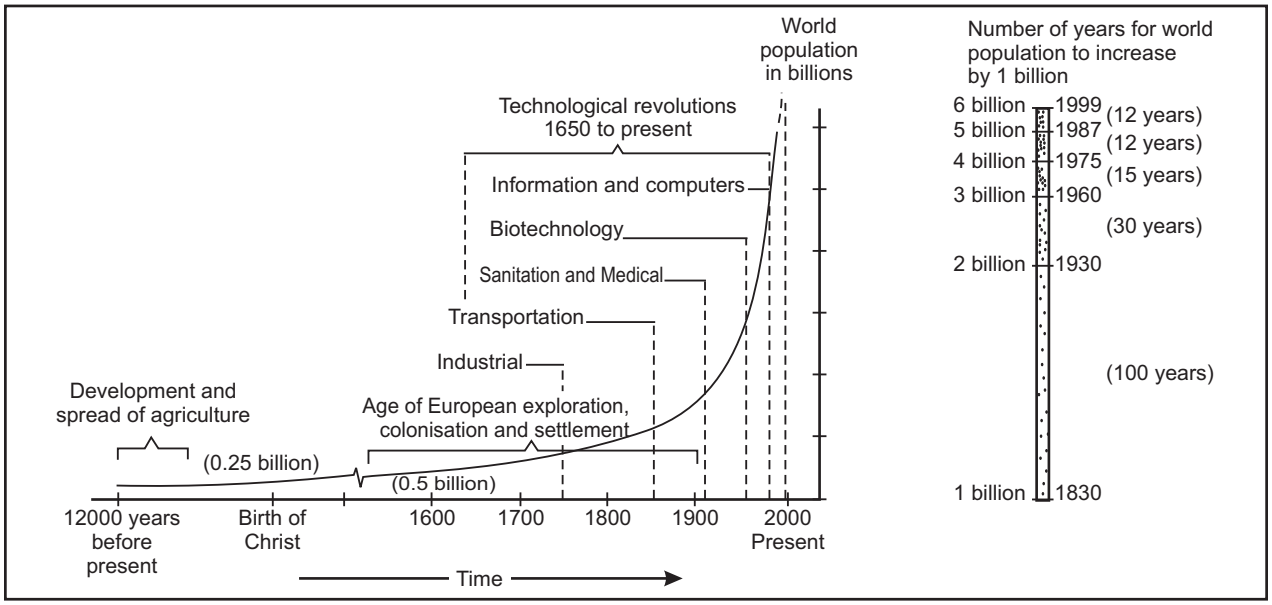


Fig. 2.3: Resource, Technology and Population Growth

Table 2.1: Doubling Time of World Population

Period	Population	Time in which Population Doubles
10,000 B.C.	5 million	
1650 A.D.	500 million	1,500 years
1850 A.D.	1,000 million	200 years
1930 A.D.	2,000 million	80 years
1975 A.D.	4,000 million	45 years
2012 A.D.	8,000 million projected figure	37 years

300 million. The expanding world trade during the sixteenth and seventeenth century, set the stage for rapid population growth. Around 1750, at the dawn of the Industrial Revolution, the world population was 550 million. World population exploded in the eighteenth century after the Industrial Revolution. Technological advancement achieved so far helped in the reduction of birth rate and provided a stage for accelerated population growth.

How Science and Technology helped Population Growth?

The steam engine replaced human and animal energy and also provided mechanised energy of water and wind. This increased agricultural and industrial production.

Inoculation against epidemics and other communicable diseases, improvement in medical facilities and sanitation contributed to a rapid decline in death rates throughout the world.

Do You Know

Human population increased more than ten times in the past 500 hundred years.

In the twentieth century itself the population has increased four times.

Nearly 80 million people are added each year.

DOUBLING TIME OF WORLD POPULATION

It took more than a million years for the human population to attain the one billion mark. But it took only 12 years for it to rise from 5 billion to 6 billion. See the Table 2.1 carefully which shows that doubling time of world population is reducing fast.

There is a great variation among regions in doubling their population. Table 2.2 shows that developed countries are taking more time to double their population as compared to developing countries. Most of the population growth is taking place in the developing world, where population is exploding. Why is this so?

Table 2.2: Population Growth Rates (%) 1995-2000

High		Low	
Liberia	8.2	Latvia	–1.5
Somalia	4.2	Estonia	–1.2
Yemen	3.7	Russia, Ukraine	–0.6
Saudi Arabia	3.4	Albania, Bulgaria	
Oman	3.3	Croatia	
		Slovania, Czech Republic	
		Germany, Portugal	–0.1
		Spain, Italy	
		Denmark	0

SPATIAL PATTERN OF POPULATION CHANGE

Population growth in different parts of the world can be compared. The growth of population is low in developed countries as compared to developing countries. There is negative correlation between economic development and population growth.

Although the annual rate of population change (1.4 per cent) seems to be low (Table 2.3), it is actually not so. This is because:

- When a small annual rate is applied to a very large population, it will lead to a large population change.

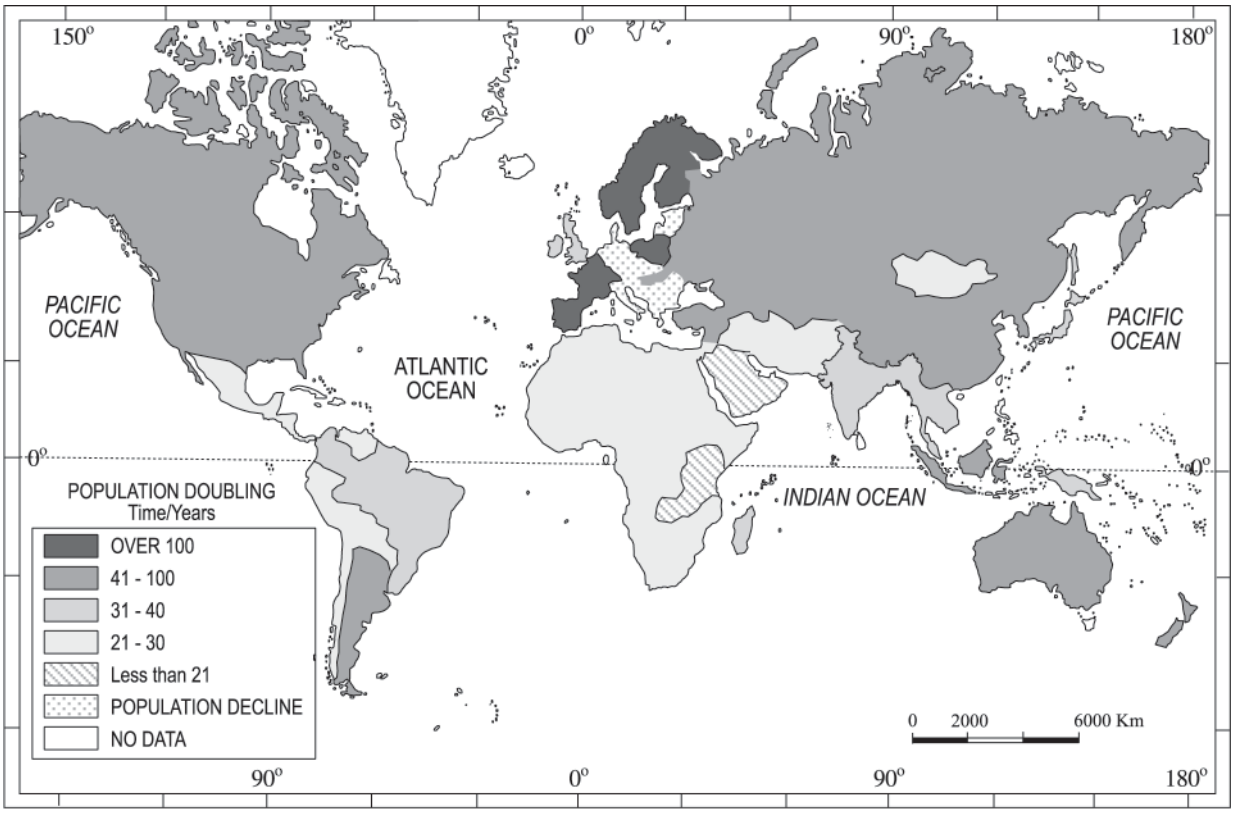


Figure 2.4: Population Doubling Time

- Even if the growth rate continues to decline, the total population grows each year. The infant mortality rate may have increased as has the death rate during childbirth.

Table 2.3: Growth of Population 2004-05 over 1990-95

Region	Growth Rate	
	1990-95	2004-05 (Estimated)
World	1.6	1.4
Africa	2.4	2.6
Europe	0.2	0.0
North & Central America	1.4	1.1
South America	1.7	1.4
Asia	1.6	1.4
Oceania (Australia, New Zealand and Fiji)	1.5	1.3

IMPACT OF POPULATION CHANGE

A small increase in population is desirable in a growing economy. However, population growth beyond a certain level leads to problems. Of these the depletion of resources is the most serious. Population decline is also a matter of concern. It indicates that resources that had supported a population earlier are now insufficient to maintain the population.

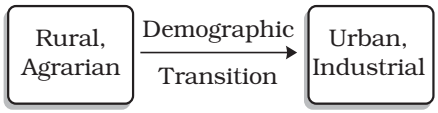
The deadly HIV/AIDS epidemics in Africa and some parts of the Commonwealth of Independent States (CIS) and Asia have pushed up death rates and reduced average life expectancy. This has slowed down population growth.

The Doubling Story... It will take 36 years

The annual population growth rate in India is 1.9 per cent. At this rate India's population of over 1 billion will double in 36 years. Some developed countries will take 318 years to double their population whereas some countries still do not show symptoms of doubling their population.

DEMOGRAPHIC TRANSITION

Demographic transition theory can be used to describe and predict the future population of any area. The theory tells us that population of any region changes from high births and high deaths to low births and low deaths as society progresses from rural agrarian and illiterate to urban industrial and literate society. These changes occur in stages which are collectively known as the **demographic cycle**.



The Fig. 2.5 explains the three-staged model of Demographic Transition Theory:

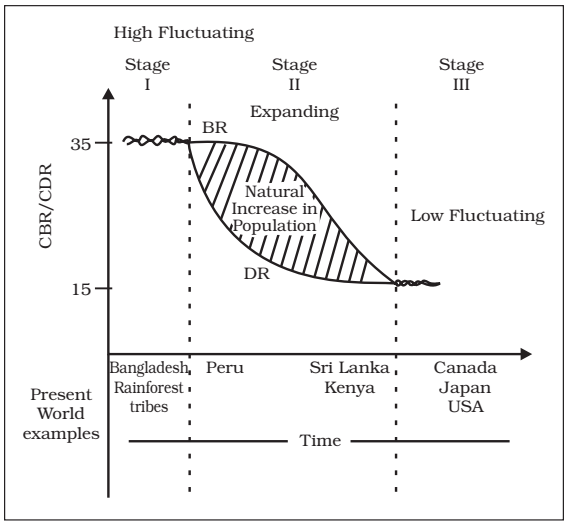


Fig. 2.5: Demographic Transition Theory

The first stage has high fertility and high mortality because people reproduce more to compensate for the deaths due to epidemics and variable food supply. The population growth is slow and most of the people are engaged in agriculture where large families are an asset. Life expectancy is low, people are mostly illiterate and have low levels of technology. Two hundred years ago all the countries of the world were in this stage.

Fertility remains high in the beginning of second stage but it declines with time. This is accompanied by reduced mortality rate. Improvements in sanitation and health conditions lead to decline in mortality. Because of this gap the net addition to population is high.

In the last stage, both fertility and mortality decline considerably. The population is either stable or grows slowly. The population becomes urbanised, literate and has high technical know-how and deliberately controls the family size.

This shows that human beings are extremely flexible and are able to adjust their fertility.

In the present day, different countries are at different stages of demographic transition.

POPULATION CONTROL MEASURES

Family planning is the spacing or preventing the birth of children. Access to family planning services is a significant factor in limiting population growth and improving women's health. Propaganda, free availability of contraceptives and tax disincentives for large families are some of the measures which can help population control.

Thomas Malthus in his theory (1793) stated that the number of people would increase faster than the food supply. Any further increase would result in a population crash caused by famine, disease and war. The preventive checks are better than the physical checks. For the sustainability of our resources, the world will have to control the rapid population increase

EXERCISES

1. Choose the right answer from the four alternatives given below.

(i) Which one of the following continents has the highest growth of population?

(a) Africa (c) Asia

(b) South America (d) North America

(ii) Which one of the following is not an area of sparse population?

(a) The Atacama (c) Equatorial region

(b) South-east Asia (d) Polar regions

(iii) Which one of the following is not a push factor ?

(a) Water shortage (c) Unemployment

(b) Medical/educational facilities (d) Epidemics

(iv) Which one of the following is not a fact ?

(a) Human population increased more than ten times during the past 500 years.

(b) Nearly 80 million people are added to the world population each year.

(c) It took 100 years for the population to rise from 5 billion to 6 billion.

(d) Population growth is high in the first stage of demographic transition?

2. Answer the following questions in about 30 words.

(i) Name three geographical factors that influence the distribution of population.

(ii) There are a number of areas with high population density in the world. Why does this happen?

(iii) What are the three components of population change?

3. Distinguish between:

(i) Birth rate and death rate.

(ii) Push factors and pull factors of migration.

4. Answer the following questions in about 150 words.

(i) Discuss the factors influencing the distribution and density of population in the world.

(ii) Discuss the three stages of demographic transition.

Map Skill

On the outline map of the world, show and name the following.

(i) Countries of Europe and Asia with negative growth rate of population.

(ii) African countries with growth rate of population more than three per cent. (You may refer to Appendix 1).

Project/Activity

(i) Has someone in your family migrated? Write about her/his place of destination. What made her/him migrate?

(ii) Write a brief report on the distribution and density of population in your state.

Unit-II
Chapter-3

Population Composition

People of any country are diverse in many respects. Each person is unique in her/his own way. People can be distinguished by their age, sex and their place of residence. Some of the other distinguishing attributes of the population are occupation, education and life expectancy.

SEX COMPOSITION

The number of women and men in a country is an important demographic characteristic. The ratio between the number of women and men in the population is called the Sex Ratio. In some countries it is calculated by using the formula:

$$\frac{\text{Male Population}}{\text{Female Population}} \times 1000$$

or the number of males per thousand females.

In India, the sex ratio is worked out using the formula:

$$\frac{\text{Female Population}}{\text{Male Population}} \times 1000$$

or the number of females per thousand males.

The sex ratio is an important information about the status of women in a country.

In regions where gender discrimination is rampant, the sex ratio is bound to be unfavourable to women. Such areas are those where the practice of female foeticide, female infanticide and domestic violence against women are prevalent. One of the reasons could be lower socio-economic status of women in these areas. You must remember that more women in the population does not mean they have a better status. It could be that the men might have migrated to other areas for employment.

Natural Advantage v/s Social Disadvantage

Females have a biological advantage over males as they tend to be more resilient than males yet this advantage is cancelled out by the social disadvantages and discriminations that they face.

On an average, the world population reflects a sex ratio of 990 females per 1000 males. The highest sex ratio in the world has been recorded in Latvia which is 1187 females per 1000 males. In contrast, the lowest sex ratio occurs in U.A.E. which is 468 females per 1000 males.

The world pattern of sex ratio does not exhibit variations in the developed regions of the world. The sex ratio is favourable for females in 139 countries of the world and unfavourable for them in the remaining 72 countries listed by the United Nations.

In general, Asia has a low sex ratio. Countries like China, India, Saudi Arabia, Pakistan, Afghanistan have a lower sex ratio.

On the other extreme is greater part of Europe (including Russia) where males are in minority. A deficit of males in the populations of many European countries is attributed to better status of women, and an excessively male-dominated out-migration to different parts of the world in the past.

Age Structure

Age structure represents the number of people of different age groups. This is an important indicator of population composition, since a large size of population in the age group of 15-59 indicates a large working population. A greater proportion of population above 60 years represents an ageing population which requires more expenditure on health care facilities. Similarly high proportion of young population would mean that the region has a high birth rate and the population is youthful.

Age-Sex Pyramid

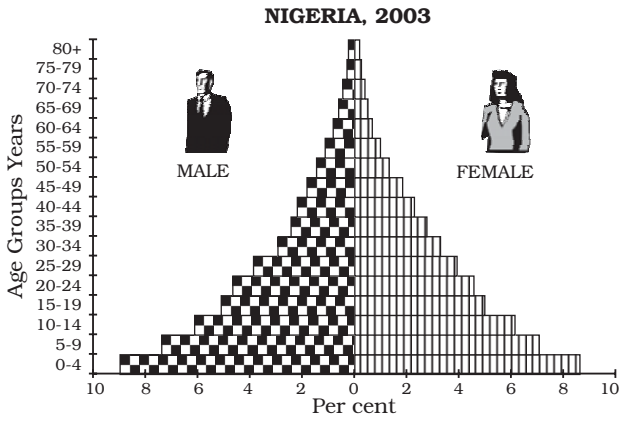
The age-sex structure of a population refers to the number of females and males in different age groups. A population pyramid is used to show the age-sex structure of the population.

The shape of the population pyramid reflects the characteristics of the population. The left side shows the percentage of males while the right side shows the percentage of women in each age group.

Fig. 3.1, 3.2 and 3.3 show different types of population pyramids.

Expanding Populations

The age-sex pyramid of Nigeria as you can see is a triangular shaped pyramid with a wide base and is typical of less developed countries. These have larger populations in lower age groups due to high birth rates. If you construct the pyramids for Bangladesh and Mexico, it would look the same.

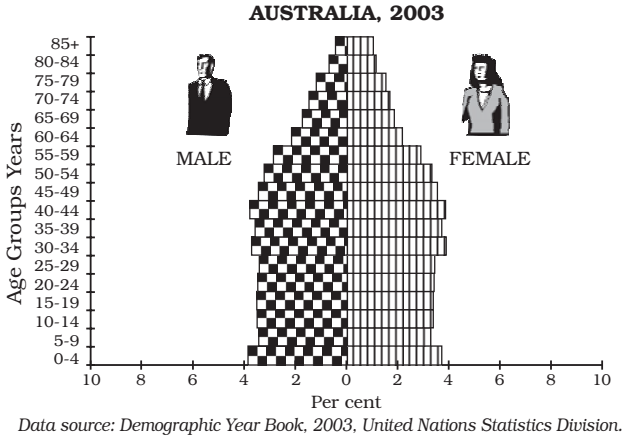


Data source: Demographic Year Book, 2003, United Nations Statistics Division. Data refer to national projection

Fig. 3.1: Expanding Population

Constant Population

Australia's age-sex pyramid is bell shaped and tapered towards the top. This shows birth and death rates are almost equal leading to a near constant population.

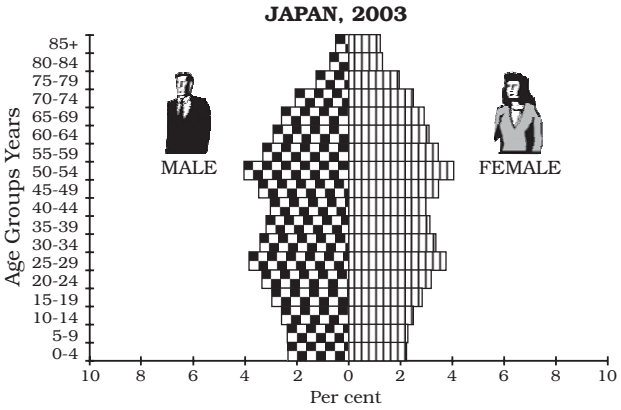


Data source: Demographic Year Book, 2003, United Nations Statistics Division.

Fig. 3.2: Constant Population

Declining Populations

The Japan pyramid has a narrow base and a tapered top showing low birth and death rates. The population growth in developed countries is usually zero or negative.



Data source: Demographic Year Book, 2003, United Nations Statistics Division. Excluding diplomatic personnel outside the country and foreign military and civilian personnel and their dependants stationed in the area

Fig. 3.3: Declining Population

Activity

Draw a population pyramid of the children in your school and describe its characteristics.

Ageing Population

Population ageing is the process by which the share of the older population becomes proportionally larger. This is a new phenomenon of the twentieth century. In most of the developed countries of the world, population in higher age groups has increased due to increased life expectancy. With a reduction in birth rates, the proportion of children in the population has declined.

RURAL URBAN COMPOSITION

The division of population into rural and urban is based on the residence. This division is necessary because rural and urban life styles differ from each other in terms of their livelihood and social conditions. The age-sex-occupational structure, density of population and level of development vary between rural and urban areas.

The criteria for differentiating rural and urban population varies from country to country. In general terms rural areas are those where people are engaged in primary activities and urban areas are those when majority of the working population is engaged in non-primary activities.

Fig. 3.4 shows rural urban sex composition of selected countries. The rural and urban differences in sex ratio in Canada and West European countries like Finland are just the opposite of those in African and Asian countries like Zimbabwe and Nepal respectively. In Western countries, males outnumber females in rural areas and females outnumber the males in urban areas. In countries like Nepal, Pakistan and India the case is reverse. The excess of females in urban areas of U.S.A., Canada and Europe is the result of influx of females from rural areas to avail of the vast job opportunities. Farming in these developed countries is also highly mechanised and remains largely a male occupation. By contrast the sex ratio in Asian urban areas remains male dominated due to the predominance of male migration. It is also worth noting that in countries like India, female participation in farming activity in rural area is fairly high. Shortage of housing, high cost of living, paucity of job opportunities and lack of security in cities, discourage women to migrate from rural to urban areas.

Literacy

Proportion of literate population of a country in an indicator of its socio-economic development as it reveals the standard of living, social status of females, availability of educational facilities and policies of government. Level of economic development is both a cause and consequence of literacy. In India – literacy rate denotes the percentage of population above 7 years of age, who is able to read, write and have the ability to do arithmetic calculations with understanding.

Occupational Structure

The working population (i.e. women and men of the age group – 15 to 59) take part in various occupations ranging from agriculture, forestry,

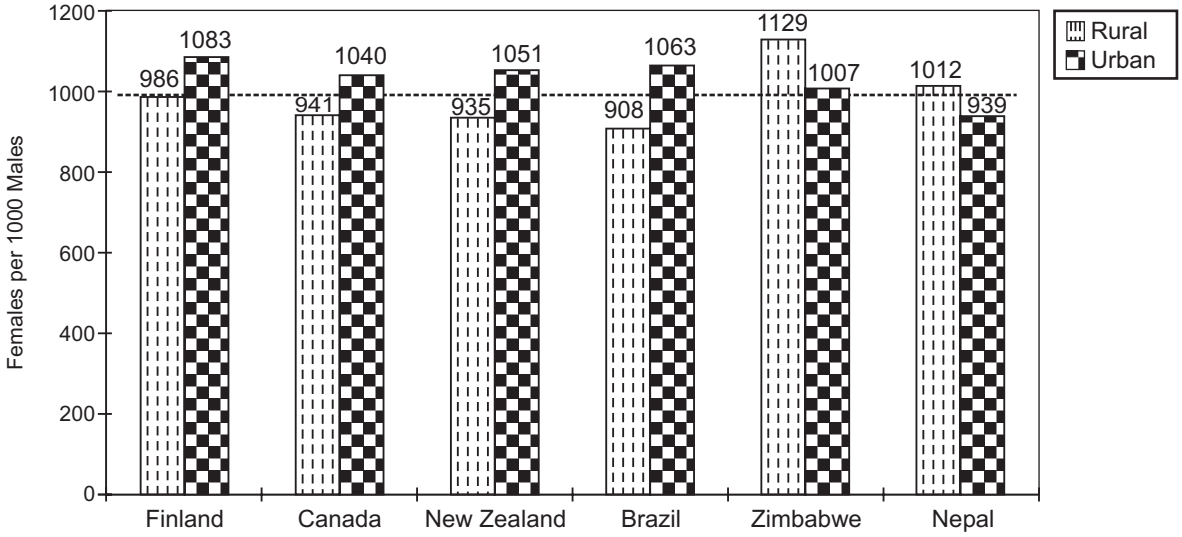


Fig. 3.4: Rural Urban Sex Composition, 2003 (Selected Countries)

fishing, manufacturing construction, commercial transport, services, communication and other unclassified services.

Agriculture, forestry, fishing and mining are classified as primary activities manufacturing as secondary, transport, communication and other services as tertiary and the jobs related to research and developing ideas as quaternary activities. The proportion of working population engaged in these four sectors is a good indicator of the levels of economic development of a nation. This is because only a developed economy with industries and infrastructure can accommodate more workers in the secondary, tertiary and quaternary sector. If the economy is still in the primitive stages, then the proportion of people engaged in primary activities world be high as it involves extraction of natural resources.

EXERCISES

1. Choose the right answer from the four alternatives given below.

(i) Which one of the following has caused the sex ratio of the United Arab Emirates to be low?

(a) Selective migration of male working population

(b) High birth rate of males

(c) Low birth rate of females

(d) High out migration of females

(ii) Which one of the following figures represents the working age group of the population?

(a) 15 to 65 years
(b) 15 to 64 years
(c) 15 to 66 years
(d) 15 to 59 years

(iii) Which one of the following countries has the highest sex ratio in the world?

(a) Latvia
(b) United Arab Emirates
(c) Japan
(d) France

2. Answer the following questions in about 30 words.

(i) What do you understand by population composition?

(ii) What is the significance of age-structure?

(iii) How is sex-ratio measured?

3. Answer the following questions in not more than 150 words.

(i) Describe the rural-urban composition of the population.

(ii) Discuss the factors responsible for imbalances in the sex-age found in different parts of the world and occupational structure.

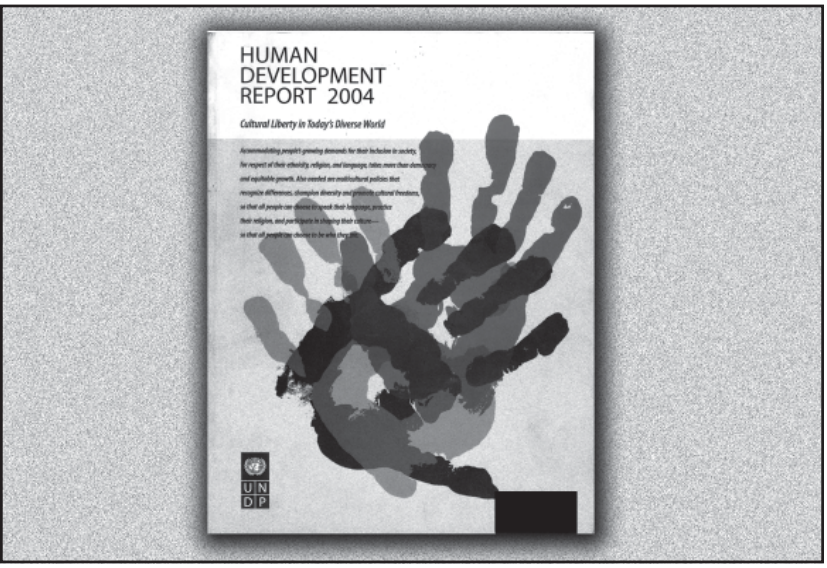
Project/Activity

Construct an age-sex pyramid for your district/state.

Unit-II

Chapter-4

Human Development



The words 'growth' and 'development' are not new to you. Look around you, almost everything that you can see (and many that you cannot) grows and develops. These may be plants, cities, ideas, nations, relationships or even you yourself! What does this mean?

Do growth and development mean the same thing?
Do they accompany each other?

This chapter discusses the concept of human development as it pertains to nations and communities.

GROWTH AND DEVELOPMENT

Both growth and development refer to changes over a period of time. The difference is that growth is quantitative and value neutral. It may have a positive or a negative sign. This means that the change may be either positive (showing an increase) or negative (indicating a decrease).

Development means a qualitative change which is always value positive. This means that development cannot take place unless there is an increment or addition to the existing conditions. Development occurs when positive growth takes place. Yet, positive growth does not always lead to development. Development occurs when there is a positive change in quality.

For example, if the population of a city grows from one lakh to two lakhs over a period of time, we say the city has grown. However, if a facilities like housing, provision of basic services and other characteristics remain the same, then this growth has not been accompanied by development.

Can you think of a few more examples to differentiate between growth and development?

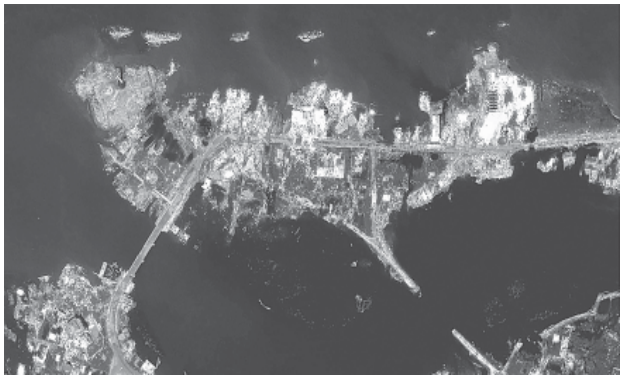
Activity

Write a short essay or draw a set of pictures illustrating growth without development and growth with development.

For many decades, a country's level of development was measured only in terms of its

Band Aceh, June, 2004

Band Aceh, December, 2004



Do you know that cities can also grow negatively? Look at the photographs of this tsunami affected city. Are natural disasters the only reasons for negative growth in a city's size?

economic growth. This meant that the bigger the economy of the country, the more developed it was considered, even though this growth did not really mean much change in the lives of most people.

The idea that the quality of life people enjoy in a country, the opportunities they have and freedoms they enjoy, are important aspects of development, is not new.

These ideas were clearly spelt out for the first time in the late eighties and early nineties. The works of two South Asian economists, Mahbub-ul-Haq and Amartya Sen are important in this regard.

The concept of human development was introduced by Dr Mahbub-ul-Haq. Dr Haq has described human development as development that enlarges people's choices and improves their lives. People are central to all development under this concept. These choices are not fixed but keep on changing. The basic goal of development is to create conditions where people can live meaningful lives.

A meaningful life is not just a long one. It must be a life with some purpose. This means that people must be healthy, be able to develop their talents, participate in society and be free to achieve their goals.

Do You Know

Dr Mahbub-ul-Haq and Prof Amartya Sen were close friends and have worked together under the leadership of Dr Haq to bring out the initial Human Development Reports. Both these South Asian economists have been able to provide an alternative view of development.

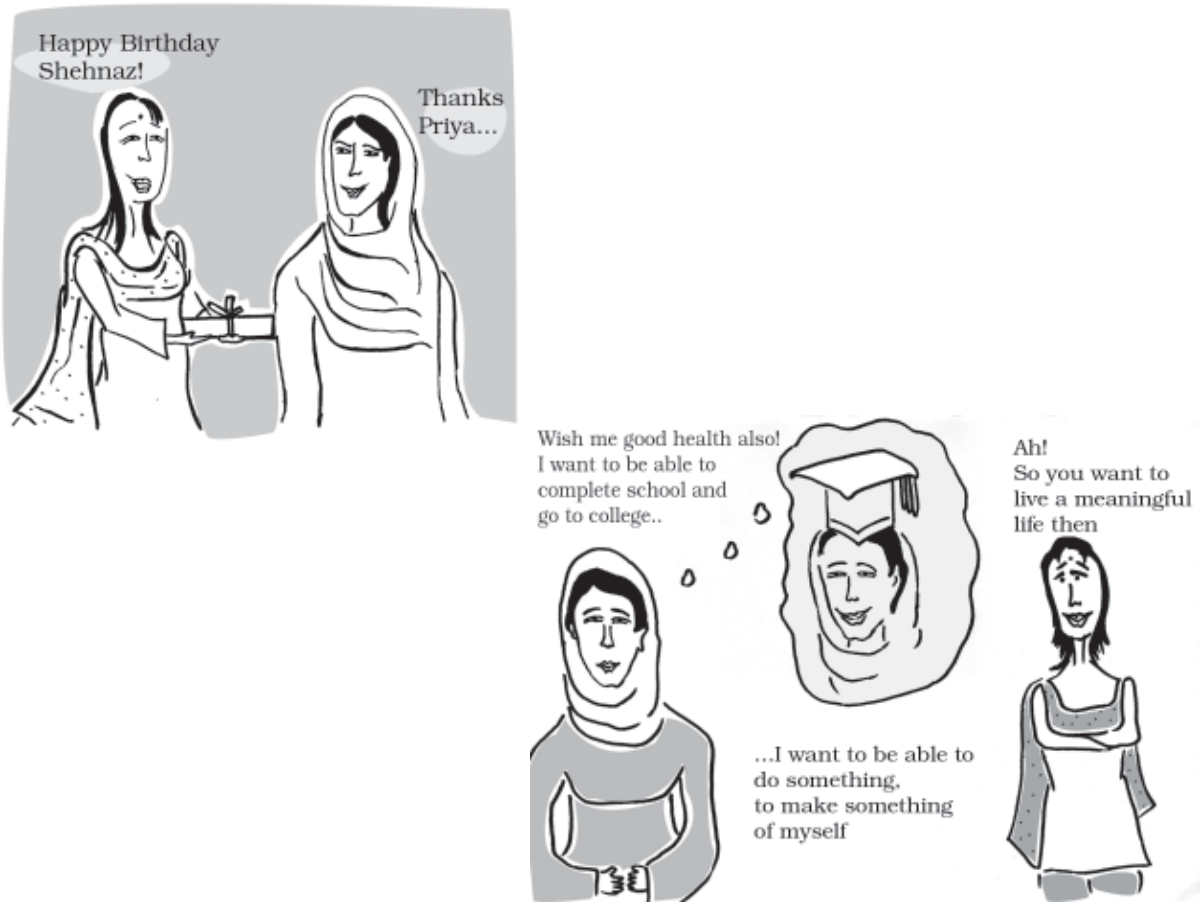
A man of vision and compassion, Pakistani economist Dr Mahbub-ul-Haq created the Human Development Index in 1990. According to him, development is all about enlarging people's choices in order to lead long, healthy lives with dignity. The United Nations Development Programme has used his concept of human development to publish the Human Development Report annually since 1990.

Dr Haq's flexibility of mind and ability to think out of the box can be illustrated from one of his speeches where he quoted Shaw saying, "'You see things that are, and ask why? I dream of things that never were, and ask why not?'

Nobel Laureate Prof Amartya Sen saw an increase in freedom (or decrease in unfreedom) as the main objective of development. Interestingly, increasing freedoms is also one of the most effective ways of bringing about development. His work explores the role of social and political institutions and processes in increasing freedom.

The works of these economists are path breaking and have succeeded in bringing people to the centre of any discussion on development.

What is a Meaningful Life?



Which of these lives is a meaningful life?

Who do you think leads more meaningful life? What makes one of these more meaningful than the other?

Leading a long and healthy life, being able to gain knowledge and having enough means to be able to live a decent life are the most important aspects of human development.

Therefore, access to resources, health and education are the key areas in human development. Suitable indicators have been developed to measure each of these aspects. Can you think of some?

Very often, people do not have the capability and freedom to make even basic choices. This may be due to their inability to acquire knowledge, their material poverty, social discrimination, inefficiency of institutions and other reasons. This prevents them from leading healthy lives, being able to get educated or to have the means to live a decent life.

Building people's capabilities in the areas of health, education and access to resources is therefore, important in enlarging their choices. If people do not have capabilities in these areas, their choices also get limited.

For example, an uneducated child cannot make the choice to be a doctor because her choice has got limited by her lack of education. Similarly, very often poor people cannot choose to take medical treatment for disease because their choice is limited by their lack of resources.

Activity

Enact a five-minute play with your classmates showing how choices are limited due to lack of capability in the areas of either income, education or health.

THE FOUR PILLARS OF HUMAN DEVELOPMENT

Just as any building is supported by pillars, the idea of human development is supported by the concepts of **equity, sustainability, productivity** and **empowerment**.

Equity refers to making equal access to opportunities available to everybody. The opportunities available to people must be equal irrespective of their gender, race, income and in the Indian case, caste. Yet this is very often not the case and happens in almost every society.

For example, in any country, it is interesting to see which group the most of the school dropouts belong to. This should then lead to an understanding of the reasons for such behaviour. In India, a large number of women and persons belonging to socially and economically backward groups drop out of school. This shows how the choices of these groups get limited by not having access to knowledge.

Sustainability means continuity in the availability of opportunities. To have sustainable human development, each generation must have the same opportunities. All environmental, financial and human resources must be used keeping in mind the future. Misuse of any of these resources will lead to fewer opportunities for future generations.

A good example is about the importance of sending girls to school. If a community does not stress the importance of sending its girl children to school, many opportunities will be lost to these young women when they grow up. Their career choices will be severely curtailed and this would affect other aspects of their lives. So each generation must ensure the availability of choices and opportunities to its future generations.

Productivity here means human labour productivity or productivity in terms of human work. Such productivity must be constantly enriched by building capabilities in people. Ultimately, it is people who are the real wealth of nations. Therefore, efforts to increase their knowledge, or provide better health facilities ultimately leads to better work efficiency.

Empowerment means to have the power to make choices. Such power comes from increasing freedom and capability. Good governance and people-oriented policies are required to empower people. The empowerment of socially and economically disadvantaged groups is of special importance.

Activity

Talk to the vegetable vendor in your neighbourhood and find out if she has gone to school. Did she drop out of school? Why? What does this tell you about her choices and the freedom she has? Note how her opportunities were limited because of her gender, caste and income.

APPROACHES TO HUMAN DEVELOPMENT

There are many ways of looking at the problem of human development. Some of the important approaches are: (a) The income approach; (b) The welfare approach; (c) Minimum needs approach; and (d) Capabilities approach (Table 4.1).

MEASURING HUMAN DEVELOPMENT

The human development index (HDI) ranks the countries based on their performance in the key areas of health, education and access to resources. These rankings are based on a score between 0 to 1 that a country earns from its record in the key areas of human development.

The indicator chosen to assess health is the life expectancy at birth. A higher life expectancy means that people have a greater chance of living longer and healthier lives.

The adult literacy rate and the gross enrolment ratio represent access to knowledge. The number of adults who are able to read and write and the number of children enrolled in schools show how easy or difficult it is to access knowledge in a particular country.

Access to resources is measured in terms of purchasing power (in U.S. dollars).

Each of these dimensions is given a weightage of 1/3. The human development index is a sum total of the weights assigned to all these dimensions.

The closer a score is to one, the greater is the level of human development. Therefore, a score of 0.983 would be considered very high while 0.268 would mean a very low level of human development.

The human development index measures **attainments** in human development. It reflects what has been achieved in the key areas of human development. Yet it is not the most reliable measure. This is because it does not say anything about the distribution.

The human poverty index is related to the human development index. This index measures the **shortfall** in human development.

Table 4.1: Approaches to Human Development

(a) Income Approach	This is one of the oldest approaches to human development. Human development is seen as being linked to income. The idea is that the level of income reflects the level of freedom an individual enjoys. Higher the level of income, the higher is the level of human development.
(b) Welfare Approach	This approach looks at human beings as beneficiaries or targets of all development activities. The approach argues for higher government expenditure on education, health, social secondary and amenities. People are not participants in development but only passive recipients. The government is responsible for increasing levels of human development by maximising expenditure on welfare.
(c) Basic Needs Approach	This approach was initially proposed by the International Labour Organisation (ILO). Six basic needs i.e.: health, education, food, water supply, sanitation, and housing were identified. The question of human choices is ignored and the emphasis is on the provision of basic needs of defined sections.
(d) Capability Approach	This approach is associated with Prof. Amartya Sen. Building human capabilities in the areas of health, education and access to resources is the key to increasing human development.

Bhutan is the only country in the world to officially proclaim the Gross National Happiness (GNH) as the measure of the country's progress. Material progress and technological developments are approached more cautiously taking into consideration the possible harm they might bring to the environment or the other aspects of cultural and spiritual life of the Bhutanese. This simply means material progress cannot come at the cost of happiness. GNH encourages us to think of the spiritual, non-material and qualitative aspects of development.

Since 1990, the United Nations Development Programme (UNDP) has been publishing the Human Development Report every year. This report provides a rank-wise list of all member countries according to the level of human development. The Human Development index and the Human Poverty index are two important indices to measure human development used by the UNDP.

It is a non-income measure. The probability of not surviving till the age of 40, the adult illiteracy rate, the number of people who do not have access to clean water, and the number of small children who are underweight are all taken into account to show the shortfall in human development in any region. Often the human poverty index is more revealing than the human development index.

Looking at both these measures of human development together gives an accurate picture of the human development situation in a country.

The ways to measure human development are constantly being refined and newer ways of capturing different elements of human development are being researched. Researchers have found links between the level of corruption or political freedom in a particular region. There is also a discussion regarding a political freedom index and, a listing of the most corrupt countries. Can you think of other links to the level of human development?

INTERNATIONAL COMPARISONS

International comparisons of human development are interesting. Size of the territory and per capita income are not directly related to human development. Often smaller countries have done better than larger ones in human development. Similarly, relatively poorer nations have been ranked higher than richer neighbours in terms of human development.

For example, Sri Lanka, Trinidad and Tobago have a higher rank than India in the human development index despite having smaller economies. Similarly, within India, Kerala performs much better than Punjab and Gujarat in human development despite having lower per capita income.

Countries can be classified into three groups on the basis of the human development scores earned by them (Table 4.2).

Table 4.2: Human Development: Categories, Criteria and Countries

Level of Human Development	*Score in Development Index*	*Number of Countries*
High	above 0.8	57
Medium	between 0.5 up to 0.799	88
Low	below 0.5	32

Source: Human Development Report, 2005

Countries with High Index Value

Countries with high human development index are those which have a score of over 0.8.

According to the *Human Development Report* of 2005, this group includes 57 countries. Table 4.3 shows the countries in this group.

Table 4.3: Top Ten Countries with High Value Index

Sl. No.	Country	Sl. No.	Country
1.	Norway	6.	Sweden
2.	Iceland	7.	Switzerland
3.	Australia	8.	Ireland
4.	Luxembourg	9.	Belgium
5.	Canada	10.	United States

Source: Human Development Report, 2005

Try to locate these countries on a map. Can you see what these countries have in common? To find out more visit the official government websites of these countries.

Providing education and healthcare is an important government priority. Countries with higher human development are those where a lot of investment in the social sector has taken place. Altogether, a higher investment in people and good governance has set this group of countries apart from the others.

Try to find out the percentage of the country's income spent on these sectors. Can you think of some other characteristics that these countries have in common?

You will notice that many of these countries have been the former imperial powers. The degree of social diversity in these countries is not very high. Many of the countries with a high human development score are located in Europe and represent the industrialised western world. Yet there are striking numbers of non-European countries also who have made it to this list.

Countries with Medium Index Value

Countries with medium levels of human development form the largest group. There are a total of 88 countries in this group. Most of these are countries which have emerged in the period after the Second World War. Some countries from this group were former colonies while many others have emerged after the break up of the erstwhile Soviet Union in 1990. Many of these countries have been rapidly improving their human development score by adopting more people-oriented policies and reducing social discrimination. Most of these countries have a much higher social diversity than the countries with higher human development scores. Many in this group have faced political instability and social uprisings at some point of time in their recent history.

India 126th in UN Human Development Index

BS REPORTER
New Delhi, 9 November

Observing that water and sanitation are under-financed compared to military spending in India, a UNDP report has called for adequate funds for such basic amenities so that increased income levels could be successfully translated into human development.

UNDP's Human Development Report 2006, which ranked India 126 globally on Human Development Index, as compared to 127 a year ago, noted that India alone loses 4.5 lakh lives annually to diarrhea, more than any country.

Though the millennium development goal (MDG) of water access has a deadline of 2015, India may take longer to reach there, UNDP Resident Representative Maxine Olson said today.

"The report focuses on water access this year as it cuts across all the MDGs," Olson said, adding that the MDG aimed at enabling each individual to get at least 20 litres of water a day. "India has a higher target of 40 litres a day," she said, referring to the target set by the Union Rural Development Ministry.

The report, which was released by Water Resources Minister Saifuddin Soz, takes a hard look at the failure of irrigation systems in the country.

Olson said that though agriculture has been blamed for consuming 80 per cent of water in India, the beneficiaries of the power subsidies are the rich farmers, while the poor still depend on rains.

The report also notes that water harvesting has been on the retreat in India. It says the rise of canal irrigation and the groundwater revolution have led to neglect of traditional systems. Since the 1980s, the number of tanks, ponds and other surface water bodies has reduced by almost a third, thus reducing groundwater recharge capabilities.

The report favours small scale water harvesting systems and check dams, saying that the efficiency claims offered to advance large scale infrastructure are sometimes overstated.

Speaking at the function, Soz said the Artificial Recharge Council for Groundwater set up recently by the government would go a long way in conserving rain water and recharging groundwater.

Water Resources Minister Saifuddin Soz (right) and Maxine Olson, UNDP Resident Coordinator in India, at the release of Human Development Report, 2006, in New Delhi on Thursday PTI

GOVT QUESTIONS REPORT

PRESS TRUST OF INDIA
New Delhi, 9 November

India, which has been placed 126th in the UNDP Human Development Index, today questioned the ranking, saying comparisons should be between equals.

"Just as you cannot compare Maldives with India, you cannot compare us with countries like Norway, Sweden or Singapore, which are far more developed," Union Minister of Water Resources Saifuddin Soz told reporters here while releasing the UNDP Human Development Report, 2006.

Soz said India had made "spectacular progress" in many fields and it was not necessarily reflected by the index. "The ranking should be on the basis of comparisons between equal countries in terms of size and population," he said, adding UNDP had been comparing big countries like India and China with other smaller countries.

Soz said in future UNDP should think about the ranking system and find new tools to give a more appropriate picture.

The index, which measures achievements in terms of life expectancy, education and adjusted real income, ranked 177 countries with Norway on top and Niger at the bottom.

UNDP Policy Specialist Arunabha Ghosh, however, said the rankings were limited to comparable data. "We do not use absolute numbers but percentage," he said.

What could be the reasons for India to be behind 125 countries in HDI?

Countries with Low Index Value

As many as 32 countries record low levels of human development. A large proportion of these are small countries which have been going through political turmoil and social instability in the form of civil war, famine or a high incidence of diseases. There is an urgent need to address the human development requirements of this group through well thought out policies.

International comparisons of human development can show some very interesting results. Often people tend to blame low levels of human development on the culture of the people. For example, X country has lower human development because its people follow Y religion, or belong to Z community. Such statements are misleading.

To understand why a particular region keeps reporting low or high levels of human development it is important to look at the pattern of government expenditure on the social sector. The political environment of the country and the amount of freedom people have is also important. Countries with high levels of human development invest more in the social sectors and are generally free from political turmoil and instability. Distribution of the country's resources is also far more equitable.

On the other hand, places with low levels of human development tend to spend more on defence rather than social sectors. This shows that these countries tend to be located in areas of political instability and have not been able to initiate accelerated economic development.

EXERCISES

1. Choose the right answer from the four alternatives given below.

(i) Which one of the following best describes development?

(a) an increase in size
(b) a constant in size
(c) a positive change in quality
(d) a simple change in the quality

(ii) Which one of the following scholars introduced the concept of Human Development?

(a) Prof. Amartya Sen
(b) Ellen C. Semple
(c) Dr Mahabub-ul-Haq
(d) Ratzel

(iii) Which one of the following is not a country with high human development?

(a) Norway
(b) Japan
(c) Argentina
(d) Egypt

2. Answer the following questions in about 30 words.

(i) What are the three basic areas of human development?

(ii) Name the four main components of human development?

(iii) How are countries classified on the basis of human development index?

3. Answer the following questions in not more than 150 words.

(i) What do you understand by the term human development?

(ii) What do equity and sustainability refer to within the concept of human development?

Project/Activity

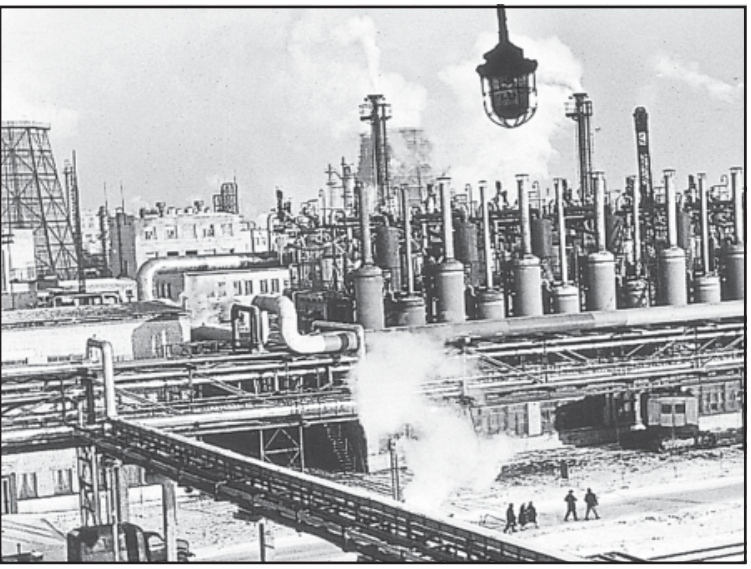
Make a list of the ten most corrupt countries and ten least corrupt countries. Compare their scores on the human development index. What inferences can you draw?

Consult the latest Human Development Report for this.

Unit-III

Chapter-6

Secondary Activities



All economic activities namely primary, secondary, tertiary and quaternary, revolve around obtaining and utilising resources necessary for survival.

Secondary activities add value to natural resources by *transforming* raw materials into valuable products. Cotton in the boll has limited use but after it is transformed into yarn, becomes more valuable and can be used for making clothes. Iron ore, cannot be used; directly from the mines, but after being converted into steel it gets its value and can be used for making many valuable machines, tools, etc. The same is true of most of the materials from the farm, forest, mine and the sea. Secondary activities, therefore, are concerned with manufacturing, processing and construction (infrastructure) industries.

MANUFACTURING

Manufacturing involves a full array of production from handicrafts to moulding iron and steel and stamping out plastic toys to assembling delicate computer components or space vehicles. In each of these processes, the common characteristics are the application of power, mass production of identical products and specialised labour in factory settings for the production of standardised commodities. Manufacturing may be done with modern power and machinery or it may still be very primitive. Most of the Third World countries still 'manufacture' in the literal sense of the term. It is difficult to present a full picture of all the manufacturers in these countries. More emphasis is given to the kind of 'industrial' activity which involves less complicated systems of production.

Characteristics of Modern Large Scale Manufacturing

Modern large scale manufacturing has the following characteristics:

Specialisation of Skills/Methods of Production

Under the 'craft' method factories produce only a few pieces which are made-to-order. So the costs are high. On the other hand, mass

production involves production of large quantities of standardised parts by each worker performing only one task repeatedly.

'Manufacturing' Industry and 'Manufacturing Industry'

Manufacturing literally means *'to make by hand'*. However, now it includes goods 'made by machines'. It is essentially a process which involves *transforming raw materials into finished goods of higher value for sale in local or distant markets*. Conceptually, an industry is a geographically located manufacturing unit maintaining books of accounts and, records under a management system. As the term *industry* is comprehensive, it is also used as synonymous with 'manufacturing' When one uses terms like 'steel industry' and 'chemical industry' one thinks of *factories* and *processes*. But there are many secondary activities which are not carried on in factories such as what is now called the 'entertainment industry' and Tourism industry, etc. So for clarity the longer expression 'manufacturing industry' is used.

Mechanisation

Mechanisation refers to using gadgets which accomplish tasks. Automation (without aid of human thinking during the manufacturing process) is the advanced stage of mechanisation. Automatic factories with feedback and closed-loop computer control systems where machines are developed to 'think', have sprung up all over the world.

Technological Innovation

Technological innovations through research and development strategy are an important aspect of modern manufacturing for quality control, eliminating waste and inefficiency, and combating pollution.

Organisational Structure and Stratification

Modern manufacturing is characterised by:

(i) a complex machine technology
(ii) extreme specialisation and division of labour for producing more goods with less effort, and low costs
(iii) vast capital
(iv) large organisations
(v) executive bureaucracy.

Uneven Geographic Distribution

Major concentrations of modern manufacturing have flourished in a few number of places. These cover less than 10 per cent of the world's land area. These nations have become the centres of economic and political power. However, in terms of the total area covered, manufacturing sites are much less conspicuous and concentrated on much smaller areas than that of agriculture due to greater intensity of processes. For example, 2.5 sq km of the American corn belt usually includes about four large farms employing about 10-20 workers supporting 50-100 persons. But this same area could contain several large integrated factories and employ thousands of workers.

Why do Large-scale Industries choose different locations?

Industries maximise profits by reducing costs. Therefore, industries should be located at points where the production costs are minimum. Some of the factors influencing industrial locations are as under:

Access to Market

The existence of a market for manufactured goods is the most important factor in the location of industries. 'Market' means people who have a demand for these goods and also have the purchasing power (ability to purchase) to be able to purchase from the sellers at a place. Remote areas inhabited by a few people offer small markets. The developed regions of Europe, North America, Japan and Australia provide large global markets as the purchasing power of the people is very high. The densely populated regions of South and South-east Asia also

provide large markets. Some industries, such as aircraft manufacturing, have a global market. The arms industry also has global markets.

Access to Raw Material

Raw material used by industries should be cheap and easy to transport. Industries based on cheap, bulky and weight-losing material (ores) are located close to the sources of raw material such as steel, sugar, and cement industries. Perishability is a vital factor for the industry to be located closer to the source of the raw material. Agro-processing and dairy products are processed close to the sources of farm produce or milk supply respectively.

Access to Labour Supply

Labour supply is an important factor in the location of industries. Some types of manufacturing still require skilled labour. Increasing mechanisation, automation and flexibility of industrial processes have reduced the dependence of industry upon the labours.

Access to Sources of Energy

Industries which use more power are located close to the source of the energy supply such as the aluminium industry.

Earlier coal was the main source of energy, today hydroelectricity and petroleum are also important sources of energy for many industries.

Access to Transportation and Communication Facilities

Speedy and efficient transport facilities to carry raw materials to the factory and to move finished goods to the market are essential for the development of industries. The cost of transport plays an important role in the location of industrial units. Western Europe and eastern North America have a highly developed transport system which has always induced the concentration of industries in these areas. Modern industry is inseparably tied to transportation systems. Improvements in transportation led to integrated economic development and regional specialisation of manufacturing.

Communication is also an important need for industries for the exchange and management of information.

Government Policy

Governments adopt 'regional policies' to promote 'balanced' economic development and hence set up industries in particular areas.

Access to Agglomeration Economies/ Links between Industries

Many industries benefit from nearness to a leader-industry and other industries. These benefits are termed as agglomeration economies. Savings are derived from the linkages which exist between different industries.

These factors operate together to determine industrial location.

Foot Loose Industries

Foot loose industries can be located in a wide variety of places. They are not dependent on any specific raw material, weight losing or otherwise. They largely depend on component parts which can be obtained anywhere. They produce in small quantity and also employ a small labour force. These are generally not polluting industries. The important factor in their location is accessibility by road network.

Classification of Manufacturing Industries

Manufacturing industries are classified on the basis of their size, inputs/raw materials, output/products and ownership (Fig. 6.1).

Industries based on Size

The amount of capital invested, number of workers employed and volume of production determine the size of industry. Accordingly, industries may be classified into household or cottage, small-scale and large-scale.

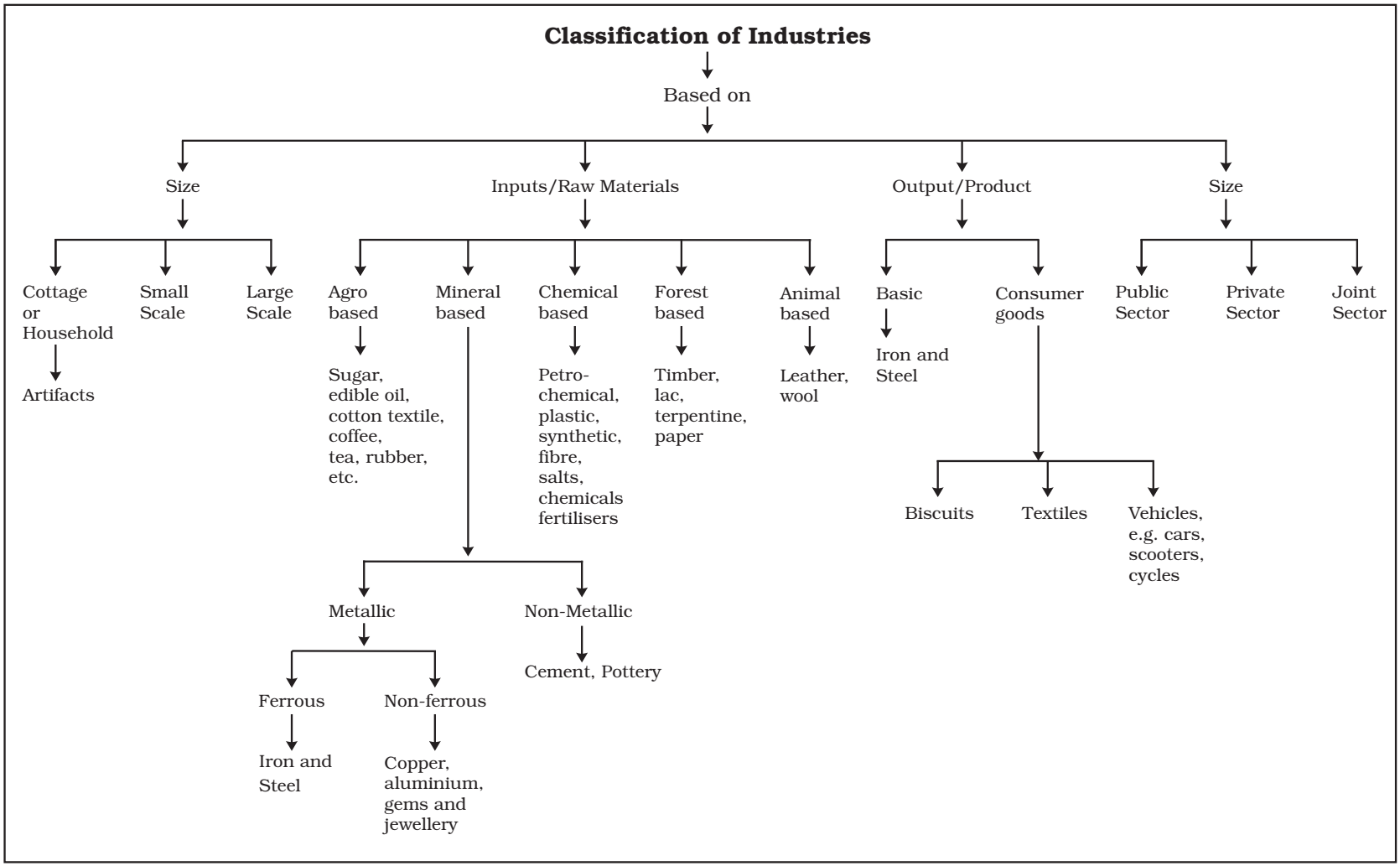


Fig. 6.1 : Classification of Industries

HOUSEHOLD INDUSTRIES OR COTTAGE MANUFACTURING

It is the smallest manufacturing unit. The craftsmen or artisans use local raw materials and simple hand tools to produce everyday goods in their homes with the help of their family members or part-time labour. Finished products may be for consumption in the same household or, for sale in local (village) markets, or, for barter. Capital and transportation do not wield much influence as this type of manufacturing has low commercial significance and most of the tools are devised locally.

Fig. 6.2 (a) : A man making pots in his courtyard-example of household industry in Nagaland

Fig. 6.2 (b) : A man weaving a bamboo basket by the roadside in Arunachal Pradesh

Some common everyday products produced in this sector of manufacturing include foodstuffs, fabrics, mats, containers, tools, furniture, shoes, and figurines from wood lot and forest, shoes, thongs and other articles from leather; pottery and bricks from clays and stones. Goldsmiths make jewellery of gold, silver and bronze. Some artefacts and crafts are made out of bamboo, wood obtained locally from the forests.

Small Scale Manufacturing

Small scale manufacturing is distinguished from household industries by its production techniques and place of manufacture (a workshop outside the home/cottage of the producer). This type of manufacturing uses local raw material, simple power-driven machines and semi-skilled labour. It provides employment and raises local purchasing power. Therefore, countries like India, China, Indonesia and Brazil, etc. have developed labour-intensive small scale manufacturing in order to provide employment to their population.

Fig. 6.3: Products of Cottage Industry on Sale in Assam

Large Scale Manufacturing

Large scale manufacturing involves a large market, various raw materials, enormous energy, specialised workers, advanced technology, assembly-line mass production and large capital. This kind of manufacturing developed in the last 200 years, in the United Kingdom, north-eastern U.S.A. and Europe. Now it has diffused in almost all over the world.

On the basis of the system of large scale manufacturing, the world's major industrial regions may be grouped under two broad types, namely

(i) traditional large-scale industrial regions which are thickly clustered in a few more developed countries.

(ii) high-technology large scale industrial regions which have diffused to less developed countries.

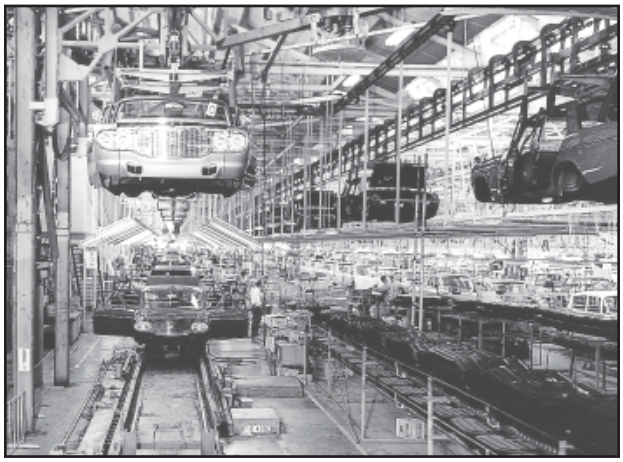


Fig. 6.4 : Passenger car assembly hires at a plant of the Motor Company in Japan

Fig. 6.5: Tea Garden and a Tea Factory in the Nilgiri Hills of Tamil Nadu

Agri-business is commercial farming on an industrial scale often financed by business whose main interests lie outside agriculture, for example, large corporations in tea plantation business. Agri-business farms are mechanised, large in size, highly structured, reliant on chemicals, and may be described as 'agro-factories'.

Industries based on Inputs/Raw Materials

On the basis of the raw materials used, the industries are classified as: (a) agro-based; (b) mineral based; (c) chemical based; (d) forest based: and (e) animal based.

(a) *Agro based Industries*

Agro processing involves the processing of raw materials from the field and the farm into finished products for rural and urban markets. Major agro-processing industries are food processing, sugar, pickles, fruits juices, beverages (tea, coffee and cocoa), spices and oils fats and textiles (cotton, jute, silk), rubber, etc.

Food Processing

Agro processing includes canning, producing cream, fruit processing and confectionery. While some preserving techniques, such as drying, fermenting and pickling, have been known since ancient times, these had limited applications to cater to the pre-Industrial Revolution demands.

(b) *Mineral based Industries*

These industries use minerals as a raw material. Some industries use ferrous metallic minerals which contain ferrous (iron), such as iron and steel industries but some use non-ferrous metallic minerals, such as aluminium, copper and jewellery industries. Many industries use non-metallic minerals such as cement and pottery industries.

(c) *Chemical based Industries*

Such industries use natural chemical minerals, e.g. mineral-oil (petroleum) is used in petro-chemical industry. Salts, sulphur and potash industries also use natural minerals. Chemical industries are also based on raw materials obtained from wood and coal. Synthetic fibre, plastic, etc. are other examples of chemical based industries.

(d) Forest based Raw Material using Industries

The forests provide many major and minor products which are used as raw material. Timber for furniture industry, wood, bamboo and grass for paper industry, lac for lac industries come from forests.

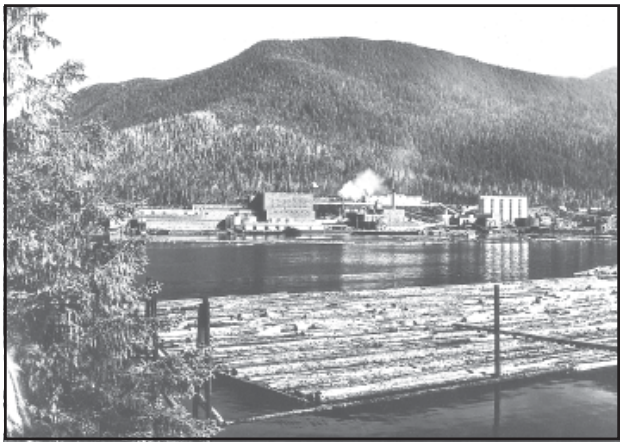


Fig. 6.6: A pulp mill in the heart of the Ketchikan's timber area of Alaska

(e) Animal based Industries

Leather for leather industry and wool for woollen textiles are obtained from animals. Besides, ivory is also obtained from elephant's tusks.

Industries Based On Output/Product

You have seen some machines and tools made of iron or steel. The raw material for such machines and tools is iron and steel. Which is itself an industry. The industry whose products are used to make other goods by using them as raw materials are basic industries. Can you identify the links? Iron/steel ⟶ machines for textile industry ⟶ clothes for use by consumers.

The consumer goods industries produced goods which are consumed by consumers directly. For example, industries producing breads and biscuits, tea, soaps and toiletries, paper for writing, televisions, etc. are consumer goods or non-basic industries.

INDUSTRIES BASED ON OWNERSHIP

(a) Public Sector Industries are owned and managed by governments. In India, there were a number of Public Sector Undertakings (PSUs). Socialist countries have many state owned industries. Mixed economies have both Public and Private sector enterprises.

(b) Private Sector Industries are owned by individual investors. These are managed by private organisations. In capitalist countries, industries are generally owned privately.

(c) Joint Sector Industries are managed by joint stock companies or sometimes the private and public sectors together establish and manage the industries. Can you make a list of such industries?

Traditional Large-Scale Industrial Regions

These are based on heavy industry, often located near coal-fields and engaged in metal smelting, heavy engineering, chemical manufacture or textile production. These industries are now known as smokestack industries. Traditional industrial regions can be recognised by:

- High proportion of employment in manufacturing industry.
  High-density housing, often of inferior type, and poor services.
  Unattractive environment, for example, pollution, waste heaps, and so on.
- Problems of unemployment, emigration and derelict land areas caused by closure of factories because of a worldwide fall in demand.

The Ruhr Coal-field, Germany

This has been one of the major industrial regions of Europe for a long time. Coal and iron and steel formed the basis of the economy, but as the demand for coal declined, the industry started shrinking. Even after the iron ore was exhausted, the industry remained, using imported ore brought by waterways to the Ruhr.

The Ruhr region is responsible for 80 per cent of Germany's total steel production.

Changes in the industrial structure have led to the decay of some areas, and there are problems of industrial waste and pollution. The future prosperity of the Ruhr is based less on the products of coal and steel, for which it was initially famous, and more on the new industries like the huge Opel car assembly plant, new chemical plants, universities. Out-of-town shopping centres have appeared resulting in a 'New Ruhr' landscape.

Concept of High Technology Industry

High technology, or simply high-tech, is the latest generation of manufacturing activities. It is best understood as the application of intensive research and development (R and D) efforts leading to the manufacture of products of an advanced scientific and engineering character. Professional (white collar) workers make up a large share of the total workforce. These highly skilled specialists greatly outnumber the actual production (blue collar) workers. Robotics on the assembly line, computer-aided design (CAD) and manufacturing, electronic controls of smelting and refining processes, and the constant development of new chemical and pharmaceutical products are notable examples of a high-tech industry.

Neatly spaced, low, modern, dispersed, office-plant-lab buildings rather than massive assembly structures, factories and storage areas mark the high-tech industrial landscape. Planned business parks for high-tech start-ups have become part of regional and local development schemes.

High-tech industries which are regionally concentrated, self-sustained and highly specialised are called technopolies. The Silicon Valley near San Francisco and Silicon Forest near Seattle are examples of technopolies. Are some technopolies developing in India?

Manufacturing contributes significantly to the world economy. Iron and steel, textiles, automobiles, petrochemicals and electronics are some of the world's most important manufacturing industries.

Iron and Steel Industry

The iron and steel industry forms the base of all other industries and, therefore, it is called a basic industry. It is basic because it provides raw material for other industries such as machine tools used for further production. It may also be called a heavy industry because it uses large quantities of bulky raw materials and its products are also heavy.

Iron is extracted from iron ore by smelting in a blast furnace with carbon (coke) and limestone. The molten iron is cooled and moulded to form pig iron which is used for converting into steel by adding strengthening materials like manganese.

The large integrated steel industry is traditionally located close to the sources of raw materials – iron ore, coal, manganese and limestone – or at places where these could be easily brought, e.g. near ports. But in mini steel mills access to markets is more important than inputs. These are less expensive to build and operate and can be located near markets because of the abundance of scrap metal, which is the main input. Traditionally, most of the steel was produced at large integrated plants, but mini mills are limited to just one-step process – steel making – and are gaining ground.

Distribution : The industry is one of the most complex and capital-intensive industries and is concentrated in the advanced countries of North America, Europe and Asia. In U.S.A, most of the production comes from the north Appalachian region (Pittsburgh), Great Lake region (Chicago-Gary, Erie, Cleveland, Lorain, Buffalo and Duluth) and the Atlantic Coast (Sparrows Point and Morisville). The industry has also moved towards the southern state of Alabama. Pittsburg area is now losing ground. It has now become the "rust bowl" of U.S.A. In Europe, U.K., Germany, France, Belgium, Luxembourgh, the Netherlands and Russia are the leading producers. The important steel centres are Birmingham and Sheffield in the U.K.; Duisburg, Dortmund, Dusseldorf and Essen in Germany; Le Creusot and St. Ettienne in France; and Moscow, St. Petersburgh, Lipetsk, Tula, in Russia and Krivoi Rog, and

Donetsk in Ukraine. In Asia, the important centres include Nagasaki and Tokyo-Yokohama in Japan; Shanghai, Tienstin and Wuhan in China; and Jamshedpur, Kulti-Burnpur, Durgapur, Rourkela, Bhilai, Bokaro, Salem, Visakhapatnam and Bhadravati in India. Consult your atlas to locate these places/ centres.

Cotton Textile Industry

Cotton textile industry has three sub-sectors i.e. handloom, powerloom and mill sectors. Handloom sector is labour-intensive and provides employment to semi-skilled workers. It requires small capital investment. Why did Mahatma Gandhi propagate Khadi as part of the independence movement? This sector involves spinning, weaving and finishing of the fabrics. The powerloom sector introduces machines and becomes less labour intensive and the volume of production increases. Cotton textile mill sector is highly capital intensive and produces fine clothes in bulk.

Cotton textile manufacturing requires good quality cotton as raw material. India, China, U.S.A, Pakistan, Uzbekistan, Egypt produce more than half of the world's raw cotton. The U.K, NW European countries and Japan also produce cotton textile made from imported yarn. Europe alone accounts for nearly half of the world's cotton imports. The industry has to face very stiff competition with synthetic fibres hence it has now shown a declining trend in many countries. With the scientific advancement and technological improvements the structure of industries changes. For example, Germany recorded constant growth in cotton textile industry since Second World War till the seventies but now it has declined. It has shifted to less developed countries where labour costs are low.

EXERCISES

1. Choose the right answer from the four alternatives given below.

(i) Which one of the following statements is wrong?

(a) Cheap water transport has facilitated the jute mill industry along the Hugli.

(b) Sugar, cotton textiles and vegetable oils are footloose industries.

(c) The development of hydro-electricity and petroleum reduced, to a great extent, the importance of coal energy as a locational factor for industry.

(d) Port towns in India have attracted industries.

(ii) In which one of the following types of economy are the factors of production owned individually ?

(a) Capitalist (c) Socialist

(b) Mixed (d) None

(iii) Which one of the following types of industries produces raw materials for other industries?

(a) Cottage Industries (c) Basic Industries

(b) Small-scale Industries (d) Footloose Industries

(iv) Which one of the following pairs is correctly matched ?

(a) Automobile industry ... Los Angeles

(b) Shipbuilding industry ... Lusaka

(c) Aircraft industry ... Florence

(d) Iron and Steel industry ... Pittsburgh

2. Write a short note on the following in about 30 words.

(i) High-Tech industry

(ii) Manufacturing

(iii) Footloose industries

3. Answer the following in not more than 150 words.

(i) Differentiate between primary and secondary activities.

(ii) Discuss the major trends of modern industrial activities especially in the developed countries of the world.

(iii) Explain why high-tech industries in many countries are being attracted to the peripheral areas of major metropolitan centres.

(iv) Africa has immense natural resources and yet it is industrially the most backward continent. Comment.

Project/Activity

(i) Carry out a survey in your school premises of the factory-made goods used by students and the staff.

(ii) Find out the meaning of the terms bio-degradable and non-biodegradable. Which kind of material is better to use? Why?

(iii) Look around and make a list of the global brands, their logos and products.

Unit-III
Chapter-7

Tertiary and Quaternary Activities

When you fall ill you go to your family doctor or you call a doctor. Sometimes your parents take you to a hospital for treatment. While in school, you are taught by your teachers. In the event of any dispute, legal opinion is obtained from a lawyer. Likewise, there are many professionals who provide their services against payment of their fee. Thus, all types of services are special skills provided in exchange of payments. Health, education, law, governance and recreation etc. require professional skills. These services require other theoretical knowledge and practical training. Tertiary activities are related to the service sector. Manpower is an important component of the service sector as most of the tertiary activities are performed by skilled labour, professionally trained experts and consultants.

In the initial stages of economic development, larger proportion of people worked in the primary sector. In a developed economy, the majority of workers get employment in tertiary activity and a moderate proportion is employed in the secondary sector.

Tertiary activities include both production and exchange. The production involves the 'provision' of services that are 'consumed'. The output is indirectly measured in terms of wages and salaries. Exchange, involves trade, transport and communication facilities that are used to overcome distance. Tertiary activities, therefore, involve the commercial output of services rather than the production of tangible goods. They are not directly involved in the processing of physical raw materials. Common examples are the work of a plumber, electrician, technician, launderer, barber, shopkeeper, driver, cashier, teacher, doctor, lawyer and publisher etc. The main difference between secondary activities and tertiary activities is that the expertise provided by services relies more heavily on specialised skills, experience and knowledge of the workers rather than on the production techniques, machinery and factory processes.

TYPES OF TERTIARY ACTIVITIES

By now you know that you purchase your books, stationery from traders shop, travel by

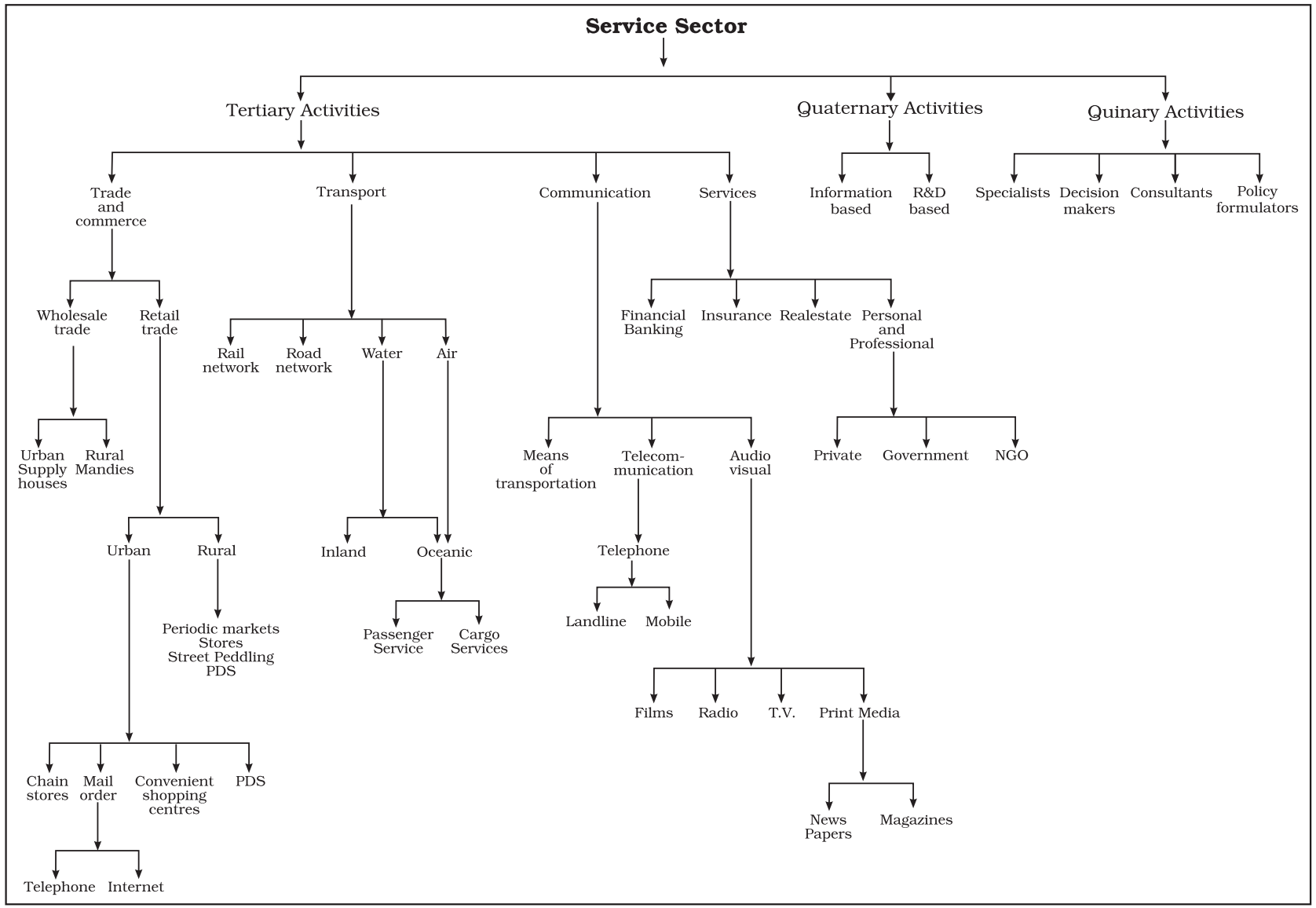


Fig. 7.1: Service Sector

bus or rail, send letters, talk on telephone and obtain services of teachers for studies and doctors at the time of illness.

Thus, trade, transport, communication and services are some of the tertiary activities discussed in this section. The chart provides the basis for classifying the tertiary activities.

TRADE AND COMMERCE

Trade is essentially **buying** and **selling** of items produced elsewhere. All the services in retail and wholesale trading or commerce are specifically intended for profit. All this work takes place in towns and cities also known as **trading centres.**

The rise of trading from barter at the local level to money-exchange of international scale has produced many centres and institutions such as **trading centres** or collection and distribution points.

Trading centres may be divided into rural and urban marketing centres.

Rural marketing centres cater to nearby settlements. These are quasi-urban centres. They serve as trading centres of the most rudimentary type. Here personal and professional services are not well-developed. These form local collecting and distributing centres. Most of these have *mandis (*wholesale markets) and also retailing areas. They are not urban centres *per se* but are significant centres for making available goods and services which are most frequently demanded by rural folk.

Fig. 7.2: A Wholesale Vegetable Market

Periodic markets in rural areas are found where there are no regular markets and local periodic markets are organised at different temporal intervals. These may be weekly, bi-weekly markets from where people from the surrounding areas meet their temporally accumulated demand. These markets are held on specified dates and move from one place to another. The shopkeepers thus, remain busy on all the days while a large area is served by them.

Urban marketing centres have more widely specialised urban services. They provide ordinary goods and services as well as many of the specialised goods and services required by people. Urban centres, therefore, offer manufactured goods as well as many specialised markets develop, e.g. markets for labour, housing, semi or finished products. Services of educational institutions and professionals such as teachers, lawyers, consultants, physicians, dentists and veterinary doctors are available.

Fig. 7.3: Packed Food Market in U.S.A.

RETAIL TRADING SERVICES

This is the business activity concerned with the sale of goods directly to the consumers. Most of the retail trading take place in fixed establishments or stores solely devoted to selling. Street peddling, handcarts, trucks, door-to-door, mail-order, telephone, automatic vending machines and internet are examples of non-store retail selling.

More on Stores

Consumer cooperatives were the first of the large-scale innovations in retailing.

Departmental stores delegate the responsibility and authority to departmental heads for purchasing of commodities and for overseeing the sale in different sections of the stores.

Chain stores are able to purchase merchandise most economically, often going so far as to direct the goods to be manufactured to their specification. They employ highly skilled specialists in many executive tasks. They have the ability to experiment in one store and apply the results to many.

WHOLESALE TRADING SERVICE

Wholesale trading constitutes bulk business through numerous intermediary merchants and supply houses and not through retail stores. Some large stores including chain stores are able to buy directly from the manufacturers. However, most retail stores procure supplies from an intermediary source. Wholesalers often extend credit to retail stores to such an extent that the retailer operates very largely on the wholesaler's capital.

TRANSPORT AND COMMUNICATION SERVICES

Transport is a service or facility by which persons, manufactured goods, and property are physically carried from one location to another. It is an organised industry created to satisfy man's basic need of mobility. Modern society requires speedy and efficient transport systems to assist in the production, distribution and consumption of goods. At every stage in this complex system, the value of the material is significantly enhanced by transportation.

Transport distance can be measured as: **km distance** or actual distance of route length; **time distance** or the time taken to travel on a particular route; and **cost distance** or the expense of travelling on a route. In selecting the mode of transport, distance, in terms of time or cost, is the determining factor. Isochrone lines are drawn on a map to joins places equal in terms of the time taken to reach them.

Network and Accessibility

As transport systems develop, different places are linked together to form a **network.** Networks are made up of nodes and links. A **node** or **vertex,** is the meeting point of two or more routes, a point of origin, a point of destination or any sizeable town along a route, Every road that joins two nodes is called a **link** or **edge.** A developed network has many links, which means that places are well-connected.

Factors Affecting Transport Services

Demand for transport is influenced by the size of population. The larger the population size, the greater is the demand for transport.

Routes depend on: location of cities, towns, villages, industrial centres and raw materials, pattern of trade between them, nature of the landscape between them, type of climate, and funds available for overcoming obstacles along the length of the route.

COMMUNICATION SERVICES

Communication services involve the transmission of **words** and **messages, facts** and **ideas.** The invention of writing preserved messages and helped to make communication dependent on means of transport. These were actually carried by hand, animals, boat, road, rail and air. That is why all forms of transport are also referred to as lines of communication. Where the transport network is efficient, communications are easily disseminated. Certain developments, such as mobile telephony and satellites, have made communications independent of transport. All forms are not fully disassociated because of the cheapness of the older systems. Thus, very

large volumes of mail continue to be handled by post offices all over the world.

Some of the communication services are discussed below.

Telecommunications

The use of telecommunications is linked to the development of electrical technology. It has revolutionised communications because of the speed with which messages are sent. The time reduced is from weeks to minutes and recent advancements like mobile telephony have made communications direct and instantaneous at any time and from anywhere. The telegraph, morse code and telex have almost become things of the past.

Radio and **television** also help to relay news, pictures, and telephone calls to vast audiences around the world and hence they are termed as **mass media.** They are vital for advertising and entertainment. **Newspapers** are able to cover events in all corners of the world. Satellite communication relays information of the earth and from space. The internet has truly revolutionised the global communication system .

SERVICES

Services occur at many different levels. Some are geared to industry, some to people; and some to both industry and people, e.g. the transport systems. Low-order services, such as grocery shops and laundries, are more common and widespread than high-order services or more specialised ones like those of accountants, consultants and physicians. Services are provided to individual consumers who can afford to pay for them. For example the gardener, the launderers and the barber do primarily physical labour. Teacher, lawyers, physicians, musicians and others perform mental labour.

Many services have now been regulated. Making and maintaining highways and bridges, maintaining fire fighting departments and supplying or supervising education and customer-care are among the important services most often supervised or performed by governments or companies. State and union legislation have established corporations to supervise and control the marketing of such services as transport, telecommunication, energy and water supply. Professional services are primarily health care, engineering, law and management. The location of recreational and entertainment services depends on the market. Multiplexes and restaurants might find location within or near the Central Business District (CBD), whereas a golf course would choose a site where land costs are lower than in the CBD.

Informal/Non-Formal Sector

Personal services are made available to the people to facilitate their work in daily life. The workers migrate from rural areas in search of employment and are unskilled. They are employed in domestic services as housekeepers, cooks, and gardeners. This segment of workers is unorganised. One such example in India is Mumbai's *dabbawala* (Tiffin) service provided to about 1,75,000 customers all over the city.

Fig. 7.4: Dabbawala Service in Mumbai

PEOPLE ENGAGED IN TERTIARY ACTIVITIES

Today most people are service workers. Services are provided in all societies. But in more developed countries a higher percentage of workers is employed in provision of services in contrast to less than 10 per cent in the less developed countries. In U.S.A. over 75 per cent of workers are engaged in services. The trend

in employment in this sector has been increasing while it has remained unchanged or decreasing in the primary and secondary activities.

Some Selected Examples

Tourism

Tourism is travel undertaken for purposes of recreation rather than business. It has become the world's single largest tertiary activity in total registered jobs (250 million) and total revenue (40 per cent of the total GDP). Besides, many local persons, are employed to provide services like accommodation, meals, transport, entertainment and special shops serving the tourists. Tourism fosters the growth of infrastructure industries, retail trading, and craft industries (souvenirs). In some regions, tourism is seasonal because the vacation period is dependent on favourable weather conditions, but many regions attract visitors all the year round.

Fig. 7.5: Tourists skiing in the snow capped mountain slopes of Switzerland

Tourist Regions

The warmer places around the Mediterranean Coast and the West Coast of India are some of the popular tourist destinations in the world. Others include winter sports regions, found mainly in mountainous areas, and various scenic landscapes and national parks, which are scattered. Historic towns also attract tourists, because of the monument, heritage sites and cultural activities.

Factors Affecting Tourism

Demand **:** Since the last century, the demand for holidays has increased rapidly. Improvements in the standard of living and increased leisure time, permit many more people to go on holidays for leisure.

Transport **:** The opening-up of tourist areas has been aided by improvement in transport facilities. Travel is easier by car, with better road systems. More significant in recent years has been the expansion in air transport. For example, air travel allows one to travel anywhere in the world in a few hours of flying-time from their homes. The advent of package holidays has reduced the costs.

Tourist Attractions

Climate: Most people from colder regions expect to have warm, sunny weather for beach holidays. This is one of the main reasons for the importance of tourism in Southern Europe and the Mediterranean lands. The Mediterranean climate offers almost consistently higher temperatures, than in other parts of Europe, long hours of sunshine and low rainfall throughout the peak holiday season. People taking winter holidays have specific climatic requirements, either higher temperatures than their own homelands, or snow cover suitable for skiing.

Landscape: Many people like to spend their holidays in an attractive environment, which often means mountains, lakes, spectacular sea coasts and landscapes not completely altered by man.

History and Art: The history and art of an area have potential attractiveness. People visit ancient or picturesque towns and archaeological sites, and enjoy exploring castles, palaces and churches.

Culture and Economy: These attract tourists with a penchant for experiencing ethnic and local customs. Besides, if a region provides for the needs of tourists at a cheap cost, it is likely to become very popular. Home-stay has emerged as a profitable business such as

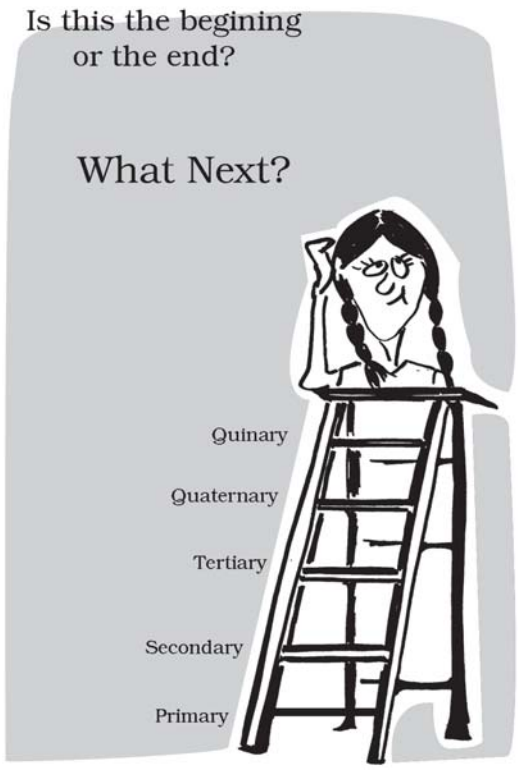
heritage homes in Goa, Madikere and Coorg in Karnataka.

Empowered Workers

Entrepreneurs are the empowered workers of the quarternary sector and the slowly emerging quinrary sector. They represent an important stage of development in the hierarchy of economic activity where the need for **self-actualisation** is not motivated by wealth and security alone but by other factors. They have predominantly a value system which emphasises quality of life and believe in creativity and individual values.

The illiterate of the twenty first century will not be those who do not read or write but those who do not learn, re-learn and un-learn.
–Alvin Toffler

Where Will it All Lead to?



No one can be sure where all this change will lead to but some patterns do point strongly to the future. As ideas and freedom of information and communication grow, people will expect their applications at the workplace. More employees will receive training and become highly skilled. They will work more and more on their own initiative. Many will have flexible working arrangements. Some will choose work – paid and unpaid – that is personally fulfilling and accords with their concern for natural environment and social issues.

These are just predictions. But part of the future belongs to you. By the choices made, you, too, can affect the changing patterns and work without increasing the strain upon natural resources and help save the planet.

QUATERNARY ACTIVITIES

What do a CEO of an MNC in Copenhagen, at New York and a medical transcriptionist at Bangalore have in common? All these people work in a segment of the service sector that is knowledge oriented. This sector can be divided into quaternary and quinary activities.

Quaternary activities involve some of the following: the collection, production and dissemination of information or even the production of information. Quaternary activities centre around research, development and may be seen as an advanced form of services involving specialised knowledge, technical skills, and administrative competence.

The Quaternary Sector

The Quaternary Sector along with the Tertiary Sector has replaced all primary and secondary employment as the basis for economic growth. Over half of all workers In developed economies are in the 'Knowledge Sector' and there has been a very high growth in demand for and consumption of information-based services

from mutual fund managers to tax consultants, software developers and statisticians. Personnel working in office buildings, elementary schools and university classrooms, hospitals and doctors' offices, theatres, accounting and brokerage firms all belong to this category of services.

Like some of the tertiary functions, quaternary activities can also be outsourced. They are not tied to resources, affected by the environment, or necessarily localised by market.

QUINARY ACTIVITIES

The highest level of decision makers or policy makers perform quinary activities. These are subtly different from the knowledge based industries that the quinary sector in general deals with.

Quinary activities are services that focus on the creation, re-arrangement and interpretation of new and existing ideas; data interpretation and the use and evaluation of new technologies. Often referred to as 'gold collar' professions, they represent another subdivision of the tertiary sector representing special and highly paid skills of senior business executives, government officials, research scientists, financial and legal consultants, etc. Their importance in the structure of advanced economies far outweighs their numbers.

Outsourcing has resulted in the opening up of a large number of call centres in India, China, Eastern Europe, Israel, Philippines and Costa Rica. It has created new jobs in these countries. Outsourcing is coming to those countries where cheap and skilled workers are available. These are also out-migrating countries. With the work available though outsourcing, the migration in these countries may come down. Outsourcing countries are facing resistance from job-seeking youths in their respective countries. The comparative advantage is the main reason for continuing outsourcing. New trends in quarternary services include knowledge processing outsourcing (KPO) and 'home shoring', the latter as an alternative to outsourcing. The KPO industry is distinct from Business Process Outsourcing (BPO) as it involves more high skilled workers. It is information driven knowledge outsourcing. KPO enables companies to create additional business opportunities. Examples of KPOs include research and development (R and D) activities, e-learning, business research, intellectual property (IP) research, legal profession and the banking sector.

Outsourcing

Outsourcing or contracting out is giving work to an outside agency to improve efficiency and reduce costs. When outsourcing involves transferring work to overseas locations, it is described by the term off - shoring, although both off - shoring and outsourcing are used together. Business activities that are outsourced include information technology (IT), human resources, customer support and call centre services and at times also manufacturing and engineering.

Data processing is an IT related service easily be carried out in Asian, East European and African countries, In these countries IT skilled staff with good English language skills are available at lower wages than those in the developed countries. Thus, a company in Hyderabad or Manila does work on a project based on GIS techniques for a country like U.S.A or Japan. Overhead costs are also much lower making it profitable to get job-work carried out overseas, whether it is in India, China or even a less populous country like Botswana in Africa.

Activity

Describe the nature of work against each colour-name

Colour of the collar	Nature of work
Red	?
Gold	?
White	?
Grey	?
Blue	?
Pink	?

Medical Services for Overseas Patients in India

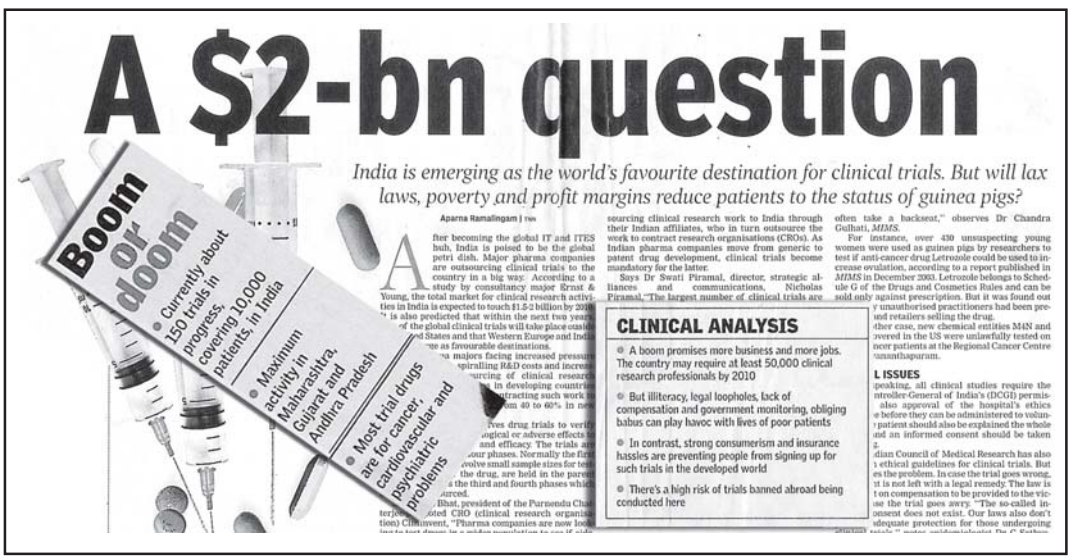
About 55,000 patients from U.S.A. visited India in 2005 for treatment. This is still a small number compared with the millions of surgeries performed each year in the U.S. healthcare system. India has emerged as the leading country of medical tourism in the world. World class hospitals located in metropolitan cities cater to patients all over the world. Medical tourism brings abundant benefits to developing countries like India, Thailand, Singapore and Malaysia. Beyond medical tourism, is the trend of outsourcing of medical tests and data interpretation. Hospitals in India, Switzerland and Australia have been performing certain medical services – ranging from reading radiology images, to interpreting Magnetic Resonance Images (MRIs) and ultrasound tests. Outsourcing holds tremendous advantages for patients, if it is focused on improving quality or providing specialised care.

Medical Tourism

When medical treatment is combined with international tourism activity, it lends itself to what is commonly known as medical tourism.

THE DIGITAL DIVIDE

Opportunities emerging from the Information and Communication Technology based development is unevenly distributed across the globe. There are wide ranging economic, political and social differences among countries. How quickly countries can provide ICT access and benefits to its citizens is the deciding factor. While developed countries in general have surged forward, the developing countries have lagged behind and this is known as the digital divide. Similarly digital divides exist within countries. For example, in a large country like India or Russia, it is inevitable that certain areas like metropolitan centres possess better connectivity and access to the digital world versus peripheral rural areas.



A $2-bn question

India is emerging as the world's favourite destination for clinical trials. But will lax laws, poverty and profit margins reduce patients to the status of guinea pigs?

Aparna Ramalingan | res

Boom or doom

- Currently about 150 trials in progress, covering 10,000 patients, in India
- Maximum activity in Maharashtra, Gujarat and Andhra Pradesh
- Most trial drugs are for cancer, cardiovascular and psychiatric problems

CLINICAL ANALYSIS

- A boom promises more business and more jobs. The country may require at least 50,000 clinical research professionals by 2010
- But illiteracy, legal loopholes, lack of compensation and government monitoring, obliging babus can play havoc with lives of poor patients
- In contrast, strong consumerism and insurance hassles are preventing people from signing up for such trials in the developed world
- There's a high risk of trials banned abroad being conducted here

Organise an informal debate session in your class about how could the emerging medical industry of our country become a boom as well as doom?

EXERCISES

1. Choose the right answer from the four alternatives given below.

(i) Which one of the following is a tertiary activity?

(a) Farming (c) Weaving

(b) Trading (d) Hunting

(ii) Which one of the following activities is NOT a secondary sector activity?

(a) Iron Smelting (c) Making garments

(b) Catching fish (d) Basket Weaving

(iii) Which one of the following sectors provides most of the employment in Delhi, Mumbai, Chennai and Kolkata.

(a) Primary (c) Secondary

(b) Quaternary (d) Service

(iv) Jobs that involve high degrees and level of innovations are known as:

(a) Secondary activities (c) Quinary activities

(b) Quaternary activities (d) Primary activities

(v) Which one of the following activities is related to quaternary sector?

(a) Manufacturing computers (c) University teaching

(b) Paper and Raw pulp production (d) Printing books

(vi) Which one out of the following statements is not true?

(a) Outsourcing reduces costs and increases efficiency.

(b) At times engineering and manufacturing jobs can also be outsourced.

(c) BPOs have better business opportunities as compared to KPOs.

(d) There may be dissatisfaction among job seekers in the countries that outsource the job.

2. Answer the following questions in about 30 words.

(i) Explain retail trading service.

(ii) Describe quaternary services.

(iii) Name the fast emerging countries of medical tourism in the world.

(iv) What is digital divide?

3. Answer the following questions in not more than 150 words.

(i) Discuss the significance and growth of the service sector in modern economic development.

(ii) Explain in detail the significance of transport and communication services.

Project / Activity

(i) Find out the activities of BPO.

(ii) Find out from a travel agent the documents you need to travel abroad.

Unit-III
Chapter-8

Transport and Communication

Natural resources, economic activities and markets are rarely found in one place. Transport, communication and trade establish links between producing centres and consuming centres. The system of mass production and exchange is complex. Each region produces the items for which it is best suited. Trade or the exchange of such commodities relies on transportation and communication. Likewise, the high living standards and quality of life depend on efficient transportation, communications and trade. In earlier days, the means of transport and communication were the same. But today both have acquired distinct and specialised forms. Transport provides the network of links and carriers through which trade takes place.

TRANSPORT

Transport is a service or facility for the carriage of persons and goods from one place to the other using humans, animals and different kinds of vehicles. Such movements take place over land, water and air. Roads and railways form part of land transport; while shipping and waterways and airways are the other two modes. Pipelines carry materials like petroleum, natural gas, and ores in liquidified form.

Moreover, transportation is an organised service industry created to satisfy the basic needs of society. It includes transport arteries, vehicles to carry people and goods, and the organisation to maintain arteries, and to handle loading, unloading and delivery. Every nation has developed various kinds of transportation for defence purposes. Assured and speedy transportation, along with efficient communication, promote cooperation and unity among scattered peoples.

What is a Transport Network ?

Several places (nodes) joined together by a series of routes (links) to form a pattern.

MODES OF TRANSPORTATION

The principal modes of world transportation, as already mentioned are **land, water, air** and

pipelines. These are used for inter-regional and intra-regional transport, and each one (except pipelines) carries both passengers and freight. The significance of a mode depends on the type of goods and services to be transported, costs of transport and the mode available. International movement of goods is handled by ocean freighters. Road transport is cheaper and faster over short distances and for door-to-door services. Railways are most suited for large volumes of bulky materials over long distances within a country. High-value, light and perishable goods are best moved by airways. In a well-managed transport system, these various modes complement each other.

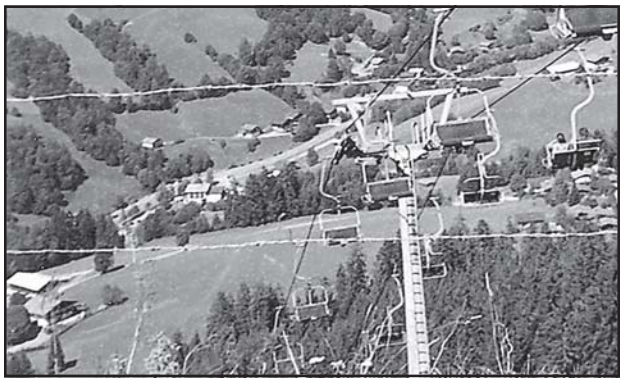


Fig. 8.1: Ropeway and Cable cars in Austria

This means of transport is usually found on steep mountain slopes and mines which are not suitable for building roads.

Land Transport

Most of the movement of goods and services takes place over land. In early days, humans themselves were carriers. Have you ever seen a bride being carried on a palanquin *(palki/doli)* by four persons (*Kahars* in north India). Later animals were used as beasts of burden. Have you seen mules, horses and camels, carrying loads of cargo in rural areas? With the invention of the wheel, the use of carts and wagons became important. The revolution in transport came about only after the invention of the steam engine in the eighteenth century. Perhaps the first public railway line was opened in 1825 between Stockton and Darlington in northern England and then onwards, railways became the most popular and fastest form of transport in the nineteenth century. It opened up continental interiors for commercial grain farming, mining and manufacturing in U.S.A. The invention of the internal combustion engine revolutionised road transport in terms of road quality and vehicles (motor cars and trucks) plying over them. Among the newer developments in land transportation are pipelines, ropeways and cableways. Liquids like mineral oil, water, sludge and sewers are transported by pipelines. The great freight carriers are the railways, ocean vessels, barges, boats and motor trucks and pipelines.

In general, the old and elementary forms like the human porter, pack animal, cart or wagon are the most expensive means of transportation and large freighters are the cheapest. They are important in supplementing modern channels and carriers which penetrate the interiors in large countries. In the densely populated districts of India and China, overland transport still takes place by human porters or carts drawn or pushed by humans.

Pack Animals

Horses **are used as a draught animal even in the Western countries.** ***Dogs*** **and** ***reindeer*** **are used in North America, North Europe and Siberia to draw sledges over snow-covered ground.** ***Mules*** **are preferred in the mountainous regions; while** ***camels*** **are used for caravan movement in deserts. In India,** ***bullocks*** **are used for pulling carts.**

Fig. 8.2: A horse cart in a village Tefki, in Ethiopia

Roads

Road transport is the most economical for short distances compared to railways. Freight transport by road is gaining importance because it offers door-to-door service. But **unmetalled** roads, though simple in construction, are not effective and serviceable for all seasons. During the rainy season these become unmotorable and even the **metalled** ones are seriously handicapped during heavy rains and floods. In such conditions, the high embankment of rail-tracks and the efficient maintenance of railway transport service, is an effective solution. But the rail kilometrage being small cannot serve the needs of vast and developing countries at a low cost. Roads, therefore, play a vital role in a nation's trade and commerce and for promoting tourism.

The quality of the roads varies greatly between developed and developing countries because road construction and maintenance require heavy expenditure. In developed countries good quality roads are universal and provide long-distance links in the form of motorways, autobahns (Germany), and inter–state highways for speedy movement. Lorries, of increasing size and power to carry heavy loads, are common. But unfortunately, the world's road system is not well developed.

The world's total motorable road length is only about 15 million km, of which North America accounts for 33 per cent. The highest **road density** and the highest number of vehicles are registered in this continent compared to Western Europe.

Table 8.1: Length of the Roads

Sl. No.	*Countries*	*For every 100 km² area*
1.	India	105
2.	Japan	327
3.	France	164
4.	U.K.	162
5.	U.S.A.	67
6.	Spain	68
7.	Sri Lanka	151

Source : Encyclopedia Britannica – Year Book, 2005.

Traffic Flows: Traffic on roads has increased dramatically in recent years. When the road network cannot cope with the demands of traffic, congestion occurs. City roads suffer from chronic traffic congestion. Peaks (high points) and troughs (low points) of traffic flow can be seen on roads at particular times of the day, for example, peaks occurring during the rush hour before and after work. Most of the cities in the world have been facing the problem of congestion.

Think on these lines for a better tomorrow . . .

URBAN TRANSPORT SOLUTIONS

Higher Parking Fee

Mass Rapid Transit (MRT)

Improved Public Bus Service

Expressways

Highways

Highways are metalled roads connecting distant places. They are constructed in a manner for unobstructed vehicular movement. As such these are 80 m wide, with separate traffic lanes, bridges, flyovers and dual carriageways to facilitate uninterrupted traffic flow. In developed countries, every city and port town is linked through highways.

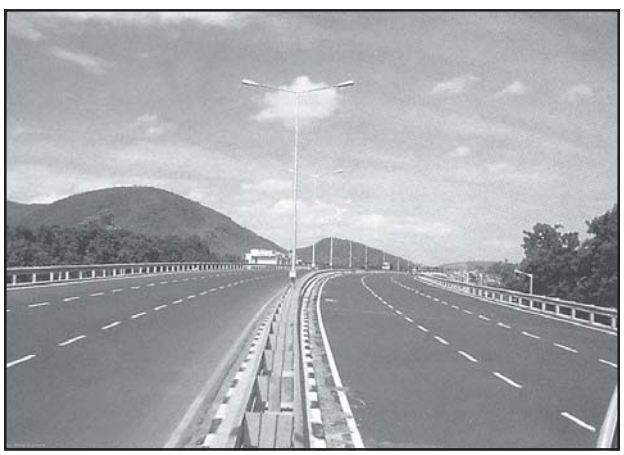


Fig. 8.3 : Dharmavaram Tuni National Highway, India

In North America, highway density is high, about 0.65 km per sq km. Every place is within 20 km distance from a highway. Cities located on the Pacific coast (west) are well-connected with those of the Atlantic Coast (east). Likewise, the cities of Canada in the north are linked with those of Mexico in the south. The Trans-Canadian Highway links Vancouver in British Columbia(west coast) to St. John's City in Newfoundland (east coast) and the Alaskan Highway links Edmonton (Canada) to Anchorage (Alaska).

The Pan-American Highway, a large portion of which has been constructed, will connect the countries of South America, Central America and U.S.A.-Canada. The Trans-Continental Stuart Highway connects Darwin (north coast) and Melbourne via Tennant Creek and Alice Springs in Australia.

Europe has a large number of vehicles and a well-developed highway network. But highways face a lot of competition from railways and waterways.

In Russia, a dense highway network is developed in the industrialised region west of the Urals with Moscow as the hub. The important Moscow-Vladivostok Highway serves the region to the east. Due to the vast geographical area, highways in Russia are not as important as railways.

In China, highways criss-cross the country connecting all major cities such as Tsungtso (near Vietnam boundary), Shanghai (central China), Guangzhou (south) and Beijing (north). A new highway links Chengdu with Lhasa in Tibet.

In India, there are many highways linking the major towns and cities. For example, National Highway No. 7 (NH 7), connecting Varanasi with Kanya Kumari, is the longest in the country. The Golden Quadrilateral (GQ) or Super Expressway is underway to connect the four metropolitan cities — New Delhi, Mumbai, Bangalore, Chennai, Kolkata and Hyderabad.

In Africa, a highway joins Algiers in the north to Conakry in Guinea. Similarly, Cairo is also connected to Cape Town.

Border Roads

Roads laid along international boundaries are called border roads. They play an important role in integrating people in remote areas with major cities and providing defence. Almost all countries have such roads to transport goods to border villages and military camps.

Railways

Railways are a mode of land transport for bulky goods and passengers over long distances. The railway gauges vary in different countries and are roughly classified as broad (more than 1.5 m), standard (1.44 m), metre gauge (1 m) and smaller gauges. The standard gauge is used in the U.K.

Commuter trains are very popular in U.K., U.S.A, Japan and India. These carry millions of passengers daily to and fro in the city. There are about 13 lakh km of railways open for traffic in the world.

Fig. 8.4: Tube Train in Vienna

***Table 8.2: Total Length of Railways in Selected Countries* (in 100 sq km)**

Sl. No.	Countries	For every 100/km² area
1.	U.S.A.	278.3
2.	Russia	160.8
3.	India	144.7
4.	Canada	93.5
5.	Germany	90.8
6.	China	70.1
7.	Australia	40.0
8.	U.K.	37.9
9.	France	34.5
10.	Brazil	30.1

Source : Encyclopaedia Britanica – Year Book, 2005.

Europe has one of the most dense rail networks in the world. There are about 4,40,000 km of railways, most of which is double or multiple-tracked. Belgium has the highest density of 1 km of railway for every 6.5 sq kms area. The industrial regions exhibit some of the highest densities in the world. The important rail heads are London, Paris, Brussels, Milan, Berlin and Warsaw. Passenger transport is more important than freight in many of these countries. Underground railways are important in London and Paris. Channel Tunnel, operated by Euro Tunnel Group through England, connects London with Paris. Trans-continental railway lines have now lost their importance to quicker and more flexible transport systems of airways and roadways.

In Russia, railways account for about 90 per cent of the country's total transport with a very dense network west of the Urals. Moscow is the most important rail head with major lines radiating to different parts of the country's vast geographical area. Underground railways and commuter trains are also important in Moscow.

North America has one of the most extensive rail networks accounting for nearly 40 per cent of the world's total? In contrast to many European countries, the railways are used more for long-distance bulky freight like ores, grains, timber and machinery than for passengers. The most dense rail network is found in the highly industrialised and urbanised region of East Central U.S.A. and adjoining Canada.

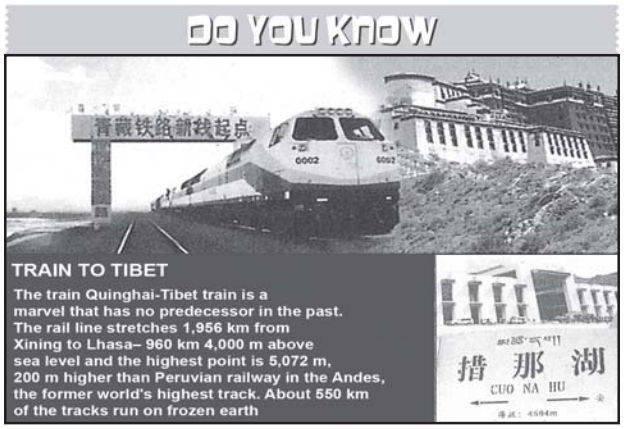
In Canada, railways are in the public sector and distributed all over the sparsely populated areas. The transcontinental railways carry the bulk of wheat and coal tonnage.

Australia has about 40,000 km of railways, of which 25 per cent are found in New South Wales alone. The west-east Australian National Railway line runs across the country from Perth to Sydney. New Zealand's railways are mainly in the North Island to serve the farming areas.

In South America, the rail network is the most dense in two regions, namely, the Pampas of Argentina and the coffee growing region of Brazil which together account for 40 per cent of South America's total route length. Only Chile, among the remaining countries has a considerable route length linking coastal centres with the mining sites in the interior. Peru, Bolivia, Ecuador, Colombia and Venezuela have short single-track rail-lines from ports to the interior with no inter-connecting links.

There is only one trans-continental rail route linking Buenos Aires (Argentina) with Valparaiso (Chile) across the Andes Mountains through the Uspallatta Pass located at a height of 3,900 m.

In Asia, rail network is the most dense in the thickly populated areas of Japan, China and India. Other countries have relatively few rail routes. West Asia is the least developed in rail facilities because of vast deserts and sparsely populated regions.



Africa continent, despite being the second largest, has only 40,000 km of railways with South Africa alone accounting for 18,000 km due to the concentration of gold, diamond and copper mining activities. The important routes of the continent are: (i) the Benguela Railway through Angola to Katanga-Zambia Copper Belt; (ii) the Tanzania Railway from the Zambian Copper Belt to Dar-es-Salaam on the coast; (iii) the Railway through Botswana and Zimbabwe linking the landlocked states to the South African network; and (iv) the Blue Train from Cape Town to Pretoria in the Republic of South Africa. Elsewhere, as in Algeria, Senegal, Nigeria, Kenya and Ethiopia, railway lines connect port cities to interior centres but do not form a good network with other countries.

Trans–Continental Railways

Trans–continental railways run across the continent and link its two ends. They were constructed for economic and political reasons to facilitate long runs in different directions. The following are the most important of these:

Trans–Siberian Railway

This is a trans–siberian Railways major rail route of Russia runs from St. Petersburg in the west to Vladivostok on the Pacific Coast in the east passing through Moscow, Ufa, Novosibirsk, Irkutsk, Chita and Khabarovsk. It is the most important route in Asia and the longest (9,332 km) double-tracked and electrified trans–continental railway in the world. It has helped in opening up its Asian region to West European markets. It runs across the Ural Mountains Ob and Yenisei rivers Chita is an important agro-centre and Irkutsk, a fur centre. There are connecting links to the south, namely, to Odessa (Ukraine), Baku on the Caspian Coast, Tashkent (Uzbekistan), Ulan Bator (Mongolia), and Shenyang (Mukden) and Beijing in China.

Trans–Canadian Railways

This 7,050 km long rail-line in Canada runs from Halifax in the east to Vancouver on the Pacific Coast passing through Montreal, Ottawa, Winnipeg and Calgary (Fig. 8.6). It was constructed in 1886, initially as part of an agreement to make British Columbia on the west coast join the Federation of States. Later on, it gained economic significance because it connected the Quebec-Montreal Industrial Region with the wheat belt of the Prairie Region and the Coniferous Forest region in the north. Thus each of these regions became complementary to the other. A loop line from

Fig. 8.5: Trans–Siberian Railway

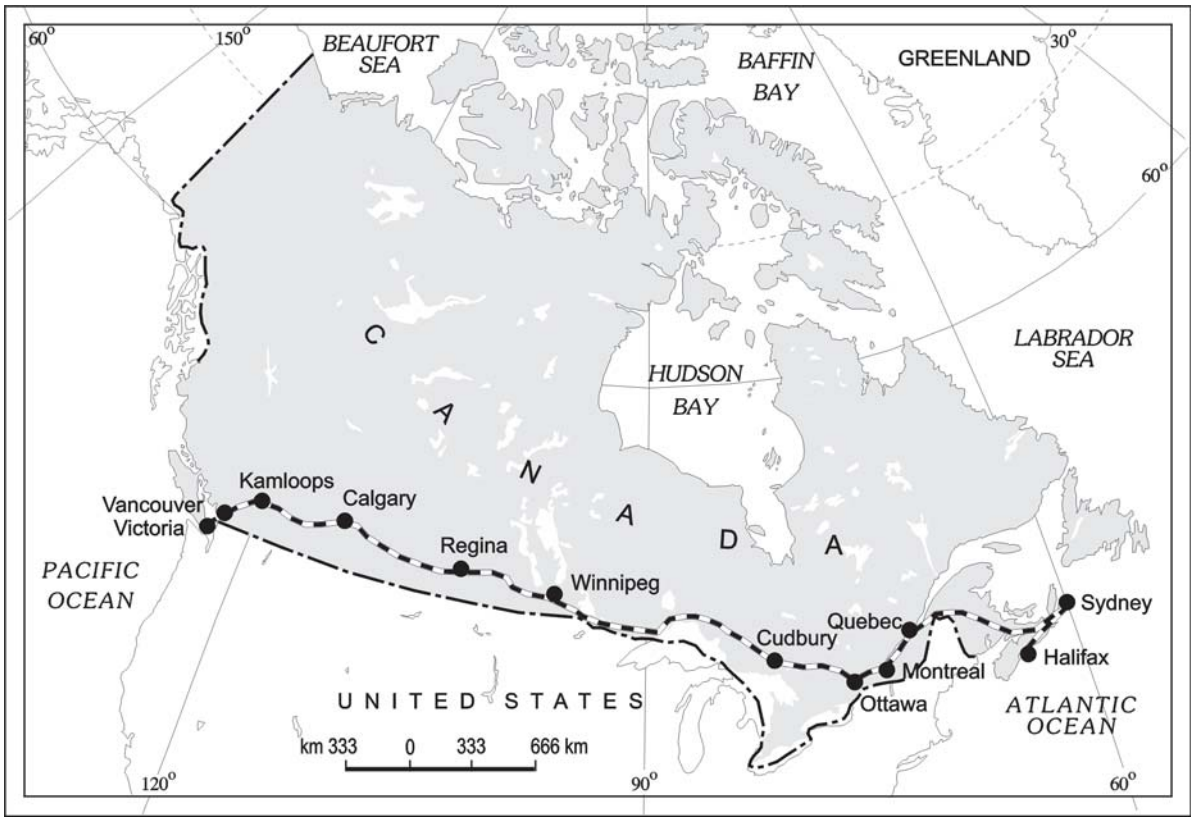


Fig. 8.6: Trans–Canadian Railway

Winnipeg to Thunder Bay (Lake Superior) connects this rail-line with one of the important waterways of the world. This line is the economic artery of Canada. Wheat and meat are the important exports on this route.

The Union and Pacific Railway

This rail-line connects New York on the Atlantic Coast to San Francisco on the Pacific Coast passing through Cleveland, Chicago, Omaha, Evans, Ogden and Sacramento. The most valuable exports on this route are ores, grain, paper, chemicals and machinery.

The Australian Trans–Continental Railway

This rail-line runs west-east across the southern part of the continent from Perth on the west coast, to Sydney on the east coast. passing through Kalgoorlie, Broken Hill and Port Augusta (Fig. 8.7).

Another major north-south line connects Adelaide and Alice Spring and to be joined further to the Darwin–Birdum line.

The Orient Express

This line runs from Paris to Istanbul passing through Strasbourg, Munich, Vienna, Budapest and Belgrade. The journey time from London to Istanbul by this Express is now reduced to 96 hours as against 10 days by the sea-route. The chief exports on this rail-route are cheese, bacon, oats, wine, fruits, and machinery.

There is a proposal to build a Trans–Asiatic Railway linking Istanbul with Bangkok via Iran, Pakistan, India, Bangladesh and Myanmar.

WATER TRANSPORT

One of the great advantages of water transportation is that it does not require route construction. The oceans are linked with each

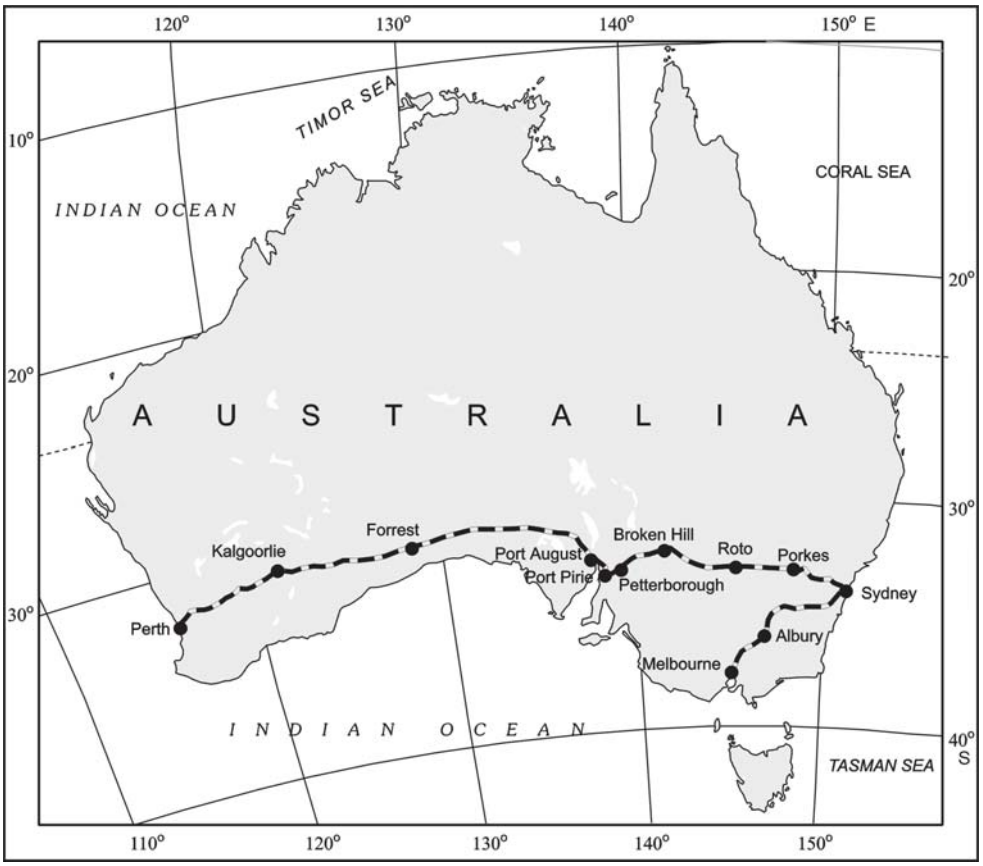


Fig. 8.7: Australian Trans–Continental Railway

other and are negotiable with ships of various sizes. All that is needed is to provide port facilities at the two ends. It is much cheaper because the friction of water is far less than that of land. The energy cost of water transportation is lower. Water transport is divided into ocean routes and inland waterways.

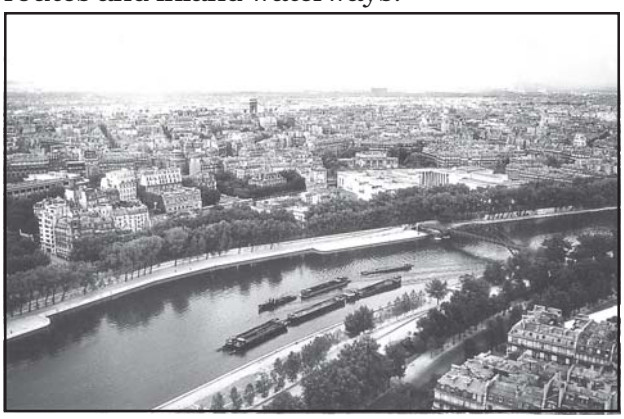


Fig. 8.8: The view of Seine River from the Eiffel Tower (One can see how the river has become an important Inland waterway)

Ocean Routes

The oceans offer a smooth highway traversable in all directions with no maintenance costs. Its transformation into a routeway by sea-going vessels is an important development in human adaptation to the physical environment. Compared to land and air, ocean transport is a cheaper means of haulage (carrying of load) of bulky material over long distances from one continent to another.

Modern passenger liners (ships) and cargo ships are equipped with radar, wireless and other navigation aids. The development of refrigerated chambers for perishable goods, tankers and specialised ships has also improved cargo transport. The use of containers has made cargo handling at the world's major ports easier.

Important Ocean Routes

Major ocean trade routes are shown in the Fig. 8.9. Some important ocean routes have been discussed in the following pages.

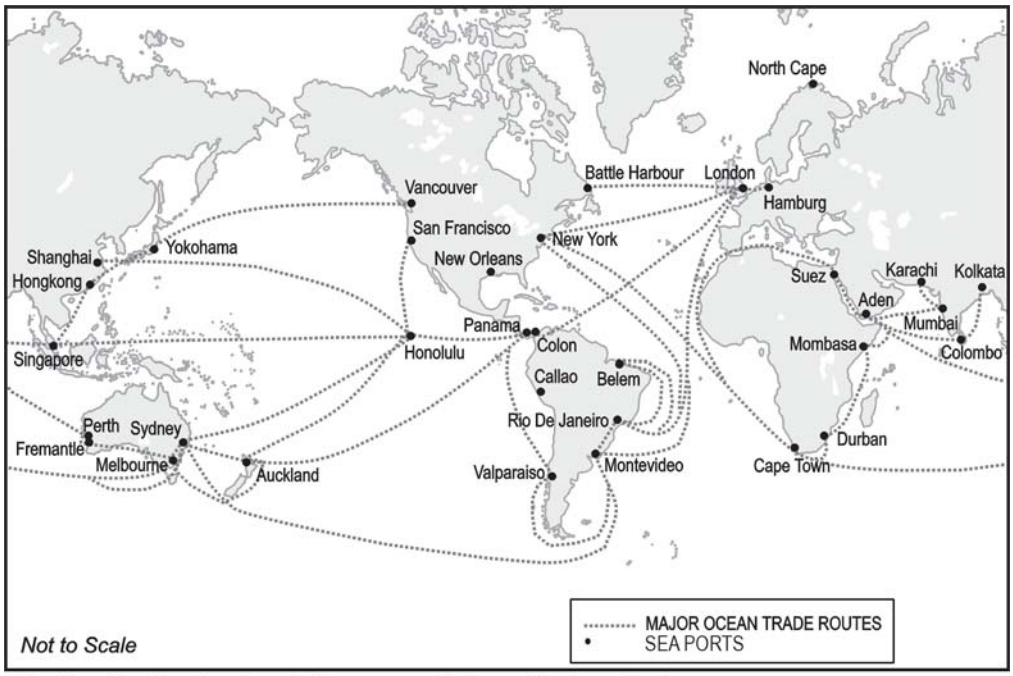


Fig. 8.9: Major Ocean Trade Routes and Sea Ports

The Northern Atlantic Sea Route

This links North-eastern U.S.A. and North-western Europe, the two industrially developed regions of the world. The foreign trade over this route is greater than that of the rest of the world combined. One fourth of the world's foreign trade moves on this route. It is, therefore, the busiest in the world and otherwise, called the Big Trunk Route. Both the coasts have highly advanced ports and harbour facilities.

Activity

Find out some of the important ports on the coast of U.S.A. and Western Europe in your atlas.

This sea route passes through the heart of the Old World and serves more countries and people than any other route. Port Said, Aden, Mumbai, Colombo and Singapore are some of the important ports on this route. The construction of Suez canal has greatly reduced the distance and time as compared to the earlier route through the Cape of Good Hope.

The Mediterranean–Indian Ocean Route

The trade route connects the highly industrialised Western European region with West Africa, South Africa, South-east Asia and the commercial agriculture and livestock economies of Australia and New Zealand. Before the construction of the Suez Canal this was the route connecting Liverpool and Colombo which was 6,400 km longer than the Suez Canal route. The volume of trade and traffic between both East and West Africa is on the increase due to the development of the rich natural resources such as gold, diamond, copper, tin, groundnut, oil palm, coffee and fruits.

The Cape of Good Hope Sea Route

This sea route is another important one across the Atlantic Ocean which connects West European and West African countries with Brazil, Argentina and Uruguay in South America. The traffic is far less on this route compared to that of the North Atlantic Route

because of the limited development and population in South America and Africa. Only southeastern Brazil and Plata estuary and parts of South Africa have large-scale industries. There is also little traffic on the route between Rio de Janeiro and Cape Town because both South America and Africa have similar products and resources.

Trade across the vast North Pacific Ocean moves by several routes which converge at Honolulu. The direct route on the Great Circle links Vancouver and Yokohama and reduces the travelling distance (2,480 km) by half.

The North Atlantic Sea Route

This sea route links the ports on the west-coast of North America with those of Asia. These are Vancouver, Seattle, Portland, San Francisco and Los Angeles on the American side and Yokohama, Kobe, Shanghai, Hong Kong, Manila and Singapore on the Asian side.

The South Pacific Sea Route

This sea route connects Western Europe and North America with Australia, New Zealand and the scattered Pacific islands via the Panama Canal. This route is also used for reaching Hong Kong, Philippines and Indonesia. The distance covered between Panama and Sydney is 12,000 km. Honolulu is an important port on this route.

Coastal Shipping

It is obvious that water transport is a cheaper mode. While oceanic routes connect different countries, coastal shipping is a convenient mode of transportation with long coastlines, e.g. U.S.A, China and India. Shenzhen States in Europe are most suitably placed for coastal shipping connecting one member's coast with the other. If properly developed, coastal shipping can reduce the congestion on the land routes.

Shipping Canals

The Suez and the Panama Canals are two vital man-made navigation canals or waterways which serve as gateways of commerce for both the eastern and western worlds.

The Suez Canal

This canal had been constructed in 1869 in Egypt between Port Said in the north and Port Suez in the south linking the Mediterranean Sea and the Red Sea. It gives Europe a new gateway to the Indian Ocean and reduces direct sea-route distance between Liverpool and Colombo compared to the Cape of Good Hope route. It is a sea-level canal without locks which is about 160 km and 11 to 15 m deep. About 100 ships travel daily and each ship takes 10-12 hours to cross this canal. The tolls are so heavy that some find it cheaper to go by the longer Cape Route whenever the consequent delay is not important. A railway follows the canal to Suez, and from Ismailia there is a branch line to Cairo. A navigable fresh-water canal from the Nile also joins the Suez Canal in Ismailia to supply fresh-water to Port Said and Suez.

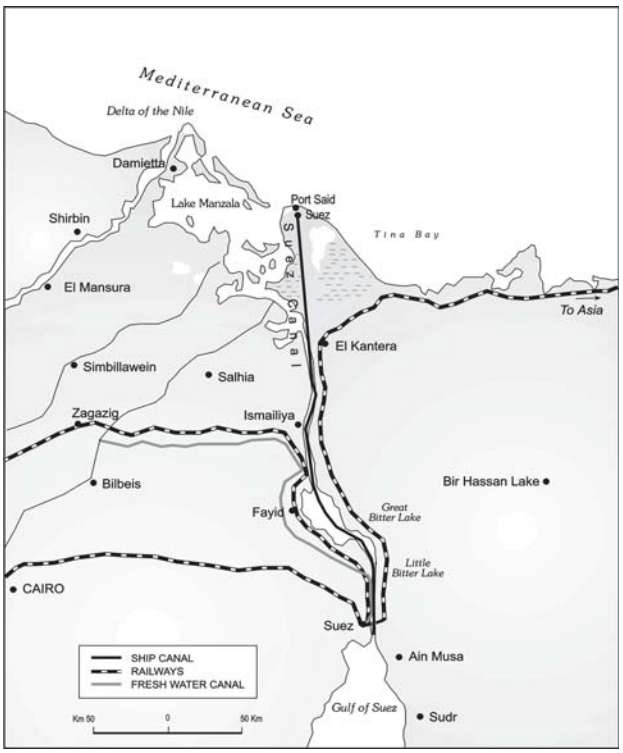


Fig. 8.10 : Suez Canal

The Panama Canal

This canal connects the Atlantic Ocean in the east to the Pacific Ocean in the west. It has been

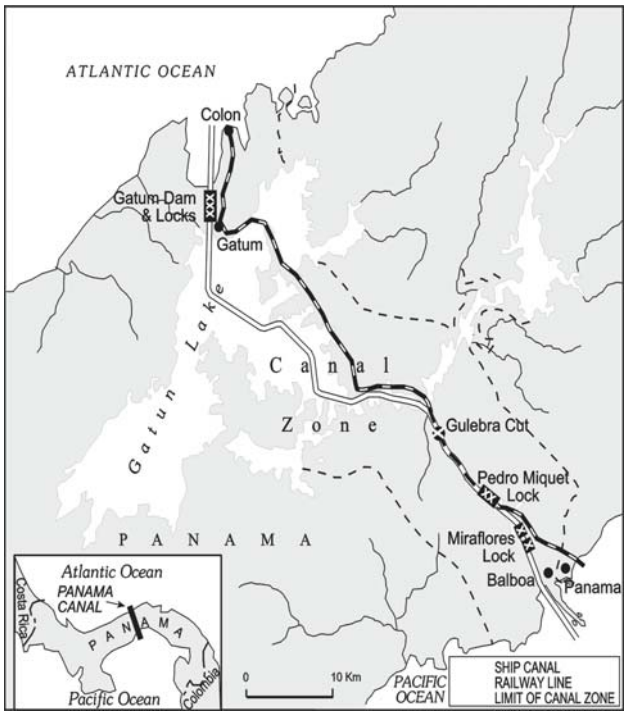
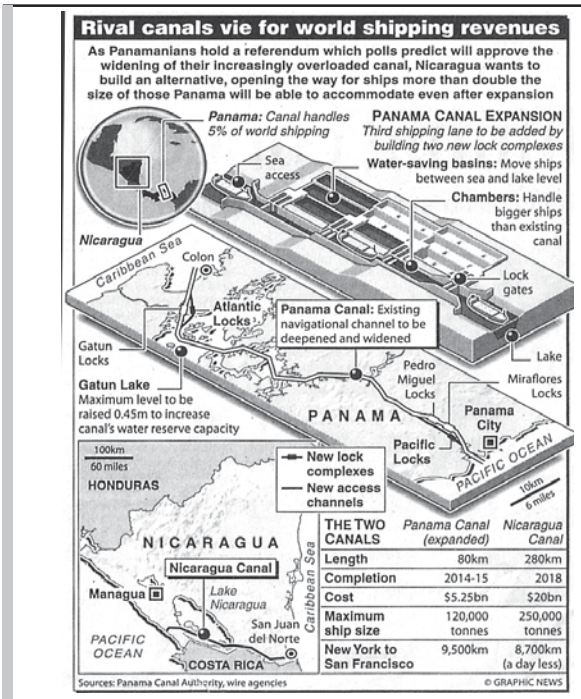


Fig. 8.11 : The Panama Canal



Activity

Can you think of the impact on traffic in Panama canal after the Nicaraguan canal opens up?

constructed across the Panama Isthmus between Panama City and Colon by the U.S. government which purchased 8 km of area on either side and named it the Canal Zone. The Canal is about 72 km. long and involves a very deep cutting for a length of 12 km. It has a six-lock system and ships cross the different levels (26 m up and down) through these locks before entering the Gulf of Panama.

It shortens the distance between New York and San Francisco by 13,000 km by sea. Likewise the distance between Western Europe and the West-coast of U.S.A.; and North-eastern and Central U.S.A. and East and South-east Asia is shortened. The economic significance of this Canal is relatively less than that of the Suez. However, it is vital to the economies of Latin America.

Inland Waterways

Rivers, canals, lakes and coastal areas have been important waterways since time immemorial. Boats and steamers are used as means of transport for cargo and passengers. The development of inland waterways is dependent on the **navigability** width and depth of the channel, continuity in the **water flow**, and **transport technology** in use. Rivers are the only means of transport in dense forests. Very heavy cargo like coal, cement, timber and metallic ores can be transported through inland waterways. In ancient times, riverways were the main highways of transportation as in the case of India. But they lost importance because of competition from railways, lack of water due to diversion for irrigation, and their poor maintenance.

Fig. 8.12: Inland waterways are a major source of transport wherever the river is wide, deep and free of silt

The significance of rivers as inland waterways for domestic and international transport and trade has been recognised throughout the developed world. Despite inherent limitations, many rivers have been modified to enhance their navigability by dredging, stabilising river banks, and building dams and barrages for regulating the flow of water. The following river waterways are some of the world's important highways of commerce.

The Rhine Waterways

The Rhine flows through Germany and the Netherlands. It is navigable for 700 km from Rotterdam**,** at its mouth in the Netherlands to **Basel** in Switzerland. Ocean-going vessels can reach up to Cologne. The Ruhr river joins the Rhine from the east. It flows through a rich coalfield and the whole basin has become a prosperous manufacturing area. Dusseldorf is the Rhine port for this region. Huge tonnage moves along the stretch south of the Ruhr. This waterway is the world's most heavily used. Each year more than 20,000 ocean-going ships and 2,00,000 inland vessels exchange their cargoes. It connects the industrial areas of Switzerland, Germany, France, Belgium and the Netherlands with the North Atlantic Sea Route.

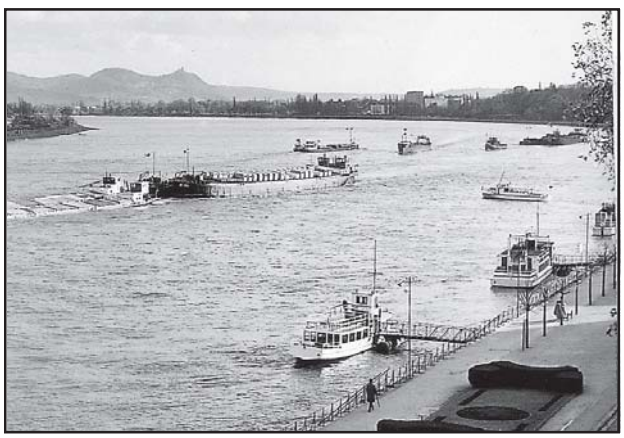


Fig. 8.13: The Rhine Watereay

The Danube Waterway

This important inland waterway serves Eastern Europe. The Danube river rises in the Black Forest and flows eastwards through many countries. It is navigable up to Taurna Severin. The chief export items are wheat, maize, timber, and machinery.

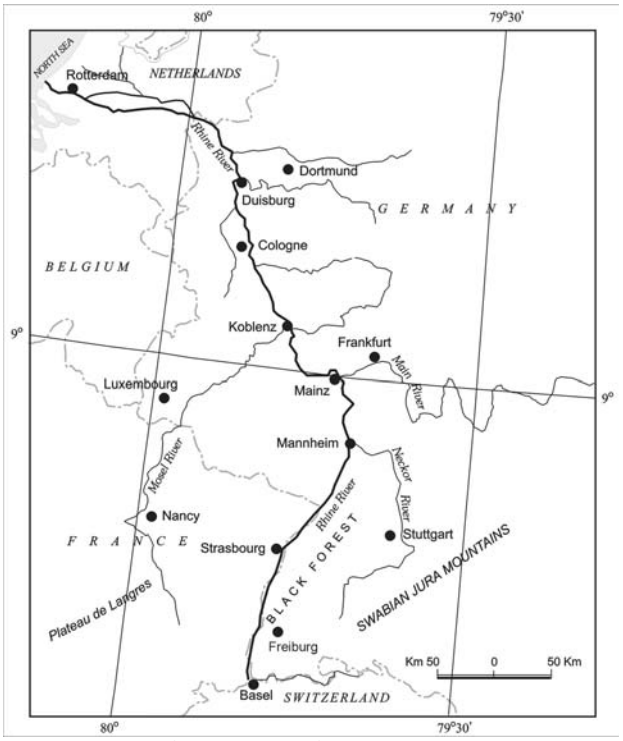


Fig. 8.14 : Rhine Waterway

The Volga Waterway

Russia has a large number of developed waterways, of which the Volga is one of the most important. It provides a navigable waterway of 11,200 km and drains into the Caspian Sea. The Volga-Moscow Canal connects it with the Moscow region and the Volga-Don Canal with the Black Sea.

The Great Lakes – St. Lawrence Seaway

The Great Lakes of North America Superior, Huron Erie and Ontario are connected by Soo Canal and Welland Canal to form an inland waterway. The estuary of St. Lawrence River, along with the Great Lakes, forms a unique commercial waterway in the northern part of North America. The ports on this route like Duluth and Buffalo are equipped with all facilities of ocean ports. As such large ocean-going vessels are able to navigate up the river deep inside the continent to Montreal**.** But here goods have to be trans-shipped to smaller vessels due to the presence of rapids. Canals have been constructed up to 3.5 m deep to avoid these.

The Mississippi Waterways

The Mississippi-Ohio waterway connects the interior part of U.S.A. with the Gulf of Mexico in the south. Large steamers can go through this route up to Minneapolis.

AIR TRANSPORT

Air transport is the fastest means of transportation, but it is very costly. Being fast, it is preferred by passengers for long-distance travel. Valuable cargo can be moved rapidly on a world-wide scale. It is often the only means to reach inaccessible areas. Air transport has brought about a connectivity revolution in the world. The frictions created by mountainous snow fields or inhospitable desert terrains have been overcome. The accessibility has increased. The airplane brings varied articles to the Eskimos in Northern Canada unhindered by the frozen ground. In the Himalayan region, the routes are often obstructed due to landslides, avalanches or heavy snow fall. At such times, air travel is the only alternative to reach a place. Airways also have great strategic importance. The air strikes by U.S. and British forces in Iraq bears testimony to this fact. The airways network is expanding very fast.

Fig. 8.15: An Aeroplane at Salsburg Airport

The manufacturing of aircrafts and their operations require elaborate infrastructure like hangars, landing, fuelling, and maintenance facilities for the aircrafts. The construction of airports is also very expensive and has developed more in highly industrialised countries where there is a large volume of traffic.

At present no place in the world is more than 35 hours away. This startling fact has been made possible due to people who build and fly airplanes. Travel by air can now be measured by hours and minutes instead of years and months. Frequent air services are available to many parts of the world. Although, U.K. pioneered the use of commercial jet transport, U.S.A. developed largely post-War international civil aviation. Today, more than 250 commercial airlines offer regular services to different parts of the world. Recent developments can change the future course of air transport. Supersonic aircraft, cover the distance between London and New York within three and a half hours.

Inter-Continental Air Routes

In the Northern Hemisphere, there is a distinct east-west belt of inter-continental air routes. Dense network exists in Eastern U.S.A., Western Europe and Southeast Asia. U.S.A. alone accounts for 60 per cent of the airways of the world. New York, London, Paris, Amsterdam, Frankfurt Rome, Moscow, Karachi, New Delhi, Mumbai, Bangkok, Singapore, Tokyo, San Francisco, Los Angeles and Chicago are the nodal points where air routes converge or radiate to all continents.

Africa, Asiatic part of Russia and South America lack air services. There are limited air services between 10-35 latitudes in the Southern hemisphere due to sparser population, limited landmass and economic development.

PIPELINES

Pipelines are used extensively to transport liquids and gases such as water, petroleum and natural gas for an uninterrupted flow. Water supplied through pipelines is familiar to all. Cooking gas or LPG is supplied through pipelines in many parts of the world. Pipelines can also be used to transport liquidified coal. In New Zealand, milk is being supplied through pipelines from farms to factories.

In U.S.A. there is a dense network of oil pipelines from the producing areas to the

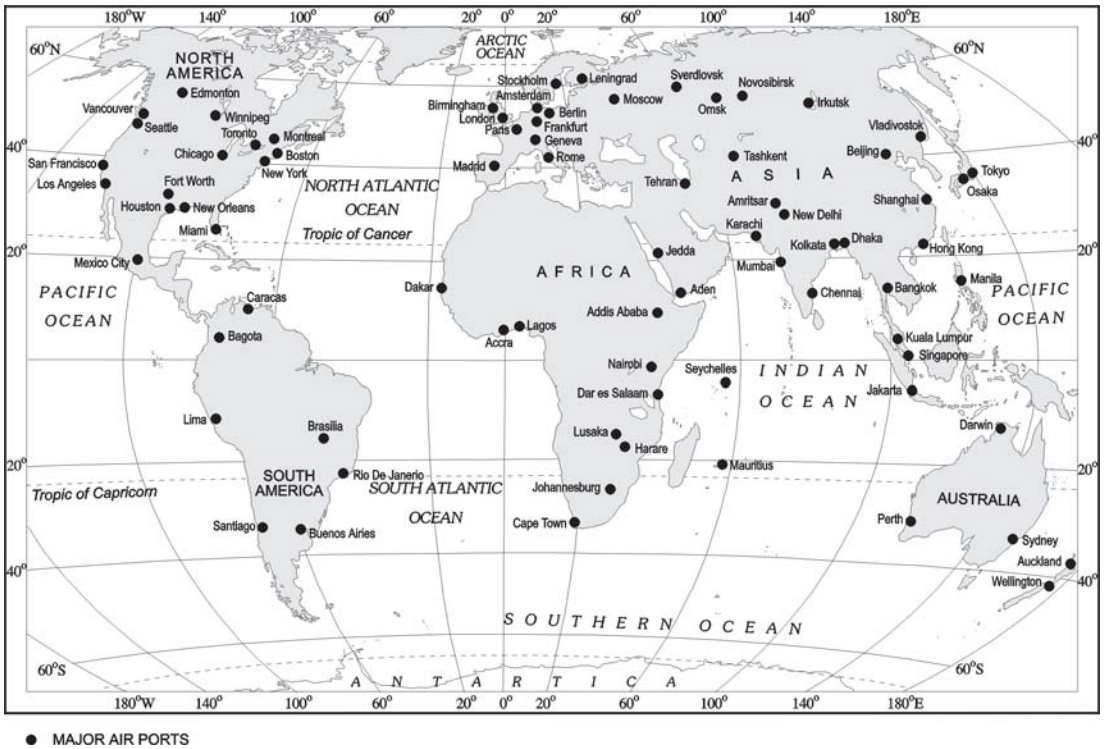


Fig. 8.16: Major Airports

consuming areas. Big Inch is one such famous pipeline, which carries petroleum from the oil wells of the Gulf of Mexico to the North-eastern States. About 17 per cent of all freight per tonne-km. is carried through pipelines in U.S.A.

Fig. 8.17: Pipelines transporting natural gas in Ukraine

In Europe, Russia, West Asia and India pipelines are used to connect oil wells to refineries, and to ports or domestic markets. Turkmenistan is central Asia has extended pipelines to Iran and also to parts of China.

The proposed Iran-India via Pakistan international oil and natural gas pipeline will be the longest in the world.

COMMUNICATIONS

Human beings have used different methods long-distance communications of which the telegraph and the telephone were important. The telegraph was instrumental in the colonisation of the American West. During the early and mid-twentieth century, the American Telegraph and Telephone Company (AT&T) enjoyed a monopoly over U.S.A.'s telephone industry. In fact, the telephone became a critical factor in the urbanisation of America. Firms centralised their functioning at city-headquarters and located their branch offices in smaller towns. Even today, the telephone is the most commonly used mode. In developing countries, the use of cell phones, made possible by satellites, is important for rural connectivity.

Today there is a phenomenal pace of development. The first major breakthrough is the use of optic fiber cables (OFC). Faced with mounting competition, telephone companies all

over the world soon upgraded their copper cable systems to include optic fiber cables. These allow large quantities of data to be transmitted rapidly, securely, and are virtually error-free. With the digitisation of information in the 1990s, telecommunication slowly merged with computers to form integrated networks termed as Internet.

Satellite Communication

Today Internet is the largest electronic network on the planet connecting about 1,000 million people in more than 100 countries.

Satellites touch human lives in many ways. **Every time you use a cell phone to call a friend, send an SMS or watch a popular programme on cable television. You are using *satellite communication.***

Communication through satellites emerged as a new area in communication technology since the 1970s after U.S.A. and former U.S.S.R. pioneered space research. Artificial satellites, now, are successfully deployed in the earth's orbit to connect even the remote corners of the globe with limited on-site verification. These have rendered the unit cost and time of communication invariant in terms of distance. This means it costs the same to communicate over 500 km as it does over 5,000 km via satellite

India has also made great strides in satellite development. Aryabhatt was launched on 19 April 1979, Bhaskar-I in 1979 and Rohini in 1980. On 18 June 1981, APPLE (Arian Passenger Payload Experiment) was launched through Arian rocket. Bhaskar, Challenger and INSAT I-B have made long-distance communication, television and radio very effective. Today weather forecasting through television is a boon.

Cyber Space – Internet

Cyberspace is the world of electronic computerised space. It is encompassed by the Internet such as the World Wide Web (www). In simple words, it is the electronic digital world for communicating or accessing information over computer networks without physical movement of the sender and the receiver... It is also referred to as the Internet. Cyberspace exists everywhere. It may be in an office, sailing boat, flying plane and virtually anywhere.

The speed at which this electronic network has spread is unprecedented in human history. There were less than 50 million Internet users in 1995, about 400 million in 2000 A.D. and over one billion in 2005. The next billion users are to be added by 2010. In the last five years there has been a shift among global users from U.S.A. to the developing countries. The percentage share of U.S.A. has dropped from 66 in 1995 to only 25 in 2005. Now the majority of the world's users are in U.S.A., U.K., Germany, Japan, China and India.

As billions use the Internet each year, cyberspace will expand the contemporary economic and social space of humans through e-mail, e-commerce, e-learning and e-governance. Internet together with fax, television and radio will be accessible to more and more people cutting across place and time. It is these modern communication systems, more than transportation, that has made the concept of global village a reality.

EXERCISES

1. Choose the right answer from the four alternatives given below.

(i) The Trans–Continental Stuart Highway runs between

(a) Darwin and Melbourne

(b) Edmonton and Anchorage

(c) Vancouver and St. John's City

(d) Chengdu and Lhasa

(ii) Which country has the highest density of railway network?

(a) Brazil (c) Canada

(b) U.S.A (d) Russia

(iii) The Big Trunk Route runs through

(a) The Mediterranean – Indian ocean

(b) The North Atlantic Ocean

(c) The South Atlantic Ocean

(d) The North Pacific Ocean

(iv) The Big Inch pipeline transports

(a) Milk (c) Water

(b) Liquid petroleum gas (LGP) (d) Petroleum

(v) Which one pair of the following places is linked by Channel Tunnel?

(a) London – Berlin (c) Berlin – Paris

(b) Paris – London (d) Barcelona – Berlin

2. Answer the following questions in about 30 words.

(i) What are the problems of road transport in mountainous, desert and flood prone regions?

(ii) What is a trans–continental railway?

(iii) What are the advantages of water transport?

3. Answer the following questions in not more than 150 words.

(i) Elucidate the statement– "In a well managed transport system, various modes complement each other".

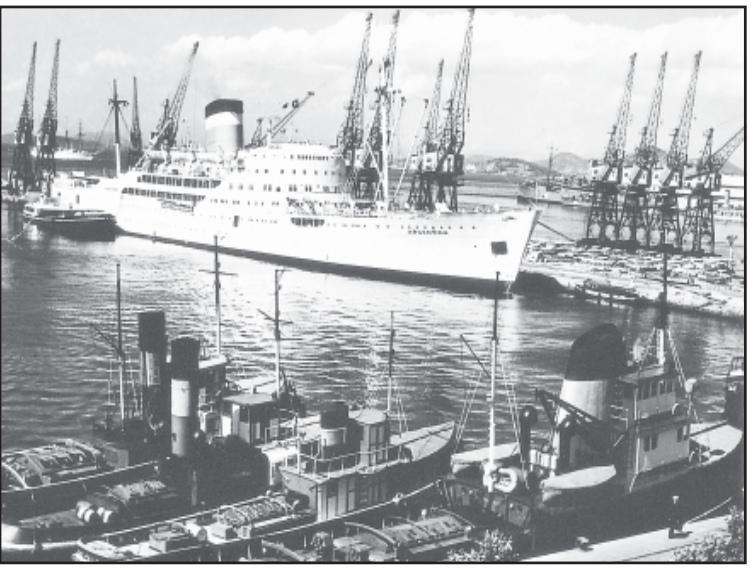
(ii) Which are the major regions of the world having a dense network of airways.

(iii) What are the modes by which cyber space will expand the contemporary economic and social space of humans.

Unit-III

Chapter-9

International Trade



You are already familiar with the term "trade" as a tertiary activity which you have studied in Chapter 7 of this book. You know that trade means the voluntary exchange of goods and services. Two parties are required to trade. One person sells and the other purchases. In certain places, people barter their goods. For both the parties trade is mutually beneficial.

Trade may be conducted at two levels: international and national. International trade is the exchange of goods and services among countries across national boundaries. Countries need to trade to obtain commodities, they cannot produce themselves or they can purchase elsewhere at a lower price.

The initial form of trade in primitive societies was the **barter system**, where direct exchange of goods took place. In this system if you were a potter and were in need of a plumber, you would have to look for a plumber who would be in need of pots and you could exchange your pots for his plumbing service.

Fig. 9.1: Two women practising barter system in Jon Beel Mela

Every January after the harvest season Jon Beel Mela takes place in Jagirod, 35 km away from Guwahati and it is possibly the only fair In India, where barter system is still alive. A big market is organised during this fair and people from various tribes and communities exchange their products.

The difficulties of barter system were overcome by the introduction of money. In the olden times, before paper and coin currency

came into being, rare objects with very high intrinsic value served as money, like, flintstones, obsidian, *cowrie* shells, tiger's paws, whale's teeth, dogs teeth, skins, furs, cattle, rice, peppercorns, salt, small tools, copper, silver and gold.

Do You Know

The word salary comes from the Latin word *Salarium* which means payment by salt. As in those times producing salt from sea water was unknown and could only be made from rock salt which was rare and expensive. That is why it became a mode of payment.

HISTORY OF INTERNATIONAL TRADE

In ancient times, transporting goods over long distances was risky, hence trade was restricted to local markets. People then spent most of their resources on basic necessities – food and clothes. Only the rich people bought jewellery, costly dresses and this resulted in trade of luxury items.

The Silk Route is an early example of long distance trade connecting Rome to China – along the 6,000 km route. The traders transported Chinese silk, Roman wool and precious metals and many other high value commodities from intermediate points in India, Persia and Central Asia.

After the disintegration of the Roman Empire, European commerce grew during twelfth and thirteenth century with the development of ocean going warships trade between Europe and Asia grew and the Americas were discovered.

Fifteenth century onwards, the European colonialism began and along with trade of exotic commodities, a new form of trade emerged which was called **slave trade.** The Portuguese, Dutch, Spaniards, and British captured African natives and forcefully transported them to the newly discovered Americas for their labour in the plantations. Slave trade was a lucrative business for more than two hundred years till it was abolished in Denmark in 1792, Great Britain in 1807 and United States in 1808.

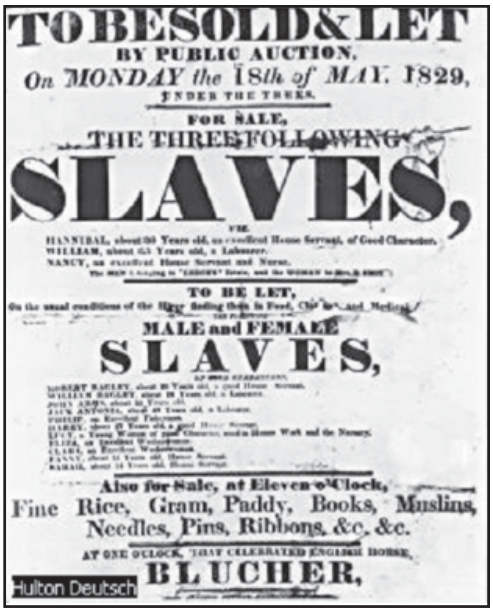

TO BE SOLD & LET
BY PUBLIC AUCTION,
On MONDAY the 18th of MAY, 1829,
UNDER THE TREES,
FOR SALE,
THE THREE FOLLOWING
SLAVES,
TO BE LET,
MALE and FEMALE
SLAVES,
Also for Sale, at Eleven o'Clock,
Fine Rice, Gram, Paddy, Books, Muslins,
Needles, Pins, Ribbons, &c. &c.
AT ONE O'CLOCK, THAT CELEBRATED ENGLISH HORSE,
BLUCHER,
Hulton Deutsch

Figure 9.2 : Advertisement for Slave Auction, 1829

This American slave auction advertised slaves for sale or temporary hire by their owners. Buyers often paid as much as $2,000 for a skilled, healthy slave. Such auctions often separated family members from one another, many of whom never saw their loved ones again.

After the Industrial Revolution the demand for raw materials like grains, meat, wool also expanded, but their monetary value declined in relation to the manufactured goods.

The industrialised nations imported primary products as raw materials and exported the value added finished products back to the non-industrialised nations.

In the later half of the nineteenth century, regions producing primary goods were no more important, and industrial nations became each other's principle customers.

During the World Wars I and II, countries imposed trade taxes and quantitative restrictions for the first time. During the post-war period, organisations like General Agreement for Tariffs and Trade (which later became the World Trade Organisation), helped in reducing tariff.

Why Does International Trade Exist?

International trade is the result of specialisation in production. It benefits the world economy if

different countries practise specialisation and division of labour in the production of commodities or provision of services. Each kind of specialisation can give rise to trade. Thus, international trade is based on the principle of comparative advantage, complimentarity and transferability of goods and services and in principle, should be mutually beneficial to the trading partners.

In modern times, trade is the basis of the world's economic organisation and is related to the foreign policy of nations. With well-developed transportation and communication systems, no country is willing to forego the benefits derived from participation in international trade.

Basis of International Trade

(i) *Difference in national resources:* The world's national resources are unevenly distributed because of differences in their physical make up i.e. geology, relief soil and climate.
   (a) *Geological structure:* It determines the mineral resource base and topographical differences ensure diversity of crops and animals raised. Lowlands have greater agricultural potential. Mountains attract tourists and promote tourism.
   (b) *Mineral resources:* They are unevenly distributed the world over. The availability of mineral resources provides the basis for industrial development.
   (c) *Climate:* It influences the type of flora and fauna that can survive in a given region. It also ensures diversity in the range of various products, e.g. wool production can take place in cold regions, bananas, rubber and cocoa can grow in tropical regions.

(ii) *Population factors*: The size, distribution and diversity of people between countries affect the type and volume of goods traded.
   (a) *Cultural factors:* Distinctive forms of art and craft develop in certain cultures which are valued the world over, e.g. China produces the finest porcelains and brocades. Carpets of Iran are famous while North African leather work and Indonesian batik cloth are prized handicrafts.
   (b) *Size of population:* Densely populated countries have large volume of internal trade but little external trade because most of the agricultural and industrial production is consumed in the local markets. Standard of living of the population determines the demand for better quality imported products because with low standard of living only a few people can afford to buy costly imported goods.

(iii) *Stage of economic development:* At different stages of economic development of countries, the nature of items traded undergo changes. In agriculturally important countries, agro products are exchanged for manufactured goods whereas industrialised nations export machinery and finished products and import food grains and other raw materials.

(iv) *Extent of foreign investment:* Foreign investment can boost trade in developing countries which lack in capital required for the development of mining, oil drilling, heavy engineering, lumbering and plantation agriculture. By developing such capital intensive industries in developing countries, the industrial nations ensure import of food stuffs, minerals and create markets for their finished products. This entire cycle steps up the volume of trade between nations.

(v) *Transport:* In olden times, lack of adequate and efficient means of transport restricted trade to local areas. Only high value items, e.g. gems, silk and spices were traded over long distances. With expansions of rail, ocean and air transport, better means of refrigeration and preservation, trade has experienced spatial expansion.

Important Aspects of International Trade

International trade has three very important aspects. These are volume, sectoral composition and direction of trade.

Volume of Trade

The actual tonnage of goods traded makes up the volume. However, services traded cannot be measured in tonnage. Therefore, the **total value** of goods and services traded is considered to be the volume of trade. Table 9.1 shows that the total volume of world trade has been steadily rising over the past decades.

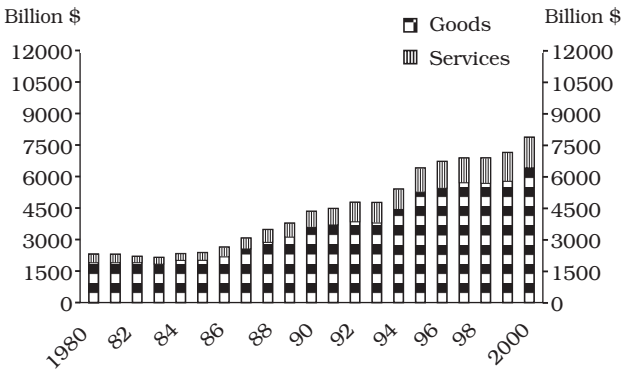
Activity

Why do you think that the volume of trade has increased over the decades? Can these figures be compared? What has been the growth in the year 2005 over the year 1955?

Composition of Trade

The nature of goods and services imported and exported by countries have undergone changes during the last century.

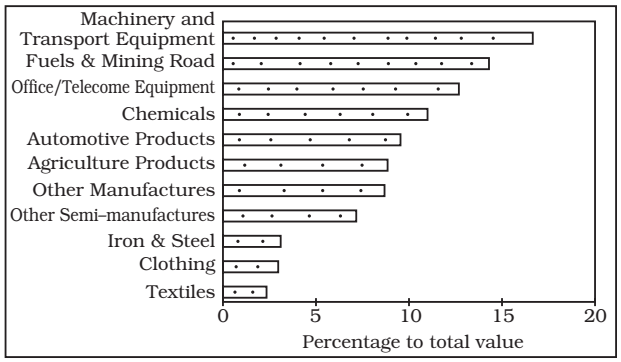
Trade of primary products was dominant in the beginning of the last century. Later manufactured goods gained prominence and currently, though the manufacturing sector commands the bulk of the global trade, service sector which includes travel, transportation and other commercial services have been showing an upward trend.



Source: WTO, Trade Statistics, 2002.

Fig. 9.3: Exports of Goods and Services, 1980-2000

The share of different commodities in total global trade can be seen in the graph below.



Source: WTO, Trade Statistics, 2005

Fig. 9.4: World Merchandise Exports By Products, 2004

Looking at the graph above, we find that machinery and transport equipment, fuel and mining products, office and telecom equipment, chemicals, automobile parts, agricultural

Table 9.1: World Imports and Exports (in millions of U.S. $)

	1955	*1965*	*1975*	*1985*	*1995*	*2005*
Exports Total Merchandise	95000	190000	877000	1954000	5162000	10393000
Imports Total Merchandise	99000	199000	912000	2015000	5292000	10753000

Source: WTO, International Trade Statistics, 2005

products, iron and steel, clothing and textiles make up the major items of merchandise which are traded over the world. Trade in the service sector is quite different from trade in the products of primary and manufacturing sectors as the services can be expanded infinitely, consumed by many, are weightless and once produced, can be easily replicated and thus, are capable of generating more profit than producing goods. There are four different ways through which services can be supplied. Table 9.2 shows different types of services and the share of those services supplied to the international market.

Table 9.2 : Services and their Share to the International Market

Relevant Services	*Share in %*
Commercial services excluding travel and construction services.	35
Travel	10 to 15
Construction services	50
Labour flow	1 to 2

Direction of Trade

Historically, the developing countries of the present used to export valuable goods and artefacts, etc. which were exported to European countries. During the nineteenth century there was a reversal in the direction of trade. European countries started exporting manufactured goods for exchange of foodstuffs and raw materials from their colonies. Europe and U.S.A. emerged as major trade partners in the world and were leaders in the trade of manufactured goods. Japan at that time was also the third important trading country. The world trade pattern underwent a drastic change during the second half of the twentieth century. Europe lost its colonies while India, China and other developing countries started competing with developed countries. The nature of the goods traded has also changed.

Balance of Trade

Balance of trade records the volume of goods and services imported as well as exported by a country to other countries. If the value of imports is more than the value of a country's exports, the country has negative or unfavourable balance of trade. If the value of exports is more than the value of imports, then the country has a positive or favourable balance of trade.

Balance of trade and balance of payments have serious implications for a country's economy. A negative balance would mean that the country spends more on buying goods than it can earn by selling its goods. This would ultimately lead to exhaustion of its financial reserves.

Types of International Trade

International trade may be categorised into two types:

(a) Bilateral trade: Bilateral trade is done by two countries with each other. They enter into agreement to trade specified commodities amongst them. For example, country A may agree to trade some raw material with agreement to purchase some other specified item to country B or vice versa.

(b) Multi-lateral trade: As the term suggests multi-lateral trade is conducted with many trading countries. The same country can trade with a number of other countries. The country may also grant the status of the "Most Favoured Nation" (MFN) on some of the trading partners.

Case for Free Trade

The act of opening up economies for trading is known as free trade or trade liberalisation. This is done by bringing down trade barriers like tariffs. Trade liberalisation allows goods and services from everywhere to compete with domestic products and services.

Globalisation along with free trade can adversely affect the economies of developing countries by not giving equal playing field by imposing conditions which are unfavourable. With the development of transport and communication systems goods and services can travel faster and farther than ever before. But free trade should not only let rich countries enter the markets, but allow the developed

countries to keep their own markets protected from foreign products.

Countries also need to be cautious about **dumped goods;** as along with free trade dumped goods of cheaper prices can harm the domestic producers.

Dumping

The practice of selling a commodity in two countries at a price that differs for reasons not related to costs is called dumping.

Panel to study anti-dumping duty on shrimp

The US act had seriously hit India's export to that country as US is the second largest importer of marine products from India

GEORGE JOSEPH
KOCHI, 26 November

Upholding India and Thailand request, World Trade Organization (WTO) has constituted a panel to examine the anti-dumping duty and customs bond imposed by the US government against the import shrimp from these countries. The dispute settlement body of WTO has resolved to appoint the panel so that several rounds of discussion with these countries were fu-

Alliance [SSA], an organization of local shrimp manufacturers. The US act had seriously hit India's export to that country as US is the second largest importer of marine products from India. The duty was also imposed against a host of other countries like Thailand, China, Brazil, Ecuador and Vietnam in July 2004. US customs had also imposed continuous bond requirement on importers of certain frozen warm water shrimp from these countries.

Activity

Think of some reasons why dumping is becoming a serious concern among trading nations?

World Trade Organisation

In1948, to liberalise the world from high customs tariffs and various other types of restrictions, General Agreement for Tariffs and Trade (GATT) was formed by some countries. In 1994, it was decided by the member countries to set up a permanent institution for looking after the promotion of free and fair trade amongst nation and the GATT was transformed into the World Trade Organisation from 1st January 1995.

WTO is the only international organisation dealing with the global rules of trade between nations. It sets the rules for the global trading system and resolves disputes between its member nations. WTO also covers trade in services, such as telecommunication and banking, and others issues such as intellectual rights.

The WTO has however been criticised and opposed by those who are worried about the effects of free trade and economic globalisation. It is argued that free trade does not make ordinary people's lives more prosperous. It is actually widening the gulf between rich and poor by making rich countries more rich. This is because the influential nations in the WTO focus on their own commercial interests. Moreover, many developed countries have not fully opened their markets to products from developing countries. It is also argued that issues of health, worker's rights, child labour and environment are ignored.

Do You Know

WTO Headquarters are located in Geneva, Switzerland.

149 countries were members of WTO as on December 2005.

India has been one of the founder member of WTO.

Regional Trade Blocs

Regional Trade Blocs have come up in order to encourage trade between countries with geographical proximity, similarity and complementarities in trading items and to curb restrictions on trade of the developing world. Today, 120 regional trade blocs generate 52 per cent of the world trade. These trading blocs developed as a response to the failure of the global organisations to speed up intra-regional trade.

Though, these regional blocs remove trade tariffs within the member nations and

encourage free trade, in the future it could get increasingly difficult for free trade to take place between different trading blocs. Some major regional trade blocs have been listed in Table 9.3.

Table 9.3: Major Regional Trade

Regional Blocs	*Head Quarter*	*Member nations*	*Origin*	*Commodities*	*Other Areas of Cooperation*
ASEAN (Association of South East Asian Nations)	Jakarta, Indonesia	Brunei, Indonesia, Malaysia, Singapore, Thailand, Vietnam	Aug, 1967	Agro products, rubber, palm oil, rice, copra, coffee, minerals – copper, coal, nickel and tungsten. Energy – petroleum and natural gas and Software products	Accelerate economic growth, cultural development, peace and regional stability
CIS (Commonwealth of Independent States)	Minsk, Belarus	Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.	—	Crude oil, natural gas, gold, cotton, fibre, aluminium	Integration and cooperation on matters of economics, defence and foreign policy
EU (European Union)	Brussels, Belgium	Austria, Belgium, Denmark, France, Finland, Ireland, Italy, the Netherlands, Luxemburg, Portugal, Spain, Sweden and U.K.	EEC- March 1957 EU - Feb. 1992	Agro products, minerals, chemicals, wood, paper, transport vehicles, optical instruments, clocks - works of art, antiques	Single market with single currency
LAIA (Latin American Integration Association)	Montevideo, Uruguay	Argentina, Bolivia, Brazil, Columbia, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela	1960	—	—
NAFTA (North American Free Trade Association)		U.S.A., Canada and Mexico	1994	Agro products, motor vehicles, automotive parts, computers, textiles	—
OPEC (Organisation of Petroleum Exporting Countries)	Vienna, Austria	Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, U.A.E. and Venezuela	1949	Crude petroleum	Coordinate and unify petroleum policies.
SAFTA (South Asian Free Trade Agreement)		Bangladesh, Maldives, Bhutan, Nepal, India, Pakistan and Sri Lanka	Jan-2006	—	Reduce tariffs on inter-regional trade

Concerns Related to International Trade

Undertaking international trade is mutually beneficial to nations if it leads to regional specialisation, higher level of production, better standard of living, worldwide availability of goods and services, equalisation of prices and wages and diffusion of knowledge and culture.

International trade can prove to be detrimental to nations of it leads to dependence on other countries, uneven levels of development, exploitation, and commercial rivalry leading to wars. Global trade affects many aspects of life; it can impact everything from the environment to health and well-being of the people around the world. As countries compete to trade more, production and the use of natural resources spiral up, resources get used up faster than they can be replenished. As a result, marine life is also depleting fast, forests are being cut down and river basins sold off to private drinking water companies. Multi-national corporations trading in oil, gas mining, pharmaceuticals and agri-business keep expanding their operations at all costs creating more pollution – their mode of work does not follow the norms of sustainable development. If organisations are geared only towards profit making, and environmental and health concerns are not addressed, then it could lead to serious implications in the future.

GATEWAYS OF INTERNATIONAL TRADE

Ports

The chief gateways of the world of international trade are the harbours and ports. Cargoes and travellers pass from one part of the world to another through these ports.

The ports provide facilities of docking, loading, unloading and the storage facilities for cargo. In order to provide these facilities, the port authorities make arrangements for maintaining navigable channels, arranging tugs and barges, and providing labour and managerial services. The importance of a port is judged by the size of cargo and the number of ships handled. The quantity of cargo handled by a port is an indicator of the level of development of its hinterland.

Fig. 9.5: San Francisco, the largest land-locked harbour in the world

Types of Port

Generally, ports are classified according to the types of traffic which they handle.

Types of port according to cargo handled:

(i) *Industrial Ports:* These ports specialise in bulk cargo-like grain, sugar, ore, oil, chemicals and similar materials.

(ii) *Commercial Ports:* These ports handle general cargo-packaged products and manufactured good. These ports also handle passenger traffic.

Fig. 9.6: Leningrad Commercial Port

(iii) *Comprehensive Ports:* Such ports handle bulk and general cargo in large volumes.

Most of the world's great ports are classified as comprehensive ports.

Types of port on the basis of location:

(i) *Inland Ports:* These ports are located away from the sea coast. They are linked to the sea through a river or a canal. Such ports are accessible to flat bottom ships or barges. For example, Manchester is linked with a canal; Memphis is located on the river Mississippi; Rhine has several ports like Mannheim and Duisburg; and Kolkata is located on the river Hoogli, a branch of the river Ganga.

(ii) *Out Ports:* These are deep water ports built away from the actual ports. These serve the parent ports by receiving those ships which are unable to approach them due to their large size. Classic combination, for example, is Athens and its out port Piraeus in Greece.

Types of port on the basis of specialised functions:

(i) *Oil Ports:* These ports deal in the processing and shipping of oil. Some of these are tanker ports and some are refinery ports. Maracaibo in Venezuela, Esskhira in Tunisia, Tripoli in Lebanon are tanker ports. Abadan on the Gulf of Persia is a refinery port.

(ii) *Ports of Call:* These are the ports which originally developed as calling points on main sea routes where ships used to anchor for refuelling, watering and taking food items. Later on, they developed into commercial ports. Aden, Honolulu and Singapore are good examples.

(iii) *Packet Station:* These are also known as *ferry ports.* These packet stations are exclusively concerned with the transportation of passengers and mail across water bodies covering short distances. These stations occur in pairs located in such a way that they face each other across the water body, e.g. Dover in England and Calais in France across the English Channel.

(iv) *Entrepot Ports:* These are collection centres where the goods are brought from different countries for export. Singapore is an entrepot for Asia. Rotterdam for Europe, and Copenhagen for the Baltic region.

(v) *Naval Ports:* These are ports which have only strategic importance. These ports serve warships and have repair workshops for them. Kochi and Karwar are examples of such ports in India.

EXERCISES

1. Choose the right answer from the four alternatives given below.

(i) Most of the world's great ports are classified as:

(a) Naval Ports (c) Comprehensive Ports

(b) Oil Ports (d) Industrial Ports

(ii) Which one of the following continents has the maximum flow of global trade?

(a) Asia (c) Europe

(b) North America (d) Africa

(iii) Which one of the following South American nation, is a part of OPEC?

(a) Brazil (c) Venezuela

(b) Chile (d) Peru

(iv) In which of the following trade blocs, is India an associate member?

(a) SAFTA (c) ASEAN

(b) OECD (d) OPEC

2. Answer the following questions in about 30 words:

(i) What is the basic function of the World Trade Organisation?

(ii) Why is it detrimental for a nation to have negative balance of payments?

(iii) What benefits do nations get by forming trading blocs?

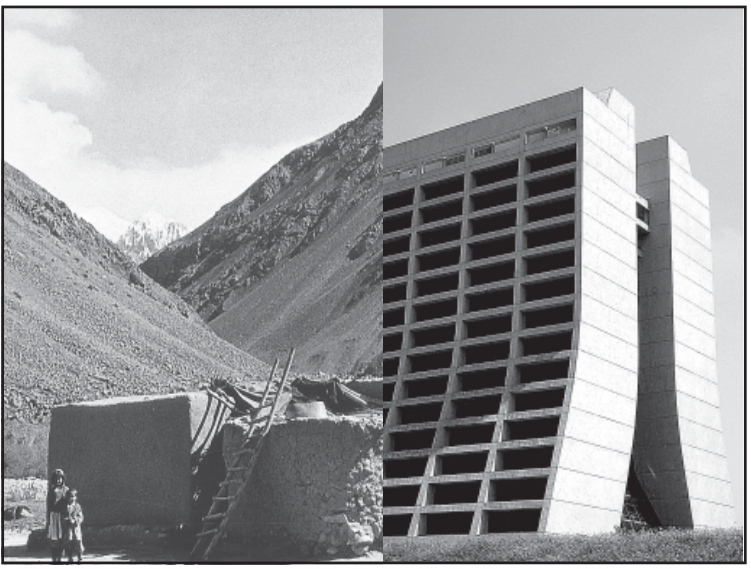
3. Answer the following questions in not more than 150 words:

(i) How are ports helpful for trade? Give a classification of ports on the basis of their location.

(ii) How do nations gain from International Trade?

Unit-IV
Chapter-10

Human Settlements



We all live in clusters of houses. You may call it a village, a town or a city, all are examples of human settlements. The study of human settlements is basic to human geography because the form of settlement in any particular region reflects human relationship with the environment. A human settlement is defined as a place inhabited more or less permanently. The houses may be designed or redesigned, buildings may be altered, functions may change but settlement continues in time and space. There may be some settlements which are temporary and are occupied for short periods, may be a season.

CLASSIFICATION OF SETTLEMENTS

RURAL URBAN DICHOTOMY

It is widely accepted that settlements can be differentiated in terms of rural and urban, but there is no consensus on what exactly defines a village or a town. Although population size is an important criterion, it is not a universal criterion since many villages in densely populated countries of India and China have population exceeding that of some towns of Western Europe and United States.

At one time, people living in villages pursued agriculture or other primary activities, but presently in developed countries, large sections of urban populations prefer to live in villages even though they work in the city. The basic difference between towns and villages is that in towns the main occupation of the people is related to secondary and tertiary sectors, while in the villages most of the people are engaged in primary occupations such as agriculture, fishing, lumbering, mining, animal husbandry, etc.

Sub Urbanisation

It is a new trend of people moving away from congested urban areas to cleaner areas outside the city in search of a better quality of living. Important suburbs develop around major cities and everyday thousands of people commute from their homes in the sub urbs to their work places in the city.

Differentiations between rural and urban on the basis of functions are more meaningful even though there is no uniformity in the hierarchy of the functions provided by rural and urban settlements. Petrol pumps are considered as a lower order function in the United States while it is an urban function in India. Even within a country, rating of functions may vary according to the regional economy. Facilities available in the villages of developed countries may be considered rare in villages of developing and less developed countries.

> The census of India, 1991 defines urban settlements as "All places which have municipality, corporation, cantonment board or notified town area committee and have a minimum population of 5000 persons, at least 75 per cent of male workers are engaged in non-agricultural pursuits and a density of population of at least 400 persons per square kilometers are urban.

TYPES AND PATTERNS OF SETTLEMENTS

Settlements may also be classified by their shape, patterns types. The major types classified by shape are:

(i) *Compact or Nucleated settlements:* These settlements are those in which large number of houses are built very close to each other. Such settlements develop along river valleys and in fertile plains. Communities are closely knit and share common occupations.

Fig.10.1 : Compact Settlements

(ii) *Dispersed Settlements:* In these settlements, houses are spaced far apart and often interspersed with fields. A cultural feature such as a place of worship or a market, binds the settlement together.

Fig. 10.2: Dispersed Settlements

Rural Settlements

Rural settlements are most closely and directly related to land. They are dominated by primary activities such as agriculture, animal husbandary, fishing etc. The settlements size is relatively small.

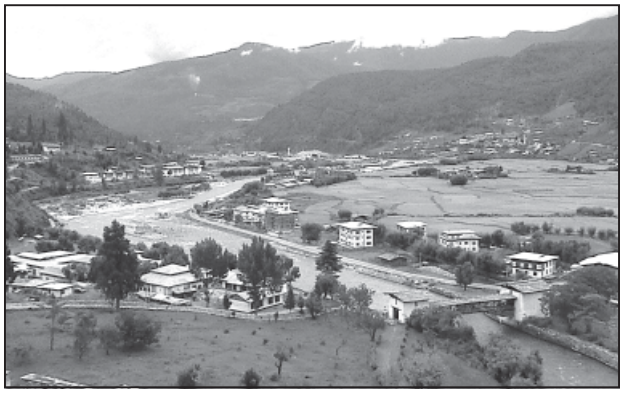


Fig. 10.3 : Siting near water

Water Supply

Usually rural settlements are located near water bodies such as rivers, lakes, and springs where water can be easily obtained. Sometimes the need for water drives people to settle in otherwise disadvantaged sites such as islands surrounded by swamps or low lying river banks. Most water based 'wet point' settlements have many advantages such as water for

drinking, cooking and washing. Rivers and lakes can be used to irrigate farm land. Water bodies also have fish which can be caught for diet and navigable rivers and lakes can be used for transportation.

Land

People choose to settle near fertile lands suitable for agriculture. In Europe villages grew up near rolling country avoiding swampy, low lying land while people in south east Asia chose to live near low lying river valleys and coastal plains suited for wet rice cultivation. Early settlers chose plain areas with fertile soils.

Upland

Upland which is not prone to flooding was chosen to prevent damage to houses and loss of life. Thus, in low lying river basins people chose to settle on terraces and levees which are "dry points". In tropical countries people build their houses on stilts near marshy lands to protect themselves from flood, insects and animal pests.

Building Material

The availability of building materials- wood, stone near settlements is another advantage. Early villages were built in forest clearings where wood was plentiful.

Fig. 10.4 : House on stilts

In loess areas of China, cave dwellings were important and African Savanna's building materials were mud bricks and the Eskimos, in polar regions, use ice blocks to construct igloos.

Defence

During the times of political instability, war, hostility of neighbouring groups villages were built on defensive hills and islands. In Nigeria, upstanding inselbergs formed good defensive sites. In India most of the forts are located on higher grounds or hills.

Planned Settlements

Sites that are not spontaneously chosen by villagers themselves, planned settlements are constructed by governments by providing shelter, water and other infrastructures on acquired lands. The scheme of villagisation in Ethiopia and the canal colonies in Indira Gandhi canal command area in India are some good examples.

Rural Settlement Patterns

Patterns of rural settlements reflect the way the houses are sited in relation to each other. The site of the village, the surrounding topography and terrain influence the shape and size of a village.

Rural settlements may be classified on the basis of a number of criteria:

(i) *On the basis of setting:* The main types are plain villages, plateau villages, coastal villages, forest villages and desert villages.

(ii) *On the basis of functions:* There may be farming villages, fishermen's villages, lumberjack villages, pastoral villages etc.

(iii) *On the basis of forms or shapes of the settlements:* These may be a number of geometrical forms and shapes such as Linear, rectangular, circular star like, T-shaped village, double village, cross-shaped village etc.

(a) *Linear pattern:* In such settlements houses are located along a road, railway line, river, canal edge of a valley or along a levee.

(b) *Rectangular pattern:* Such patterns of rural settlements are found in plain areas or wide inter montane valleys. The roads are rectangular and cut each other at right angles.

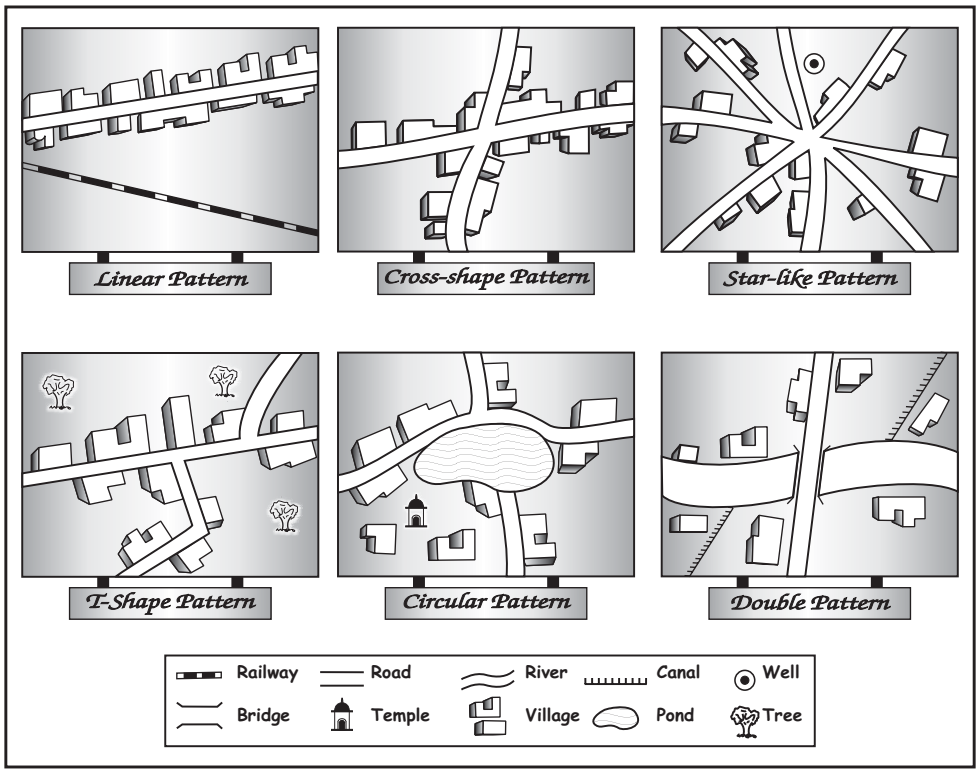


Fig. 10.5: Rural Settlement Patterns

(c) *Circular pattern*: Circular villages develop around lakes, tanks and sometimes the village is planned in such a way that the central part remains open and is used for keeping the animals to protect them from wild animals.

(d) *Star like pattern:* Where several roads converge, star shaped settlements develop by the houses built along the roads.

(e) *T-shaped, Y-shaped, Cross-shaped or cruciform settlements:* T-shaped settlements develop at tri-junctions of the roads (⊤) while Y-shaped settlements emerge as the places where two roads converge on the third one and houses are built along these roads. Cruciform settlements develop on the cross-roads and houses extend in all the four direction.

Fig.10.6 : Linear pattern settlement

Fig.10.7 : Y shape settlement

(f) Double village: These settlements extend on both sides of a river where there is a bridge or a ferry.

Activity

Identify these patterns on any topographical sheet which you have studied in Practical Work in Geography, Part I (NCERT, 2006) in Class XI

Problems of Rural Settlements

Rural settlements in the developing countries are large in number and poorly equipped with infrastructure. They represent a great challenge and opportunity for planners.

Supply of water to rural settlements in developing countries is not adequate. People in villages, particularly in mountainous and arid areas have to walk long distances to fetch drinking water. Water borne diseases such as cholera and jaundice tend to be a common problem. The countries of South Asia face conditions of drought and flood very often. Crop cultivation sequences, in the absence of irrigation, also suffer.

The general absence of toilet and garbage disposal facilities cause health related problems.

The design and use of building materials of houses vary from one ecological region to another. The houses made up of mud, wood and thatch, remain susceptible to damage during heavy rains and floods, and require proper maintenance every year. Most house designs are typically deficient in proper ventilation. Besides, the design of a house includes the animal shed along with its fodder-store within it. This is purposely done to keep the domestic animals and their food properly protected from wild animals.

Unmetalled roads and lack of modern communication network creates a unique problem. During rainy season, the settlements remain cut off and pose serious difficulties in providing emergency services. It is also difficult to provide adequate health and educational infrastructure for their large rural population. The problem is particularly serious where proper villagisation has not taken place and houses are scattered over a large area.

Urban Settlements

Rapid urban growth is a recent phenomenon. Until recent times, few settlements reached the population size of more than a few thousand inhabitants. The first urban settlement to reach a population of one million was the city of London by around. A.D. 1810 By 1982 approximately 175 cities in the world had crossed the one million population mark. Presently 48 per cent of the world's population lives in urban settlements compared to only 3 per cent in the year 1800 (Table 10.1).

Table 10.1: Percentage of World's Population Living in Urban Areas

Year	*Percentage*
1800	3
1850	6
1900	14
1950	30
1982	37
2001	48

Classification of Urban Settlements

The definition of urban areas varies from one country to another. Some of the common basis of classification are size of population, occupational structure and administrative setup.

Population Size

It is an important criteria used by most countries to define urban areas. The lower limit of the population size for a settlement to be designated as urban is 1,500 in Colombia, 2,000 in Argentina and Portugal, 2,500 in U.S.A. and Thailand, 5,000 in India and 30,000 in Japan. Besides the size of population, density of 400 persons per sq km and share of non-agricultural workers are taken into consideration in India. Countries with low density of population may choose a lower number as the cut-off figure compared to densely populated countries. In Denmark, Sweden and Finland, all places with a population size of 250 persons are called urban. The minimum population for a city is

300 in Iceland, whereas in Canada and Venezuela, it is 1,000 persons.

Occupational Structure

In some countries, such as India, the major economic activities in addition to the size of the population in designating a settlement as urban are also taken as a criterion. Similarly, in Italy, a settlement is called urban, if more than 50 per cent of its economically productive population is engaged in non-agricultural pursuits. India has set this criterion at 75 per cent.

Administration

The administrative setup is a criterion for classifying a settlement as urban in some countries. For example, in India, a settlement of any size is classified as urban, if it has a municipality, Cantonment Board or Notified Area Council. Similarly, in Latin American countries, such as Brazil and Bolivia, any administrative centre is considered urban irrespective of its population size.

Location

Location of urban centres is examined with reference to their function. For example, the sitting requirements of a holiday resort are quite different from that of an industrial town, a military centre or a seaport. Strategic towns require sites offering natural defence; mining towns require the presence of economically valuable minerals; industrial towns generally need local energy supplies or raw materials; tourist centres require attractive scenery, or a marine beach, a spring with medicinal water or historical relics, ports require a harbour etc.

Locations of the earliest urban settlements were based on the availability of water, building materials and fertile land. Today, while these considerations still remain valid, modern technology plays a significant role in locating urban settlements far away from the source of these materials. Piped water can be supplied to a distant settlement, building material can be transported from long distances.

Apart from site, the situation plays an important role in the expansion of towns. The urban centres which are located close to an important trade route have experienced rapid development.

Functions of Urban Centres

The earliest towns were centres of administration, trade, industry, defence and religious importance. The significance of defence and religion as differentiating functions has declined in general, but other functions have entered the list. Today, several new functions, such as, recreational, residential, transport, mining, manufacturing and most recently activities related to information technology are carried on in specialised towns. Some of these functions do not necessarily require the urban centre to have any fundamental relationship with their neighbouring rural areas.

What would be the effects of Information and Communication Technology (ICT) as a function on the development of existing and new settlements?

Activity

Prepare a list of cities where earlier functions have been replaced by newer ones.

In spite of towns performing multiple functions we refer to their dominant function. For example, we think of Sheffield as an industrial city, London as a port city, Chandigarh as an administrative city and so on. Large cities have a rather greater diversity of functions. Besides, all cities are dynamic and over a period of time may develop new functions. Most of the early nineteenth-century fishing ports in England have now developed tourism. Many of the old market towns are now known for manufacturing activities. Towns and cities are classified into the following categories.

Administrative Towns

National capitals, which house the administrative offices of central governments, such as New Delhi, Canberra, Beijing, Addis Ababa, Washington D.C., and London etc. are called administrative

towns. Provincial (sub-national) towns can also have administrative functions, for example, Victoria (British Columbia), Albany (New York), Chennai (Tamil Nadu).

Trading and Commercial Towns

Agricultural market towns, such as, Winnipeg and Kansas city; banking and financial centres like Frankfurt and Amsterdam; large inland centres like Manchester and St Louis; and transport nodes such as, Lahore, Baghdad and Agra have been important trading centres.

Cultural Towns

Places of pilgrimage, such as Jerusalem, Mecca, Jagannath Puri and Varanasi etc. are considered cultural towns. These urban centres are of great religious importance.

Additional functions which the cities perform are health and recreation (Miami and Panaji), industrial (Pittsburgh and Jamshedpur), mining and quarrying (Broken Hill and Dhanbad) and transport (Singapore and Mughal Sarai).

Do You Know

Urbanisation means the increase in the proportion population of a country who live in urban areas.

The most important cause of urbanisation is rural-urban migration. During the late 1990s some 20 to 30 million people were leaving the countryside every year and moving into towns and cities.

Developed countries experienced rapid urbanisation during the nineteenth century.

Developing counties experienced rapid urbanisation during the second half of the twentieth century.

CLASSIFICATION OF TOWNS ON THE BASIS OF FORMS

An urban settlement may be linear, square, star or crescent shaped. In fact, the form of the settlement, architecture and style of buildings and other structures are an outcome of its historical and cultural traditions.

Towns and cities of developed and developing countries reflect marked differences in planning and development. While most cities in developed countries are planned, most urban settlements of developing countries have evolved historically with irregular shapes. For example, Chandigarh and Canberra are planned cities, while smaller town in India have evolved historically from walled cities to large urban sprawls.

Addis Ababa (The New Flower)

The name of Ethiopian capital Addis Ababa, as the name indicates (*Addis*-New, *Ababa*-Flower) is a 'new' city which was established in 1878.

The whole city is located on a hill-valley topography. The road pattern bears the influence

Fig. 10.8: Morphology of Addis Ababa

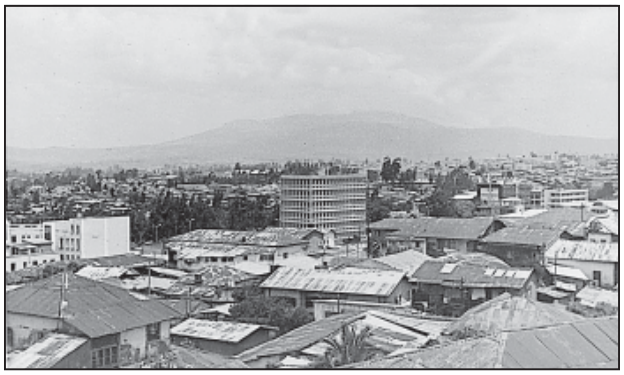


Fig. 10.9: Skyline of Addis Ababa

of the local topography. The roads radiate from the govt headquarters Piazza, Arat and Amist Kilo roundabouts. Mercato has markets which grew with time and is supposed to be the largest market between Cairo and Johannesburg. A multi-faculty university, a medical college, a number of good schools make Addis Ababa an educational centre. It is also the terminal station for the Djibouti-Addis Ababa rail route. Bole airport is a relatively new airport. The city has witnessed rapid growth because of its multi-functional nature and being a large nodal centre located in the centre of Ethiopia.

Canberra

Canberra was planned as the capital of Australia in 1912 by American landscape architect, Walter Burley Griffin. He had envisaged a garden city for about 25,000 people taking into account the natural features of the landscape. There were to be five main centres, each with separate city functions. During the last few decades, the city has expanded to accommodate several satellite towns, which have their own centres. The city has wide-open spaces and many parks and gardens.

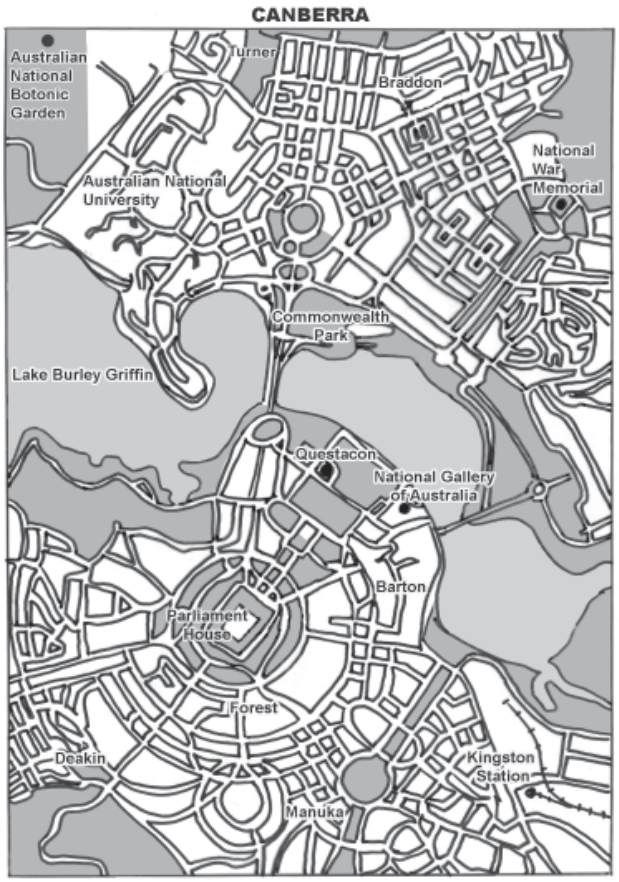


Fig. 10.10 : Morphology of a planned city – Canberra

Types of Urban Settlements

Depending on the size and the services available and functions rendered, urban centres are designated as town, city, million city, conurbation, megalopolis.

Town

The concept of 'town' can best be understood with reference to 'village'. Population size is not the only criterion. Functional contrasts between towns and villages may not always be clear-cut, but specific functions such as, manufacturing, retail and wholesale trade, and professional services exist in towns.

City

A city may be regarded as a leading town, which has outstripped its local or regional rivals. In the words of Lewis Mumford, " the city is in fact the physical form of the highest and most complex type of associative life". Cities are much larger than towns and have a greater number of economic functions. They tend to have transport terminals, major financial institutions and regional administrative offices. When the population crosses the one million mark it is designated as a million city.

Conurbation

The term conurbation was coined by Patrick Geddes in 1915 and applied to a large area of urban development that resulted from the merging of originally separate towns or cities. Greater London, Manchester, Chicago and Tokyo are examples. Can you find out an example from India?

Megalopolis

This Greek word meaning "great city", was popularised by Jean Gottman (1957) and signifies 'super- metropolitan' region extending,

as union of conurbations. The urban landscape stretching from Boston in the north to south of Washington in U.S.A. is the best known example of a megalopolis.

Million City

The number of million cities in the world has been increasing as never before. London reached the million mark in 1800, followed by Paris in 1850, New York in 1860, and by 1950 there were around 80 such cities. The rate of increase in the number of million cities has been three-fold in every three decades – around 160 in 1975 to around 438 in 2005.

Table 10.2: Continent–wise Distribution of Million Cities

Continent	*Early 1950*	*Mid 1970s*	*Mid 2000*
Europe	23	30	58
Asia	32	69	206
North and Central America	16	36	79
South America	8	17	43
Africa	3	8	46
Australia	2	2	6
World Total	84	162	438

Source: www.citypopulation.de/World.html

Distribution of Mega Cities

A mega city or megalopolis is a general term for cities together with their suburbs with a population of more than 10 million people. New York was the first to attain the status of a mega city by 1950 with a total population of about 12.5 million. The number of mega cities is now 25. The number of mega cities has increased in the developing countries during the last 50 years vis-à-vis the developed countries.

Problems of Human Settlements in Developing Countries

The settlements in developing countries, suffer from various problems, such as unsustainable concentration of population, congested housing and streets, lack of drinking water facilities.

Table 10.3: Mega Cities of the World (as on 28. 01. 2006)

Sl. No.	*Name of the City*	*Country*	*Population (in millions)*
1.	Tokyo	Japan	34.2
2.	Mexico city	Mexico	22.8
3.	Seoul	South Korea	22.3
4.	New York	U.S.A.	21.9
5.	Sao Paulo	Brazil	20.2
6.	Mumbai	India	19.9
7.	Delhi	India	19.7
8.	Shanghai	China	18.2
9.	Los Angeles	U.S.A.	18.0
10.	Osaka	Japan	16.8
11.	Jakarta	Indonesia	16.6
12.	Kolkata	India	15.7
13.	Cairo	Egypt	15.6
14.	Manila	Philippines	15.0
15.	Karachi	Pakistan	14.3
16.	Moscow	Russia	13.8
17.	Buenos Aires	Argentina	13.5
18.	Dhaka	Bangladesh	13.3
19.	Rio de Janeiro	Brazil	12.2
20.	Beijing	China	12.1
21.	London	G. Britain	12.0
22.	Tehran	Iran	11.9
23.	Istanbul	Turkey	11.5
24.	Lagos	Nigeria	11.1
25.	Shenzhen	China	10.7

Source: www.citypopulation.de/World.html

They also lack infrastructure such as, electricity, sewage disposal, health and education facilities.

Activity

Rural/Urban Problems

Can you identify the problems faced by your city/town/village in terms of any one of the following?

Availability of potable water.

Electricity supply.

Sewerage system.

Transportation and communication facilities.

Health and educational infrastructure.

Water and air pollution.

Can you think of solutions to these problems?

Problems of Urban Settlements

People flock to cities to avail of employment opportunities and civic amenities. Since most cities in developing countries are unplanned, it creates severe congestion. Shortage of housing, vertical expansion and growth of slums are characteristic features of modern cities of developing countries. In many cities an increasing proportion of the population lives in substandard housing, e.g. slums and squatter settlements. In most million plus cities in India, one in four inhabitants lives in illegal settlements, which are growing twice as fast as the rest of the cities. Even in the Asia Pacific countries, around 60 per cent of the urban population lives in squatter settlements.

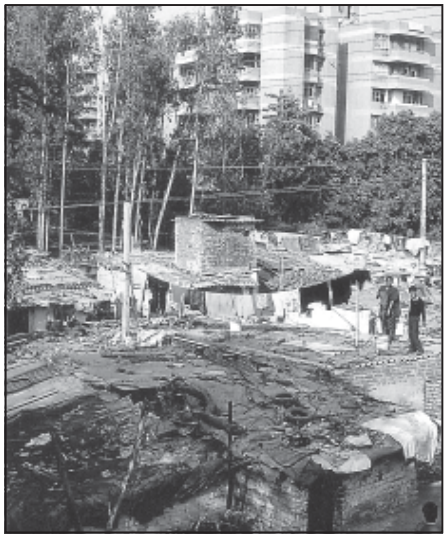


Fig. 10.11: Slums

What is a Healthy City?

World Health Organisation (WHO) suggests that, among other things, a 'healthy city' must have:

A 'Clean' and 'Safe' environment.

Meets the 'Basic Needs' of 'All' its inhabitants.

Involves the 'Community' in local government.

Provides easily accessible 'Health' service.

Economic Problems

The decreasing employment opportunities in the rural as well as smaller urban areas of the developing countries consistently push the population to the urban areas. The enormous migrant population generates a pool of un-skilled and semi-skilled labour force, which is already saturated in urban areas.

Socio-cultural Problems

Cities in the developing countries suffer from several social ills. Insufficient financial resources fail to create adequate social infrastructure catering to the basic needs of the huge population. The available educational and health facilities remain beyond the reach of the urban poor. Health indices also, present a gloomy picture in cities of developing countries. Lack of employment and education tends to aggravate the crime rates. Male selective migration to the urban areas distorts the sex ratio in these cities.

Environmental Problems

The large urban population in developing countries not only uses but also disposes off a huge quantity of water and all types of waste materials. Many cities of the developing countries even find it extremely difficult to provide the minimum required quantity of potable water and water for domestic and industrial uses. An improper sewerage system creates unhealthy conditions. Massive use of traditional fuel in the domestic as well as the industrial sector severely pollutes the air. The domestic and industrial wastes are either let into the general sewerages or dumped without treatment at unspecified locations. Huge concrete structures erected to accommodate the population and economic play a very conducive role to create heat islands.

Urban Strategy

The United Nations Development Programme (UNDP) has outlined these priorities as part of its 'Urban Strategy'.

Increasing 'Shelter' for the urban poor.

Provision of basic urban services such as 'Education', 'Primary Health care', 'Clean Water and Sanitation'.

Improving women's access to 'Basic Services' and government facilities.

Upgrading 'Energy' use and alternative 'Transport' systems.

Reducing 'Air Pollution'.

Cities, towns and rural settlements are linked through the movements of goods, resources and people. Urban-rural linkages are of crucial importance for the sustainability of human settlements. As the growth of rural population has outpaced the generation of employment and economic opportunities, rural-to-urban migration has steadily increased, particularly in the developing countries, which has put an enormous pressure on urban infrastructure and services that are already under serious stress. It is urgent to eradicate rural poverty and to improve the quality of living conditions, as well as to create employment and educational opportunities in rural settlements. Full advantage must be taken of the complementary contributions and linkages of rural and urban areas by balancing their different economic, social and environmental requirements.

EXERCISES

1. Choose the right answer from the four alternatives given below.

(i) Which one of the following forms of settlement develops along either side of roads, rivers or canals?

(a) circular (c) cross-shaped

(b) linear (d) square

(ii) Which one of the following types of economic activities dominates in all rural settlement?

(a) primary (c) secondary

(b) tertiary (d) quaternary

(iii) In which of the following regions has the oldest well-documented urban settlement found?

(a) Huang He Valley (c) Nile Valley

(b) Indus Valley (d) Mesopotamia

(iv) How many of the following cities in India have attained the million status at the beginning of 2006?

(a) 40 (c) 41

(b) 42 (d) 43

(v) Sufficiency of which type of resources can help to create adequate social infrastructure catering to the needs of the large population in the developing countries?

(a) financial (c) natural

(b) human (d) social

2. Answer the following questions in about 30 words.

(i) How would you define a settlement?

(ii) Distinguish between site and situation.

(iii) What are the bases of classifying settlements?

(iv) How would you justify the study of human settlements in human geography?

(v) Identify the types of settlement shown in the photograph and write a brief note on it.

3. Answer the following questions in not more than 150 words.

(i) What are rural and urban settlements? Mention their characteristics.

(ii) Discuss the problems associated with urban settlements in developing countries.

Project/Activity

(i) Do you live in a city? If not, do you live nearby? Is your life somehow linked to a city?

(a) What is its name?
(b) When was it first settled?
(c) Why was the site chosen?
(d) What is its population?
(e) What are the functions it performs?
(f) On a sketch of the city, try to identify the areas where these functions are performed.

Each student should make a list of five things associated with the selected city; things that cannot be found elsewhere. This is a mini definition of the city as each student sees it. The lists should be shared with the class. How much agreement is there between the lists?

(ii) Can you think of some ways by which you can single handedly help reduce pollution levels of your settlement

Hints :

(a) Proper garbage disposal
(b) Using public transport
(c) Better management of domestic water consumption
(d) Planting trees in the neighbourhood