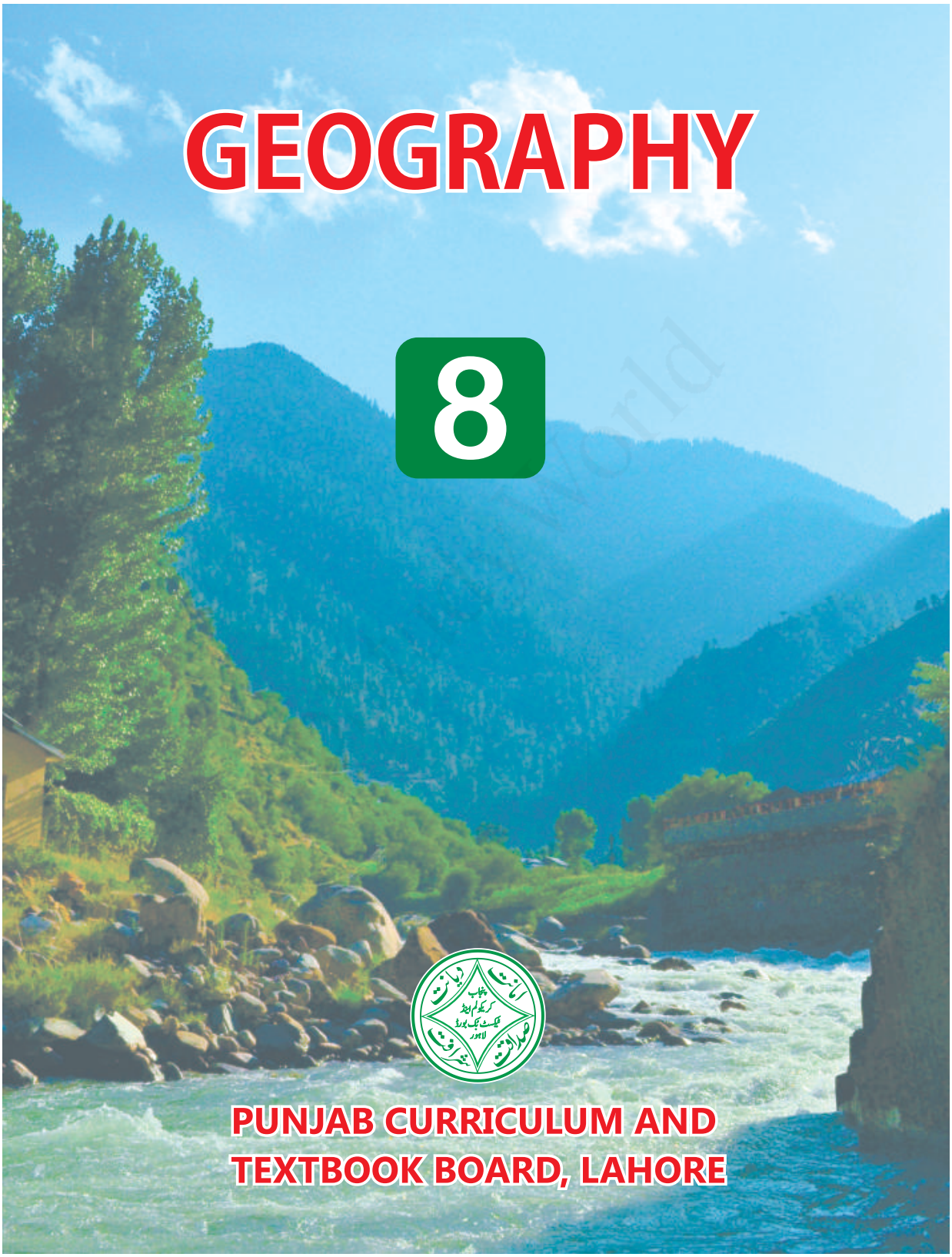

CONTENTS

Authors

- **Prof. Nadeem Fayyaz**
  Govt. Postgraduate College, Asghar Mall, Rawalpindi
- **Prof. Sajid Mehmood Farooqi**
  Govt. Postgraduate College, Asghar Mall, Rawalpindi
- **Prof. Syed Atif Bukhari**
  Govt. Postgraduate College, Asghar Mall, Rawalpindi
- **Prof. Mian Muhammad Aslam** (Late)

Review Committee

- **Prof. Muhammad Khalid,** Deptt. of Geography
  Govt. College of Science, Wahdat Road, Lahore
- **Prof. Sajid Mushtaq,** Department of Geography
  Govt. Emerson College, Multan
- **Prof. Muhammad Ghous,** Deptt. of Geography
  Govt. College of Science, Wahdat Road, Lahore
- **Miss Samaha Sajid,** Deptt. of Geography
  Bahauddin Zakariya University, Multan

Supervision ◦ **Rana Muhammad Akram**

Artist ◦ **Mrs. Ayesha Waheed**

Composing & Layout ◦ **Hafiz Inam-ul-Haq** ◦ **Naveed Fayyaz** ◦ **Muhammad Ashraf**

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Chapter 1

MAPS AND DIAGRAMS

Students' Learning Outcomes

After studying this chapter, students will be able to:

- discuss distribution maps.
- explain techniques to draw different diagrams.
- discuss the use of statistical data for diagrams.
- construct line graph, bar graph and pie graph using statistical data.
- evaluate merits and demerits of the diagrams.

Map

A representation of the features of an area of the Earth or whole of the Earth on a flat surface according to a scale is called a map. Maps are made to show the physical features, distribution of agricultural production, population distribution or political administrative divisions of any region, for example, physical feature maps or weather maps etc.

In different regions of the world, there is variation in the distribution of industrial production, population, agricultural production and other resources. Geographers prepare maps by using different data and methods which help to obtain information about the areas quickly.

To study different places of the world, first of all, knowledge of their location is important that can be acquired by maps. Maps not only identify the exact location of a place, but can also highlight its physical and economic significance, for example, with the help of political maps exact location and boundaries can be identified. Similarly, physical maps tell us about the physical features like mountains, plateaus, plains of any region. Weather map tells about

Map of Pakistan (Political Division)

the weather conditions of a country. It not only tells us about the current weather variation but also helps in forecasting the coming weather conditions on daily basis. Maps also help in determining the directions of different places. Aeroplanes and ships move to their destinations with the help of maps. There are many types of maps. Details of some maps are given below:

1. Atlas Maps

Atlas maps are prepared for countries, continents and world with less details and general information. These maps provide important information about larger areas, for example, distribution of rainfall, temperature, forests, minerals and climatic conditions at continental level.

2. Topographical Maps

Topographical maps are prepared for smaller areas with all the details, for example, low lying and elevated areas, rivers, streams, forests, railways, roads, footpaths, canals and wells etc. present in that area.

3. Cadastral Maps

These are large scale maps. These maps contain more details as compared to topographical maps. These maps provide information at village level about ownership of farms and houses. Similarly, cadastral maps of cities provide detailed information about every house, block, street, road, parks and markets etc.

4. Distribution Maps

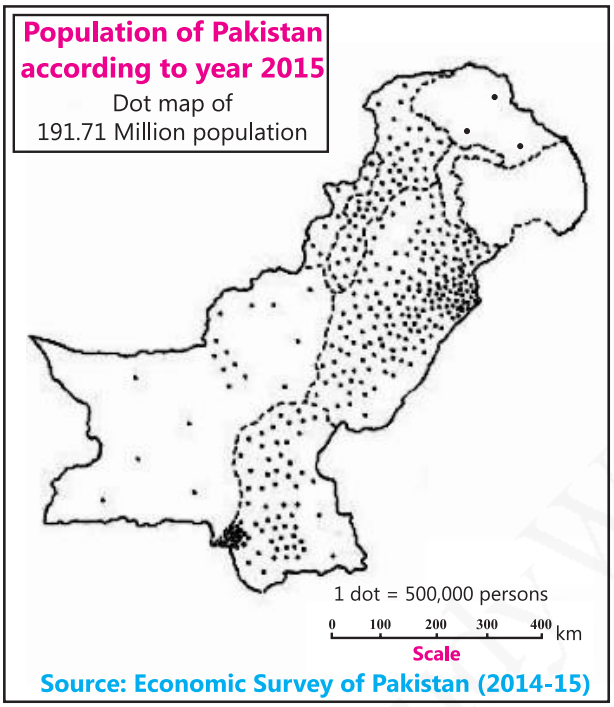
Distribution maps are prepared to show and compare distribution of different phenomenon, for example, population of areas, number of cattle, mineral reserves, production and division of crops etc. Every phenomenon is shown at its real location keeping topography of the area in view. Area of a specific region is considered while showing distribution of a phenomenon.

There are two types of distribution maps, i.e., qualitative and quantitative. Qualitative maps only show production and not the quantity. Quantitative maps show variations in the production or numbers. Quantitative maps can be prepared by two methods that are dot maps and shade maps.

Dot Method

A dot distribution map is a map that uses a dot symbol to show the division of population or agricultural production of a specific area. Dot maps rely on a visual scatter to show distribution pattern. To prepare such distribution maps, area is divided into smaller units i.e., provinces, divisions, districts, tehsils or towns.

According to the data, number of dots is determined according to a scale in such a manner that number of dots should not be too a high or too low. In case of large number of dots, there may be inadequate or a little space available. On the other hand, fewer dots in a large unit may distort the correct visual concept of the map. Therefore, care has to be taken while selecting scale for dots. Before placing the dots on map, physical map of the region must be consulted to know that where most of the dots should be placed or where the dots are not required. This method is usually considered suitable for display of absolute data or total amounts. Any variation in production can be estimated from the number of dots.



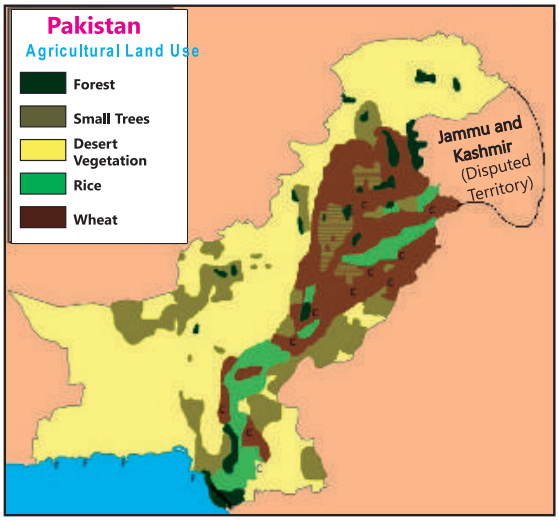
Source: Economic Survey of Pakistan (2014-15)

Important Information

To show all kinds of crops producing areas with the help of dot map, high mountainous areas and river channels are avoided while placing dots. Similarly, unproductive and uninhabited areas must be left blank.

Shading Method

Sometimes to show a country's population or the production of various goods on the map, different colours or light or dark shades of one colour are used. The major drawback of this method is that the division of anything seems uniformly distributed everywhere. Whereas, variations may take place depending on the time and place. Sometimes to show agricultural production in different regions, it becomes difficult to ignore non-productive areas, i.e., mountains, rivers and lakes etc.



Shade map of agricultural production and land use of Paksitan

Disadvantages of Distribution Maps

- In general, the maps showing the distribution of the population are developed on the basis of the census. Most countries of the world have a census every ten years. Sometimes people live temporarily in a region or a country and after sometime, they move to other region or countries due to economic or political conditions. Therefore, it becomes difficult to show such mobile population on distribution maps. Within a country or a region, population density (persons per square kilometre) is usually displayed with the help of colours or shades of a colour which do not provide complete information about the region. It is difficult to differentiate between areas of dense population through colours or shades in different regions.
- By distribution maps, the production or distribution of population of an area can easily be estimated. Often data used in producing these maps changes. So, it becomes mandatory to make changes in these maps according to the latest changes in the data. It is beneficial, if distribution maps are produced by averaging the previous years because in doing so, variations in production of various years can be compensated.

Methods of Showing Statistical Data

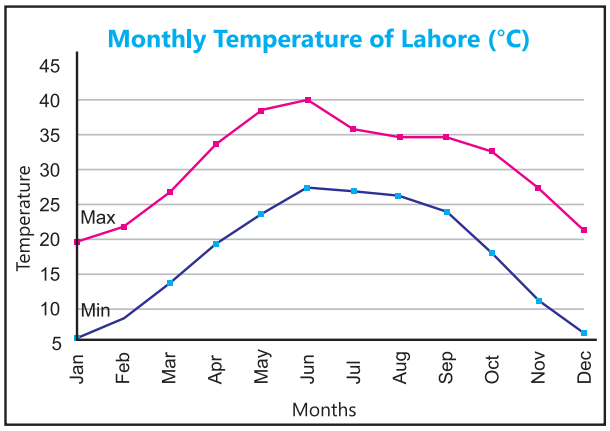
In geography, diagrams are those conceptual sketches through which geographic information and data is transferred to the paper. These are called statistical diagrams. These are:

1. Line Graph 2. Bar Graph 3. Pie Graph

Let us study these diagrams in detail:

1. Line Graph

In this diagram, statistical data is displayed with the help of a line on the graph, therefore, it is called line graph. In this graph two variables are discussed, one as a variable quantity and other as a constant. To construct a line graph, two



Line Graph

lines are drawn that bisect normally at each other at 90 degrees. Constant variable i.e., days, months, years, kilometres and kilograms etc. is placed on horizontal axis (X-axis) where measurable variable i.e., rainfall, temperature, air pressure and production etc. is placed on vertical axis. To measure the values at vertical axis (Y-axis), an appropriate scale is determined. With the help of scale, values are marked in the form of dots for each constant variable. Then these dots are joined by a line to prepare a line graph. We cannot show the total quantity of any item with the help of line graph. For example, it is not possible to show the annual rainfall on a line graph. Similarly, the monthly or annual variation of population of any city or country can be shown but it is not possible to show the population of all cities on this graph.

Merits of Line Graph

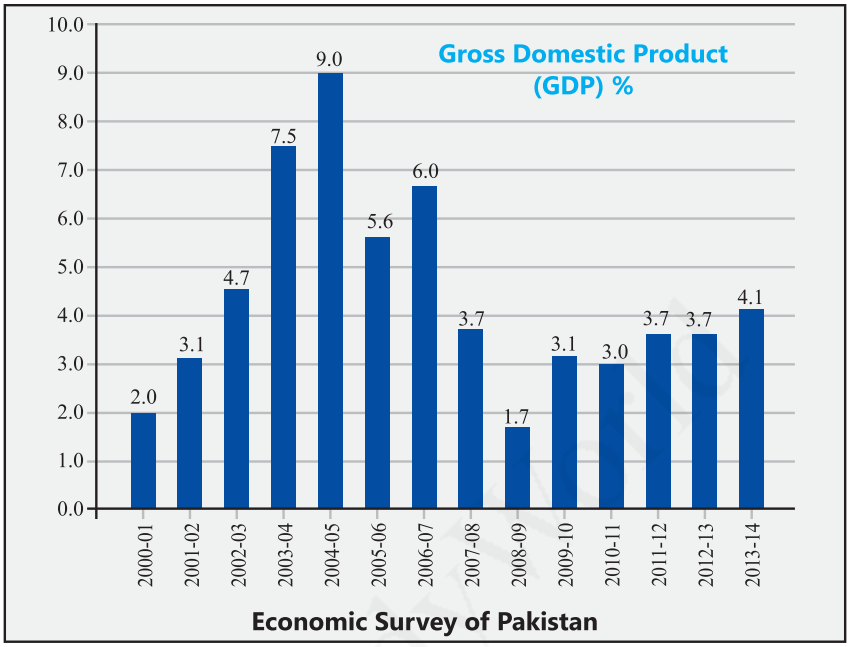
- With the help of line graph, more than one variables can be compared easily. For example, we can compare the annual temperatures and rainfall values of Karachi and Lahore, which is not possible on bar and pie graph.
- Line graph is the best way to show decrease or increase in annual, monthly and daily production of various items. Besides this, line graph is also used to show weather conditions, population, production, animal distribution, exports and imports of a country or region.
- On line graph, we can easily understand the fluctuations as well as the production of items.

Demerits of Line Graph

- We can show average quantities (annual rainfall or temperature etc.) on line graph but we cannot show percentages on it.
- We cannot show the total quantity of any thing with the help of line graph. For example, it is not possible to represent the annual rainfall with this graph. Similarly, we can show the annual or monthly change of population of any county or city on this graph but we cannot represent the population of all cities on it.

2. Bar Graph

In these days, bar graph is widely used in geography. In this graph, we show quantities in the form of bars of equal width on equal intervals. The height of the bar varies with quantity. Bars can be drawn both vertically and horizontally. This method is very useful for comparison of different quantities. For example, population of big cities of Pakistan, length of canals, marks of students in a



Bar Graph

subject, imports and exports of a country, areas and productions etc. are prepared. We can also shade and colour the bars.

Merits of Bar Graph

- The total quantity or production of any item can be shown on the bar graph.
- We can also compare different quantities of the same item.
- The best feature of this graph is that we can easily show quantities on this graph.

Demerits of Bar Graph

- To show more than one item or quantity, we have to draw multiple bars or a compound bar.
- It is possible to show value of only one item on the bar graph.

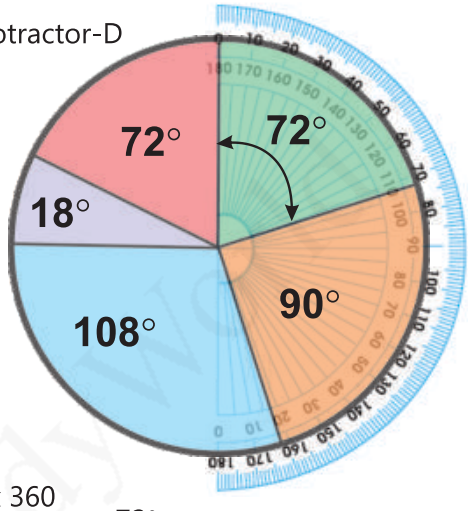
3. Pie Graph

Sometimes geographical data is displayed in the form of circles. This is called pie graph. In pie graph, 360 angles of a circle are divided into different sectors with the help of a formula. These sectors are given different colours.

Formula for calculating angles is as follows:

$$\frac{\text{Given Quantity}}{\text{Total Quantity}} \times 360$$

Students	Grade
40	A+
50	A
60	B
10	C
40	D
200	Total



$$\text{Formula} = \frac{40 \times 360}{200} = 72°$$

Students scoring grades in annual examination.

In the given pie graph, circle has been divided into different sectors with the help of given formula. For percentages, formula can be modified as follows.

$$\frac{\text{Percentage Value} \times 360}{100}$$

Merits of Pie Graph

- Pie graphs are most suitable for showing percentage values and total quantities.
- Pie graph covers less space as compared to line and bar graphs. It presents a better comparison between different quantities.
- It shows the areas of different countries in a better way which is not possible on line and bar graphs. Pie graph is preferred to show production of power resources, i.e., electricity or gas.

Demerits of Pie graph

- Pie graph is suitable to represent population of countries, areas and

production etc. It is not suitable to show weather data, i.e., distribution of temperature, rainfall and wind pressure.

- Calculations of percentages and division of circle into sectors is comparatively difficult and time consuming.

KEY POINTS

1. A representation of the features of an area of the Earth or whole of the Earth on a flat surface according to scale is called a map.
2. Landforms like mountains, plateaus, plains, valleys and deserts are shown on physical feature maps.
3. In geography, statistical data displayed with the help of a line is called line graph.
4. Two variables are discussed on a line graph.
5. The total quantity or production of any item is shown on a bar graph.
6. In bar graph, different quantities are shown with the help of bars with equal width.

QUESTIONS

1. Tick (✓) the correct answer.

   i. In many countries of the world, the census is held after a period of :

   a. three years b. five years

   c. eight years d. ten years

   ii. Representation of statistical data in circular diagrams is called:

   a. pie graph b. line graph

   c. bar graph d. shading method

   iii. The most suitable method to show distribution of temperature and rainfall is:

   a. bar graph b. pie graph

   c. line graph d. dot method

iv. Unproductive or uninhabited areas in the map are :

a. filled in green b. left blank

c. filled in blue d. shaded

v. How many types of graphs are discussed in your book?

a. 3 b. 4

c. 5 d. 6

2. Give short answers:

i. Name methods of showing statistical data.

ii. Define a map.

iii. Write two characteristics of distribution maps.

iv. On what basis distribution maps are made ?

v. What is meant by pie graph ?

vi. How line graph is prepared ?

3. Give detailed answers:

i. Explain different methods to show statistical data.

ii. Describe the use of dot method in distribution maps. Also evaluate its merits and demerits.

iii. Discuss the types of distribution maps.

Activities

- Show today's temperature of five big cities of Pakistan on line graph.
- Students may draw line and pie graphs and show annual rainfall and temperature data etc., on it under the supervision of their teachers.

Chapter 2

AGENTS OF LANDFORMS CHANGE

Students' Learning Outcomes

After studying this chapter, students will be able to:

- describe functions performed by different agencies responsible for micro-relief features.
- describe the work of rivers and landforms made by rivers.
- describe glacier and its types.
- differentiate between the landforms made by continental and alpine glaciers.
- recognize wind as an agent of landforms change in the desert climate.
- describe the features made by wind.
- identify the waves as an agent of landforms change over the coastal area.
- recognize features formed by any of these agencies with special reference to Pakistan.

Landforms

Different types of landforms are found on our Earth because its surface is not uniform. These landforms have been created by internal and external forces of the Earth. Mountains, plateaus and plains etc., are the major landforms created by the internal forces of the Earth. External forces of the Earth include different agents which create different landforms in different environments by erosion and deposition. These agents are river, glacier, wind and sea waves etc.

Let us have a look on landforms created by these agents.

Landforms made by River

River is an important agent of landform change. Permanent rivers are found in those areas which receive ample rainfall regularly. Presence of

mountains provides initial slope for the flow of surface water in tiny channels. These tiny channels join to form a river. A river after its creation, performs three types of geologic works. It breaks the rocks coming in its way. This act is called **erosion**. It transports the eroded material. This act is called **transportation**. It deposits the eroded material when its speed is very low. This act is called **deposition**.

1. River's Erosional Landforms

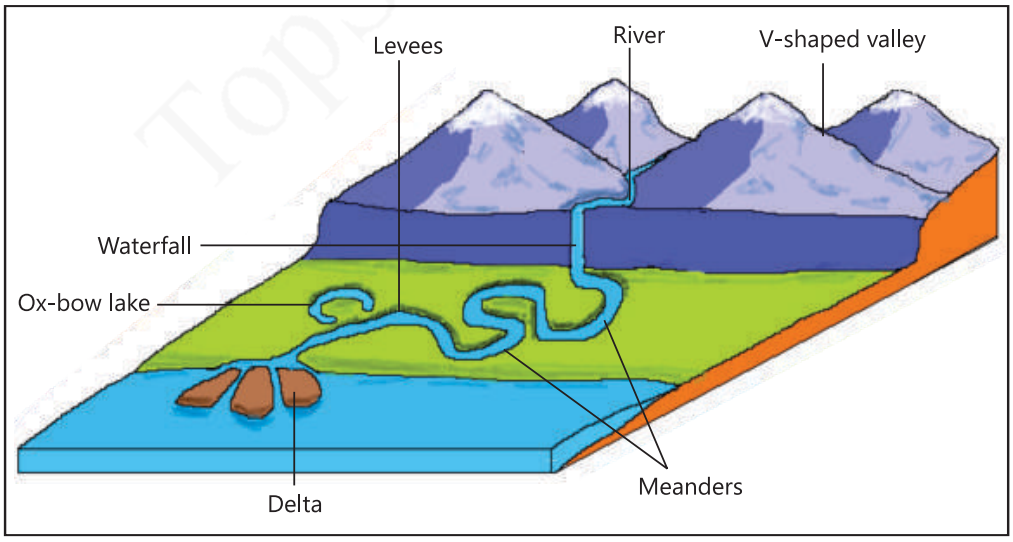
River creates the following landforms by erosion.

i) V-Shaped Valley

In mountains the valley of the river gets deeper due to downward erosion and attains the shape of English alphabet 'V'. This landform is called V-shaped valley. Very deep valleys are often called 'Gorges'. Such valleys are found in northern areas of Pakistan.

ii) Waterfall

River bed may contain hard and soft rocks. Sometimes soft rocks are found beneath the bed of hard rocks. When the river cuts the upper layer of hard rocks on the bed, it tends to erode the lower soft rocks to a great depth. This act causes the fall of water in the form of sheet called waterfall.



Landforms made by river

iii) Pot Holes

Sometimes the swirling action of stones in the water develop holes in the river bed. These are called pot holes.

iv) Meanders and Ox-bow Lake

Occurrence of hard and soft rocks in the river's channel results in the creation of a winding path due to uneven erosion of the river. These are called meanders. Sometimes river after cutting the outer bends of the meanders attains a straighter channel, leaving behind a crescentic lake at the side. This lake is called ox-bow lake. Kalery lake on river Indus is an ox-bow lake.

2. River's Depositional Landforms

i) Flood Plain

In plains during floods, the river water comes out of its channel and spreads over vast stretches of land. During this process it deposits its sediments in the area. In this way a smooth plain comes into existence, which is called flood plain.

ii) Natural Levees

Sand and silt accumulation along the banks of the river during floods make them high enough above the flood plain. These ridges of sand and silt are called natural levees.

iii) Delta

When a river is about to enter the sea, its speed is reduced because of lack of slope. Here the river deposits its material in its channels, gets divided into branches and enters the sea forming a plain called delta.

Landforms made by Glacier

High mountains and polar areas are the coldest regions of the world which receive heavy precipitation in the form of snow. Upper layers of snow exert pressure on the lower layers and convert them into hard glass type layer over which the body of snow tends to flow down slope. This huge mass of moving ice is called glacier. Like river, glacier is also an important agent of landform change but its action is confined to high mountains and polar regions.

Types of Glacier

There are two major types of glacier.

1. Valley Glacier
2. Continental Glacier

1) Valley Glacier

Glaciers found on high altitude (mountains) are called valley / alpine glaciers. They move quickly as compared to continental glaciers because of slope. However, this movement is not more than a few feet per day. Initially valley glaciers tend to erode the rocks. But when they begin to melt, they start depositing the eroded material. In this way, new landforms are created by erosion and deposition.

Erosional Landforms

i) Cirque

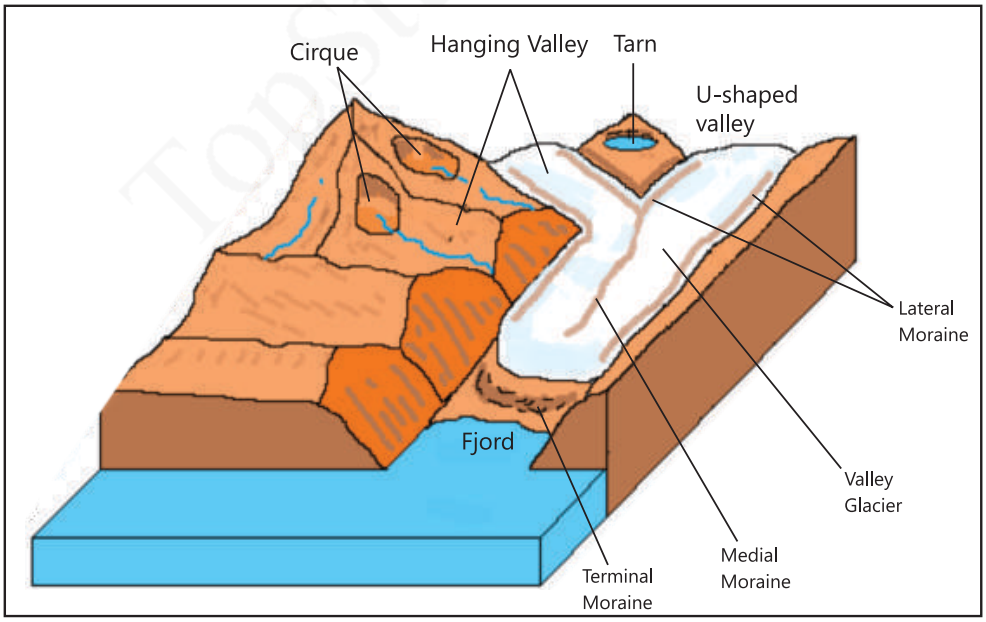
In high altitude areas where glaciers are formed, accumulation of ice creates a bowl shaped depression known as cirque.

ii) Cirque Lake / Tarn

When valley glacier comes out of the cirque, the depression is filled with water to create natural lakes. These are called cirque lakes or tarns. Saif-ul-Muluk and Satpara in Pakistan are examples of such lakes.

iii) U-Shaped Valley

Glacier tends to erode its valley downwards as well as sidewards. Due to



Landforms made by valley glacier

this action, the valley gets widen and resembles english alphabet 'U'. That's why it is called U-shaped valley. Kaghan, Naran and Hunza are examples of such valleys.

iv) Hanging Valley

Just like a major river which is joined by small streams, a major glacier is joined by many small glaciers. The valleys of these small glaciers lie above the valley of main glacier and are called hanging valleys.

v) Fjord

Many mountain ranges are situated on the coasts. Here the valley glaciers directly descend into the sea and the sea water enters into their valleys. These are called Fjords (drowned valleys). Such valleys are common in Denmark, Norway and Sweden.

Depositional Landforms

Glaciers deposit the eroded material in the form of huge piles which are called moraines. The moraines are of following types:

i) Lateral Moraine

Glacier widens its valley by lateral cutting. This material is deposited on both sides of glacier in the form of a continuous ridge. This is called lateral moraine.

ii) Medial Moraine

Where two valley glaciers join, their lateral morianes merge together to form a medial moraine.

iii) Terminal / End Moraine

The arc shaped material deposited at the terminus of glacier is called terminal moraine.

2. Continental Glacier

The polar lands away from equator have been covered by huge ice sheets of Greenland and Antarctica. These are continental glaciers which are thousands of feet deep and stretch over millions of square kilometres in area. Large area and lack of slope results in very slow movement. That's why they are mostly engaged in depositional work. The depositional landforms are:

i) Marginal Lakes and Delta Kames

Natural lakes are often formed between the terminus of glacier and the rising land ahead. These lakes are formed by melt water streams. Sometimes material deposited in these lakes forms deltas, known as delta kames.

ii) Eskers

Melt water streams often form tunnels in the glacier. These streams deposit fine material in the form of long winding piles in these tunnels. These are called eskers.

iii) Out-Wash Plain

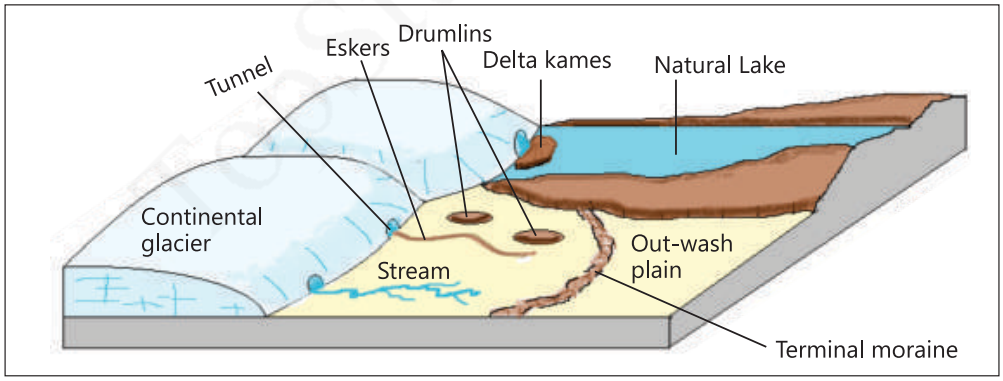
Often melt water streams deposit fine material over vast area of land ahead of glacier. This smooth plain is called out-wash plain.

iv) Drumlins

The material deposited directly by the glacier without melting in the form of elongated oval shaped hills is called drumlins. These hills often resemble inverted spoons or eggs.

v) Terminal Moraine

The arc shaped material deposited at the terminus of glacier is called terminal moraine.



Landforms made by continental glacier

Landforms made by Wind

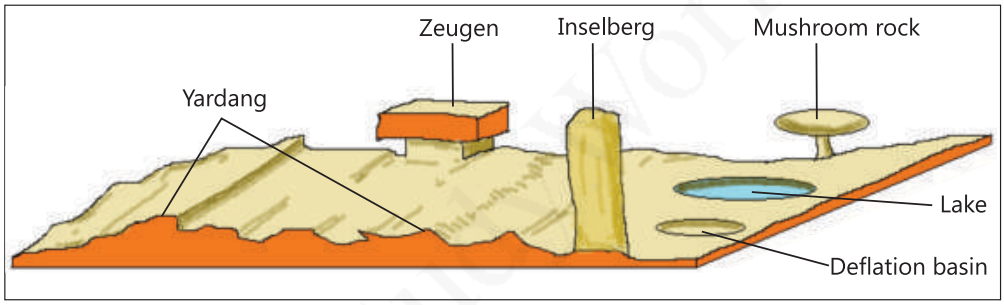
There are no permanent streams in deserts because the amount of rainfall is very low. As a result, the vegetation is also sparse in deserts. In these circumstances wind plays an important role in landform modification. Wind also creates new landforms by erosion and deposition like river and glacier.

1. Erosional Landforms

Wind performs erosional work in two ways. First it carries unconsolidated sediments with it. This process is called **deflation**. Second, it uses these sediments as tool for further erosion. This process is called **abrasion**. Following are some important erosional landforms:

i) Zeugen

Sometimes hard rocks underlain by soft rocks are present on the surface of Earth. Wind erodes the lower layers of soft rocks as compared to hard rocks. As a result, the soft rocks become thin and hard rocks remain above these soft rocks in the form of slabs. This landform is called zeugen.



Erosional landforms made by wind

ii) Mushroom Rock

Further erosion of zeugen transforms the hard rocks into mushroom shaped rock residing over thinner soft rocks.

iii) Deflation Basin and Lakes

When wind picks and carries loose sediments, shallow depressions are formed on the Earth's surface. These are called deflation basins. When rain water accumulates in these depressions, they become lakes which evaporate with time.

iv) Yardang

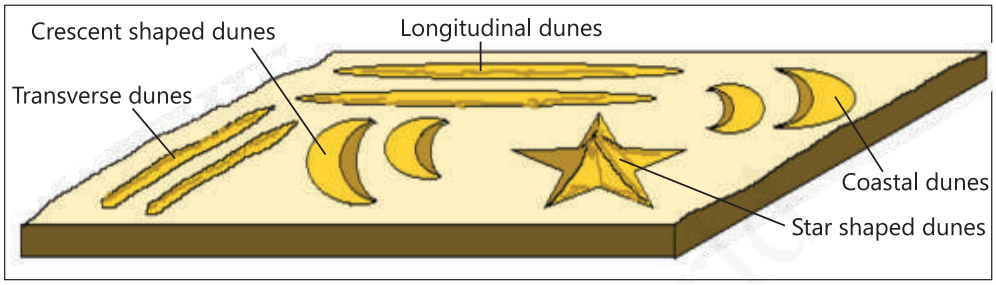
Sometimes a series of hard and soft rocks is present side by side on the Earth's surface. Uneven erosion of wind transforms these rocks in irregular shapes, which are called yardangs.

v) Inselberg

When soft rocks are eroded completely by wind, columns of hard rocks remain behind at distant places. These are called inselbergs.

2. Depositional Landforms

The piles of sand deposited by wind are called dunes. These are of different shapes.



Depositional landforms made by wind

i) Longitudinal Dunes

These are long ridges of sand formed along the general direction of the wind. They are few feet high but their length may reach several kilometres.

ii) Transverse Dunes

These dunes make an angle of 90° degree with the direction of wind. That's why these are called transverse dunes. They are present in a wave-like form.

iii) Crescent Shaped Dunes / Barchans

These crescent shaped dunes are called barchans. The sharp points of the crescent mark the wind direction. The windward slopes of barchans are gentle while the leeward slopes are steeper.

iv) Star Shaped Dunes

When the wind direction is constantly changing, the dunes attain the shape of a star. Their height in the center may reach above 100 metres.

v) Coastal Dunes

In coastal areas, when wind blows towards the coast, crescentic dunes are formed. Their direction is opposite to Barchans. These are called coastal dunes.

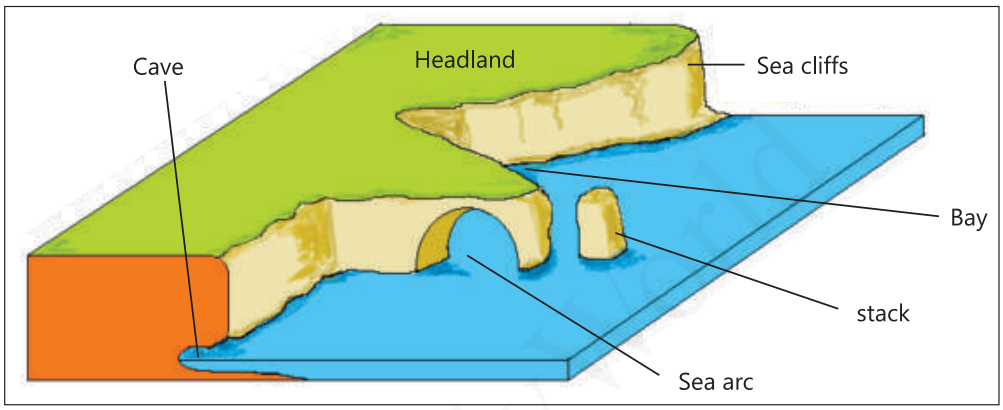
Landforms made by Sea Waves

Waves of the river tend to erode inland areas whereas sea waves are an important source of landform change in the coastal areas on a larger scale.

1. Erosional Landforms

i) Caves

Continuous wave attack at the bottom of cliffs create cavities. These cavities by further erosion transform into caves.



Erosional landforms of sea waves

ii) Headland and Bay

Sometimes, sea water invades farther inland the Earth creating a bay. While the bordering land comprised of hard rocks remains well ahead in water. This is called head land.

iii) Sea Arch and Stacks

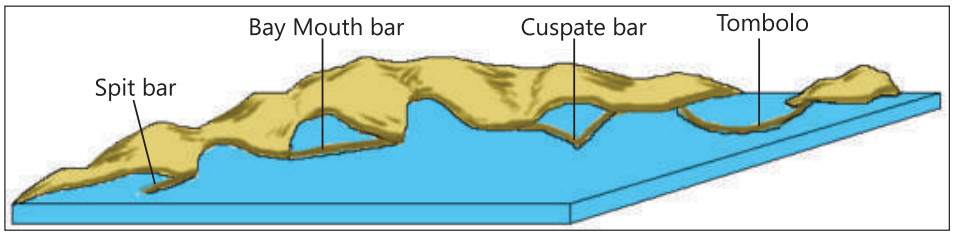
Sea waves attack the head land from both sides. This continuous erosion results in creating an opening in the head land. This landform is called sea arch. When the sea arch is detached from the headland by further erosion, the remaining column like structures are called stacks. The landform made by sea waves can be seen in coastal areas of Pakistan especially at Cliffton.

iv) Sea Cliffs

On mountainous coasts, seaward slopes are exposed to wave attack. With time the slopes retreat and become perpendicular. These are called cliffs. The rate of retreat depends upon the nature of the rocks.

2. Depositional Landforms

Apart from erosion, sea waves also deposit sand over the land adjacent to the sea. Due to this deposition, a smooth plain comes into existence which is known as coast. Further accumulation of sand may result in the formation of



Depositional landforms made by sea waves

ridges known as bars. These bars are of different types:

i. Spit Bar

Sea waves deposit sand on the coasts. Sometimes a bay comes along with a coast and the sand ridge extends in front of a bay. It is called spit bar.

ii) Tombolo

When a spit bar extends in open sea and connects the coast with a nearby island, it is called tombolo.

iii) Bay Mouth Bar and Cuspate Bar

Sometimes a spit bar extends from one end of the bay to join the other end. In this way, it separates the bay water from the sea. This is called bay mouth bar. Sometimes, two spit bars from opposite directions join together. This is called cuspate bar.

KEY POINTS

1. Different types of landforms are found on our Earth because its surface is not uniform.
2. Mountains, plateaus and plains etc. are the major landforms created by internal forces of the Earth.
3. Landforms made by river, glacier, wind and sea waves can be observed in different areas of Pakistan.
4. When sea water invades farther inland, it is called bay.
5. In the beginning, a river mostly performs erosional work.
6. Glaciers are found in high altitude and polar areas away from equator.
7. In deserts, the landforms are mostly formed by the action of wind.
8. In coastal areas, sea waves are the important source of creation of landforms.

QUESTIONS

1. Tick (✓) the correct answer.

   i. Mushroom rock is formed by:

   a. river b. wind
   c. glacier d. sea waves

   ii. Landforms made by wind are found in:

   a. mountainous areas b. coastal areas
   c. tropical areas d. desert areas

   iii. The bar which connects the coastal area with an island is called :

   a. spit bar b. bay mouth bar
   c. cuspate bar d. tombolo

   iv. River forms a V-shaped valley in:

   a. mountains b. plains
   c. deserts d. deltas

   v. U-shaped valley is formed by:

   a. wind b. river
   c. glaciers d. sea waves

2. Give short answers.

   i. What is meant by yardang?
   ii. How spit bar is formed?
   iii. How ox-bow lake is formed?
   iv. What is meant by coast?

3. Give detailed answers.

   i. Describe different landforms made by river.
   ii. Explain the landforms made by valley glacier.
   iii. Describe the landforms made by wind.
   iv. Discuss the landforms made by sea waves.

Activity

Prepare a model of a glacier and write names of landforms on it.

Chapter 3

OCEANS AND SEAS

Students' Learning Outcomes

After studying this chapter, students will be able to:

- describe the main characteristics of major oceans and seas.
- define the following features:
  - Sea • Gulf • Bay • Bight • Channel/Strait • Peninsula • Island • Isthmus
- describe the configuration of ocean floor.
- describe the nature and causes of various oceanic movements.
- differentiate between waves, currents and tides

Oceans and Seas

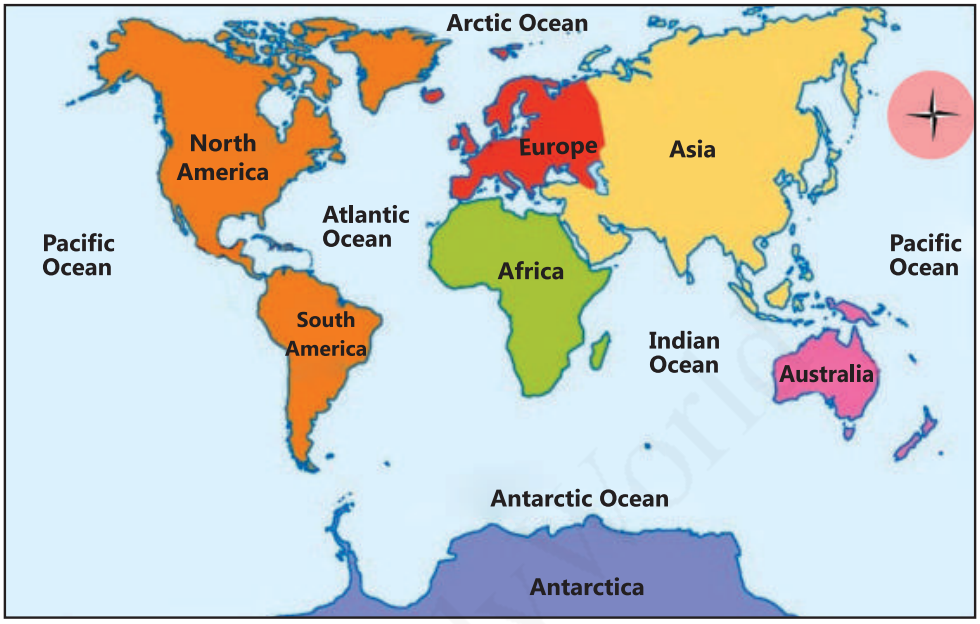
A large body of water on the surface of Earth is called ocean and an adjacent smaller body of water is called sea. There are five oceans in the world. These are:

i) Paci› c Ocean

It is the largest ocean of the world. Its area is 168 million square kilometres. It has an average depth of 4000 metres. Its marginal areas are comprised of deep trenches and volcanoes. Panama Canal which links Pacific Ocean with the Atlantic Ocean is among the important trade routes of the world.

ii) Atlantic Ocean

It is the second largest ocean. Its area is 85 million square kilometres and it has an average depth of 3900 metres. Mid-oceanic ridge, which is the result of eruption of magma at the divergent plate boundary is the significant feature of this ocean. This oceanic ridge spreads across the Atlantic, Indian, Pacific and Antarctic Oceans. It is included in the active earthquake areas of the world. It is



also the world's most important and busiest trade route.

iii) Indian Ocean

It is the third largest ocean. Its area is about 70 million square kilometres and it has an average depth of 3900 metres. It has its maximum stretch in southern hemisphere. Mid- oceanic ridge from the Atlantic Ocean also divides the floor of Indian Ocean in east-west portions. Deep trenches are also present in which Java trench is 7400 metres deep. It has become an important trade route between western and eastern hemispheres due to the construction of Suez Canal which links Red Sea (Indian Ocean) with the Mediterranean Sea.

iv) Antarctic Ocean

Antarctic Ocean has an area of 22 million square kilometres and an average depth of 4000 metres. It has no distinct boundary with the Pacific, Atlantic and Indian Oceans. Extreme cold water and huge icebergs are characteristic features of this ocean.

v) Arctic Ocean

Arctic Ocean is situated around the North Pole. It has an area of 15 million square kilometres and an average depth of 1200 metres. Shallow waters, low salinity and frozen surface are characteristic features of this ocean.

Some Landforms Associated with Water Bodies

i) Sea

The part of ocean adjacent to the continental margins is called sea, i.e., Arabian sea and Red sea etc.

ii) Gulf

A large but narrow part of ocean which invades farther inland is called gulf, i.e., Persian Gulf and Gulf of Mexico etc.

iii) Bay

Contrary to gulf, large and vast part of ocean which invades farther inland is called bay, i.e., Bay of Bengal and Hudson Bay etc.

iv) Bight

A very vast and extended bay is called bight, i.e., Great Australian Bight in the south Australia.

v) Strait

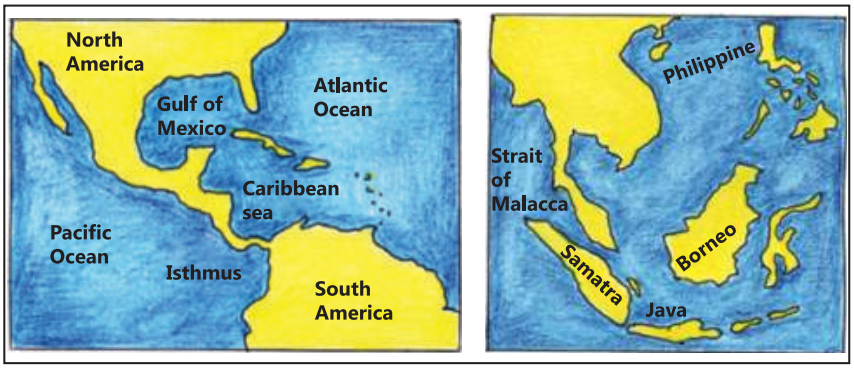
A narrow passage of water which connects two large bodies of water i.e. oceans or seas is called strait e.g. Strait of Gibraltar which connects Atlantic Ocean with Mediterranean Sea.

vi) Peninsula

An area of land which is surrounded by ocean water from three sides except for an isthmus which connects it with the mainland is called peninsula i.e., Arabian and Indian Peninsula.

vii) Island

An area of land surrounded by water from all sides is called an island, i.e.,



Isthmus and Gulf Strait and Island

Srilanka, Indonesia and West Indies, etc.

viii) Isthmus

A narrow strip of land which connects two large masses of land is called an isthmus, i.e. Isthmus of Panama which connects North and South American continents and the isthmus of Suez which connects Asia with Africa.

Con› guration of Ocean Floor

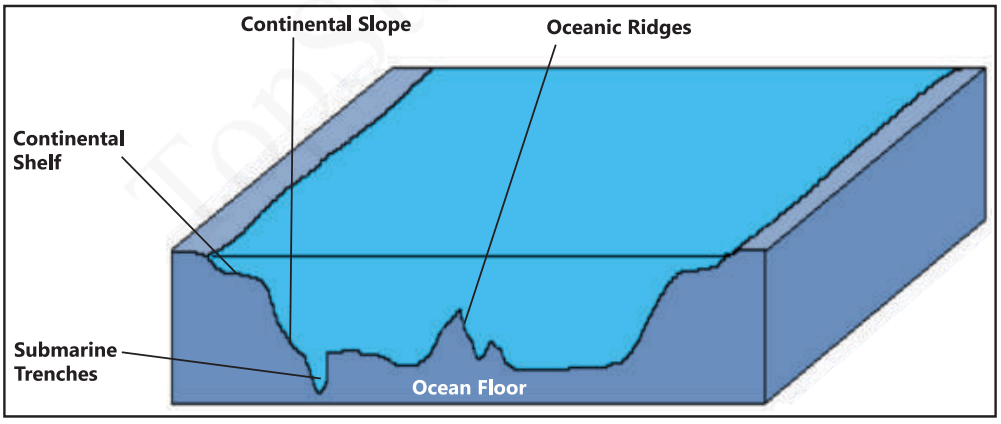
Like Earth, the surface of ocean floor is not uniform as well. The undulating ocean floor is divided into the following parts:

i) Continental Shelf

The shallow part of sea which lies adjacent to the coastal areas is called continental shelf. This part of ocean has vital importance from the geographical, political and economic point of view. A country's maritime borders, rights of mining and fishing, trade routes and strategic planning depends upon continental shelf.

ii) Continental Slope

The gentle sloping continental shelf ends at a steep slope which descends into the deep ocean. This is called continental slope.



Configuration of Ocean Floor

iii) Submarine Trenches / Canyons

The continental slope merges into the deepest part of the ocean which comprises of narrow and deep V-shaped canyons called trenches. These trenches descend upto 10 kilometres under water.

iv) Oceanic Ridges

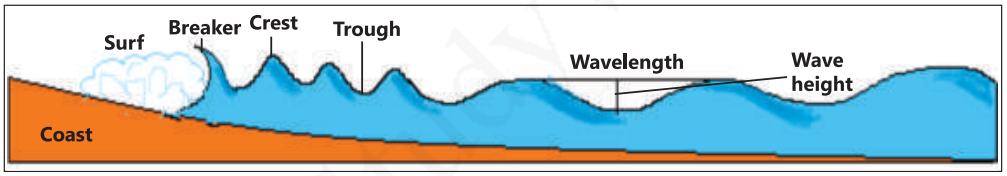
The central portion of ocean is usually comprised of vast undulating plain. This part has an average depth of 4500 to 6000 metres. Volcanoes are also found in this portion in a series of a non-ending long ridge. This is called mid-oceanic ridge formed by the eruption of magma at divergent plate boundary.

Movement of Oceanic Water

Ocean water never remains stagnant. It tends to move. Main causes of this movement are waves, currents and tides. Let us have a look on nature and causes of these movements.

1. Waves

The movement of surface water is called wave. Waves in an ocean are generated due to different natural factors. Actually it is the movement of energy which is transferred in water particles from one to another.



Wave

The top of the wave is called crest and the bottom is called trough. The vertical distance between crest and trough is called wave height. While the horizontal distance between two crests or troughs is called wavelength. As the wave travels towards the shallow waters of the coast, its height increases and length decreases. The crest gets narrower and sharp. This is called breaker. The sharp pointed crest travels ahead of the bottom part and breaks to make foam. This is called surf.

Winds are the main cause of generating waves. Cyclones and tornadoes which originate and travel across the oceans also create waves. An earthquake near coastal areas or beneath the ocean floor can also generate huge waves.

Do you know?

When earthquake originates beneath the ocean floor, it generates huge waves called Tsunamis.

2. Currents

Rivers flow on land. Similarly, when the ocean water moves permanently in a specific direction, it is called current. The currents which flow from equator to polar areas are called warm currents. They increase the temperature of coastal areas e.g. Gulf stream along the eastern coast of North America in the Atlantic Ocean is a warm current. The currents which flow from polar areas to equator are called cold currents e.g. Labrador current in Atlantic and Kamchatka current in the Pacific Ocean are cold currents.

Currents move clockwise in the northern hemisphere and anti-clockwise in the southern hemisphere. A larger current formed by joining of two currents is called drift. Where warm currents meet cold currents, fog is produced which is harmful for the sailing ships.

Causes of Ocean Currents

Following are the major causes of current circulation:

i) Permanent Winds

The most important cause of current circulation are winds. Winds force the ocean water to circulate in their general direction e.g. trade winds blow from east to west, while western winds blow from west to east. So the currents move eastwards under trade winds and vice versa under western winds.

ii) Salinity of Oceanic Water

Salinity variation also causes the ocean water to circulate. Water of inland seas is more saline than the water of open seas and oceans. So more saline water due to its greater density sinks downwards while less saline water moves upwards. This variation of salinity causes water circulation.

iii) Temperature of the Oceanic Water

Temperature difference is another cause of current circulation. Warmer water of equatorial regions moves upwards, while colder water of polar regions sinks downwards due to greater density.

3. Tides

There is a continuous rise and fall in the sea level. Twice a day, the level rises and twice a day the level falls as well. This is called tides.

The basic cause of tides is the gravitation of Moon. This reality was

presented by Newton in his "Theory of Gravitation" in the seventeenth century. According to this theory, every two celestial bodies attract each other. So the Moon, which is nearest to the Earth, creates tides on Earth inspite of its lesser mass as compared to the Sun. Sun, as compared to Moon, is 390 times more distant from the Earth. So the effect of Sun's gravitation is 46% of the Moon's gravity on the Earth.

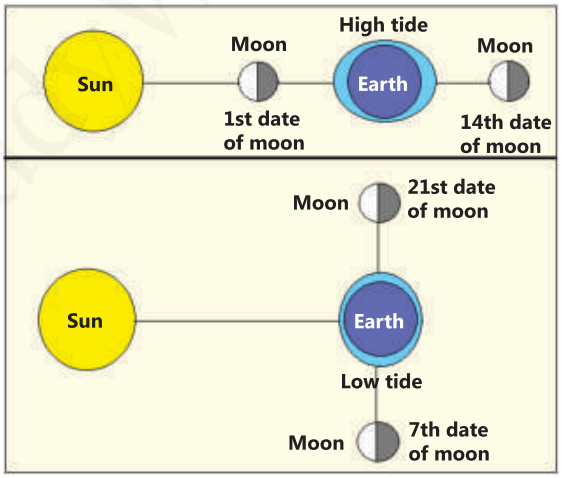
According to nature, there are two types of tides.

Daily tides occur twice with the interval of 12 hours 25 minutes. The effect of gravitation is maximum on the portion of Earth which is in front of the Moon and is minimum on the other side. But the centrifugal forces of the Earth maintain balance of tides on the other side too. So the effect of gravitation is equal on both sides of the Earth.

Monthly tides are of two types.

i. Spring Tides

The Earth revolves around the Sun and the Moon revolves around the Earth. During this revolution it happens twice on the 1st and 14th date in a lunar month that the Moon, Earth and Sun are in the same plane. The combined gravitation of Sun and Moon creates very high tides in the sea. These are called spring tides.



ii. Neap Tides

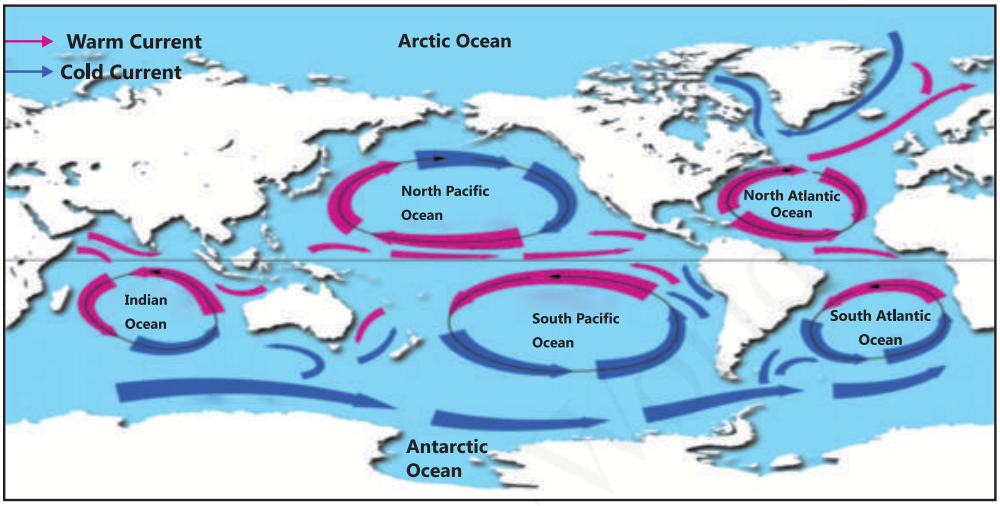
Twice in the lunar month on the 7th and 21st date, it happens that the Moon and Sun are perpendicular to each other with reference to the Earth. Gravitation of both bodies counter act each other resulting in the creation of low tides in the seas. These are called neap tides.

Difference between Waves, Currents and Tides

Winds, cyclones and earthquakes are major causes of generation of waves in the stagnant water.

When winds force the ocean water to move in a specific direction, this

movement is called current. The continuous rise and fall of sea level due to the gravitation of Moon is called tides.



KEY POINTS

1. The up and down and back and forth movement of water is called wave.
2. Different types of water bodies are found on Earth which have different characteristics.
3. The ocean floor is not uniform like that Earth surface.
4. Currents are caused by prevailing winds.
5. Tides are caused by the gravitation of Moon.
6. An important cause of ocean water movement is the difference of temperature.

QUESTIONS

1. Tick (✓) the correct answer.

   i. The scientist who presented the "Theory of Gravitation" was:

   a. Marconi b. Galileo
   c. Newton d. Edison

   ii. The largest water body on the surface of the Earth is called:

   a. ocean b. sea
   c. strait d. bay

   iii. Connects Atlantic Ocean to Mediterranean Sea:

   a. Malacca strait b. English channel
   c. Berring strait d. Gibraltar strait

   iv. Moon, Earth and Sun are in same plane on:

   a. 1st and 14th date of lunar month
   b. 4th date of lunar month
   c. 7th date of lunar month
   d. 21st date of lunar month

   v. Waves which break to form foam, are called:

   a. swell b. breaker
   c. surf d. tsunami

2. Give short answer:

   i. What is meant by wave?
   ii. Define tides.
   iii. Differentiate between ocean and sea.
   iv. What is the difference between strait and isthmus?
   v. What is meant by ocean current?

3. Give detailed answers:

   i. Discuss characteristics of some important oceans.
   ii. Analyse different landforms found on the ocean floor.
   iii. Write down the causes of circulation of ocean currents.
   iv. Write a note on spring and neap tides.
   v. Write down the causes of waves.

Activity

Draw a model of spring and neap tides and label it.

Chapter 4

NATURAL DISASTERS

Students' Learning Outcomes

After studying this chapter, students will be able to:

- discuss the natural phenomena that cause disasters for mankind.
- analyze the impact of various natural disasters with special reference to Pakistan.
- examine the usual management practices including forecast, monitoring and mitigation.
- discuss main considerations in constructing buildings in earthquake prone areas.
- list the safety measures that can be taken in case of earthquakes, floods, cyclones, volcanism and forest fire.
- discuss the measures that can be taken to avoid desertification.

Natural Disaster

"Any natural phenomenon which may cause loss of life and property for man is called natural disaster". Volcanism, landslides, desertification, floods, cyclones, earthquakes and forest fires are such natural phenomena which cause destruction for mankind. Let us have a look on these natural disasters.

1. Volcanism

The formation of molten rock material (magma) inside the Earth and the process of its coming out on the Earth surface is called volcanism. The magma when comes on the surface of Earth is called lava and it burns and destroys everything that comes in its way. Sometimes it comes out with an explosion and causes an earthquake.

Rising smoke during volcanism

Sometimes volcanic ash also comes out with lava and gases during volcanism. This ash may rise in the atmosphere upto several miles and causes environmental pollution.

Volcanism in Pakistan

Pakistan is fortunate that even lying in an active vibrant region, no dangerous and active volcano lies within its boundaries. However, some volcanic activities have been traced in some places of Hindu Kush mountain ranges and Balochistan.

Safety Measures

To mitigate loss of life and property in areas vulnerable to volcanism, an integrated monitoring system of volcanoes has been adopted throughout the world. In case of emergency, a warning is given in the hazard zone to prepare people to combat the disaster.

2. Landslides

"Downslope movement of soil and weathered rock material under the influence of gravity is called landslide". It may create an impact in many ways. It may cause loss of life and property. It may damage the construction severely. It may block the roads and damage the communication lines. It may block the flow of rivers i.e. the creation of Ataabad lake in Gilgit is the result of river blockade by landslides. It may disturb the agricultural productivity in the affected areas.

A scene of landsliding

Land Slides in Pakistan

The northern areas of Pakistan are affected by landslides during the rainy season. Due to the construction of roads the slopes become unstable and vulnerable to landslides. Karakoram highway which connects Pakistan to China often remains blocked due to landslides. The unchecked tree cutting in mountainous areas of Pakistan is also a main cause of landslides.

Safety Measures

Methods of slope stabilization can be adopted in areas vulnerable to

landslides to reduce their effects. Impacts of landslides can also be reduced by lowering the water table underground, by improving the irrigation system, by avoiding construction, by stopping unchecked tree cutting and by growing trees in the affected areas.

3. Deserti› cation

The extension of deserts at the expense of cultivable lands is called desertification. Although climate changes have always favoured the process of desertification but human induced activities, especially after the industrial revolution are very much responsible for increasing desertification. Due to this menace, agricultural production and useable water resources are depleting and migration of humans and wildlife from the affected areas is increasing. As a result, shortage of food, drought and increase in poverty at local level may occur.

A scene of desertification

Deserti› cation in Pakistan

Pakistan is situated in warm and dry climatic region where the annual amount of rainfall is less than 25 centimetres. Arid to semi-arid weather conditions prevail in almost 80% area of Pakistan. The main cause of desertification in Pakistan is unsafe and poor ways of cultivation which result in soil erosion, lapse of fertility and continuous drop in biodiversity.

Safety Measures

To combat desertification,tree plantation can favour in two ways. Firstly, it reduces desertification by keeping weather conditions moderate. Secondly, it acts as hurdle to stop the spread of desertification towards cultivable areas. The use of organic fertilizers can enhance the fertility of land. People can be made aware about desertification and methods to stop it. Unchecked cutting of trees should be discouraged and modern ways of cultivation and irrigation should be adopted to stop desertification.

4. Floods

An overflow of river water out of its channel, which may cause damage to

the nearby settlements is called flood. It is considered a natural disaster because it may be a cause of social and environmental degradation. It can damage any constructional frame-work, uncemented housing and buildings without deep foundations. It may destroy bridges, roads, communication lines, crops, farms, orchards, livestock and cultural monuments as well. Loss of lives especially of women, children and aged can occur, alongwith the spread of diseases and epidemics.

A scene of flood

Floods in Pakistan

Pakistan has a natural system of rivers flowing out of the northern mountain ranges. These mountain ranges are a home of huge glaciers outsides the polar areas. Meltwater streams from glaciers feed these rivers. The upper plains of these rivers are situated in the rainy monsoon regions. In summers, the monsoon rains alongwith the melt water streams from glaciers cause heavy flooding in the rivers of Pakistan.

Safety Measures

Awareness about the flood risks should be given to the people of areas vulnerable to floods. Evacuation plan should be prepared to get people out of dangerous area. Electricity and gas supplies should be disconnected to avoid any accident. Camps should be established in safe areas to provide shelter and food to the affectees. Proper arrangements should be made for the return of affectees to their homes. Efforts should be made on governmental and non-governmental side for reconstruction of houses and rehabilitation of the affectees.

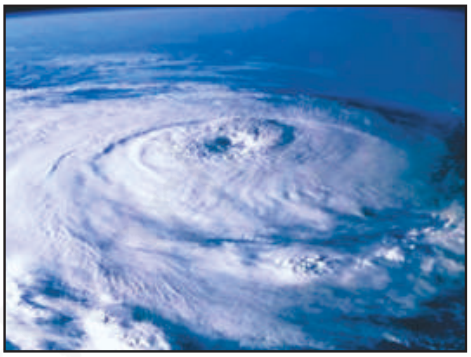
5. Cyclones

Cyclone is a system of swirling winds which has a low pressure area in the center. The winds tend to circulate towards the center and produce rain with thunder and lightning. Wind speed exceeds upto 200 kilometres per hour. The winds have erosive power which destroys everything that comes in their way. Cyclones produce continuous rainfall in a short period of time which may cause

flooding and loss of life and property. In coastal areas huge sea waves called storm surges are generated which may cause destruction on a large scale.

Cyclones in Pakistan

Arabian sea lies in the south of Pakistan. In Indian ocean, this is an important area of the origin of tropical cyclones. These cyclones affect the coastal areas of Pakistan. Thatta and Badin in Sindh, while Jeewani, Gwadar and Lasbela in Balochistan are the main areas affected by the cyclones. Inadequate construction methods and inferior construction material, absence of laws of land use, lack of awareness of the local people, lack of education and poverty are the main causes of destruction caused by cyclones. In winter seasion, rain fall takes place in Pakistan due to cyclones which develope in mediteranean sea.



Cyclone

Safety Measures

Construction of resistant houses should be made possible. Forecast management system should be established in areas vulnerable to cyclones. As soon as the warning is given, arrangements should be made to shift the livestock and household items to safe places. Evacuation system should be established and mobilization of volunteers in the affected areas should be made possible. In case of evacuation, the house should be sealed after disconnecting power supplies. A risk map should be prepared about the estimation of extent and destruction caused by the cyclone to human life, livestock and infrastructure. Storage of drinking water, food, candles, matches and first aid material should be made possible. Keep in touch with radio and report to emergency rescue centers established by the government.

6. Earthquakes

Sudden and intense vibration of the Earth crust is called earthquake. As this is a sudden movement without any pre-occurring symbols, prediction of earthquake is not possible. Earthquakes destroy human settlements, buildings and infrastructure i.e. bridges, roads, railway lines, pipelines, water tanks and communication etc. Indirect damages include fire, loss of water reservoirs, and landslides etc. The most unrecoverable damage caused by the earthquake is the

loss of valuable lives.

Earthquakes in Pakistan

Geologically Pakistan lies in an active zone at the margin of three tectonic plates. Indian plate is converging with the Eurasian plate in the north and Arabian plate in the west. The geologic result of this convergence is the formation of Karakoram, Himalayas and the Hindu Kush mountain ranges in the north and northwest. This convergent boundary is also responsible for the occurrence of earthquakes in Pakistan and adjacent areas.

Do you know

The earthquake of 2005 in Azad Kashmir resulted in the loss of almost 80,000 lives.

Destruction by earthquakes

Safety Measures

To reduce the damages of earthquakes at minimum level, it is necessary to keep the people aware about three actions i.e. drop or sit down even in case of a slight tremor, cover your heads and hold something strong. Always keep heavy objects near or on the ground. Learn to disconnect the power supplies i.e. electricity and gas in emergency. If you are outside the home, try to keep away from electrical wires and tall buildings which may drop on you. Keep the radio sets on to be informed. If there is fire, put it off. Don't enter the homes if the walls or structure is cracked. If there is leakage of gas then disconnect the supply and get out of homes. Beware of the aftershocks and only re-enter the homes when the vibrations have stopped completely.

Construction in Earthquake Prone Areas

There is possibility of recurrence of earthquake in earthquake prone areas. That's why following points should be kept in mind during construction.

If new construction is inevitable, adopt specific construction designs to resist earthquake. Construct the building structure on resistant concrete columns. Avoid construction in sloping areas. Avoid use of heavy materials in the ceilings.

7. Forest Fires

The term forest fire is used for such uncontrollable fire which burns forests

and other types of vegetation and causes damage to the associated wildlife. There are various causes of forest fires which can be either natural i.e. lightning associated with thunder storms or human i.e. accidents, negligence or criminal act etc. Forest fire badly affects the ecological system of the forests. It may result in loss of life and property in the nearby settlements. It destroys agricultural products i.e. wood, fruits and crops. It increases the temperature and causes environmental pollution. It disturbs the watershed areas and it may have a negative impact on human health and economic activities.

A scene of forest fire

Forests in Pakistan

Forests are considered as a valuable asset for a country. According to experts the average area under forests should be 25% of the country. Unluckily, area under forest in Pakistan is less than 5% of the country. Illegal tree cutting is a normal practice in Pakistan. Sometimes to cover this crime, forests are put on fire too. This act burns down the valuable economic assets of the country.

Safety Measures

Almost 52% of forest fires are the result of human negligence. So care and planning are the key issues involved in safety measures. In areas vulnerable to forest fires, avoid planning of development projects and settlements. If inevitable, use fire resistant material in construction. Clear the areas around forests from bushes, plants, dry leaves and broken branches which may aid the process of fire. Do not store inflammable material like natural gas and petrol etc. near the forests. Grow spongy type of vegetation which can store a large amount of water in their stems and are not easily inflammable. Select those areas for construction which are less vulnerable to fires i.e. flat ground should be preferred as compared to sloping surface. Train the people about firefighting. Establish an effective monitoring system of forests especially in warm and dry areas to stop such incidents as forest fires. Evacuation plans should be prepared to shift the people towards safer areas and avoid return till the fire is extinguished completely.

Disaster Management Practices

The disaster management system involves following three steps.

1. Forecast Management Practices

These involve prediction and all such pre-measures that may help to keep the damages at minimum level.

2. Monitoring

These involve such measures which are taken during the disaster to fulfill the needs and reduce the problems of the affectees.

3. Rehabilitation and Recovery

These involve post-disaster measures which are taken for the speedy rehabilitation and recovery of the affectees.

KEY POINTS

1. Pakistan has been a victim of natural disasters from the past.
2. Any natural phenomenon which may cause loss of life and property for man is called natural disaster.
3. Forests are considered valuable national assets throughout the world.
4. Volcanism, landslides, desertification, floods, cyclones, earthquakes and forest fires are different natural disasters.
5. Safety measures can reduce the effects and damages of natural disasters.
6. Volcanic ash also comes out from volcanoes along with lava and gases.

QUESTIONS

1. Tick (✓) the correct answer:

   i. The percentage area of forests in Pakistan is:

   a. less than 5% b. 15%

   c. 25% d. 10%

   ii. The natural disaster causing destruction in mininmum time is :

   a. cyclone b. forest fire

   c. earthquake d. volcanism

iii. When the molten matter inside the Earth comes on the surface, it is called :

a. magma b. cyclone

c. landslide d. lava

iv. The percentage of land under arid and semi-arid conditions in Pakistan is :

a. 20% b. 60%

c. 40% d. 80%

v. The areas vulnerable to landslides in Pakistan are :

a. plains b. mountains

c. deserts d. river plains

2. Give short answers:

i. What is meant by natural disaster ?

ii. Describe three safety measures against floods.

iii. Describe two ways to avoid the possibility of forest fires.

iv. Write two causes of landslides.

v. What is meant by desertification?

3. Give detailed answers:

i. Describe the impacts of floods in Pakistan.

ii. Write note on cyclones.

iii. Analyze the damages caused by earthquakes.

iv. Discuss the disaster management practices.

v. Analyze the impacts of desertification.

Activity Make a list of flood affected areas of Pakistan during the last ten years.

Chapter 5

MAJOR ENVIRONMENTAL PROBLEMS

Students' Learning Outcomes

After studying this chapter, students will be to:

- define an environmental problem.
- identify the causes for various environmental problems.
- describe the impact of various environmental pollutants on life.
- describe the nature and causes of global warming and evaluate its impact on life.
- describe the greenhouse effect.
- recommend solutions to avoid environmental pollution.

Pollution

Disproportionate presence of any unwanted substance which is harmful for human life is referred to as environmental pollution. The domestic, industrial waste and emissions from combustion of vehicles, trains and air traffic, pollute our natural environment. These are responsible for noise pollution as well as air pollution. The solid waste generates soil and land pollution, besides, it also produces water pollution. The environmentalists' opine that air pollution, water pollution, soil pollution and noise pollution are the principal concerns for humanity. Let us have a look on these forms of environmental pollution.

1. Air Pollution

The atmosphere is composed of different gases which envelop our Earth. This envelope of gases protects us from harmful portion of incoming solar radiation and also keeps the thermal balance of our planet which is essential for survival of life. The natural and human interventions are considered responsible

A scene of air pollution

for increasing the level of harmful gases, dust, smoke, water vapours, chemical compounds and impacts of ultraviolet radiations. The resultant environmental imbalance harms and pollutes our environment.

Causes of Air Pollution

Volcanism, wild forest fire, tsunamis in the oceans, storms, unplanned industrialization, transportation and communication, deforestation, unsafe solid waste disposal, inefficient agricultural practices, wars and marine traffic are considered as the main causes of air pollution in these days.

Impacts of Air Pollution

The humanity is facing different problems as a result of air pollution. Acid rains, the depletion of ozone layer are causing minor health issues to major health problems these days. These include cataract, nose, throat and ear infections, headache, allergies and heart problems. Besides this, the prevalence of cancer, liver, kidney and lungs problems are also the signs of deteriorating air quality. The experts also attribute the decline of agricultural production to polluted air.

2. Water Pollution

The unwanted change in physical or chemical composition of water is referred to as water pollution. This causes damage to human life as well as adversely affects the plant and animal life. In these days, our water resources are rapidly being polluted due to the causes of human activities.

A scene of water pollution

Do you know!

71% of Earth surface is covered with water, out of which 97% of water is present in oceans while 3% is available in the form of rivers, springs, lakes, atmospheric moisture, glaciers and underground water reservoirs.

Causes of Water Pollution

The use of chemical fertilizers, pesticides, herbicides, unsafe and inefficient agricultural practices, the disposal of untreated domestic and industrial effluents in fresh water resources, floods, acid rains, open dumping and

disposal of solid waste in coastal areas, the spillage and leakages from marine traffic, hospital waste and industrialization in present times are known sources of water pollution.

Impacts of Water Pollution

Water pollution not only affects human life but it creates negative impacts on all form of life. This reduces biological diversity on the planet Earth. Water pollution accelerates and promotes water borne diseases among mankind in the form of malaria and dengue. The use of polluted water causes abdominal problems, hepatitis, liver and kidney failures along with various types of cancer. Every year, an over whelming portion of human population becomes a victim of water borne diseases. The water borne diseases are transmitted through plants and animals to human bodies due to the process of biomagnification.

3. Soil Pollution

The undesired physical or chemical change in the composition and structure of soil components that negatively impacts the organic life on the surface of the Earth is referred to as soil pollution.

Causes of Soil Pollution

According to environmentalists, the major reasons for soil pollution include untreated domestic, industrial, commercial and hospital waste disposal, the careless use of chemical fertilizers, insecticides and herbicides in agriculture, deforestation, unplanned urbanization and careless constructional activities. The natural causes such as volcanism, earthquakes, soil erosion and desertification also contribute towards soil pollution

A scene of soil pollution

Impacts of Soil Pollution

The impacts of soil pollution are more visible in high density urban areas as compared to low density urban and rural areas or underdeveloped regions. The widespread impacts of soil pollution are visible in the form of growing health problems e.g. lungs, respiratory diseases, skin and different types of cancer are directly or indirectly attributed to soil pollution. Soil pollution not only contributes to water pollution but also leads to increase speed and scale of air pollution.

4. Noise Pollution

Noise Pollution

In our daily lives, we hear different types of sounds. Some of these are pleasant and audioable while the others being high pitched, become unbearable. When the volume and speed of these high pitched sounds create a disturbance for our hearing abilities, it is termed as noise pollution. Noise pollution is a type of environmental pollution. These unwanted sounds negatively impact physical and psychological health of the listener. The common sources of noise pollution are vehicular traffic, air traffic, factories and undesired use of pressure horns. Noise pollution not only disturbs the humans but also affect the terrestrial and aquatic life. Deforestation disturbs the wildlife and marine traffic disturb the aquatic life.

Causes of Noise Pollution

The unnecessary and careless use of modern audio/video equipments, washing machines, air coolers, grinder machines etc. in our domestic life promote noise pollution in houses and neighbourhoods. Besides, the unnecessary and outdated social customs, public gatherings also cause noise pollution. It is opined that the non-observance of procedures for reducing noise pollution in commercial, industrial, constructional activities and various means of communications are the major sources of noise pollution.

Impacts of Noise Pollution

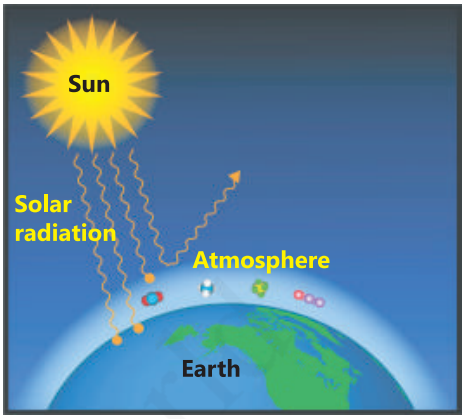
In these days, the negative impacts of noise pollution on human health are widespread and visible in the form of hearing deformities, sleeplessness, headaches, high blood pressure and prevalence of psychological issues and social problems among the population in high density areas.

Global Warming

The natural forces have developed a protective gaseous envelope around the sphere of Earth. The human activities are responsible for changing the structure and composition of this protective layer. The resultant gradual increase in terrestrial temperature as a result of human interference in the natural environment is referred to as global warming.

Causes of Global Warming

The environmentalists enlist the following reasons for global warming. According to them, the emission of greenhouse gases from the process of combustion as result of commercial, industrial, transportational and domestic activities are responsible for the phenomena. Deforestation, land and air pollution are the other main contributors for increasing the speed and scale of global warming in present times.



Global Warming

Impacts of Global Warming

Global warming negatively impacts the natural environment by increasing the sea level, glacial melting, floods and droughts, increase in global temperature, prevalence of the health problems among organisms, deforestation and fluctuations in the cycle of precipitation.

Greenhouse Effect

As you have studied in the previous classes that carbon dioxide, water vapours and dust particles absorb the terrestrial heat emission and keep the lower atmosphere warm for organic life. This process is called greenhouse effect. It keeps the terrestrial temperature suitable. The average temperature of the earth is 15^0 celsius. The uncontrolled increase in the amount of carbon dioxide, methane, choloroflorocarbons (CFCs), dust particles and water vapours causes air pollution which ultimately promotes the process of global warming and damages the protective ozone (O_3) layer. The industrial revolution speeded up the carbon emission by increased burning of fossil fuels for industrial and mechanical activities.

Strategies for Reduction of Environmental Pollution

The following strategies may prove fruitful for reducing the level of environmental pollution. Proper disposal of waste material, cleanliness, minimizing the use of plastic bags, optimal use of energy resources, promotion of green values in daily life, promotion of plantation and awareness about the environment and our responsibilities towards environmental protection are keys to protect and keep our environment green and clean for all forms of life.

KEY POINTS

1. Water pollution causes negative impacts on human, terrestrial and aquatic life.
2. All types of waste materials and careless use of pesticides and chemical fertilizers causes soil pollution.
3. Greenhouse effect keeps the terrestrial temperature suitable.
4. Average temperature of the Earth is 15° Celsius.
5. Noise pollution negatively impacts on the physical and psychological health of the listener.
6. The gradual increase in terrestrial temperature is called global warming.

QUESTIONS

1. Tick (✓) the correct answer.

   i. Noise pollution causes:

   a. weakness of eyesight b. lungs problem
   c. hepatitis d. high blood pressure

   ii. Glaciers are melting due to :

   a. soil pollution b. water pollution
   c. global warming d. noise pollution

   iii. _____ is made of different gases :

   a. lithosphere b. hydrosphere
   c. atmosphere d. biosphere

   iv. Ozone layer is depleting due to:

   a. water pollution b. soil pollution
   c. noise pollution d. air pollution

   v. Toxic gases enter the atmosphere due to:

   a. noise pollution b. deforestation

c. putting waste on fire d. use of chemical fertilizers

2. Give short answers.

i. What is meant by pollution?

ii. What is the cause of greenhouse effect?

iii. Name the types of pollution.

iv. Give three strategies to reduce environmental pollution.

v. What is meant by global warming?

3. Give detailed answer.

i. Describe the causes and impacts of water pollution.

ii. Write the causes and impacts of soil pollution.

iii. Describe the causes and impacts of global warming.

iv. Explain the causes and impacts of air pollution.

v. Describe the impacts of noise pollution.

Activity

Arrange a discussion on "measures to reduce environmental pollution" in your school and write down the results on a chart.

Chapter 6

NATURAL REGIONS

Students' Learning Outcomes

After studying this chapter, students will be able to:

- identify a region as a spatial entity.
- identify the major regions of the world in terms of climate.
- describe selected natural regions in terms of climatic controls and their impact on human activities.
- describe the importance of selected natural regions in terms of climate and human activities.
- name some countries from each natural region.

Region

A geographical or ecological area having physical or cultural homogeneity is called region. It is a spatial entity that may comprise one or some parts of the globe. It is not necessary that different areas comprising a region may be geographically inter-connected.

Concept of a Region

The surface of Earth is not uniform. Due to this variation, the climate found in different parts of the Earth is not uniform too. As a result, the way of living and economic activities of people alongwith natural vegetation and wildlife also differ from each other. On the other hand, there is uniformity as well. If we can divide the Earth on the basis of physical and cultural diversity, we can integrate different parts of the Earth to form a region i.e. mountainous region, forest region, desert region and region of Muslim countries, etc. A region is a spatial entity which has a specific area, a geographic boundary and a specific location which can be described in terms of latitudes and longitudes or with reference to some other point. All regions are physically or culturally integrated with each other.

Major Regions of the World

On the basis of horizontal distribution of temperature, the world has been divided into three major regions. These regions are:-

1. Torrid Region

This region lies between Tropic of Cancer (23.5° north) and Tropic of Capricorn (23.5° south) on both sides of equator. Southern parts of Asia and North America, northern parts of South America and Australia and central parts of Africa are included in this region. Sun rays fall vertically on the equator and surrounding regions. That's why the temperature remains high in the torrid region throughout the year. Maximum rainfall occurs on the eastern coasts of the continents which decrease westwards. That's why vast deserts are found in the central and western coasts of the continents.

2. Temperate Region

This region lies on both sides of equator from Tropic of Cancer and Capricorn to Arctic and Antarctic Circle 66.5° respectively. Areas of Asia, Europe, North & South America, Africa and Australia are included in this region.The sun rays are oblique in this region. That's why intensity of temperature is not too high. Both seasons i.e. summers and winters are found. There is abundant rainfall in this region. Amount of rainfall is maximum on the west coasts of the continents which decrease eastward. That's why deserts are found in the interior of the continents.

3. Frigid Region

This region lies on both sides of equator from the Arctic & Antarctic circles to North and South poles 90° respectively. Areas of Asia, Europe, North America and whole of Antarctica are included in this region.The sun rays are too oblique in this region. That's why, it is extremely cold region with no summer season. Amount of rainfall is low. Maximum precipitation occurs in the form of snowfall.

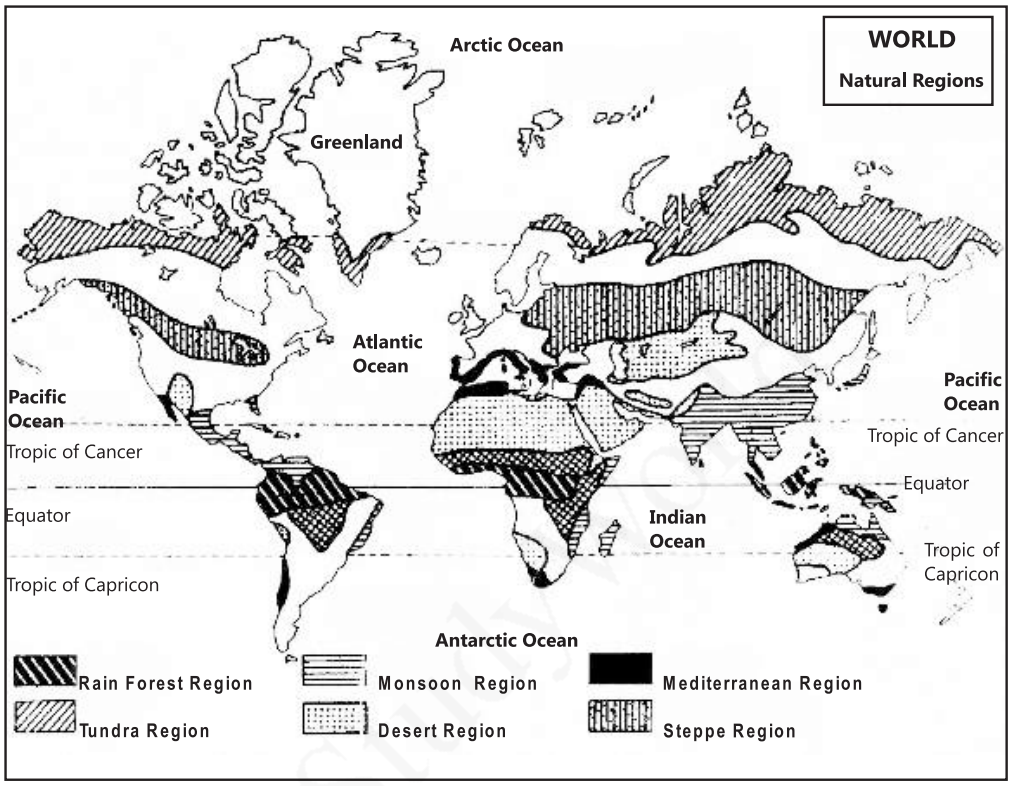
Important Natural Regions

In the above mentioned major regions of the world, there can be found further regions on the basis of physical homogeneity. These regions are:

1. Rain Forest Region

Location and Countries

This region lies on both sides of equator between 5° latitudes within the



torrid region. Main countries in this region are Indonesia, Malaysia, Thailand, Sri Lanka from Asia, Kenya, Uganda, Congo, and Gabon from Africa, Brazil, Columbia, Peru and Ecuador from South America.

Climate

Because this region lies within torrid region, the average temperature remains above 27° centigrade throughout the year. The air gets heated and rises up, looses its temperature and causes rainfall. This is called convectional rain. The average annual rainfall exceeds 200 centimetres which is maximum in the world. It is because of this abundant rainfall that the world's most dense forests are found in this region. Hence, this region is called rain forest region.

Human Activities

The people in this region depend upon forests and associated products for their food, clothing, shelter and economic activities. They still cover their bodies with tree leaves and build their houses on trees. The wood is excellent for

furniture and construction. Agriculture plantation is the main economic activity. Natural rubber, cocoa, coffee, tea, banana and coconut are important products of this region. Other agricultural products include vegetables like cassava and yams which are grown by clearing a patch of forest. This type of agriculture is called Slash and Burn cultivation. This region is also known for the manufacturing of natural rubber and coconut oil.

2. Monsoon Region

Location and Countries

This region also lies within torrid region on both sides of equator from 5° to 25° latitude on the eastern coasts of the continents. Main countries in this region are Pakistan, India, Bangladesh, Myanmar, Vietnam, Philippines, Southern China from Asia, Madagascar from Africa, Southern Brazil from South America and North Eastern Australia.

Climate

On 21st June the sun rays fall vertically on the Tropic of Cancer while oblique on the Tropic of Capricorn. Due to this fact, the average temperature on the Tropic of Cancer exceeds 27°centigrade. This situation reverses on 22nd December and temperature on Tropic of Capricorn exceeds 27° centigrade. This attribute of monsoon region distinguishes it from rain forest region. The amount of rainfall varies too. In summers, the winds in this region blow from sea towards land. These moisture laden winds producing heavy rains are called summer monsoons. In winters the winds blow from land towards sea and hence produce no rainfall. This is the short dry period of this region.

Human Activities

Timber from dense forests, natural rubber, tea, coffee, banana and coconut are main products of this region. An important economic activity of this region is rice cultivation which is grown on plains and mountain slopes. The amount of rainfall is very much favourable for this purpose. Due to favourable climate and presence of natural resources, this region is densely populated. It is making rapid progress in the industrial sector as well. Tea industry is a hallmark of this region.

3. Mediterranean Region

Location and Countries

This region lies on both sides of equator between 30° to 45° latitudes on

the western coasts of the continents within temperate region. This region includes west coast of United States of America (North America), surrounding areas of Mediterranean Sea i.e., Spain, Italy, Greece and Turkey (Europe), Egypt, Tunisia, Algeria, Morocco and South Africa (Africa), Chile (South America) and South Western Australia.

Climate

Due to location in the temperate region and nearness to the sea, the average temperature of summers remains between 10° to 20° centigrade. Contrary to monsoon region, maximum rainfall occurs in the winter season on the west coasts, while the summer season remains dry.

Human Activities

Mediterranean region is known in the world for its pleasant and temperate climatic conditions. Because of this attribute, it is also a densely populated region. Agriculture is an important economic activity for which winter conditions are very much favourable. This region is known in the world for the production of wheat, barley, grapes, olives and oranges. Livestock farming is also an important economic activity. It is also known for bakery, woolen textiles and beverage industry in the world.

4. Steppe Region

Location and Countries

Steppe region lies on both sides of equator between 35° to 55° latitudes on the margins of the deserts. Mali, Niger, Chad, Sudan, Namibia from Africa, New South Wales and Victoria from Australia, central North America, northern parts of Argentina (South America) and Central Asian states are main counties included in this region.

Climate

As this region lies in the interior of the continents on the margins of deserts, the climatic conditions are better than the desert region. Average annual rainfall remains between 100 to 300 millimetres.

Human Activities

Because of adequate rainfall, this region is comprised of vast grasslands and is a major habitat of herbivores in the world. Livestock farming is an important economic activity. The single dominant crop of this region is wheat

which is cultivated in all countries of this region on vast grasslands. Among these grasslands Prairies of North America and Pampas of South America are well known. In Europe and Asia these grasslands are named as steppes.

5. Tundra Region

Location and Countries

Tundra region lies in the north of equator between 60° and 75° latitudes surrounding the Arctic Ocean. A portion of Antarctica is also included in this region in the south of equator. Russian Siberian plain in Asia, Norway, Finland and Sweden in Europe, Canada and Alaska in North America are included in this region.

Climate

The climate of this region is extremely cold. Winter season lasts for about eight months in which the temperature remains below freezing point. Summers are short in which average temperature remains below 10° centigrade. The snow melts in the months of July and August which increases humidity in the air and results in producing small amount of rainfall. The average annual rainfall in this region is less than 250 millimetres.

Human Activities

Due to extreme cold weather the vegetation in this region is sparse and is comprised of bush and scrub forests, grass and lichen. Due to the lengthy winter season, the trees do not attain their full height. Different herbivores like caribou, walrus, reindeer and rabbits are found which tend to migrate towards temperate region as soon as the summer season ends. Human activities are almost absent. Due to extreme snow, the subsoil also freezes and the land remains useless for any type of activities.

6. Desert Region

Location and Countries

The desert region lies in both torrid and temperate regions. In torrid region, it lies on both sides of equator between 15° to 25° latitudes in the west of the continents. This region includes the great Sahara desert which stretches across nine countries including Mauritania, Mali, Algeria, Chad and Sudan, the Kalahari Desert in Angola (Africa), Rajasthan desert in India, Thar desert in Pakistan, Iranian and Arabian deserts, Mongolian and Gobi desert (China) in Asia,

along with deserts of Peru and Chile in South America and Central Australia.

Climate

The deserts in the torrid region are among the hottest and driest places of the world. Average temperature exceeds 32° centigrade and daily change of temperature remains high.

The average annual amount of rainfall is well below 30 millimetres.

Human Activities

Human activities are limited due to intensity of temperature and scarcity of rainfall. Vegetation is also not very useful. However, the areas which have ground water resources are suitable for the date palms and dry farming with the help of springs and wells. People spend nomadic way of life in search of water. The region is also backward from the industrial point of view.

KEY POINTS

1. Summer and winter seasons are found in temperate region.
2. Tundra is the region of extreme cold climate.
3. Rain forest region is the region of hot and humid climate.
4. Rice is an important product of monsoon region.
5. In Mediterranean region, the summers are dry.
6. Wheat is the important product of steppe region.
7. The winter season is lengthy in the tundra region.

QUESTIONS

1. Tick(✓) the correct answer.

   i. The average annual rainfall in rain forest region is:

   a. 50 millimetres b. 200 millimetres

   c. 200 centimetres d. 400 centimetres

   ii. Slash and Burn cultivation is practiced in:

   a. monsoon region b. steppe region

   c. tundra region d. rain forest region

iii. Region of hot and humid climate is called:

a. rain forest region b. desert region

c. steppe region d. tundra region

iv. Rice is an important product of:

a. rain forest region b. desert region

c. monsoon region d. tundra region

v. Important product of Mediterranean region is:

a. rice b. natural rubber

c. banana d. grapes

2. Give short answers.

i. Define region.

ii. Write the cause of difference between torrid and frigid region.

iii. Name five countries of the rain forest region.

iv. Why there is maximum rainfall in summers in the monsoon region.

v. What are the main products of mediterranean region?

3. Give detailed answers.

i. Explain the division of three major regions of the world.

ii. Discuss the rain forest region in detail.

iii. Describe the human activities of mediterranean region.

iv. Compare the desert and steppe regions.

v. Explain the climate of tundra region.

Draw a world map and show different natural regions on it.

Chapter 7

CLIMATE OF PAKISTAN

Students' Learning Outcomes

After studying this chapter, students will be able to:

- describe the nature and extent of seasonal and regional diversity.
- describe the seasons and their salient features.
- identify the climatic regions of Pakistan and their major characteristics.
- co-relate climatic conditions with vegetation and human activities.

Season

A specific period of a year on the basis of climatic conditions is called season.i.e. Temperature, Air, Rain etc.

Seasons of Pakistan

Pakistan is situated in the warm temperate region. The seasons found in Pakistan are:

i. Winter Season

In Pakistan, the winter season starts in December and lasts up to the end of February. In this season, the average temperature in most areas of Pakistan remains below 18° centigrade. In plain areas, the severeness of cold increases while mountainous areas receive heavy snowfall. The amount of rainfall is low as compared to summer season. Important source of rainfall in this season is western disturbances (cyclones) which enter Pakistan from the west.

ii. Spring Season

Weather in Pakistan from March to April is neither too cold nor too warm and it remains fair too. However, the northern areas receive a low amount of rainfall associated with thunderstorms. In this season, the trees and plants bear

new leaves and a variety of flowers. This is called spring season.

iii. Summer Season

Start of May is the beginning of summer season in Pakistan which lasts up to mid of September. The temperature increases and remains above 18° centigrade in most parts of the country. Plain areas including deserts, experience intense heat. However, the temperature remains moderate in coastal areas due to maritime effect. In mountainous areas, the intensity of heat remains too low. In summers the pressure of air remains low in Pakistan. This low pressure system attracts winds from adjacent Arabian sea and Bay of Bengal. These moisture laden winds produce heavy rainfall in the months from July to September. This is known as rainy season in Pakistan. Maximum rainfall occurs in north eastern Punjab and adjacent mountains. The amount of rain decreases farther north, south and westward.

Important information

Murree is the rainiest place in Pakistan.

iv. Autumn Season

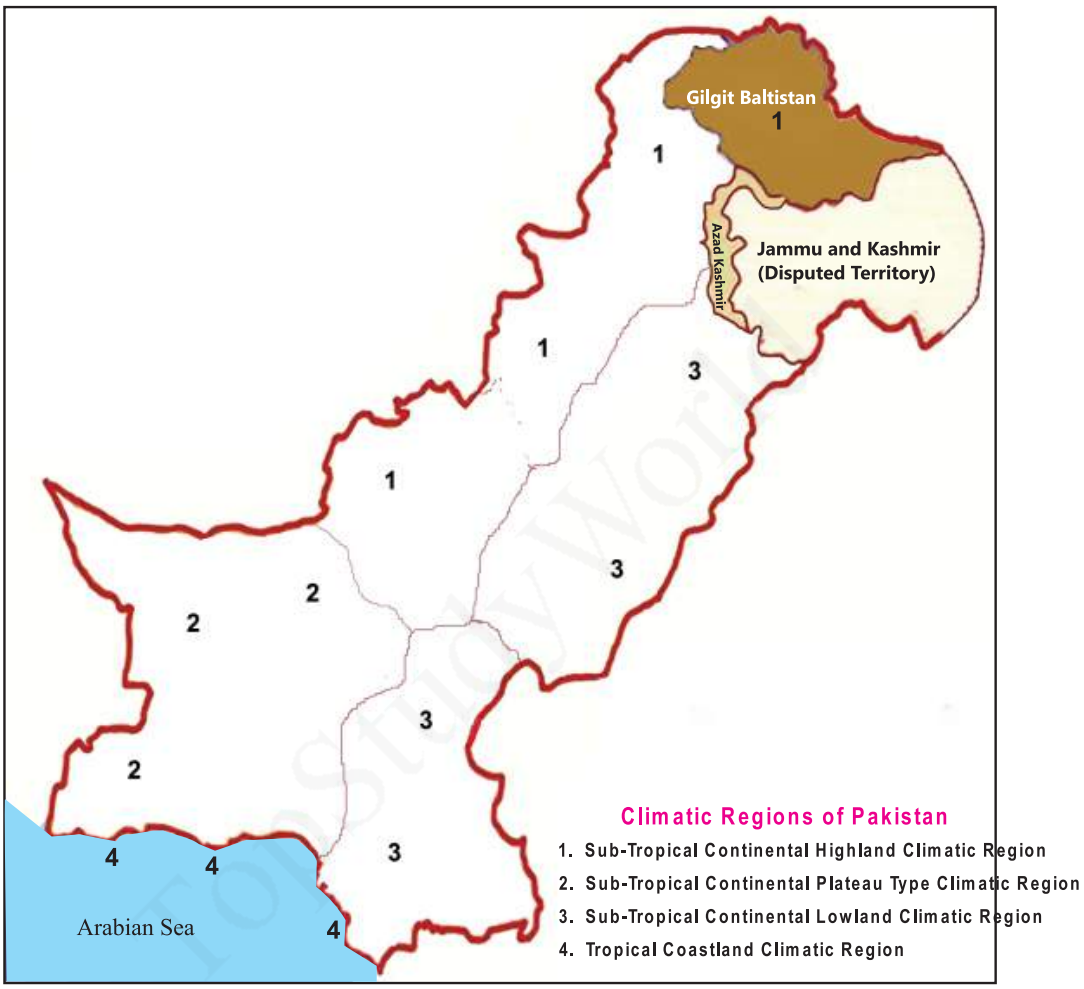
The weather is once again neither too hot nor too cold in October and November. The amount of rain decreases too. There are frequent dust storms in southern Punjab and north eastern Sindh. The northern areas receive small amount of rain fall associated with thunderstorms. The trees and plants shed their leaves. This is called autumn season.

Climatic Regions of Pakistan

The surface of land in Pakistan is not uniform. Due to this variation, temperature and amount of rainfall is not uniform in different areas of Pakistan. On the basis of these variations, Qazi Saeed-ud-Din Ahmad, a renowned geographer of Pakistan, divided Pakistan into following four major climatic regions in 1951.

1. Sub-Tropical Continental Highland Climatic Region

This climatic region is comprised of northern and western mountain ranges in addition to the mountain ranges of Balochistan. Continental effects are dominant in this climatic region due to distance and height from the sea. As the height of northern mountain ranges is well above 5000 metres, the temperature remains below 0° centigrade in winter and between 10° to 20° centigrade in summers. Frequent rain associated with thunderstorms and intense snowfall is the characteristic feature of this climate on the mountain ranges of Himalayas,



Karakoram and Hindukush. The amount of rainfall and snow is comparatively low in the western mountain ranges of Khyber Pakhtunkhwa and Balochistan.

2. Sub-Tropical Continental Plateau Climatic Region

This climatic region is comprised of western part of Balochistan plateau. Continental effects are dominant in this region too. Areas of Noushki, Chaghai, Kharan and Nokundi are included in this region. The average winter temperature remains between 0° to 9° centigrade and of summers above 32° centigrade. The amount of rainfall is low and is usually caused by western cyclones.

3. Sub-Tropical Continental Lowland Climatic Region

This climatic region is comprised of plains and deserts of Punjab, Sindh and Balochistan. Distance from the sea produces continental effects on this climatic region as well. Average winter temperature remains between 10° to 20° centigrade and of summers above 32° centigrade. The amount of rainfall is low in winters but in summers, winds coming from the Arabian Sea and Bay of Bengal produce ample rainfall.

4. Tropical Coastland Climatic Region

The coastal area of Pakistan lies near the Tropic of Cancer. This region is comprised of coastal areas of Balochistan and Sindh. Maritime effect of the Arabian Sea is dominant on the climate of this region which keeps the temperature moderate. Average winter temperature remains between 10° to 20° centigrade and of summers between 21° to 31° centigrade. The characteristic feature of this climatic region is the prevalence of sea breeze and land breeze. Sea breeze blows from sea towards land during the day and land breeze blows from land towards sea during the night. The temperature difference of day and night is the basic cause of this movement. Although humidity remains high in the air, the amount of rainfall is low. Average annual rainfall remains between 125 to 250 millimetres which varies seasonally.

Impact of Climate on Vegetation and Human Life

Variation of climate in different parts of Pakistan has a great impact on vegetation and human activities.

1. Impact of Climate on Vegetation

The forests found in the mountainous areas of Pakistan above 4000 metres are called Alpine forests. They do not grow to their full height because of extreme snowfall and a short summer season. However the forests which are found below 4000 metres are comparatively dense. Here trees attain their full height because of adequate rainfall, temperature and duration of summer season. These are found in northern areas, Mansehra, Abbottabad in Khyber Pakhtunkhwa, Murree and Galliat in northern Punjab and Quetta and Kalat in Balochistan. The climate of Balochistan plateau and piedmont areas favours the growth of scattered dry forests and grasslands.

The climate of plains favours the growth of broad leaved forests along the river banks. These are called Bela forests. Away from the rivers in open plain areas,

is found thorn bush type of vegetation. In desert areas of Pakistan, where the climate is extremely dry and hot, thorn scrubs and date palms are found. While the moderate climate of the coastal areas favours the growth of Mangrove forests in the deltaic regions of river Indus and Hub.

2. Impact of climate on Human Activities

The mountainous areas of Pakistan are not densely populated. There is severe snowfall in winters which tends to keep the human activities limited. People store food items and those who have livestock, shift their cattle in the piedmont areas. The region remains disconnected by road blockages due to snowfall, while the air transport remains disturbed too. Life becomes paralyzed in winters. However the summer is pleasant in this region. People re-shift their cattle in the grassy meadows upland. Agriculture is also practiced on a limited scale and corn is the most important crop of this region in summers. Besides, apples, plumps, apricots, peaches, almonds and walnuts also grow well in this climatic region. Rainfall is frequent which often results in the occurrence of landslides and floods. These hazards are a hurdle in the development of tourism in this region.

The plains of Pakistan are densely populated due to favourable climatic conditions for different types of activities. Agriculture is an important economic activity. Wheat and gram are major Rabi while rice, corn, cotton and sugarcane are major Kharif crops. The climate is also favourable for different types of industries. The presence of different transportation means facilitates the economic progress. However, occasional floods damage the infrastructure as well. In winters the fog disturbs the schedule of road traffic, railways and airways in this region.

The desert areas of Pakistan are not densely populated. Life remains tough due to hot and dry climatic conditions. Population is scattered due to scarcity of water. Hot wind known as "Loo" blows during the day which paralyzes the life. Limited farming is practiced in those areas where water is available. Rearing of goats and sheep is also an important economic activity.

KEY POINTS

1. Summer season in plains and winter season in mountainous areas is severe in Pakistan.
2. The climate of coastal areas of Pakistan is moderate.
3. The effects of climate are very much prominent on vegetation and human activities.
4. Pakistan is situated in warm temperate region.
5. Different seasons are found in Pakistan.
6. Due to physiographic and climatic diversity, Pakistan has been divided into four climatic regions.
7. Monsoon winds in summer and western cyclones in winter are major sources of rainfall in Pakistan.

QUESTIONS

1. Tick (✓) the correct answer.

i. The rainiest place in Pakistan is:

a. Karachi b. Lahore
c. Murree d. Sibbi

ii. Summer monsoons in Pakistan come from:

a. Afghanistan
b. Central Asia
c. Arabian Sea and Bay of Bengal
d. China

iii. The summer temperature in plains of Pakistan remains:

a. between 0° to 9° centigrade
b. between 10° to 20° centigrade
c. between 21° to 31° centigrade
d. above 32° centigrade

iv. Alpine forests are found at a height:

a. above 1000 metres b. above 2000 metres

c. above 3000 metres d. above 4000 metres

v. The coastal climatic region of Pakistan is comprised of areas of:

a. Punjab b. Sind and Balochistan

c. Khyber Pakhtunkhwa d. Sindh

2. Give short answers:

i. Define season.

ii. What is meant by land breeze and sea breeze?

iii. Name three mountain ranges included in highland climatic region of Pakistan.

iv. Name the seasons found in Pakistan.

v. Name the climatic regions of Pakistan.

3. Give detailed answer:

i. Discuss the sub-tropical continental highland climate of Pakistan.

ii. Describe the impact of climate on natural vegetation.

iii. Analyse the impact of climate on human activities.

iv. Describe the characteristic features of summer and winter seasons in Pakistan.

v. Explain the sub-tropical continental lowland climate in Pakistan.

Draw a map of Pakistan and show climatic regions on it.

Chapter 8

NEIGHBOURING REGIONS OF PAKISTAN

Students' Learning Outcomes

After studying this chapter, students will be able to:

- name the countries of each region, locate them on a map and draw the sketch of each region.
- describe the economic characteristics of each region.
- examine the relationship between Pakistan and its neighbouring regions.
- discuss geographic setting and strategic importance of Pakistan and its neighbouring regions.

Pakistan, from the beginning, has based its foreign policy on establishing peaceful and friendly bilateral relations with the neighbouring countries. For this cause, Pakistan has given special weightage to relations with the neighbouring regions like South Asia, Middle East, Central Asian States and China. Let us have a look on Pakistan and its neighbouring regions:

South Asia

Geographically South Asia is an important region of the world in terms of population and area. It is a densely populated region accommodating almost 25 percent of the world population. Countries included in this region are Afghanistan, Pakistan, India, Bangladesh, Sri Lanka, Bhutan, Nepal and Maldives.

Economic Characteristics

Colonialism has affected all countries of South Asia in the past. Due to this fact, this region has not progressed economically inspite of presence of a lot of natural resources. The impacts are very much obvious on the everyday life of individuals and community as a whole in these countries. Per capita and gross national income is dependent upon agricultural system. Efforts are being made to improve this system by rapidly implementing the use of modern technology.

The results of these efforts have started to appear in the form of increase in per capita and gross national income. This region is included among the most densely populated regions of the world. But unfortunately the population of this region, because of different socio-economic conditions, is proving to be a burden on the financial and economic development of this region. To improve this situation, special attention is being given to manpower development in these countries and it is hoped that soon the population of these countries would prove to be an economic resource rather than a burden.

Inadequate facilities and low standard of education and health were a hurdle in the way of economic development of this region. But fortunately efforts are being made for a positive change in these two domains since the start of this century. Primitive way of life along with outdated customs and traditions were also a hurdle in the way of economic development of this region which are gradually diminishing with increase in the literacy rate. There is a lack of mutual trust and cooperation among South Asian countries. To overcome this problem, positive steps were taken from the platform of SAARC (South Asian Association

Neighbouring Regions of Pakistan

for Regional Cooperation) and it is hoped that improvement in bilateral relations among the countries of this region would aid enormously in boosting economic activities in the region. Although late industrialization is also an important reason of underdevelopment of this important region, but in the changing global economic circumstances, the results in the form of valuable increase in industrial activities and production of this region have started to appear.

Pakistan's Relations With South Asian Countries

Unfortunately, at the time of creation of Pakistan, two important countries of South Asia i.e. Afghanistan and India, because of their short-sightedness, did not accept the existence of Pakistan. But due to Pakistan's continuous efforts and global circumstances, the gulf between South Asian countries is narrowing with the passage of time. In this regard, SAARC (established in 1985) played an important role. Initially, Afghanistan was not the part of this association. But through the courtesy of Pakistan, Afghanistan also became the member of SAARC in 2007. Limited economic resources alongwith complicated political and social regional issues, stop this regional association SAARC to play its full role. In present time due to the global economic circumstances, energy needs and the unfortunate threat of terrorism, the countries of this region (which were once apart) are trying rapidly to improve their bilateral relations for financial and economic development.

Middle East

Blessed with the wealth of petroleum, the geographical region of Middle East is situated in the south west of Asia. Bahrain, Iran, Iraq, Syria, Kuwait, Lebanon, Jordan, Palestine, Qatar, Saudi Arabia, Turkey, United Arab Emirates and Yemen etc. are the main countries of this region.

Economic Characteristics

Being a part of the Arabian desert, most of the Middle East countries have remained a victim of underdevelopment on the economic front. But the discovery of petroleum in this region has changed the way of life. The financial and economic development of Middle East is mostly dependent upon petroleum wealth and mineral resources. Due to various factors, the population density in this region has remained low, as a result of which the region has faced with the shortage of manpower needed for economic development.

Agricultural activities just limited to river valleys and some oasis are insufficient to meet the food requirements of the region. Industrial activities started quite late in this region and most of the industries are associated with the

production of petroleum. From the historic and religious point of view, this region has always been the focal point of the Muslim world.

Pakistan's Relations With Middle East Countries

Because of being the centre of Islam and the Muslims, peaceful bilateral relations with this region have always been the basis of foreign policy of Pakistan. When the discovery of petroleum opened the way of economic activities in this region, all countries of Middle East preferred Pakistan for the required manpower for these activities. This resulted in further strengthening of economic ties between Pakistan and Middle East countries which helped Pakistan to overcome the economic problems. Besides this, the Middle East countries with the passion of Islam and Muslim brotherhood, have always helped Pakistan whole heartedly at the time of natural disasters and regional issues. In response, the people and government of Pakistan have never stepped back in helping Middle East countries on every front in their war against Israel.

Central Asia

Stretching over a vast area, the geographical region of Central Asia is situated in the north and northwest of Pakistan. It has an area of about 4 million square kilometres. The five countries included in this region are Kazakhstan, Kirghizistan, Turkmenistan, Tajikistan and Uzbekistan. Karakoram highway links Pakistan with this region which has social, historical and cultural bondage with Pakistan. The presence of uncountable natural resources made Central Asian States the focal point of the world after their independence from Soviet Union in the last decade of the previous century. Due to the nearness of Pakistani ports to this region, it is said that the resources of this region can be proved fruitful only if the countries of this region are linked with the outside world via Pakistan.

Economic Characteristics

The geographical region of Central Asia is blessed with uncountable resources of petroleum and natural gas. Due to limited regional needs, these resources have the capacity to fulfill the rapidly growing energy needs of the world. Historically, the Central Asian States also hold an important position in agriculture, especially Turkmenistan, Uzbekistan and Kazakhstan are well known for the production and supreme quality of their cotton in the world. The defence industries which were established in the era of Soviet Union, have gained importance in this region, especially Kazakhstan is earning valuable foreign exchange through its defence production. After the break up of Soviet Union, the human resource of this region has also become an attractive market not only for

the neighbouring countries but also for the regional and international economic powers.

Pakistan and Central Asian States

Central Asian States have always been a focal point for the inhabitants of Pakistan because of their stature as a "Land of Saints". Historically, the saints arriving from Central Asia have played a vital role in the advent and spread of Islam in a major portion of Pakistan, the memories of which are still alive in the hearts of people here. On the other hand, the most convenient, economic and workable passage for petroleum and natural gas resources of Central Asia to the international markets is only possible via the territory of Pakistan. The fruitful results of this situation make Pakistan and Central Asian States as natural partners.

Pakistan and the Central Asian States are getting close together as both are trying to solve their economic problems from the platform of Economic Cooperation Organization (ECO). Through strong economic and social bilateral relations, Pakistan and Central Asian States can move forward on the path of financial and economic development by using their resources efficiently.

China

Peoples Republic of China is situated in the north and northeast of Pakistan. It stretches from Central Asian States to the Pacific ocean in the east. Pak-China friendship which is higher than Himalayas and deeper than the Pacific Ocean is based on strong bilateral economic, strategic, social, political and foreign relations, has become an example for the rest of the world. Pak-China friendship has not only played a vital role in the mutual development but has also contributed appreciably for regional and global peace and development. Pakistan was the first country which started to play a positive role to drag China in global streamline after its independence. Due to Pakistan's efforts, China came out of international isolation and entered in the streamline of world nations. In response, the people and government of China cooperated whole heartedly to compensate damages whenever Pakistan was faced with a natural disaster.

Economic Characteristics

Due to its stable economy, energetic manpower along with natural and human resources, China has attained a pivotal position in the world. According to economists, the economic development of the world will rely upon the economic behaviour and economic role played by China in the coming times. The economic development of China is based on a strong industrial

infrastructure which is dependent upon industries. China has adopted a policy of promoting agriculture on scientific and industrial basis which has enabled China not only to meet the domestic food requirements but the surplus food grains are also being sent to the world markets.

Keeping in view its immense industrial development, China has also focussed on promoting alternative energy resources i.e. wind, solar and hydel power along with the conventional power resources i.e. petroleum, gas and coal etc. After facilitating the massive population with education and technical skills, China is sending it as an economic resource to the international market and is earning valuable foreign exchange.

Pak-China Relations

Pak-China relations need no introduction. Chinese government and people have always stood with Pakistan at the time of difficulty as well as they have tried their level best to strengthen Pakistan economically and strategically. Various in-process power projects like Neelum-Jhelum and Chashma are important examples in this regard. Besides this, defence projects like Heavy Mechanical Complex Taxila, Pakistan Aeronautical Complex Kamra and Pakistan Ordnance Factory Wah and Sanjwal are proof of this everlasting Pak-China friendship. Karakoram Highway which connects Pakistan with western China and Central Asian states, is also a magnificent example of Chinese skill and cooperation.

In present times, the development of Pakistan, Central Asia and Afghanistan is not possible without developing the port of Gwadar. Due to limited financial resources of Pakistan, this project was under delay but the People's Republic of China has signed an agreement for the investment of 46 billion dollars on the development and expansion of the gigantic economic corridor project. Now this great development project has become the lifeline in the economic development of Pakistan. Its long lasting benefits would prove to be fruitful for the future generations of Pakistan.

Location of Pakistan

Pakistan has an area of 7,96,096 square kilometres. It is situated in South Asia in between 23.75° to 37° north latitudes and 61° to 77° east longitudes. India lies in its east, Afghanistan in the northwest, Iran in the southwest, China in the north and northeast and Arabian sea lies in the south. The 20 kilometre wide "Wakhan Strip" of Afghanistan separates Pakistan from the Central Asian States.

Geographical Situation and Strategic Importance of the Neighbouring Regions

i. Geographical Situation and Strategic Importance of Pakistan

Pakistan enjoys a unique position in terms of its location. Due to its location, Pakistan is a centre of interest for all the big powers of the world. Russia, United States of America and China try to enhance their influence in Pakistan. Central Asian states, blessed with the wealth of petroleum, are situated in the neighbourhood of Pakistan. All big powers have special interest in these oil reserves. On the other hand, Pakistan is also the source of providing a sea route to the land locked countries of Central Asia and Afghanistan. Karachi is an important seaport in the region and without the help and cooperation of Pakistan, all these countries cannot trade through sea.

ii. Geographical Situation and Strategic Importance of South Asia

The southern countries of Asia form the region of South Asia. Its total area is 4.5 million square kilometres. Myanmar lies in the east of South Asia, Afghanistan in the west, China in the north and Bay of Bengal, Arabian sea and Indian Ocean lie in the south. This region has a vital importance on the map of the world. It accommodates almost one-fourth population of the world. Pakistan and India are the countries with larger populations in this region. The presence of big powers like Russia and China in the north enhances the geographical importance of South Asia. On the other hand, the Central Asian states have to rely on South Asia for a passage to the sea. South Asia is also equipped with the wealth of natural resources. In its north are the mountain ranges of Himalayas, Karakoram and Hindu-Kush, which are the highest mountains in the world. Indian Ocean in the south has remained an important area during the Cold War. This region enjoys a unique position in terms of its geographic boundaries and location.

iii. Geographical Situation and Strategic Importance of Middle East

The region comprising southwest of Asia and some parts of Africa is referred as Middle East. It is situated at the junction of Asia and Africa. Russia, Black Sea and Caspian Sea are situated in its north, Central Asian states in the northeast, Pakistan in the east, northern Africa and Mediterranean Sea in the west and African countries in the southwest. The region of Middle East is

equipped with the wealth of petroleum and mineral resources and all big powers have an eye on these resources. It is mostly inhabited by Muslims, so it is called a Muslim region. It is also inhabited by adherents of other religions i.e. Christians and Jews, and their holy places are also situated in this region. So it is considered as a sacred place for Christians and Jews in addition to the Muslims. Mediterranean Sea alongwith Red Sea, Black Sea and Persian Gulf are situated in this region which are important trade routes. Due to the mineral wealth, important industrial centres of the world are also concentrated in this region. This region is also known for the maximum sale and purchase of foreign goods in the world.

iv. Geographical Situation and Strategic Importance of CentralAsia

The region situated in the center of Asia comprising five states is called Central Asia. Mangolia and China are situated in its east, Russia and Georgia in the northwest and Afghanistan alongwith Pakistan are situated in the south of this region. Although it is a land locked region, but its geographical location has its own importance. These five states were a part of Russia in the past. Before separation from these states, Russia had a chance to approach Middle East via Afghanistan. But now Russia needs to pass through these states to reach Middle East because the sea in the north of Russia remains frozen for six months and it is not possible to trade from there. Central Asia is also known for its mineral resources especially gold, which is found in abundance here. The location of two big powers, China and Russia in the immediate neighbourhood also enhances the importance of this region. This region is also a gateway to Europe.

v. Geographical Situation and Strategic Importance of China

China is situated in the east of Asia. Geographically it is situated in between 18° to 50° north latitudes and 73° to 135° east longitudes. Its total area is about 9.6 million square kilometres. North and South Korea along with Japan and Taiwan are situated in its east, Kazakhstan, Tajikistan and Kirghizistan, Afghanistan and Pakistan in the west, Mangolia and Russia in the north, Bangladesh, India, Nepal and Bhutan in the south and Myanmar (former Burma), Laos and Vietnam are situated in the southeast. China is third largest country by area and the largest country by population in the world. Its economy is considered among the bigger economies of the world. It is equipped with the wealth of natural resources. Due to its financial and agricultural development, China is considered an important country in the world and is included in the

KEY POINTS

developed countries of Asia. China is situated in that part of world where countries like Russia, India and Pakistan are situated in its neighbourhood. On the other hand, economically developed country like Japan also enhances its importance.

1. Karakoram Highway which connects Pakistan with China and Central Asia, is an excellent example of Chinese cooperation.
2. South Asia has not progressed economically inspite of presence of a lot of natural resources.
3. South Asia is included among the most densely populated regions of the world.
4. The financial and economic development of Middle East is dependent upon the wealth of petroleum and mineral resources.
5. Middle East is a low density population region.
6. Pak-China friendship is higher than Himalayas and deeper than the Pacific Ocean.
7. Due to stable economy, energetic manpower and natural resources, China has become the focal
8. South Asian Association for Regional Cooperation "SAARC" was established in 1985.

QUESTIONS

1. Tick (✓) the correct answer.

   i. Region located away from ports and seas is:

   a. South Asia b. Central Asia

   c. Middle East d. China

   ii. _____ connects Pakistan with China :

   a. G.T. Road b. Super Indus Highway

   c. Makran Coastal Highway d. Karakoram Highway

iii. _____ is a South Asian country :

a. Kazakhstan b. China

c. Maldives d. Saudi Arabia

iv. South Asian Association for Regional Cooperation "SAARC" was established in :

a. 1975 b. 1985

c. 1998 d. 2007

v. Economic development of Middle East is dependent upon :

a. tourism b. agricultural resources

c. mineral resources d. human resources

2. Give short answers.

i. Write names of Central Asian states.

ii. Write two advantages of friendly relations among nations.

iii. Write names of two regional organizations.

iv. Write the names of five countries of Middle East.

v. Describe the location of Pakistan.

3. Give detailed answers.

i. Discuss Pak-China relations.

ii. Describe the economc characteristics of Central Asian States.

iii. Explain the importance of geographical location of Pakistan.

iv. Write a note on economic development of South Asia.

v. Describe the economic characteristics of Middle East.

Activity

Draw a sketch of South Asia and write names of countries on it.

Chapter 9

PROBLEMS OF UNDER DEVELOPMENT

Students' Learning Outcomes

After studying this chapter, students will be able to:

- differentiate between development and underdevelopment.
- explain and compare developed and underdeveloped areas of the world.
- identify the geographic features that promote development.
- discuss economic, social and political problems of underdeveloped areas.
- discuss the reasons of underdevelopment of Pakistan.
- locate developed and underdeveloped areas on the world map.

Developed Countries

The developed countries are economically stable nations. High literacy rate, high gross national and per capital income and universal availability of facilities are the salient characteristics of these countries. The economies of the developed countries rely on industrial production for their development. The industrial activities of these nations are distributed across the country. The developed nations plan to balance their population and national resources. These nations also give importance to agricultural production and use modern agricultural practices. The most famous countries of the developed world are Japan, United States of America, Germany, France and England etc.

Underdeveloped Countries

The underdeveloped countries are those nations which are financially, economically and technologically weak. The basic cause for their underdevelopment is the role of mismanagement. The over population, scarcity of resources and low literacy rate are the other main obstacles in the way of their development. The subsistence agriculture is the main source of survival. Political instability, financial corruption and foreign loans are the major causes of their

underdevelopment. Pakistan, Bangladesh, Afghanistan and India etc. and many other countries of Asia, Africa and South America belong to underdeveloped countries.

Comparison between Developed and Underdeveloped Countries

The experts divide the world into two groups, developed and under-developed countries on the basis of following reasons.

- Annual per capita income of developed countries is much more than the underdeveloped countries.
- The level of literacy in developed countries is very high while the literacy rate is low in underdeveloped countries.
- The majority of population in developed countries enjoys the facilities required for life while the majorities in underdeveloped nations are forced to survive in poverty.
- Population growth rate is very high in underdeveloped countries as compared to the developed countries.

Geographical Facts which Promote Development

According to experts, the development of any country depends upon natural resource availability and human resource development. Physical geography informs us about natural resource availability, while human geography guides us about the human resource development. The development of a geographical region is impossible without proper planning of these resources.

Natural Resources

Natural resources are those resources which are created by the nature e.g. location, geology, water resources (ocean, rivers), forest resources, soil fertility, power resources (petroleum, coal, gas) and mineral resources (iron, gold) etc.

Human Resources

In present times, the economic and financial development of a region is considered a product of human efforts. In this connection, population and population growth, literacy rate, the level of scientific and technological development play an important role.

The Economic, Social and Political Problems of Underdeveloped Countries

In underdeveloped countries, the majority of population is forced to survive in poverty. In these countries, all family members of a household are forced to work. The children of these families go to work places instead of schools, yet the families fail to meet their expenditure. The basic needs of life are not available to these families. In this situation, these poor nations are forced to depend on developed countries. The experts say that if these nations want to get rid of their under development, they must solve their present economic, social and political problems otherwise they cannot make progress.

Economic Problems

In underdeveloped countries, the low per capita income forces the people to survive below the poverty line. These countries are not developing due to their low economic development but depend upon the rich and developed nations due to following reasons:

i. Lack of capital, foreign debts and unbearable return of mark up on previous loans.

ii. Population growth beyond the capacity of their national resources and growing unemployment.

iii. Primitive agricultural practices and the dependence of economy on agricultural sector.

iv. Unplanned use of limited national resources and role of direct or indirect foreign interventions.

v. Poor infrastructure of transportation, limited national market and intrusion of foreign trade for national resources.

vi. Low national and per capita income.

vii. Lack of higher education and underdevelopment of industrial sector.

viii. Energy crisis and lack of technical knowhow.

Social Problems

The peaceful atmosphere of a country contributes positively towards its economy, while the poor law and order situation negatively affects the national life. If a society accepts and adopts the new technology and emerging ideas according to its social setting in a changing world, then the outcomes will be positive and far reaching. The underdeveloped world is a victim of different social and societal problems due to bad governance in these countries. The experts identify the following reasons for social problems of these underdeveloped countries:

i. Lack of modern education and absence of basic human rights.

ii. Outdated social and societal traditions promote the wastage of limited resources.

iii. Prevailing of social and economic corruption in the society without any hindrance.

iv. Ever increasing difference between rich and poor.

v. Outdated social and economic system and lack of organization in national life.

vi. Societal norms and structure do not encourage for hard work.

vii. Prevailing specific tribal culture and way of life in these countries.

Political Problems

The unpredictable political circumstances also adversely affect the economic and social life of these underdeveloped countries. Lack of political stability affects the administrative system of these countries and create problems. The experts present the following reasons of political instability in underdeveloped countries:

(i) Unstable political system.

(ii) The unnecessary influence of foreign countries in the affairs of these countries.

(iii) Hindrances in the growth of economic, social and political systems..

(iv) Lack of consistency in governmental policies.

Reasons for Underdevelopment of Pakistan

Pakistan is considered an underdeveloped country. The basic reasons of its underdevelopment are the lack of health and educational facilities, poor planning, unemployment and over population. These problems are the major causes of poverty in Pakistan. Pakistan cannot economically develop without removing these obstacles.

The following are the reasons for the underdevelopment of Pakistan:

i. Energy crisis.

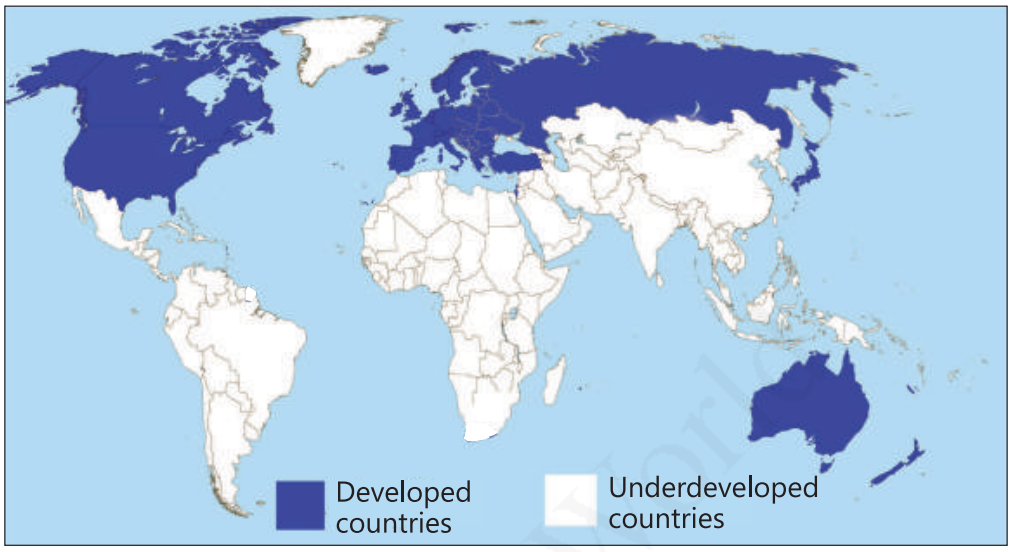
ii. Lack of natural resource management and underdevelopment of industrial sector.

iii. Foreign loans and unbearable mark up on these loans.

iv. Scarcity and unavailability of capital and unfeasible conditions of international trade with Pakistan.

v. Dependance on outdated agricultural system and over population.

vi. Scarcity of skilled and well educated persons is also affecting the economic growth of Pakistan.



KEY POINTS

1. Underdeveloped countries have lack of education and modern knowledge.
2. The political circumstances of underdeveloped countries adversely affect their economic and social conditions.
3. Pakistan is considered as underdeveloped country.
4. Developed countries are economically stable and industrialized.
5. Natural and human resources play a vital role in the economic and social development of a country.

QUESTIONS

1. Tick (✓) the correct answer.

   i. The economic development of any country depends on:

   a. industrial production
   b. more population as compared to resources
   c. lack of capital
   d. foreign loans

ii. _____ is an important social problem of underdeveloped countries:

a. difference between rich and poor
b. intervention of other countries in national affairs
c. instability in political system
d. underdeveloped means of transportation

iii. One of these is a developed country:

a. Congo b. Pakistan
c. Japan d. Afghanistan

iv. One of these is an underdeveloped country :

a. America b. England
c. Australia d. Bangladesh

v. The economy depends upon agriculture and primitive methods of cultivation in:

a. America b. Japan
c. England d. Pakistan

2. Give short answers.

i. Describe any three economic problems of underdeveloped countries.
ii. Name four geographical factors which play their role in economic development.
iii. Describe any three social problems of underdeveloped countries.
iv. What is meant by underdeveloped countries.
v. What is the identity of developed countries.

3. Give detailed answers.

i. Describe social problems of underdeveloped countries.
ii. Discuss the problems obstructing the path of economic development of Pakistan.
iii. Compare the developed and underdeveloped countries.
iv. Describe the economic problems of underdeveloped countries.

Identify developed and underdeveloped countries on the world map.

Chapter 10

INTRODUCTION TO MODERN TECHNIQUES IN GEOGRAPHY

Students' Learning Outcomes

After studying this chapter, students will be able to:

- describe the main features of the modern techniques in geography.
- learn about satellites, satellite imageries and aerial photographs.
- discuss the use of computer in geography.
- explain the usefulness of modern tools in geography.
- describe the scope of these modern tools.

In the present age, study and modern research in geography is incomplete without the aid of Geographic Information System, Remote Sensing and Global Positioning System. The need of these modern techniques was felt when the scope of geographical studies extended with time. The development of science, particularly in the field of computer opened the usage of modern techniques in scientific research.

Let us have a look on the use of these modern techniques in the field of geography.

1. Remote Sensing
2. Geographical Information System
3. Global Positioning System
4. Computer Based Models

1. Remote Sensing

Remote sensing is the science or technology of detecting, measuring and analyzing the characteristics or attributes of remote objects without having a physical contact with them. We can measure these objects and can even analyze

them. In other words, we can gather information about Earth while staying away from the Earth. Remote sensing enable us to have a bird's eye view of a place from a certain distance. It helps in studying and portraying the Earth on local, regional and global level. We can do this in two ways.

i. Aerial Photography ii. Satellite Images

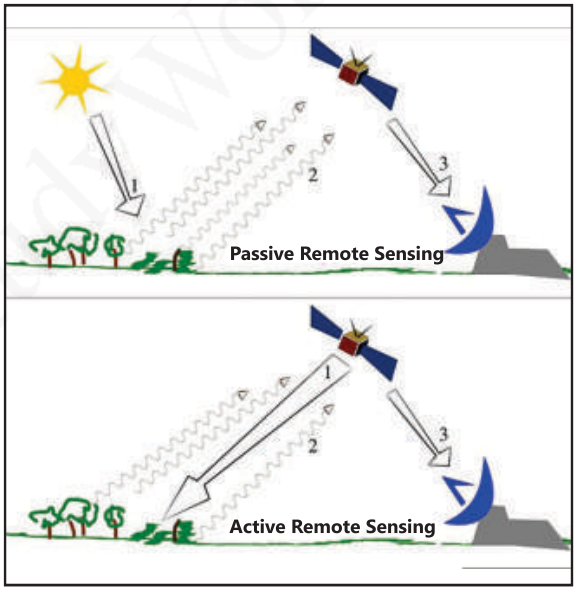
Basic Principles of Remote Sensing

Remote sensing works in two ways.

i. Active Remote Sensing ii. Passive Remote Sensing

In active remote sensing, radar waves from a satellite are sent to Earth. These waves are recorded on Earth on an instrument known as remote sensor.

Passive remote sensing depends upon electromagnetic radiation of the Sun. The electromagnetic waves tend to reflect from the Earth surface or transfer to atmosphere in the form of heat waves from the Earth. These waves are recorded on a remote sensor fixed on the satellite.



The information achieved from these waves is transformed into digital satellite images. The satellite or aeroplane on which the remote sensor is fixed is called Platform.

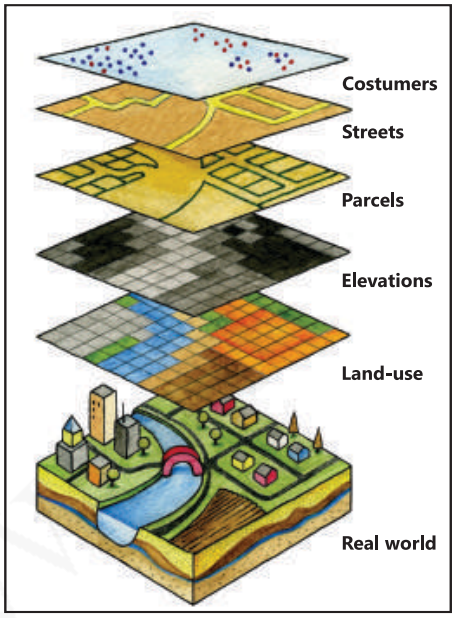
Pakistan, in recent years, has successfully experimented the launching of Badar-I and Badar-II satellites in space. In these days, a special satellite of Pakistan Pak Sat-I is placed in space which has helped Pakistan to progress in the field of telecommunications.

2. Geographical Information System (GIS)

Geographical Information System (GIS) is an integrated computer system by which geographical information is systematically collected, stored, analyzed and displayed in the form of maps.

GIS performs these different tasks conveniently. With the help of these tasks, we can find answers to many questions like location, specific conditions, trends, patterns and modeling etc. GIS enters the information regarding these questions in the data base in two forms.

- Information regarding location is entered in the form of point, line or polygons.
- From these three geographic entities GIS organizes the information in the form of layers. These layers are analyzed separately or collectively to get the answers to questions.



Different layers of geographical information system

3. Global Positioning System

The satellites in this modern age are used not only for remote sensing but we can also find the correct location of any place on the surface of Earth with the help of satellite system. This system is called Global Positioning System (GPS). The system is comprised of twenty four satellites. These satellites transmit radio waves to Earth at the speed of light i.e. 3,00,000 km per second. On the basis of time consumed by these waves to reach GPS receivers on the Earth, we can calculate the satellite's position in space and the distance between the satellite and the receiver on Earth. When the position and distance to the satellites are known, the position of the receiver is calculated as the point of intersection between the rotation circles around the satellites. The GPS instruments show the location of the receiver's position in terms of latitude, longitude and height above the sea-level on the GPS receiver screen. This is the exact location of the person using the GPS receiver.

GPS Receiver

Global Positioning System is being used on a large scale in every developed and developing country especially for navigation purposes in land, air and maritime transportation. This system is also very much helpful in tourism for determining the location of places. Besides, modern warfare is totally dependent upon this system.

4. Computer Based Models

Computer model can easily produce a duplicate of the internal process of any complex scientific matter and displays the results as well. We can define computer based model as:

"A practical method or a way designed with the help of computer technology to perform a specific task".

Computer based model about population

Computer modeling is a science, a technique or a workable idea by which answers to complex scientific matters are seeked. If such a question is raised at any stage of a scientific procedure that "if it happens, what would be the consequences". The answer to that "it" or a specific condition can be found with the help of computer modeling. For example, the population of the world is increasing at a fast pace and as a result the natural resources are depleting rapidly. So what would be the consequences after ten years if we do not turn towards alternative resources?

Use of Computers in Geography

Cartography, the art of map making has a vital importance in the field of geography. The maps are considered as the tools of geographers. The use of computer has eased the art of making maps and statistical diagrams in geography. On the other hand, Geographical Information System(GIS) is totally dependent upon computer technology.

Advantages of Modern Tools in Geography

Remote sensing in the field of geography started by fixing cameras on birds and balloons. The advent of aeroplanes paved the way for aerial photography of the Earth. Nowadays, information is

Computer

transmitted by satellites and is received on sensors and receivers on Earth. The results are displayed in the form of maps and diagrams with the help of computer technology. It has become possible to locate any place on the surface of Earth with accuracy. The use of modern tools has reduced the chances of mistakes and increased the possibilities of obtaining accurate results.

Scope of Use of Modern Tools

In the beginning, geography was just considered to describe or remember facts and figures. In present age Remote Sensing, Global Positioning System and Computer Modeling have eased many tasks i.e., cartography, determining absolute locations of places, hazard forecasting and mitigation, understanding causes of environmental pollution and methods to reduce its impacts, the depletion of power resources, use of alternative resources and a better awareness of environmental and climatic conditions to enhance agricultural productivity. All these issues have enhanced the scope of use of modern tools and it can be expected that use of modern tools would be fruitful in tackling certain problems associated with increase in population.

KEY POINTS

1. Computer modeling is a technology with which we can represent the real world with the help of computer program.
2. Cartography has a vital importance in geography.
3. Through remote sensing, we can analyze distant objects without touching them.
4. Geographic Information System performs four basic tasks.
5. In active remote sensing, radio waves are transmitted to the Earth from the satellite.

QUESTIONS

1. Tick (✓) the correct answer:

   i. In Global Positioning System, the satellites transmit information to Earth in the form of:

   a. signals b. radio waves c. images d. digits

   ii. Answer to a complex scientific matter can be found through:

   a. remote sensing b. GIS
   c. computer modeling d. GPS receiver

   iii. Getting information about distant objects without having physical contact with them is called:

   a. geographical information system
   b. remote sensing
   c. global positioning system
   d. computer modeling

   iv. The name of first Pakistani satellite was:

   a. Badar I b. Badar II
   c. Pak Sat I d. Sputnik

   v. The number of satellites involved in global positioning system are:

   a. 4 b. 12 c. 20 d. 24

2. Give short answers:

   i. Define a computer model.
   ii. What is meant by modeling?
   iii. Define GPS.
   iv. What is meant by remote sensing?
   v. Briefly highlight the principles of remote sensing.

3. Give detailed answers:

   i. Explain the global positioning system.
   ii. Write a note on computer modeling.
   iii. Differentiate between active and passive remote sensing.
   iv. Discuss the primary methods of remote sensing.

Activity Arrange a debate on computer modeling.

GLOSSARY

Chapter 1

Bar Graph	:	Illustrate geographical data in the form of bars
Dot Map	:	Map in which geographical data is shown by dots
Line Graph	:	Illustrate geographical data with the help of a line
Pie Graph	:	Illustrate geographical data in the form of circles or sectors of circles

Chapter 2

Barchans	:	Crescentic dunes made by deposition of wind
Continental Glacier	:	Glaciers found in polar areas
Deflation	:	Process of picking up of unconsolidated material by wind
Flood Plains	:	Depositional landform made by river in plain areas
Moraines	:	Depositional landforms made by glacier
Valley Glacier	:	Glaciers found on high mountains

Chapter 3

Continental Shelf	:	Shallow sea portion on the continental margin
Oceanic Ridges	:	Ridges found in the mid of ocean basins
Tides	:	Huge sea waves caused by gravitation of moon
Tsunami	:	Huge sea waves caused by an earthquake

Chapter 4

Cyclone	:	Wind system with low pressure in the centre
Desertification	:	Extension in the area of deserts due to scarcity of rain and human intervention
Earthquake	:	Sudden and intense vibration of the Earth crust

Landslide	:	Downslope movement of weathered rock material under the influence of gravity
Natural Disaster	:	Any natural phenomenon which may cause destruction for mankind
Volcanism	:	Eruption of lava on the Earth surface

Chapter 5

Global Warming	:	Gradual rise in average temperature of the Earth
Greenhouse Effect	:	Increase in atmospheric temperature due to absorption of heat by water vapours, dust particles and carbon dioxide
Pollution	:	Addition of unwanted solid, liquid or gaseous material in the environment due to human and natural causes

Chapter 6

Desert Region	:	The region located in between 15° to 25° latitude on both sides of equator on the western margins of the continents
Frigid Region	:	The region located from Arctic and Antarctic Circles to North and South Pole respectively
Mediterranean Region	:	The region located around Mediterranean Sea
Monsoon Region	:	The region located adjacent to the Rain Forest Region where there is abundant rainfall in summers
Rain Forest Region	:	The region of world's most dense forests along the equator
Steppe Region	:	The region located at the margins of Desert Region
Temperate Region	:	The region located from Tropic of Cancer and Tropic of Capricorn to Arctic and Antarctic Circles respectively
Torrid Region	:	The region located between Tropic of Cancer and Tropic of Capricorn
Tundra Region	:	The region of prolonged and severe winters

Chapter 7

Alpine Forests	:	The forests situated at an altitude of more than 4000 metres
Bela Forests	:	The forests found along river banks in the plains
Coast Land Climate	:	Moderate climate of an area lying adjacent to the coasts
Continental Climate	:	The climate of an inland region located away from the sea
Western Cyclones	:	The cyclones entering Pakistan from the west

Chapter 8

ECO	:	Economic Cooperation Organization
SAARC	:	South Asian Association for Regional Cooperation
Soviet Union	:	United Russia before the emergence of Central Asian States

Chapter 9

Developed Countries	:	Industrial countries with strong economic base
Underdeveloped Countries:		Countries which are backward in economic, social and engineering departments

Chapter 10

Computer Modeling	:	Practical way of performing a specific task with the help of computer programme
GIS	:	Geographical Information System
GPS	:	Global Positioning System
Remote Sensing	:	Getting information about things without having a physical contact with them