G E O G R A P H Y

The Geography is a combination of two words i.e. Geo and Graphy. Geo means land / earth and Graphy means description, it means description of earth / land is called Geography.

Cardinal Points

The four main points of the compass i.e. North, South, East and West, but the other lies in the midway between the cardinal points i.e. NE, SE, NW and SW.

Map

When the earth or part of it is transferred to a flat sheet of paper, it is called map. Before making a map, it is necessary to make a scale.

Globe

Round maps of our world are called globe.

Border

The imaginary line between two continents is called border.

Equator

It is an imaginary line drawn around the middle of the earth. If we cut along the equator, the earth separates into two hemisphere i.e. Northern Hemisphere and Southern Hemisphere. Most of the earth’s land is the Northern Hemisphere.
**Prime Meridian**

It is an imaginary line that runs from north to south poles. This creates eastern and western hemisphere. The continents in the eastern hemisphere are traditionally called Old World, while those in the western hemisphere called (U.S.A) Modern World.

**Latitude**

These are imaginary lines run east to west on the globe are called lines of latitude. OR The horizontal lines on the globe are called lines of latitude. Total latitudes are 180, 90 in north of the equator and 90 in south of the equator.

**Longitude**

The vertical lines on the globe run from North to south between the poles are called lines of longitude. Total longitudes are 360, 180 in east side and 180 in west side.
Introduction of Pakistan

Pakistan emerged on the map of the world on 14th August 1947 as a result of the partition of the Indian Sub-continent into two sovereign states namely Pakistan and India. Initially, Pakistan was comprised of two distinct areas, namely East Pakistan and West Pakistan. In December 1971, East Pakistan was separated and emerged as an independent state, ‘Bangladesh’.

Location of Pakistan

Pakistan is located between 24 to 37 North latitudes and extends from 61 to 76.5 East longitudes. The total area of Pakistan is 796,096 square km, stretching over 1600 km from north to south and about 885 km from east to west.

In the extreme north east Pakistan has a common border 585 km with China, while in the west it has a 2252 km long border with Afghanistan, known as the Durand Line. To the north west, Wakhan is the narrow strip of Afghan territory which separates Pakistan from Tajikistan. To the south west, Pakistan has a common border with the Islamic Republic of Iran. The Arabian Sea marks its southern border and to the east it has a common border with India, known as Radcliffe Award.

Pakistan has Five Provinces and Balochistan is the largest of all, then comes Punjab, then Sindh, then Khyber Pakhtunkhwa and Gilgit-Baltistan which was declared as a province on 29th August 2009.

Fig.1, Show the Location, Boundaries and Five Provinces of Pakistan.
Importance of Pakistan’s Location

1. Pakistan is located in the centre of the Islamic World as Indonesia lies in south east, Gulf States in the west, Central Asian States in northwest and Bangladesh in the east. Among these countries Pakistan has a atomic technology.

2. Pakistan enjoys a key position in South Asia because there are few links by land to the north and north west due to large mountain ranges and harsh climate. The Khyber pass provides a route to Afghanistan and the Karakoram Highway makes communication with China easier and promote the trade and tourism industry.

3. To the north and north west the areas are landlocked so Pakistan’s seaport of Karachi and Gwadar can also serve these areas.

4. Pakistan’s coastline on the Arabian Sea is in a central position for trading by sea both with South Asia, the Far East and beyond and with the Middle East to the west.

5. Karachi, a natural harbor and an important warm water port also serves as a refueling stop for ships.

6. The Jinnah Terminal, Karachi could have immense importance as an International airport.

7. To the northwest the Central Asian States possess untapped power resources such as mineral oil and natural gas, which can easily be transported through Pakistan and Iran to South Asia and South East Asian countries by constructing pipelines.

Fig.2, Shows the Location of Pakistan.
Physical Features of Pakistan

Topography

It is the study and description of the surface features of land, which includes both natural and artificial.

Topography means the study of geographical features on land surface such as mountains, rivers and desert.

With respect to the surface features of land, Pakistan can be divided into seven major topographical zones.

1. The Northern Mountains
2. The Western Mountains
3. The Balochistan Plateau
4. Potwar Plateau and Salt Ranges
5. The Indus Plain
6. Desert Areas.

Fig. 2, shows the Topographical Features of Pakistan.
Northern mountains

To the north, north-east and north-west of Pakistan there lie three ranges of mountains. The northern mountains comprise of three main mountain ranges:

- The Karakoram
- The Himalayas
- The Hindu Kush

Fig.3, shows the location of Northern mountains.

The Karakoram Range

- Karakoram means black gravel (mass of rock and ice).
- They are located to the North of River Indus and stretched from Hunza to Shyok.
- The ranges run east to west direction.
- Its average height is 6000 meters and K2 (8611) is the highest peak which is the 2nd highest peak of the world.
- These ranges have deep narrow valleys, vertically sharp cliffs form a rugged landscape.
- Karakoram pass is the highest and Khunjrab pass provide link to china through Karakoram Highway / Silk route.
- River Hunza, River Gilgit and River Karakoram provide drainage to this area.
- Precipitation in the form of snow.
- A number of glaciers exist in upper valleys such as Siachen, Hispar, Baifo, Baltoro and Batura.
- Steep slopes.
- Important valleys of the area i.e. Karakoram and Hunza.
- After the construction of KKH, a new era of progress has been opened in this region.
**Climatic Characteristics**

- Severe climate / very cold below freezing point.
- Large daily range (large difference between day and night temperatures).
- Large difference between sun and shade temperatures.
- Precipitation in the form of snow.
- Blizzards.

**Photograph of Karakoram Mountains**

![Photograph of Karakoram Mountains](image)

**Photograph of Siachin Glacier.**

![Photograph of Siachin Glacier](image)
**Climatic Effects**

- Too cold to grow food / for agriculture.
- Land frozen / covered by snow.
- Forced to stay at home and adopt indoor activities e.g. carpet making.
- No transportation / often cut off by snow.
- Need to stockpile food / fuel.
- Limited water supply due freeze in pipes.
- Danger of avalanches.
- Land sliding.

**The Himalayas**

The average height is about 4000m, these ranges are located to the south of the Karakoram ranges. They run east to west. They comprise the following sub-parallel ranges.

- **Siwaliks**
- **Lesser Himalayas**
- **Central Himalayas**

1. **Siwaliks**

- Average height is about 600-1200 meters.
- These are the most southern ranges.
- The ranges cover the Rawalpindi hills.
- These ranges have been **folded** and **faulted**.

**Fault**

A fracture in earth’s crust means the land is faulted.

**Fold**

A bend in rock strata caused by the movement of earth’s crust.

**Fig.4, shows the Himalayas.**
2. **Lesser Himalayas**

- They are located to the north of Siwaliks.
- Their altitude varies from **1800-4500** meters.
- These ranges have been folded and faulted.
- These ranges spread over Rawalpindi, Abbotabad and Mansehra district.
- There are many hill stations like *Murree, Nathia and Ghora gallies* lie in these ranges.
- In winter, precipitation in the form of snow which limits the human activities.

**Photograph of Himalayas**

3. **Central Himalayas**

- They are located in southeast of River Indus which separates it from Karakoram Ranges.
- They mostly lie in Kashmir with an average height of more than **4600** meters.
- Due to great altitude, some glaciers as *Rupal* (18 kms) are found here.
- Valley glaciations features are traced at Lake *Saif ul Maluk* in Kaghan.
- Nanga Parbat (8126 m) is the highest peak of the area.
- Some deepest valleys and gorges are also located in these ranges as Dasu-Patan i.e. 6500 m deep.
- River *Indus* is the main source of drainage for this range.
- Kaghan is the important valley of the area.
- Lake Saif ul Maluk and Satpara are the important lakes of the area.
The Hindu Kush

- They are located to the west of Karakoram and Himalayas mountains or North west of Pakistan.
- Their average height is about 5000 meters.
- These ranges guard the north and north-western borders of Pakistan.
- Main body of the mountains lie in Afghanistan where it acts as a nest of earthquakes.
- Barren mountains, steep slopes and fast flowing are typical features of the area.
- **Trich Mir** (7690 m) and **Noshaq** (7484 m) are the highest peaks of the area.
- These ranges occupy the Chitral district and northern areas of Pakistan.
- Glaciation is another important feature forming glaciers such as **Sakiz Jarab** (30 kms) and **Trich Mir** (22 kms).
- River Kabul, Ghizar and Mastuj provide the main drainage of the area.
- Important passes like **Barogil Pass** (provides link to Afghanistan through Wakhan strip), **Shandur Pass** connects (Chitral to Gilgit), **Babusar Pass** connects (Kaghan valley to Chilas), **Lowari Pass** connects (Peshawar valley to Chitral valley) lie in these ranges.
- Precipitation in the form of snow.
- Chitral, Dir and Swat are the important valleys of the area.

The Kohistan, Swat and Dir Ranges

- They are located south of the Hindu Kush Mountains.
- They are sub-parallel ranges run north to south.
- These mountains are separated by rivers, the Kohistan mountains lie between the Indus and Swat rivers, the Swat Mountains between the Swat and Panjkora rivers, the Dir Mountains between the Panjkora and Kunar rivers.
- In north they rise to 5000 to 6000 meters and southward they descent as low as 200 meters in altitude.
- Peaks are covered by snow.
- The Lawarai and Shandur are the important passes of these ranges.
- Precipitation in the form of snow.
- Agriculture is practiced in river valleys with terraced farming.
- Lumbering is an important source of livelihood.
- Tourism industry is promoting due scenic beauty of the ranges.
Life Style of People at Northern Mountains

- Sever climate makes this region extremely inhospitable so population density is extremely low.
- Transhumance or Semi-nomadic is practiced and some people go to lowland areas during winter season.
- Crops such as Wheat, maize, potato, peas, barley and millet are cultivated as terraced farming.
- Fruit farming such as apricot, peaches, plum, cherry, apple and dry fruit plants are also grown here.
- Where there is availability of water limited agriculture and settled lifestyle is practiced.
- In winter people are bound to stay at homes and adopt indoor activities e.g. carpet making.
- Limited amount of seasonal earning form tourism.
- Sheep and goat rearing is common to meet the family requirements.

Importance of Northern Mountains

- Snow capped peaks melt during summer to drain water into river Indus and its tributaries which irrigate vast Indus plain.
- Historical passes connect Pakistan to China and Afghanistan.
- A natural border to China and Central Asian Republics. A land route through Karakoram highway has been opened to carry out trade.
- A source of valuable minerals, timber and fruits.
- Provides raw material to several industries e.g. furniture, chipboard and chemical industries.
- Scenic beauty promotes tourist resorts which are a source of income to local people during summer.
- Mountain peaks provide protection to Pakistan against the cold winds from Central Asia. The temperature does not go below freezing point over the upper Indus plain and climate remains tolerable throughout the year.
**Western Mountains**

- These mountains border the western territory of the country and the western branches of the Himalayas.
- These are lower in altitude than the northern mountains.
- These ranges receive less amount of rain in winter.
- These ranges run north-south direction making boundary between Pakistan and Afghanistan.
- Western mountains can be divided into sub ranges.
  - Koh e safed
  - Waziristan hills
  - Suleiman ranges
  - Kirthar ranges

Fig. 5, shows the location of Western Mountains and Passes.
Koh - e - Safed

- They are located to the south of river Kabul and River Kurram flows in its North.
- These have east-west trend.
- Their height is up to 4700 meters.
- They are mostly snow covered and then called white mountains.
- Sikaram is the highest peak which is 4760 meters high.
- Khyber pass also lies in these ranges and connects Pakistan to Afghanistan.
- Rugged topography, steep slopes and severe winters are the main features.
- Precipitation in the form of snow.
- Large difference between day and night temperatures.
- Large difference between sun and shade temperature.
- People adopt nomadic life.
- Important valleys are Peshawar and Kohat, which are irrigated by canals from Warsak Dam on River Kabul.

Waziristan Hills

- The height is up to 3500 meters.
- These hills are located between the Kurram and Gomal rivers.
- They form rampart between Pakistan and Afghanistan except Kurram, Tochi and Gomal passes.
- Tochi, Gomal and Kurram are the important rivers that join river Indus and are known as western tributaries.
- Tochi and Gomal are important passes of the area.
- These hills are rich in minerals.
- Bannu is the important valley.
- The Kurram dam on the River Kurram is the main source of irrigation.

Suleiman Mountains

- The average height is 1500 meters.
- They are located towards the west of river Indus.
- They run for a distance of 480 kms. and merge into Marri-Bugti hills in their south.
- The highest peak of the area is Takht e Suleiman (3383 meters).
- These ranges are composed of Limestone, Sandstone and Shale rocks.
- Bolan is the important pass of the area that links Quetta and Sibbi, providing communication with Iran.
- River Bolan provides drainage to this area.

Kirthar Ranges

- The height is up to 2000 meters.
- They are located to the south side of Suleiman ranges, Balochistan Plateau in their west and Sindh province in their east.
- These ranges form a border between Sindh province and Baluchistan plateau.
- They merge into low hill ranges of Sindh.
- The area is drained by two rivers namely Hub and Layari.
Baluchistan plateau

Plateau: It is a large upland area which is almost level and usually bounded by steep slopes.

Main Features of Balochistan Plateau

- Located on west side of Sulaiman and Kirthar ranges, separates it from Indus Plain.
- Its Western boundary is marked by Iran, Northern by Afghanistan and southern by Arabian sea.
- The altitude varies from 600 – 3000 m.
- Its total area is 347,190 sq.Kms.
- This area is devoid of natural vegetation because of less rain.
- Landscape is covered with rugged mountains.
- Narrow streams flow downhill in rainy season and deposit sand, gravel and alluvial soil at the foothills.
- Some river join the Indus forming the western tributaries such as River Zhob and Kalachi.
- Some rivers fall into Arabian sea such as River Hab, Porali, Hingol and Dasht.
- Some rivers such as River Mula, Bolan and Chakar absorb into the Kachhi Sibi Plain.
- Some rivers flow westward and drain into inland depression such as Hamun-e-Mashkel.
- This plateau is rich in minerals resources such as Natural gas, Oil, Gold, Silver copper & Coal.
- It covers by small hill ranges, valleys, plains, water bodies and deserts.
- Dry climate is experienced and hot winds blow in summer.
- Winters are harshly cold including snowfalling.
- This plateau is divided into following natural topographical features.

1. Northern Basins
2. Western Basins
3. Mountain Ranges
4. The Coastal Areas

Fig.6, Shows the Location of Balochistan Plateau.

Fig.6
1. **Basins of Northern Balochistan**
   - Zhob and Loralai basins which are situated between Toba Kakar and sulaiman ranges.
   - To the south west of the Loralai basin is the Quetta valley surrounded by mountain ranges.

2. **Basins of Western Balochistan**
   - Number of basins between the mountain ranges of Chagai, Ras Koh, Siahan and Central Makran.

3. **Mountain Ranges**
   - To the extreme north there is Toba Kakar Range.
   - To the south of Quetta there is Kalat Plateau, which is criss crossed by Central Brahui ranges.
   - To the south of Kalat Plateau a triangular region of Khuzdar Knot which is subject to frequent earthquakes.
   - Chagai hills are located at Pak-Afghan border.
   - To the south of Chagai hills, Ras Koh range is located where some inland drainages called Hamuns are found.
   - To the south of Chagai hills curved shaped Siahan range is located.
   - To the south of Siahan Range Central Makran Range is located.

4. **The Coastal Areas**
   The coastal areas of the Balochistan Plateau can be divided into Eastern and Western parts.
   - The eastern part comprises the Lasbela Plain which is marked by gravel and sand dunes.
   - The western part is known as the Makran Coast. The Makran Coast has a narrow beach backed by rock cliffs. Behind the cliffs, there is a coastal plain. The coastal plain is covered with sand dunes and dotted with small hills.
     The Makran coast is noted for a number of uplifted terraces, including the Clifton hills, Manora, Cape Monze (Hawks Bay) Ormara, Gwadar and Jiwani.

**Life Style of the People at Balochistan Plateau**
- Rearing of animals (goat and sheep) is a major occupation in this area.
- Farming is practiced through Karez irrigation.
- Rain occur in winter by western depression and grapes are cultivated near Quetta.
- Marine fishing on Makran Coast provides living to the people at this area.
- Climatic conditions are ideal for flowering / ripening vegetables seeds.
- Gwadar port has a great potential for domestic as well as International trade.
- Road transport available only to main towns / Air transport is even more limited.
- Local traffic consists of camels and donkey.
- Density of population is very less (21 persons / sq.kms) due rugged terrain.

**Drainage System (Balochistan Plateau)**

The natural flow of water from an area in rivers, streams and lakes. The following rivers and lakes form the drainage system.
- River Hingol
- River Zhob
- River Porali
- River Mula
- River Dasht
- Hamun Makshel
- Hamun Lora
- Hamun Mergo.
Inland Drainage System  (Balochistan Plateau)

When the water from river or stream is absorbed into land or collects in a lake and does not join big river / sea. The following lakes form the inland drainage system.

- Hamun e Makshel
- Hamun Lora
- Hamun Mergo.

Potwar Plateau

Plateau: It is a large upland area which is almost level and usually bounded by steep slopes.

Main Features of Potwar Plateau

- The average height is about 300 to 600 meters.
- It is located Northwest side of the Punjab Province and covers the area of 18000 km².
- Its northern boundary is formed by Kala Chitta ranges and Margalla Hills, south side by salt ranges, eastern side by River Jhelum and western by River Indus.
- The plateau cover the districts of Rawalpindi, Jhelum, Mianwali and Chakwal.
- It is a bad land topographic area.
- Ravines, Ridges, Gullies, Trough and Residual hills are the main features of the area. These Gullies and Rivines are called khaderas.
- River Soam, Korang, Harro, Sill and Dharab are the main water bodies of the area.
- Kallar Kahar, Khabekai and Uchchali are main lakes of the area.
- Rock salt, Limestone, Gypsum, oil, Coal and Gas are the main minerals of the plateau.
- Important mountain ranges Khairi Murat, Kheri Mar, Bakralla Ridges, Jogi Tilla and Salt ranges.
- Soan valley is the important of the area.
- Steep slope towards south side.

Fig.7, shows the location of Potwar Plateau and Salt Ranges.
Photograph of Potwar Plateau showing a Bad Land Topographic area.

Photograph of Potwar Plateau

**Drainage System (Potwar Plateau)**

The natural flow of water from an area in rivers, streams and lakes. The following rivers and lakes form the drainage system of Potwar Plateau.

- River Soan
- River Korang
- River Harro
- River Sill
- River Dharab
- Kaller Kahar
- Khabeki
- Uchali

**Inland Drainage System (Potwar Plateau)**

When the water from river or stream is absorbed into land or collects in a lake and does not join big river / sea. The following lakes form the inland drainage system.

- Kaller Kahar
- Khabeki
- Uchali.
Salt Ranges

- Salt ranges are located to the south side of Potwar Plateau.
- Its average height is about 750 – 900 meters.
- Salt Ranges cover most of the Jhelum, Kalabagh and Mianwali districts has become famous as the salt ranges. This is because of the salt mines of Khewra, a small town about 160 km from Islamabad.
- The highest peak of the area is Sakesar (1527 m).
- Small streams like Khewra, Makrachi, Jaranwala and Jamsukh.
- It is a bad land topographic area.
- Some beautiful lakes exist in this area e.g. Kaller Kahar, Habeiki and Uchali, which add to the scenic beauty of the area.
- This area is rich in number of minerals e.g. Rock salt, Limestone and Gypsum.
Life Style of People at Potwar Plateau / Salt Ranges

- Settled life style is practiced.
- Farming depends on rainfall (Barani Farming) because rugged landscape does not allow canal irrigation. Wheat, Maize, Barley and gram are cultivated.
- Infrastructure is available and area is accessible by road, rail and air transport due to urban settlement.

Terms

Gully

It is a channel formed by flowing water along a hill slope.
**Ravine**

It is a narrow deep channel which is larger than gully.

![Photograph of Ravine](image)

**Trough**

It is a long deep valley.

![Photograph of Trough](image)

**Ridges**

It is a narrow range of hills. OR
A ridge is a long and rather narrow upland area with one or more steep sides.

![Photograph of Ridges](image)
Residual Hills

Isolated blocks of rock remaining after an extended period of erosion has lowered surrounding hills.

Photograph of Residual Hills.

Photograph of Residual Hills

Indus Plain

Plain: An extensive area of level or gently undulating land, usually of low altitude.

The Indus Plain were formed by the alluvium laid down by the River Indus and its tributaries. The River Indus is a mighty river about 2900 kilometers long. From its source in Mansorawar Lake in Tibet, the Indus flows from east to west between lofty mountains like the Karakoram and the great Himalayas. It then majestically flows into the Arabian Sea through a braided channel in Punjab and a meandering channel in Sindh Province.

Fig.8, shows the location of Indus Plain (Upper and Lower Indus Plain).
The Tributaries of River Indus

Tributary: A river or stream flowing into a larger river or lake.

The river Indus is joined by a number of tributaries from the right and from the left. In general the right-hand / western tributaries are small and carry a lower volume of water e.g. River Kabul, River Gilgit, River Kurram and River Gomal.

A number of left-hand / Eastern tributaries are major rivers which carry large volumes of water and sediments. These rivers are the Jhelum, River Chenab, River Ravi, River Beas and River Sutlej. Eventually, all of them join at Mithankot. From there, they flow as one stream under the name of Panjnad before they join the Indus. From there onwards, the Indus makes its way to the Arabian Sea without being joined by any further tributaries.

Fig.9, shows the location of River Indus and its Tributaries (Eastern and Western).

**Fig.9**

**Indus plain** is divided into two parts.

1. **Upper Indus Plain**

2. **Lower Indus Plain**
1. **Upper Indus Plain** (Features and comparison)

- The area between **Attock** to **Mithankot** is called Upper Indus Plain.
- Located in the northern part of the Indus Plain.
- Nearly flat, undulating plain and sloping towards the south-west.
- It stretches over the whole Punjab Province approximately.
- River Indus and its major tributaries flow here.
- River Jhelum, Ravi and Sutlej have joined the River Chenab at Panjnad to form the River Panjnad which joins the Indus near Mithankot.
- The average width of the Indus is 1.4 km till Kalabagh and 1.6 km near Sukkur.
- River Indus is in its middle course in the north and enters its lower course towards south.
- Both erosion and deposition take place.
- Meanders, Oxbow-lakes, Braided Channel and Levees are present in doab areas.
- Doabs and Bars / Alluvial Terraces are formed between the rivers exist in this area.
- Piedmont Plain with alluvial fans to the north and west.
- Ideal for industries and agriculture with a network of perennial and link canals.

\Fig.10, shows the location of Upper Indus Plain.

![Upper Indus Plains](image)

**Fig.10**

**Landforms / Natural Topographical Features of River Indus**

Land forms of **River Indus** can be divided into **four** parts.

1. **Active Flood Plain**
2. **Old Flood Plain**
3. **Scarp / Bluff**
4. **Alluvial Terraces / Bars**.

1. **Active Flood Plain**

   Flat area.
   Flooded every year.
   New alluvium is deposited.
   Meanders, Oxbow-lakes, Braided Channel and Levees are present.

2. **Old Flood Plain**

   Flat area.
   Flooded every 7/8 years due to severe flood.
   Old alluvium is deposited.
   Meanders, Oxbow-lakes, Braided Channel and Levees are present.
   Fit for agriculture.
3. **Scarp / Bluff**

   Steep slope.
   Fit for agriculture.

4. **Alluvial Terrace / Bar upland**

   **Bar Upland**: Highland built by river deposition.
   Flat / level area.
   Old alluvium is deposited.
   Fit for industry, houses and agriculture.

**Piedmont Plains**

Plain stretching out from the base of a mountain.

Piedmont plains are located at the foothills of the Sulaiman, Kirthar and Himalayas mountains. The most dominant features of the Piedmont plains are the Alluvial Fans or cones that develop eastward from the Sulaiman and Kirthar mountains.

When most of the rivers or streams coming from the Sulaiman and Kirthar ranges have low water flows. They become active only during the rainy season, when they flow down the mountain slopes swiftly. As they reach the foothills, they become slow and split into narrow channels that fan out on to the slopes. The material brought down by the water is dropped within the narrow channels of the streams. The gravel, sand and alluvium deposited by rivers form alluvial fans. There are extensive areas of alluvial fans on the eastern side of the Sulaiman and Kirthar ranges. The Sulaiman Piedmont plain is also known as Derajat. The piedmont plains are mainly agricultural.

The Derajat consist of the trans-Indus territory and are located between River Indus and Sulaiman Mountains covering an area of 2 million hectares in the districts of D.G. Khan Ranjipur plus adjacent tribal areas in the Punjab and D.I. Khan in Khyberpaktunkhan.

**Alluvial Fan**

Fan like deposit made by a river at the base of a hill
Photograph of Alluvial Fan

**Meander**
The zig zag winding course of river is called meander.

Photograph of Meanders

**Ox-Bow Lake**
It is a curved river channel cut off from the main stream.

Photograph of Ox-Bow Lake
Levees
Natural embankment built on the banks of a stream by deposition.

Fig. 11 shows the formation of Levees.

![Fig. 11](image)

Braided Channel
A channel which flows into shallow interconnected channels divided by deposited material.

![Photograph of Braided Channel](image)

Doab
Area between two rivers called doab. Well known doabs are the following.

**Bari Doab:** Area between River Sutlej and River Ravi. Following districts are Included in it. Lahore, Kasur, Okara, Shaiwal, Pakpattan, Vehari, Multan, Khanewal and Lodhran.

**Rechna Doab:** Area between River Ravi and River Chenab. (Sialkot, Narowal, Gujranwala, Hsfizabad, Jhang, Faisalabad and Toba-Tek-Singh).

**Chaj Doab:** Area between River Chenab and River Jhelum. (Gujrat, Sargodha, Mandi Bahauddin and north western part of Jhang).
Sindh Sagar Doab: Area between River Jhelum and River Indus. (Khushab, Mianwali, Leah and Muzaffargarh).

**Alluvial Terraces / Bar upland**

Alluvial Terraces / Bar Upland: Highland built by river deposition.

Alluvial Terraces have developed in some parts of the interfluvés / Doab of the Upper Indus Plain. The interfluvés are locally called Doabs and the terraces are called Bars. These terraces were formed the deposition during the past. Well known terraces are the following.

- Kirana Bar in Chaj Doab.
- Sandal Bar in Rechana Doab.
- Ganji Bar in Bari Doab.
- Nili Bar in between the old bed of River Beas and River Sutlej.

Fig. 12, shows the location of Doabs and Bars.

![Map of Pakistan showing the locations of Sindh Sagar Doab, Alluvial Terraces, and Bahawalpur Plain](image_url)

**Bahawalpur Plain**

The Bahawalpur plain is grouped with the doabs because of the riverain tracts locally known as sindh and an upland identical to the bar upland. The north eastern part is a cover and meander flood plain, the central area is a sandy plain being leveled and irrigated and the south western part is a cover flood plain of Dera Nawab. Along its southern border is the Ghaggar channel way. Bahawalpur, Bahawalnagar, Chistian and Rahim Yar Khan’s irrigated areas are best known for cultivation (cotton).
2. Lower Indus Plain

- The area between Mithankot to Thatta is called Lower Indus Plain.
- It is located in the southern part of the Indus Plain.
- Nearly flat, undulating plain and sloping towards south.
- It stretches over the whole Sindh Province approximately.
- River Indus flows alone.
- River Indus flows into the Arabian Sea south of Thatta.
- Width of the River Indus is 1.6 km.
- River Indus is in its lower course.
- Deposition is the main function of River Indus.
- Meanders, Oxbow-lakes, Braided Channel and Levees are present.
- Doabs and Bars / Alluvial Terraces are not present.
- Cuesta is (A ridge of limestone) present.
- Piedmont Plain with alluvial fans to the west.
- Ideal for industries and agriculture with a network of canals.

Fig.13, shows the location of Lower Indus Plain.

The Kachhi-Sibi Plain

It is a barren area which is bounded on the north by the Marri-Bugti Ranges and on the west by the Kalat Range and southern by Indus Plain. Heat and aridity are the common characteristics of this area.

Cuesta

It is a ridge of limestone with a steep slope and a gentle slope. The steep slope of a cuesta may also be called a scarp. The gentle slope of a cuesta is known as the dip-slope or back slope. They are only two in Pakistan namely Rohri and Ganjo Takar. Both are located in the lower Indus Plain. These limestone ridges provide a firm foundation for the construction of Barrages for irrigation. They also add to the scenic beauty of the area.
Indus / Tidal Delta

**Delta:** Triangular deposition made by river at its mouth is called delta.

When River Indus reaches near Arabian Sea its speed is reduced due to load (Sand, Clay) and low gradient. So it divides into many smaller and larger distributaries. It is the 7th largest delta in the world with an area 780 sq.km.

In Pakistan only two rivers form the delta e.g. River Indus forms delta called Indus Delta and River Hub forms delta called Hub Delta.
Features of Indus Delta

- It is located to the south of Thatta.
- The larger distributaries are Ochito and Gungro.
- The smaller distributaries are Kalri and Panyari.
- Sea water often fills up Troughs between distributaries, resulting Mangrove forest.
- There are some depressions in deltic areas which are filled with water during flood, locally called Dhands / ox-bow lake.
- Levees formed due to deposition of alluvium on the banks of distributaries.

Conditions (Formation of Delta)

➢ The River must carry the load.
➢ The River must deposit the load.

Fig. 15, shows the formation of Indus Delta.

Fig. 16, shows the location of Indus Delta.
Desert Areas

Desert: A large barren area of land that has very less rain / no rain called desert.
The most important deserts in Pakistan are the following:

1. Thal Desert / Sindh Sagar Doab
2. The Thar Desert (Thar desert has three parts)
   - Cholistan / Rohi
   - Nara / Pat
   - Tharparker
3. Kharan Desert

Features of Desert Areas

- Very hot in summer season and temperature remain above 40\(^\circ\)C.
- Arid conditions prevail (little or no rain).
- Winters are mild (Temperature remain 10\(^\circ\)C to 20\(^\circ\)C).
- Dust Storms / hot dusty winds blow during May to September.
- Sand dunes are present, they are in different shapes like Latitudinal, Longitudinal, Transverse and Crescent.
- Sand plains are present.
- Large daily range.
- People adopt nomadic life and rear goat and sheep.
- Little / no agriculture due to shortage of water e.g. grams are cultivated.
- Little / no vegetation i.e. thorny bushes (mostly acacia) is a general picture of desert.
- Mineral deposits such as coal, oil and gas fields are present in Thar desert.

Fig.17, shows the location of Desert areas in Pakistan.

![Fig.17](image-url)
Photograph of Deserts areas.

Photograph of Desert Areas

Photograph of Sand Dune

Photograph of Sand Dune

**Life Style of People in Desert areas of Pakistan**

- People adopt nomadic life in summer due to extreme hot and lack of water.
- People keep goat and sheep.
- Camels are widely used for transportation.
- Rabi crops are cultivated i.e. wheat and gram.
- Handicraft industries related to hide and wool are popular.
- Density of population is very less due to harsh climate and poor facilities.
**Avalanches**

The huge masses of snow that move down the slopes.

**Photograph of Avalanches.**

![Photograph of Avalanches](image)

**Landslide**

The movement of rocks and soil down the mountain slopes known as landslide.

**Photograph of Landslide.**

![Photograph of Landslide](image)
Photograph of Landslide.

Photograph of Landslide

Photograph of Landslide
Photograph of Landslide.