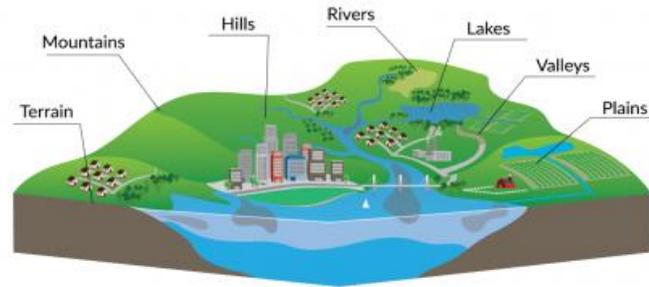


The Natural Topography

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



6 Topographic Areas of Pakistan:

1. The northern mountains and north-western mountains.
2. The Western Mountains
3. The Balochistan Plateau
4. Potwar Plateau and Salt Range
5. The Indus Plain
6. Desert Areas



The northern mountains and north-western mountains:

- To the north, north-east and north-west of Pakistan lie three mountain ranges.

The Karakoram Range (6000 m):

- It means 'black gravel'.
- It is a mass of rock and ice.
- Extends for more than 400 km from Hunza to the Shyok River.
- The western part of the range lies in Pakistan.
- The range runs east-west, has deep narrow valleys and sharp peaks thus forming a very rugged landscape.
- The average height of the mountain is 6000 meters.
- K-2, the second highest peak in the world (8610 meters) is located here.
- The precipitation is mainly in the form of snow because of the high altitude.
- There are glaciers instead of rivers in the upper regions.
- The extreme climatic conditions make it a less populated region.

- The passes which exist here are open only in summer.
- A nomadic or semi-nomadic way of life is common.
- Apple, barley and millet are grown in areas which have water.
- Cattle breeding is common.
- The Karakoram Highway connects Pakistan to China.
- The old name of the Karakoram Range is the Silk Route.

The Himalayas (4000 m):

- They are located to the south of the Karakoram Range.
- They run east to west.
- 600 - 8126 meters
- These include:

a) The Siwaliks

- The Siwaliks are the low altitude (600 - 1200 metres) hills located near Attock.

b) The lesser or outer Himalayas

- The lesser or Outer Himalayas are of medium altitude. (1800 - 4500 meters) and are represented by the Pir Panjal range.
- They have many popular hill stations e.g. Murree, Nathia Gali and Ghora Gali.

c) Central Himalayas

- The Central Himalayas mostly lie in Kashmir.
- They have snow-capped peaks, with huge glaciers causing deep erosion, and by rich natural vegetation in the valleys.
- The highest peak of this range is Nanga Parbat (8126 meters)

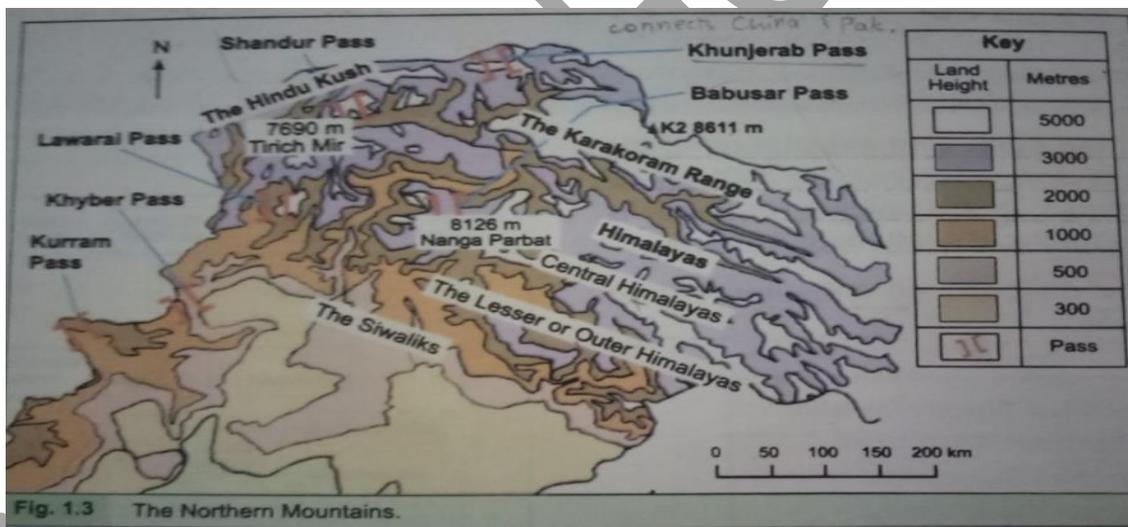
Hindu Kush (5000 m):

- The Hindu Kush Range lies where the borders of Afghanistan and China meet.
- This range runs in a north-south direction.
- It has mountains like Tirich Mir (7690m) and large glaciers it resembles the Karakoram Range.
- The high, steep valley sides and the fast flowing rivers are typical features of the Hindu Kush.
- Passes of the Hindu Kush have great historical significance.

- Many invaders like Alexander the Great crossed the Hindu Kush through these passes.
- The mountains are bare of vegetation.
- Some rich forests are found in the extreme south east and in the hills of Swat, Kohistan, Panjokara Valley and Dir district.
- Rice is cultivated on terraced fields.

a) Passes of Hindu Kush

- Passes are still of importance today.
- The Shandur pass connects Gilgit and Chitral.
- The Shangla pass links the Swat valley to the upper part of the Indus Valley.
- The Lawarai pass connects Chitral to the Swat Valley and the Vale of Peshawar.



The Mountain Valleys:

1. Swat (Hindu Kush)
2. Chitral (Hindu Kush)
3. Dir (Hindu Kush)
4. Gilgit (Karakoram)
5. Hunza (Karakoram)
6. Baltistan (Karakoram)
7. Murrie and gullies (Himalayas)
8. Kaghan (Himalayas)

Importance of the Northern Mountains:

The northern mountains hold immense importance because of a number of economic and physical factors such as;

1. Snow Capped Peaks melt during summer to drain water into River Indus and its tributaries which irrigate vast Indus Plains.
2. A natural border to China and Central Asian Republics. A land route through Karakoram Highway has been opened to carry out trade.
3. 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.
4. Historical passes connect Pakistan to China and Afghanistan.
5. A source of valuable minerals, timber and fruits. Provides raw material to several industries e.g. furniture, paper, chipboard industry, chemical industry etc.
6. Scenic beauty promotes tourist resorts which are a source of income to local people during summer.

People and Economy in the Northern Mountains:

- Life is difficult in the Northern Mountains due to lack of infrastructure facilities e.g. bridges over rivers and roads.
- Most of the population is dependent on agriculture and cattle breeding.
- Fruit farming e.g. dry fruits, apples, apricots, etc.
- Crop farming, mainly terrace farming where wheat, rice, barley, maize and vegetables are grown. (crops grown on small flat patches on mountains and hill slopes)
- In winters while staying indoors, cottage industry, e.g. carpets, rugs, straw items, handicraft items, embroidery etc.
- Only a few major industries e.g. fruit processing industry, vegetable oil, refining sugar and drying apricots.

- Northern mountains have major hydro-electric potential, but the development requires huge capital investment, which is unavailable. Skilled labor is also limited due to literacy rates.
- People may face safe drinking water shortages, poor health, low living standards and malnutrition.
- Limited options of seasonal earning from tourism.
- Livestock farming usually transhumance (seasonal migration of farmers with herds of livestock).
- Trade activity between some major towns e.g. Murree, Rawalpindi, Gilgit, Punjab, Kaghan, etc. due to transport linkages.

Economic Potential and Importance:

- Huge water reserves for HEP (Hydro Electric Power) & irrigation crops in the Indus plains.
- Natural routes and passes that link Pakistan with China, Afghanistan & Central Asia via Afghanistan; KKH to play a vital role in future.
- Natural protection by mountains peaks and scenic beauty of valleys slopes, peaks, and glaciers may help tourism industry.
- Forests act as natural habitat to wildlife; also provide timber, firewood & wood for many industries, e.g., furniture & sports goods.
- Untapped minerals e.g. limestone etc.

Effects of Human Environment on Physical Environment:

- Threat to physical environment due to growing population.
- Economic soil erosion & landslides.
- More deforestation due to failure of supply of natural gas, meeting the needs of livestock, construction of roads & rapidly growing population.
- Over grazing on high pastures lead to soil erosion.
- Roads construction have increased the destruction rate of forests and landslides.
- Water pollution due to negligence by tourists & the government, leading to water-borne diseases e.g., cholera etc.

Topographical/Relief Features of the Northern Mountains:

- Parallel ranges run mainly from West to East.
- The height of the ranges increases from South to North.
- Attain high altitude - rise to over 6000m up to 8475m.
- High passes such as Khunjerab Pass, Lawarai Pass and Shandur Pass.
- Snow fields/glaciers.
- Snow-capped peaks/steep slopes.

Drainage features of the Northern Mountains:

- Natural drainage is the natural run-off of water from an area in rivers and streams.
- The river Indus and its tributaries, which originate from the northern mountains dominate the drainage pattern.
- River Indus starts from Manasarovar Lake in Karakoram Range. It then joins River Kabul in Hindu Kush. After forming deeply dissected valleys & gorges River Indus goes south at Kalabagh and enters plains.
- The eastern tributaries of river Indus originate from Himalayas and after passing through Kashmir enters into the plain joining the river Indus.

The Western Mountains:

The Western Mountains consists of many parallel ranges not as high as the Northern Mountains.

- Safed Koh Ranges up to 4712 meters
- Waziristan Hills up to 3513 meters
- Suleiman Range up to 3383 meters
- Kirthar Range up to 2174 meters

Safed Koh Range (White Mountains):

- Located in an east to west direction south of the Kabul River.
- Peaks are covered with snow.
- River Kurram flows to the south of this range and the Kurram Pass provides a route into Afghanistan.
- Kohat Valley is located at the other end of the Kurram Pass.

- Wheat, rice and sugarcane are cultivated here.
- Another Valley in this region is the Vale of Peshawar drained by the Rivers Kabul and Swat. It is a fertile, alluvial plain irrigated by canals originating from the Warsak Dam on the River Kabul.

Waziristan Hills:

- Located between Kurram and Gomal Rivers.
- Highly mineralized zone.
- Bannu Valley is located to the east of Waziristan Hills. Bannu, near the Toci Pass, Dera Ismail Khan, near the Gomal Pass, are important towns and military centers. It is a low-lying basin bordered by hills, mountains, and drained by streams, with braided channels.
- Kurram Dam on the Kurram River is the main source of irrigation.

Suleiman and Kirthar Range:

- Located towards the west of River Indus and arises to an average height of 1500m.
- Takht-i-Sulaiman 3383 meters is the highest peak in Suleiman Range.
- Limestone and sandstone are the main minerals.
- Kirthar Range is further towards the south backed by the Pab Range.

Passes of the Western Mountains:

- Khyber Pass - Wide enough to facilitate the passage of troops. Leads to the fertile Vale of Peshawar.
- Kurram Pass - Route to Afghanistan
- Tochi Pass - Connects Ghazni to Bannu
- Gomal Pass - Connects Afghanistan to Derajats
- Bolan Pass - Connects Kachni Sibi Plain to Quetta

People and Economy is the Western Mountains:

- Climate and relief doesn't support farming.

- Canal irrigation is not possible
- Transport facilities are limited except in a few urban centers like Peshawar and Kohat.
- Life is difficult because of the rugged landscape.
- Nomadic lifestyle is common.
- Sheep and goat rearing is common.
- Population density is low.

The Balochistan Plateau:

Basins of Northern Balochistan:

- Irregular depressions like Zhob and Loralai basins situated between the Toba Kakkar Range and the Suleiman Range.
- To the south west of the Loralai Basin is the Quetta Valley.
- Infrequent rainfall, but when does, rivers form narrow channels as they reach the foothills of the mountains they deposit gravel, boulders, sand and silt.

Basins of Western Balochistan:

- Chagai Hills, Ras Koh, Siahan and Central Makran.
- The area is devoid of vegetation with very less rainfall.
- Basin have no outlet to the sea.
- During rain, when the water drains into the temporary rivers and streams which flow into the basins and either soak into the ground or gather into the temporary lakes are known as inland drainage basins.
- Temporary lakes; hamuns.
- They are Salt lakes and when their water is evaporated away a salty crust is left behind called salt pan.
- Largest temporary lake is Hamun-i-Mashkel in the western part of Kharan Desert.

Mountain Ranges:

- Average altitude 600 - 3010 meters.
- Highly mineralized, especially the Chagai Hills.
- Copper, gold and sulphur.

The coastal Areas:

- Eastern and western part
- Eastern part = Lasbela Plain [gravel and sand dunes]
- Western part = Makran coast [forms narrow coastal plain]
- Important rivers: Hab, Porali, Hingol and Dasht.

People and Economy in the Balochistan Plateau

- Surrounded by mountains
- Low rainfall, dry and extreme climate. Cool summers.
- Low population density, 10 people/ sq. km.
- No major source of water, scarce. Small schemes are dependent on karez systems, tube wells and flood diversion.
- An absence of link roads and railway covers a limited area only.
- Crop farming and livestock raising is common. Around 67% labor force is involved in agriculture.

Economic wealth of Balochistan

- Mineral Resources: Antimony, gold, crude oil and natural gas. 46% gas is supplied from Balochistan. [Not in Balochistan, but at the edge of the Lower Indus Plain]
- Fruit production: dates, grapes, apples, almonds, apricots, plums, peaches, melons and pomegranates. Good opportunities for export.
- Vegetable seed industry that require chilly weather for growing seeds.
- Livestock farming is common due to scarcity of rain and lack of irrigation facility. The important livestock products: wool, goat hair and skins.
- Fishing:
 - Gawadar: 10,00 tones fish, including 200 tons of shrimp and dry salted fish to Sri Lanka
 - Passim: 2,500 tones, 400 tones is locally consumed and the balance is exported to Sri Lanka.
 - Osmara: 700 tonnes most of which is exported to Sri Lanka.

Potwar Plateau and Salt Range:

- The Potwar Plateau and the Salt Range are located to the south of Islamabad between the River Indus and the River Jhelum.
- It is an open, undulating land with extensive flat areas.
- 300-600m
- Residual hills Kala Chitta and Khairi Murat 1000m of resistant rock left behind after erosion of less resistant rocks.
- A large part of the plateau has been dissected and eroded by the action of running water.
- Dissected land is known as Badland topography of ridges, ravines and troughs.
- Soan River dominant feature forms gullies, alluvial plains-crops.
- Rich in minerals such as salt, gypsum, limestone, coal and oil.

Natural Topographical and Drainage Features of the Potwar Plateau

- Ridges and residual hills: Upto 1200m. Due to constant erosion and deposition, residual hills made of resistant rocks are found.
- Ravines and small rivers: Small Rivers erode the land and take away the alluvium during the monsoon. A feature, common in most of the landscapes.
- Troughs and depressions: Soft rocks eroded by water and wind create troughs and depression.
- Dissected and faulted land: Land showing cracks due to the uplift of the northern mountains during the mountain building process.
- Deep ravines in less resistant rocks: Running water excavates deep ravines in less resistant rock.

Salt Range:

- The mountain range which covers most of Jhelum, Chakwal, Kalabagh and Mianwali districts has become famous as the salt range.
- Salt mines at Khewra, 160km from Islamabad.

- Average height 750 to 900 meters.
- The Sakesar Peak is 1527m.
- The ranges are badly faulted and eroded by rivers.
- Lakes: Kallar Kahar and Khabeki provide scenic beauty.
- Minerals: rock salt, gypsum and limestone.

Economic Activity and Lifestyle of the Potwar Plateau

- Rich in non-metallic minerals like limestone, marble, rock salt, clays, dolomite and soapstone.
- These provide raw materials to the cement, ceramics and chemical industries.
- Oil and Gas fields are located in this region.
- Attock Oil Refinery.
- Farming depends on rainfall.
- Rugged landscape.
- Wheat, maize, barley and gram are cultivated.
- Accessible by road, rail and air transport.
- Some urban settlements like Jhelum, Chakwal, Rawalpindi / Islamabad are developed allowing population.

The Indus Plain:

- River Indus drain Indus Plain in most of Punjab and Central Sindh.
- Northern part-Upper Indus Plain.
- By Punjab (Sutlej and Chenab) the 5 main tributaries are joined.
- Punjab flows 72 kms before joining Indus near Mithakot.
- Below Mithankot in Sindh, the Indus flows as a gigantic river till it falls into Arabian Sea known as Lower Indus Plain.

Natural Topographical Features of the Indus Plain:

- Active flood plains.
- Old Flood Plain.

- Alluvial terraces.
- Piedmont plains.
- Tidal delta.
- Rolling sand dunes.

Active flood plain:

- It is the narrow strip of land on both sides of the rivers.
- Locally known as 'bet' or 'khaddar' land.
- Rich in alluvium.
- The active flood plain is found along all the rivers except for the southern half of river Ravi.
- Meanders, oxbow lakes and levees are important features.
- They are formed through erosion and deposition.

Old flood Plain:

- Meanders and cover flood plains cover the area between alluvial terraces.
- They flood only heavy monsoon rainfall.
- Covered with old alluvium. (deposited in past)
- Alluvium is good for crops, but only because it was a flood plain the water can come back, and flood crops.
- Abandoned channels, meander scars and remains of oxbows sometimes still with some water are main features.

Alluvial Terraces:

- Alluvial Terraces or bars are areas of higher ground between rivers formed by erosion of old alluvium.
- They are formed in the Upper Indus plain.
- Scalloped Interfluves.
- Alluvial Terraces is flat and has a southwest slope.
- Ideal for agriculture with help of irrigation facilities.

Cross Section of a Doab:

- A doab is the land located between 2 rivers. (active flood plain)
 - Formed with erosion.
 - Levees, active flood plain, old flood plain are main features.
 - Scarp (a long steep slope or cliff at the edge of the plateau or ridge; usually formed by erosion).
 - Farming, construction of settlement, transport links and industrial and business activities etc.
 - High population density.
1. The active flood plain is flooded nearly every year so it is an ideal land for the crops requires of water such as rice, sugarcane etc.
 2. Arable farming (growing crops) in fertile areas.
 3. Well-developed linked canal irrigation.
 4. Bar uplands are safe from being flooded. Ideal for human settlements.

Piedmont Plains:

- Piedmont Plains are located at the foothills of the Suleiman, Kirthar and Himalayan mountains.
- The most dominant features of the Piedmont Plains are the alluvial fans or cones.

Tidal Delta:

- The Indus delta is located to the south of Thatta.
- The delta is often triangular or fan shaped with the main distributaries branching out from the main river like the ribs of a fan.
- The Indus Delta has tidal flats with mangrove swamps.
- Coastal areas are generally low and flat.

- Low population density, because the land is constantly exposed to the effects of seawater in form of waves and tides.
- Agriculture is limited.
- Local communities are involved in fishing. Mangrove trees are used as a fuel wood and their leaves as fodder for animals.
- Occasional tropical cyclones cause damage to farming areas, fishing and the shanty homes.

Rolling Sand Plains:

Cuestas In the lower Indus Plain

- Rich in minerals.
- These are ridges which, in Sindh, are made of limestone.
- The Rohri cuesta-80m, 48km.
- Gango Takkar towards Hyderabad-24km.
- These limestone ridges provide a firm foundation for the construction of barrages for irrigation. They also add to scenic beauty of the area by varying the general flat landscape.

Economic Activity and Lifestyle in the Indus Plain:

- The relief & drainage encourages the growth of settlements.
- They are excellent for farming.
- Crops are grown on fertile flat land and undulating slopes.
- Cotton, rice and sugarcane are grown in summer and wheat in winter.
- A system of canal irrigation is developed because of the favorable relief for the construction of canals.

Desert Areas:

- The Sindh Sagar doab or Thal desert is located between Indus and Jhelum.

- Thar Desert is located towards Southeastern Pakistan AKA southeastern desert.
- a) Cholistan
 - b) Nara
 - c) Tharparkar (Thar)
- Kharan Desert.
 - Winds are the most important agents in desert areas.
 - Rolling sand dunes, weathering of rocks, lack of vegetation and bare rocks are the main features.

Upper Indus Plain:

- Located in the Northern part of the Indus plain.
- River Indus and major tributaries flow here.
- Jhelum, Ravi and Satluj join the Chanab at Panjnad to form the river Panjnad which joins the Indus.
- Nearly flat undulate planes sloping towards southwest.
- The average width of the Indus is 1.4 Km till Kalabagh and 1.6 Km at Sukkur.
- River Indus in its middle course in the North and enters the lower course towards the South.
- Both erosion and deposition takes place with deposition becoming increasing dominant southward.
- Meanders, Oxbow lake, braided channels and levees are present in doab areas.
- Alluvial terraces or bars are formed between the rivers.
- Piedmont Plain with alluvial fans to the north and west.
- Ideal for agriculture.

Lower Indus Plain:

- Located in the southern part of the Indus Plain.

- River Indus flows alone.
- It flows into the Arabian Sea south of Thatta through its distributaries which flow across delta.
- Nearly Flat undulating plain sloping towards the south.
- Width is 1.6km.
- River Indus in its lower course.
- Deposition is the main function of River Indus.
- Meanders, Oxbow lake, braided channels and levees are present.
- Alluvial terraces or bars and non-existent as the Indus flows alone.
- Piedmont plane with alluvial fans to the west.
- Ideal for agriculture with irrigation

Formation of Sand Dunes:

- Formed by wind.

Topographical/Relief Features of the Thar Desert:

- Sand plain/Pattis.
- Gently Undulating plain.
- Sand dunes/ridges which are longitudinal/latitudinal.
- Wide inter-dunal valleys (b/w sand dunes) with silty and clayey sediments (cultivation).
- Barren/bare rocks due to lack of water.
- Cracks in rock due to weathering.
- Rolling sand hills.

Economic Activity and Lifestyle in the Desert Areas:

- No farming due to lack of water.(Canals from Sukkur Barrage)
- Rich mineral deposits-Mineral Oil, fields in SE part of Thar.
- Nomadic Life style is common.