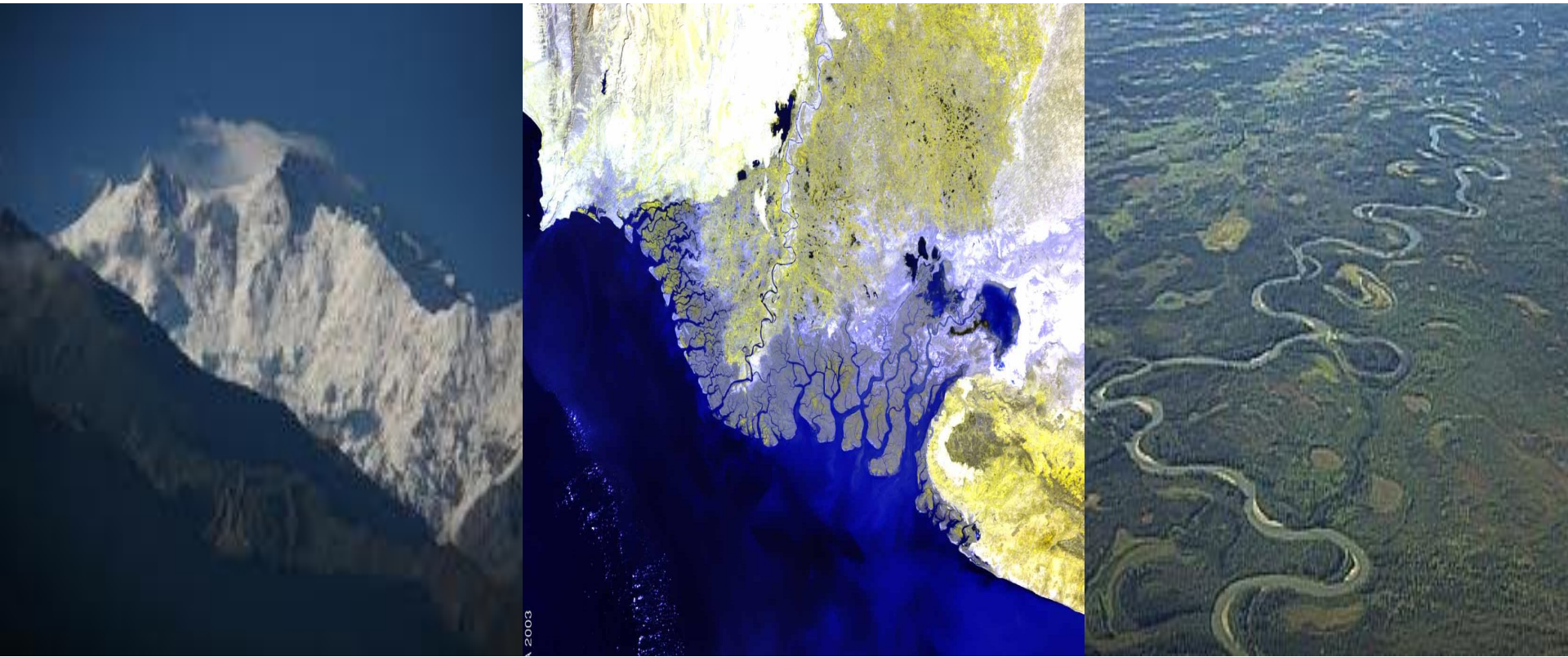


# TOPOGRAPHY OF PAKISTAN



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# IMPORTANT TERMS - I

- **Avalanche**: A huge mass of snow that moves down the slope.
- **Bar**: Alluvial terrace an old flood plain fairly high to active flood plain.
- **Bet**: Active flood plain.
- **Doab / Interfluves**: Land between two rivers.
- **Dhand**: Small salt lake.
- **Khaddar**: Fresh Alluvium.
- **Karez** : Irrigation Method used in Balochistan which consists of a water- tunnel or a narrow under ground canal.
- **Landslide**: landslide is the movement of rocks and soil down the mountain slopes.
- **Mountain**: A raised part of the earth with a peak ,steep slope attaining over 1000 meters height than a hill.
- **Range** : A group of mountains is called a range.

# IMPORTANT TERMS - II

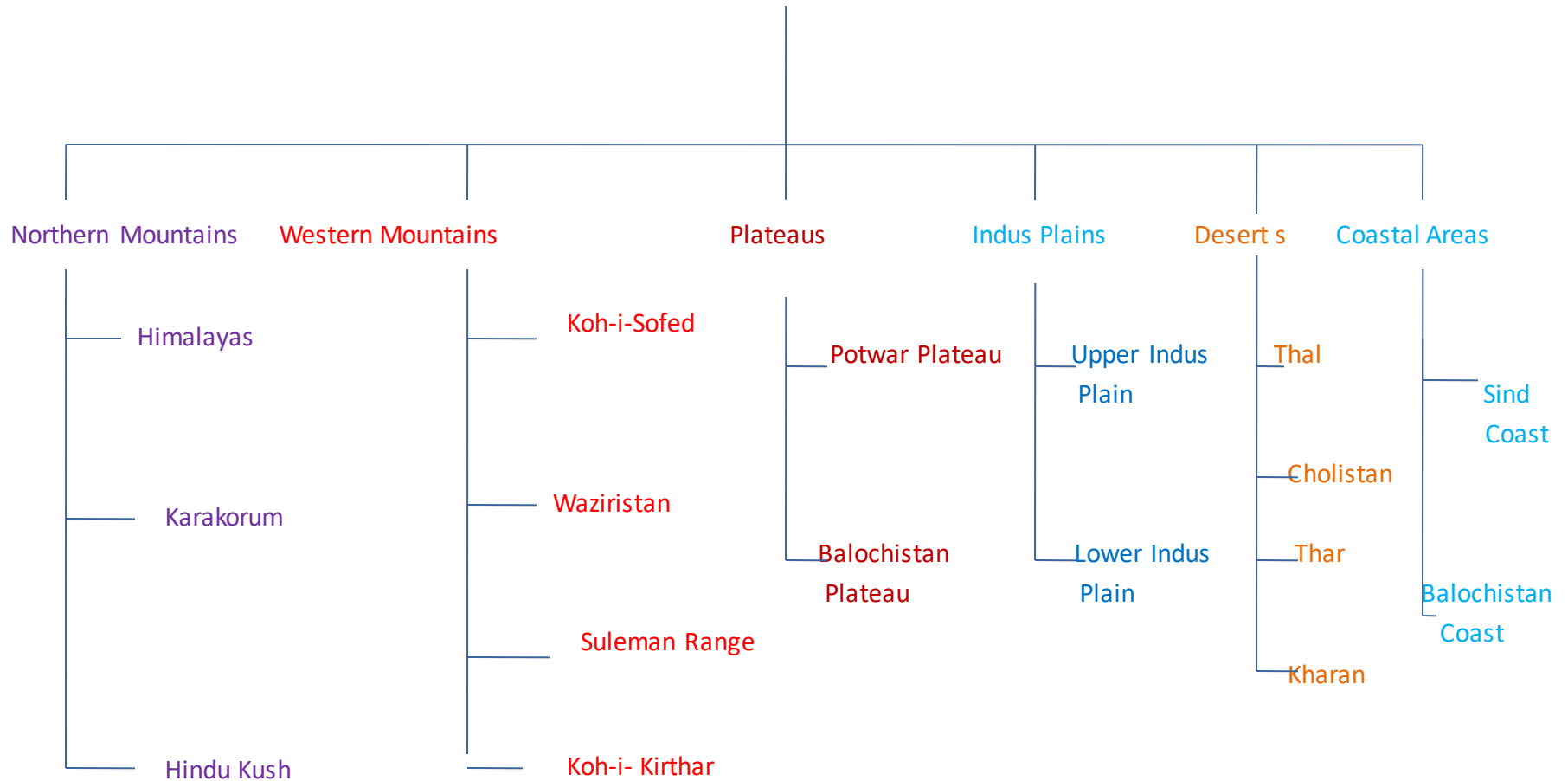
- **Plateau:** An area of fairly level high ground.
- **Plain:** A flat land with fertile soils used to grow crops.
- **Topography:** The arrangement of the natural and artificial features of an area.
- **The synonyms** of topography are land forms/ physical features/ physiography and configuration of earth surface.
- **Relief:** The specific forms of a physical feature.
- **Climate:** the generalization of the all atmospheric conditions prevailing in any area for last 30 years.
- **Economic activities:** All activities which are carried out to produce something.





# Physical Features of Pakistan

## Physical features of Pakistan



# Physical Features of Pakistan

- Pakistan can be divided into six major physical features :
  1. The Northern Mountains
  2. The western Mountains
  3. The Plateaus ( the Balochistan Plateau , the Potwar Plateau and Salt Range )
  4. The Indus Plain( Upper Indus Plain , Lower Indus Plain)
  5. Desert Areas
  6. Coastal Areas





Physical features of Pakistan

# Land forms and Drainage

## Formation of Mountains and Plains

- Millions of years ago South Asia was a part of a large land mass called **Gondwanaland**, which included **Africa, Australia and Antarctica**.
- It is estimated that South Asia broke off from the parent land mass about **130 million years** ago.
- It reached its present position about **20 million years** ago.
- After this two geomorphic processes took place which produced **two distinct physiographic regions in Pakistan**:
  - a- **The Western Highlands** which were produced by mountain –building movement(orogeny) in Himalayan Range during the tertiary period.
  - b- **The Indus Plains**, which were formed from the deposition of sediment in shallow bays by the Indus River and its tributaries in Quaternary Period.



# Plate Tectonic Theory

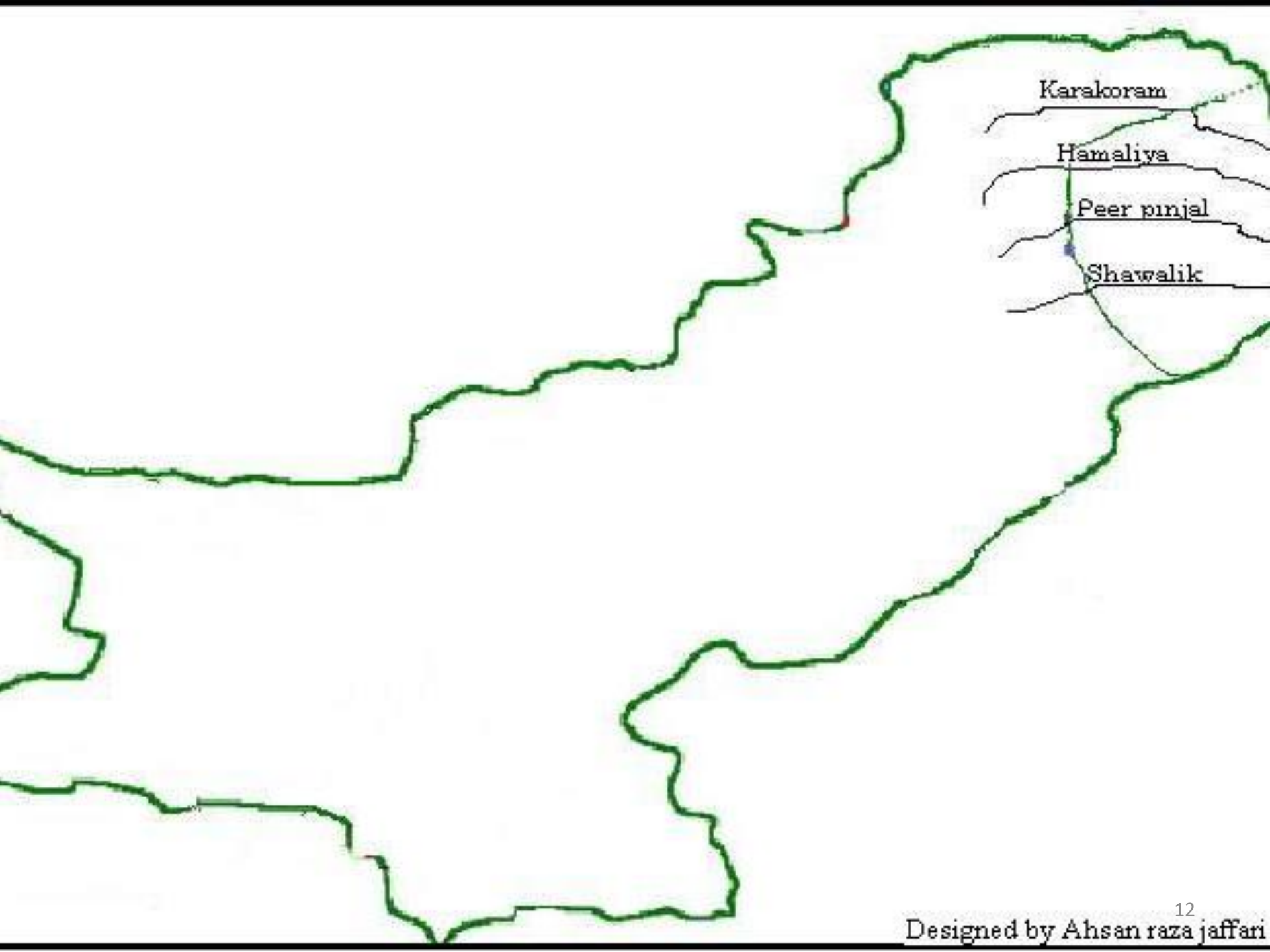
- The word 'Tectonics' comes from the Greek word 'Tekton' meaning builder.
- The theory suggests that the surface of the earth is made up of rigid plates of lithosphere which floats on the more mobile asthenosphere(35 km below lithosphere).
- the plates are in constant motion due to the movement in the asthenosphere.
- This Theory explains many of the major processes such as drifting of continents, mountain building, earthquakes and volcanic activities.
- Much of this activity occurs at the edges ,or margins, of the plates.

# Northern Mountains – An Introduction

- Northern Mountains are located to the North of Pakistan
- The ranges are stretching from East to West.
- The Northern Mountains Consists of three Ranges
  - a- Himalayas
  - b- Karakorum
  - c- Hindukush
- Average Height: 4000-6000 meters
- Relief: Lofty snowy peaks, steep slopes, gorges, cliff, gullies, passes, valleys
- Climate: Temperature- Cool summer, cold winters    Rainfall – Heavy rainfall in summer due to Monsoon , snowfall in winter
- Human and Economic Activities: Tourism is important profession  
cattle rearing, terrace agriculture and transhumance  
Moderately populated region due to mountainous terrain

# The Northern Mountains- Topographical / Relief Features, Climate, Human and Economic Activities

- The Northern Mountains are located to the North of Pakistan.
- The Northern Mountains consist of three Ranges
  - A- Himalayan Range
  - B. Karakorum Range
  - C. Hindukush Range
- Parallel ranges run mainly from West to East .
- The height of the ranges increase from South to North
- **Average height** over 6000 to 8475 meters
- **Relief:** High passes such as Khunjerab Pass, Lawari Pass and Shandur Pass is located
- Snow – capped peaks, valleys, gorges, cliff and gully are important features.
- **Climate:** Summer is mild. Winter is cold. Rainfall happens in Summer due to Monsoon winds. Snowfall occurs in winters.
- River Indus and its tributaries form the drainage system.
- **Human Activities:** Population is moderate due to mountainous terrain. Tourism is important profession. Other professions are cattle rearing and terrace agriculture.
- **Transhumance** is common in this area.





# The Himalayas

- The Himalayas extend from Assam (in India) to Pakistan in the west.
- They rise to an average height of 6000 meters. Mount Everest (8848 m) is the highest peak in the world.
- The Himalayas are represented in Pakistan by three sub parallel ranges lying south of Indus River:

The Great Himalayas

The Lesser Himalayas

The Sub Himalayas



**PAKISTAN**

**CHINA**

**NEPAL**

**BHUTAN**

**INDIA**

**Himalayas**

# The Great Himalayas- I

- **The Great Himalayas** lie south of the Indus River.
- **Location**: Their western limit is also marked by the Indus which takes to a southward turn on reaching Sazin.
- The **average height** is 6000 meters.
- **Relief**: lofty snowy peaks, glaciers, lakes, gorges ,valleys and passes are important features.
- The **highest peak** of Himalayas in Pakistan is **Nanga Parbat** (8126 meters) and it is second highest peak in Pakistan.
- Many **glaciers** are found in great Himalayas.
- The longest glacier is Rupal (south) at 17.6 km followed by Rupal (north) at 16 Km.
- **Lake Saif-ul-Maluk** in upper Kaghan valley is an old **cirque** carved by glacial action.

# The Great Himalayas- II

- The Indus River has carved a number of **gorges** in the region, including the deepest gorge in the world , located in the Dasu-Patan Region in Kohistan.
- Dasu-Patan Gorge is 6500 meters deep.
- ***Climate***: cool summer, cold winter, rainfall in summer, snowfall in winter.
- ***Economic and Human Activities***: Tourism, transhumance.





**Himalayas**

# The Lesser Himalayas

- **Location:** The lesser Himalayas are located south of the Great Himalayas.
- **Average Height:** Some of the mountains in Lesser Himalayas reach altitudes of 1800-4600 meters.
- The Lesser Himalayas are represented in Kashmir by **the Pir Punjal Mountains**.
- **Areas:** In Pakistan They are found in Batgram, Mansehra, and Abbotabad and North region of Rawalpindi District.
- Important hill resort like Murree, Natia Gali, Ayabia are located in these mountains.
- **Relief:** A relief of Mountain is found.
- **Climate:** Summer is cool and Mild. Winter is very cold. Rainfall happens in summer due to Monsoon winds. Murree is the most wettest place. It receives more than 1000 mm rainfall annually.
- **Economic Activities:** Tourism is most important profession.

# The sub-Himalayas (Siwaliks)

- **Location:** The Sub-Himalayas or the Swaliks are the southern most mountains in the Himalayan Range.
- **Average Height:** The average height is between 600-1200 meters.
- **Relief:** They are intensely folded and faulted.
- **Climate:** Summer is cool and winter is cold.
- Amount of rainfall is high. Monsoon brings heavy rainfall.

# Karakorum

- **Karakorum** means 'Black gravel' is a mass of rock and ice, extending for more than 400 km from Huns to the Shyok River
- **Location**: the Korakorum mountains lie north of the Indus River and extend northward beyond the borders of Pakistan.
- **Average Height**: the average height is 6000 meters
- **Relief**: Highest snow peak K-2 (second highest in the world) and glaciers are important features. Khunjerab pass is the highest pass in this range.
- **Climate**: Temperature remains cool in summer. Winter is very cold. Rainfall is comparatively low. Precipitation is in the form of snow usually because of a higher altitude.
- **Human and Economic Activities**: Nomadic or semi-nomadic way of life is common. Transhumance is significant activity. Cattle breeding is also common.





**Karakorum Range**

# Glaciers- An important feature of Karakorum

- **Glacier** is a tongue shaped mass of ice moving slowly down a valley. It is an avalanche of ice.
- **Glaciers** originate from the tops of the mountains
- **18 glaciers** range in length from 7 to 72 km
- The longest are Siachin (72 km) and Biafo (62.5 km) glaciers.
- The **snowline** in the southern Karakorum is at a height of about 5300 meters and in the northern KK , 5500 km.

# The Hindukush Range

- **Location:** Physiographically, the Hindukush range is the continuation of Karakorum. The water dividing the Huns River and Gilgit River is taken as the boundary between Karakorum and Hindukush Ranges
- **Average height** is about 5000 meters
- **Relief:** Snowy peaks, v shaped valleys, Passes and steep slopes
- **Climate:** Summer is cool and winter is cold and chilled. Rainfall happens in summer. Winter usually receives snowfall.
- **Human and Economic Activities:** Tourism, cattle rearing, terrace agriculture and transhumance.

# The Importance of Northern Mountains

- Sources of river water
- Irrigation and hydel-power generation
- Protection against cold Siberian winds of Central Asia
- Sources of valuable minerals
- Scenic beauty
- Tourism
- Natural guards of borders
- Historical passes
- Forests



# Peaks of Northern Mountains

Peak	Mountain Range	Height (m)
<b>K2</b>	Karakorum	8611
<b>Nanga Parbat</b>	Himalaya	8126
<b>Gasherbrum-I</b>	Karakorum	8068
<b>Broad Peak</b>	Karakorum	8047
<b>Gasherbrum-II</b>	Karakorum	8035
<b>Gasherbrum-III</b>	Karakorum	7952
<b>Gasherbrum-IV</b>	Karakorum	7925
<b>Rakaposhi</b>	Karakorum	7788
<b>Tirich Mir</b>	Hindukush	7690
<b>Noshaq SaidIstragh</b>	Hindukush	7484

Source : Khan,Fazle Karim(2008), Pakistan, Geography Economy and People, OUP  
Karachi



## K2 - Karakorum



**Nanga Parbat – Himalayas Pakistan**



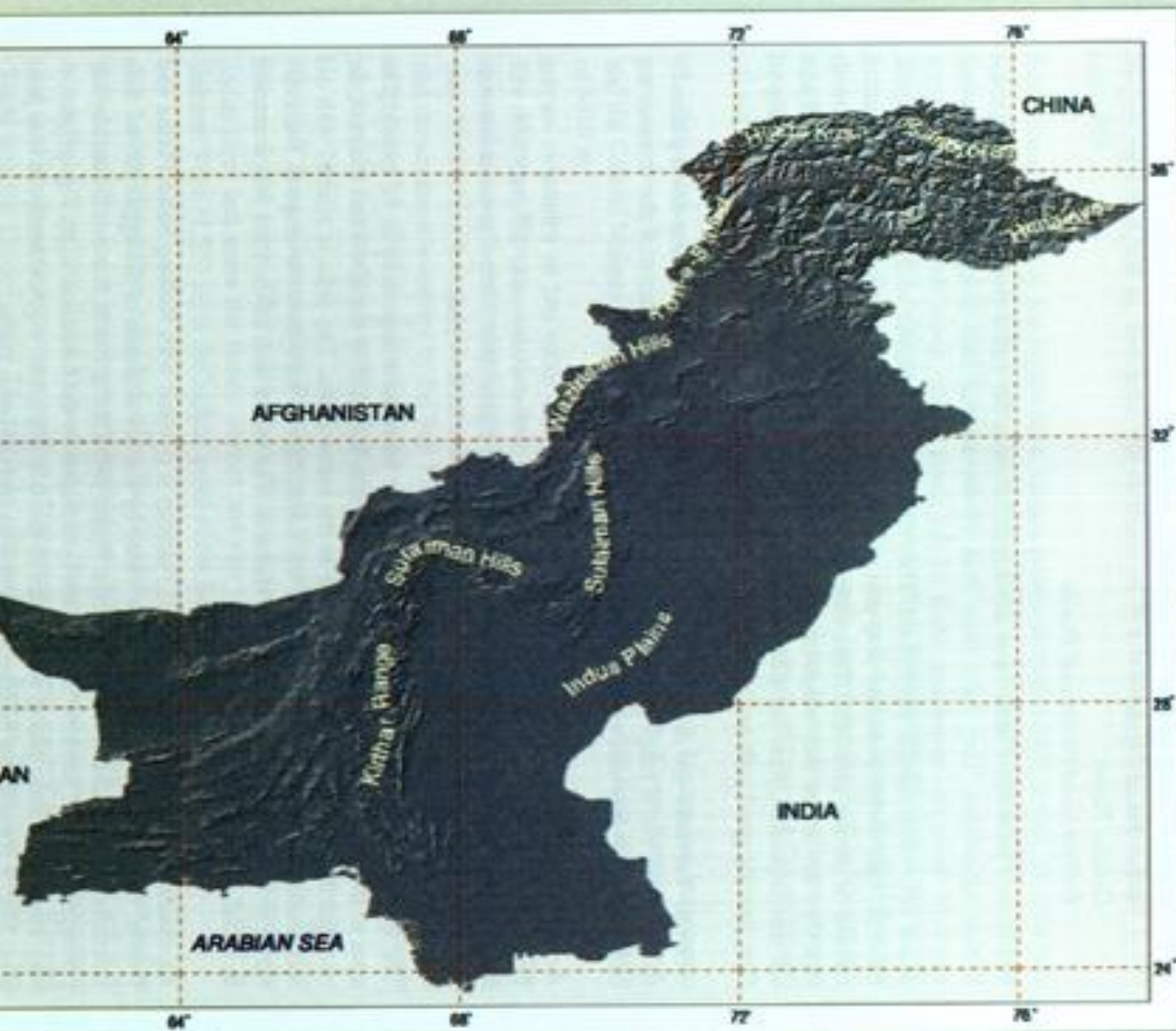


**Tirich Mir - Hindu Kush Range**

# Important Passes of Northern Mountains

Pass	Mountain Range	Height (m)	Location
<b>Karakorum</b>	Karakorum	5575	Connects Kashmir with China
<b>Khunjab</b>	Karakorum	4733	Connects N.Areas with China
<b>Dorah</b>	Hindukush	4554	Connects Chitral with Afghanistan
<b>Lawari</b>	Hindukush	3188	Connects Dir and Chitral
<b>Babusar</b>	Himalayas	4173	Connects N.Areas and Mansehra
Source : Khan,Fazle Karim(2008), Pakistan, Geography Economy and People, OUP Karachi			





Map 9  
**PAKISTAN**  
Highlands and Indus

Country Boundary/Elevation  
Digital Chart of the World  
1:1,000,000 scale (1993)



# Western Mountains

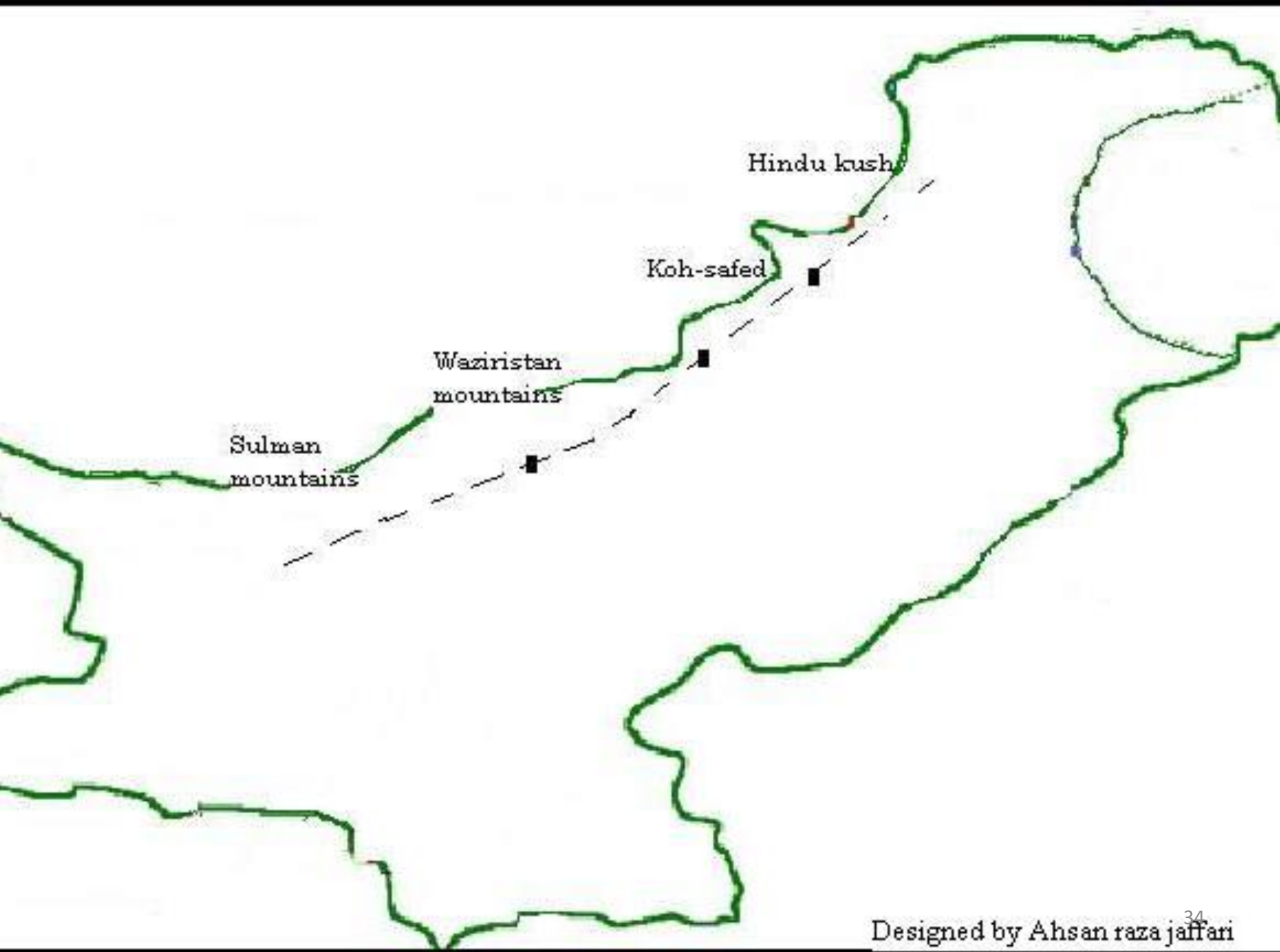
Mountain Range	Height (M)	Area
Sofed Koh Range	4712	Khyber Pukhtun Khawa
Waziristan Hills	3513	Khyber Pukhtun Khawa
Suleman Range	3383	Khyber Pukhtun Khawa, Balochistan Punjab and Sindh
Kirthar Range	2174	Sindh

# Western Mountains

Mountain Range	Height (m)	Location	Physical Features
<b>Koh-i- Sofed</b>	4712	South of the Kabul river (KPK)	Snow –capped peaks, limestone ridges. Kurram rivers form drainage pattern
<b>Waziristan Hills</b>	3513	Between the Gomal and Kurram Rivers (KPK)	Highly mineralized , devoid of natural vegetation, drained by Kurram , Tochi and Gomal rivers.
<b>Suleman Range</b>	3383	West in the River Indus in South Punjab, KPK, Sindh and Balochistan	Composed of limestone, shale, and sand stone, barren terrain.
<b>Kirthar Hills</b>	2174	West of the River Indus in Sindh	Low hilly terrain devoid of vegetation. Drained by Hub and Lyari rivers.

# Western Mountains-Topography Relief Height Climate and Economic Activities

- **Location:** The Western mountain ranges are located to the North Western part of Pakistan.
- They stretch from North to South in Khyber Pukhtun Khawa, Balochistan Sindh and some part of Punjab.
- **Average Height :** 3000 to 4000 meters.
- **Relief:** Barren hard rocky terrain, steep slopes, v-shaped valleys, snowy peaks and passes.
- **Climate:** Summer is cool on the peaks. Temperature is comparatively high in the valleys. Winter is cold and chilled. Amount of rainfall is low. Western depressions bring rainfall in winter.
- **Economic & Human Activities:** Cattle rearing, agriculture in the valleys and transhumance are important economic and human activities. Population is scarce
- Western Mountains consists of four ranges:
  - a- Sofed Koh Range
  - b- Waziristan Hills
  - c- Suleman Range
  - d- Kirthar Range





# Western Mountains- The Sofed Koh Range

- **Location:** The Kabul river separates the Sofed Koh Ranges from Northern Mountains. Sofed Koh Ranges are located in Khyber Pukhtun Khawa.
- The Sofed Koh Ranges have East – West declination.
- **Average Height:** 3600 meters.
- **Relief:** Snowy peaks, valleys and steep slopes.  
Highest peak is **Sekaram** attains **4760** meters height.
- **Climate:** summer is cool winter is cold. Rainfall is low and happens in winter due to western depressions.
- **Economic Activities:** Agriculture in valleys, cattle rearing and transhumance are important economic activities. Moderately populated.
- **Passes:** Kurram, and Tochi is an important pass.
- **Rivers:** Kurram, Tochi and Gomal flows to south of this range to merge into River Indus. Peshawar and Bannu are important valleys

# Western Mountains-Waziristan Hills

- **Location**: This range is located between the Kurram and Gomal rivers in KPK to the North West of Pakistan.
- **Average Height** : 3513 meters
- **Relief**: this range consists of low hilly areas with Peaks, barren slopes and valleys.
- **Climate**: Summer is comparatively mild and winter is chilled. Snowfall happens on peaks, western depressions cause rainfall.
- **Drainage** Patterns: River Gomal, Tochi and Kurram
- **Passes**: Gomal, Tochi and Kurram connects Pakistan with Afghanistan.
- **Economic Activity**: Mining, agriculture in valleys, transhumance. Population is scarce due to difficult terrain.

# Western Mountains – The Suleman Mountains

- **Location**: from South Waziristan southwards the Suleman Mountains run for a distance of 400 Km. They comprise to parallel to sub parallel curved range 20-25 km wide.
- **Average Height**: The slope southwards from an average of 3440 m in the North to 1600 m in the south.
- **Relief**: lofty peaks , gorges and barren steep slopes and valleys.
- **Rivers**: Gomai, Bolan, Zhob and Loralai
- **Highest Peak**. Takht-i-Suleman 3487 meters
- **Passes**: Kojak, Bolan.
- **Valleys**: Quetta, Loralai, Zhob etc.
- **Economic Activities**: Mining, Agriculture in valleys, Transhumance and cattle rearing.

# Western Mountains- Kirthar Mountains

- **Location:** South of the Quetta syntaxes, the Kirthar Mountains run southward to Arabian sea. They stretch from Balochistan to Sindh. They are about 400 km long and 30 km wide located to the North west of Pakistan.
- **Average Height:** 2174m, low height hills.
- **Relief:** Bare of vegetation due to little rainfall, they consists of shale, lime stone and sand stone.
- **Climate:** Temperature is comparatively high than other mountains in summer, winter is cold. Rainfall is scarce.
- **Economic Activity:** Mining, Agriculture , cattle rearing and transhumance.

# Important Passes of Western Mountains

Pass	Mountain Range	Height (m)	Location
<b>Khyber</b>	Sofed Koh	1067	Connects Kabul with Peshawar
<b>Kurram</b>	Sofed Koh	-	Connects Pakistan with Afghanistan
<b>Tochi</b>	Sofed Koh	-	Connects Pakistan with Afghanistan
<b>Gomal</b>	Waziristan Hills	-	Connects S. Waziristan with Afghanistan
<b>Bolan</b>	Suleman	989	Connects Quetta with Sibbi plains
<b>Khojak</b>	Toba Kakar	1312	Connects Quetta with Kandahar Afghanistan

Source : Khan,Fazle Karim(2008), Pakistan, Geography Economy and People, OUP  
Karachi





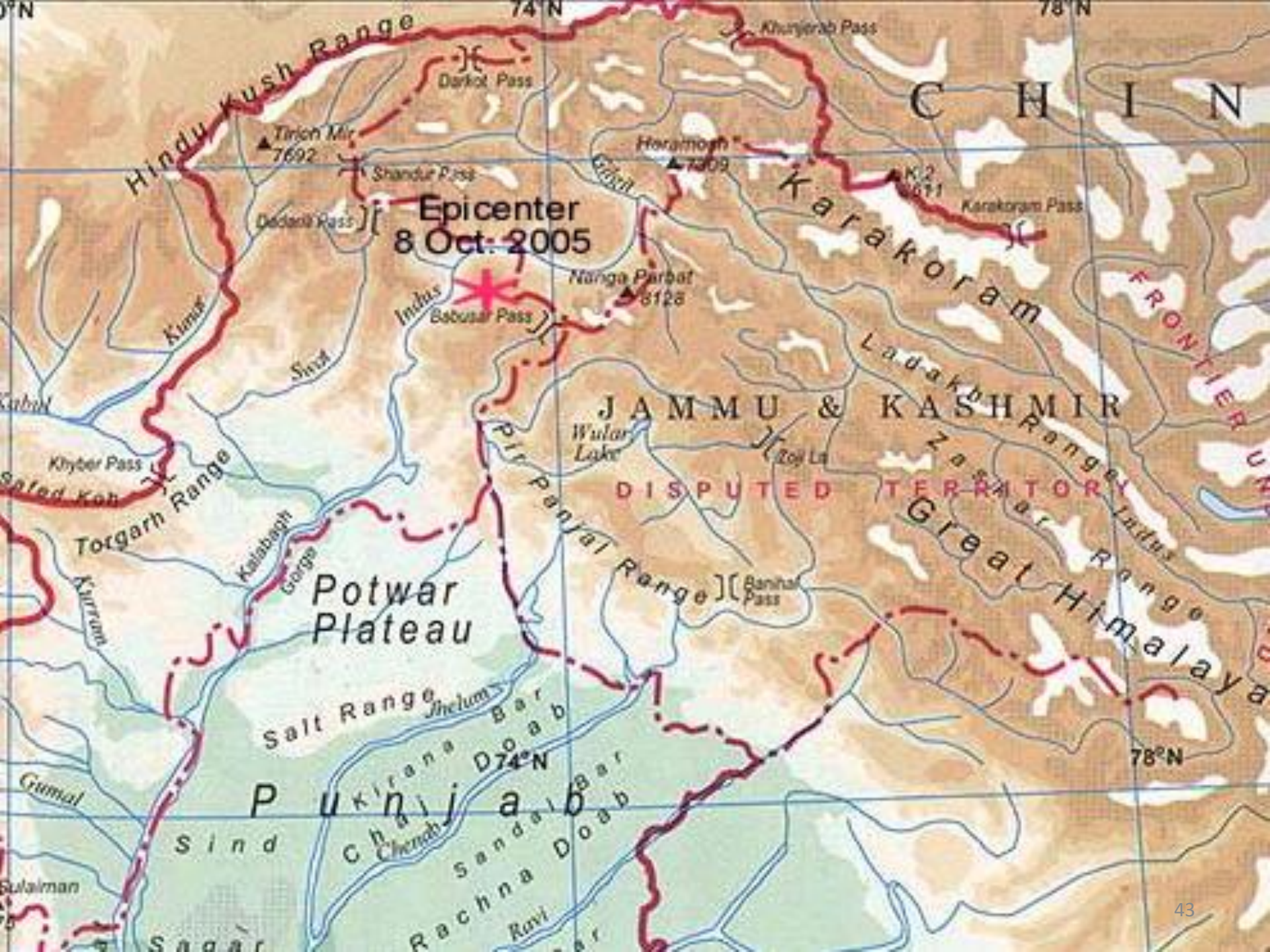
## Plateaus of Pakistan - Balochistan and Potowar



# Plateaus- Balochistan Plateau

<b>Location</b>	East : Suleman Range Murri-Bugti hills West: Koh-i-Siahan ,Koh-i- Tuftan North East: Loralai, Zhob (Baji valley) North : Chagi Hills , Toba Kakar Range South : Central Makran Range It consists of whole province of Balochistan
<b>Average Height</b>	600 to 900 meters
<b>Relief</b>	Vast rocky barren desert surrounded by mountains from all sides , therefore, it is also known as “CUP SHAPED” plateau.
<b>Drainage Patterns</b>	Drainage pattern of Balochistan plateau is different from other parts of Pakistan. There three types of rivers . A – fall into Arabian sea (south part) B- merge into plateau(central part) C- merge into Indus river (North East). Rivers swell in winter. Playa/ Salty Water lakes known as Hamun. (Hamun-i- Maskhail, Lora and Murgho).
<b>Climate</b>	Hot and dry summer. Cold winter. Sibbi is hottest place of Balochistan. Scarce rainfall varies from 150-300mm annually. Western depressions bring rainfall from January to March in winter.
<b>Human &amp; Economic Activities</b>	Population is scarce. Rich in minerals. Agriculture in valleys. Fresh fruits and wheat is produced. Mining and transhumance is important.





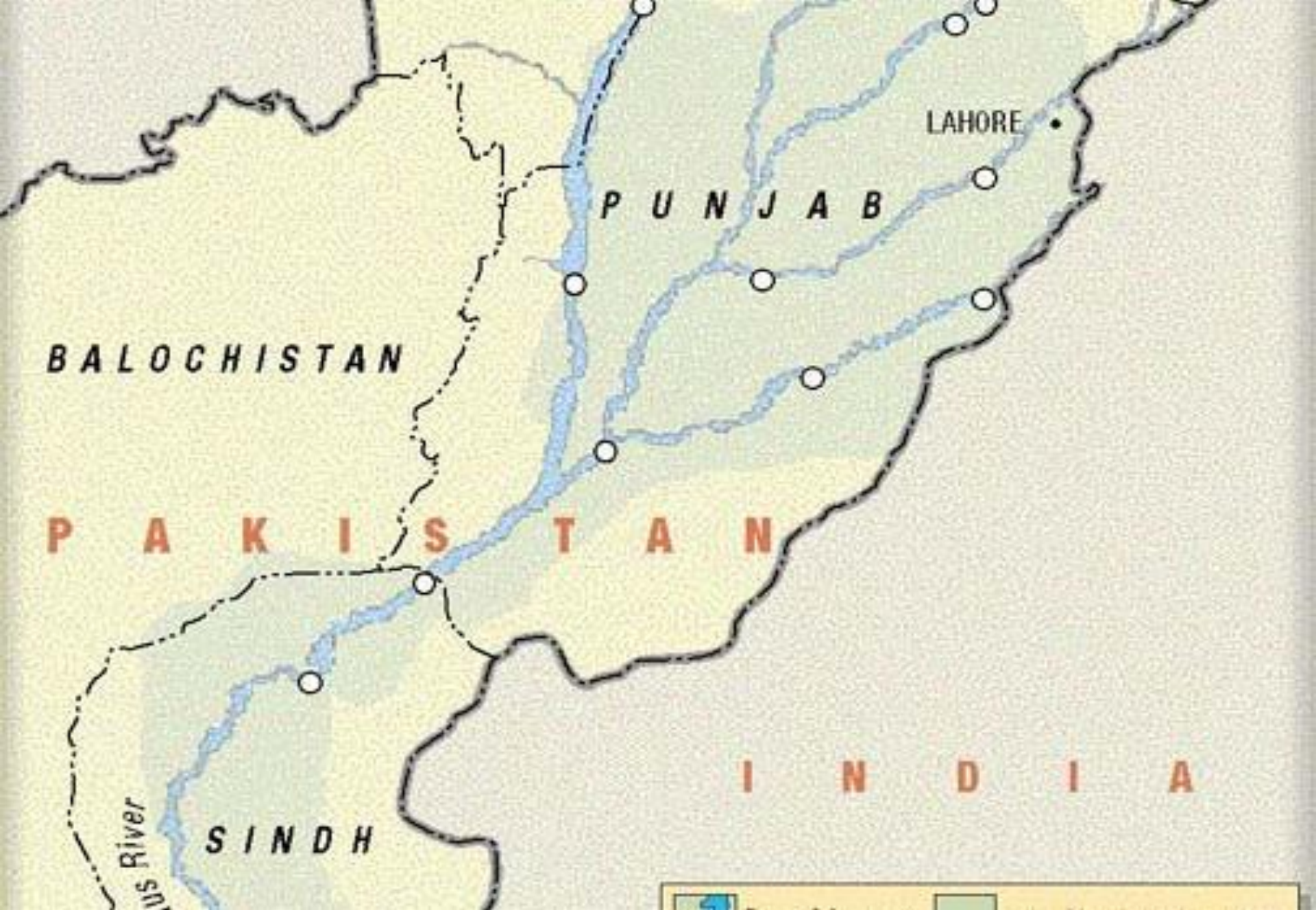
# Plateaus - Potowar Plateau

<b>Location</b>	East: River Jhelum , West: River Indus ,North: Margala Hills South: Salt Range . This consists of Attock, Chakwal, Jhelum and Rawalpindi districts in Punjab
<b>Average Height</b>	300 – 600 meters
<b>Relief &amp; Drainage Patterns</b>	Piedmont plateau merges into Margala Hills. Rugged topography with natural vegetative cover. Small streams and rivulets. River Soan is the largest river that merge into river Indus. Other rivers are Panaid, Dharab and Angori.
<b>Climate</b>	Semi-Arid climate. Summer is hot and moist. Winter is cold and chilled. Rainfall occurs in summer due to Monsoon and in winter relief and convectional rainfall bring precipitation.
<b>Human &amp; Economic Activities</b>	Population is moderate. Coal and oil are important minerals. Arid agriculture depends on rainfall. Crops are wheat, maize, millets, oilseeds, pulses and peanuts. Cattle rearing, mining and tertiary industries are important services.



# Salt Range

<b>Location</b>	East: Jhelum River, West: Indus River and district Bannu, North: Potowar Plateau, South: Upper Indus plain. This is located in district Chakwal and Khushab.
<b>Average Height</b>	900 – 1500 meters
<b>Relief &amp; Drainage Pattern</b>	This low height hill range consists of hillock and ridges. Steep slopes and cliffs. The river Soan is largest rivers supplemented by small streams and rivulets. Three lakes including Kalar Kahar, Khabeki and Uchali are located in this range.
<b>Climate</b>	Summer is mild near the peaks and warm at foothills. Winter is cold. Rainfall happens in summer due to Monsoon. Winter goes humid.
<b>Highest Peak and Valley</b>	Sakesar is the highest peak attaining a height of 1500 meters. Soan Sakesar is important valley located in district Khushab.
<b>Human &amp; Economic Activities</b>	Population is scarce. Agriculture, mining and cattle rearing is significant profession. Agriculture is done along the banks of river Soan in patches. Coal is important mineral. Khewara and Dandot are important coal mines.



**Indus Plains**

# A description of Indus Plains

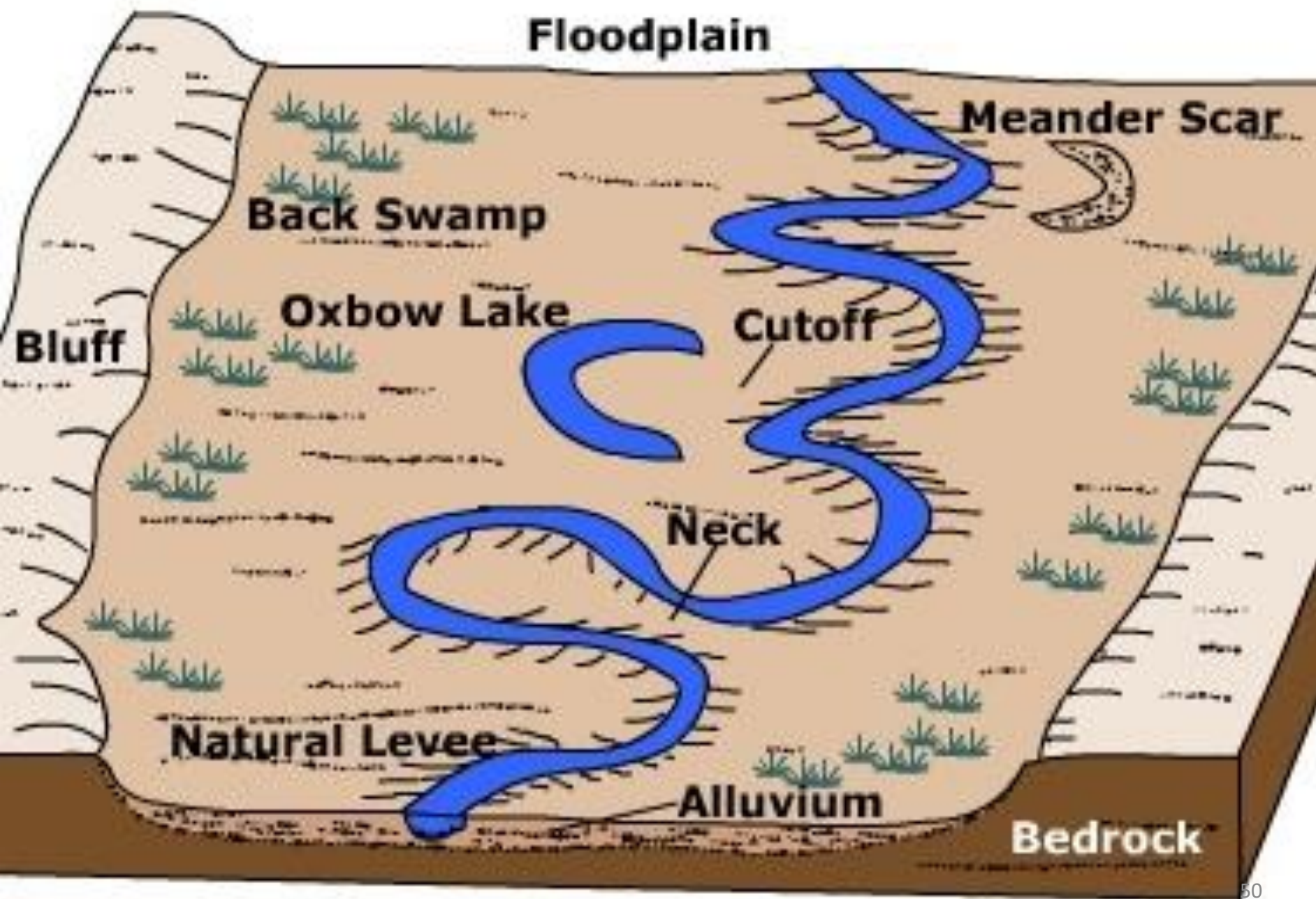
- **Location:** Indus plain of Pakistan is stretched from North to South. It consists of Punjab and Sindh provinces. It is divide into two parts Upper and Lower Indus plain.
- **Upper Indus plain** starts from Kalabagh (Attock) to MithonKot (D.G.Khan ) covering Punjab province.
- **Lower Indus plain** begins from MithonKot (D.G.Khan) to Karachi consists of south part of Punjab and whole province of Sindh.
- **Average height:** it attains about 200-300 meters height from sea level.
- **Relief:** Flat fertile plains. River Indus and its five tributaries form various physical features including Active flood plains, Old Flood Plains, Pied Mont Plains, Interfluves(Doabs) Alluvial terraces in upper Indus plains, while Lower Indus Plain has no Doabs. The river Indus makes delta near Karachi. It forms deltic plain in Sindh.
- **Climate:** Summer is hot and winter is cold in Indus Plains. Monsoon brings heavy rainfall from July to August. River floods in summer.
- **Human and Economic Activities:** Agriculture is most significant activities. Thickly populated. Indus plains are grain colonies of Pakistan. All types of industry have been set up.

# Important Features of Indus Plain

- The Indus Plain forms the following Features:
- Active Flood Plains: Active flood plains are found along the banks of the rivers. They are very fertile because flood water spreads alluvium every year. They stretch from 30-60 km
- Old Flood Plains: The old flood plains are situated next to flood plains. They consist of fertile soils. Flood comes in old flood plains after seven to eight years. They are also known as alluvial terraces.
- Piedmont Plains. The plain adjacent to river and mountain is known as piedmont plains. Such plain areas are found near Salt range Punjab and Kirthar range.
- Doab: The land found between two rivers is called interfluvies/ DOAB. (see figure of Doabs ).
- Delta: When river falls in the sea it makes a delta. Delta is a marshy land. Water stays in it.

















**Coastal Areas of Pakistan**



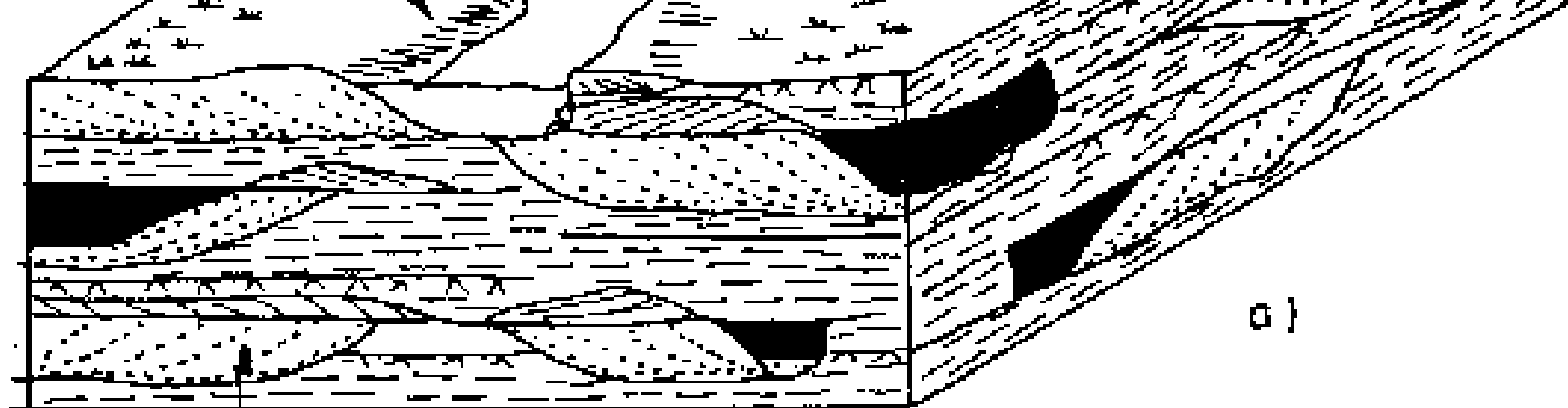
© 2003

**Indus Delta**





**Indus Delta**



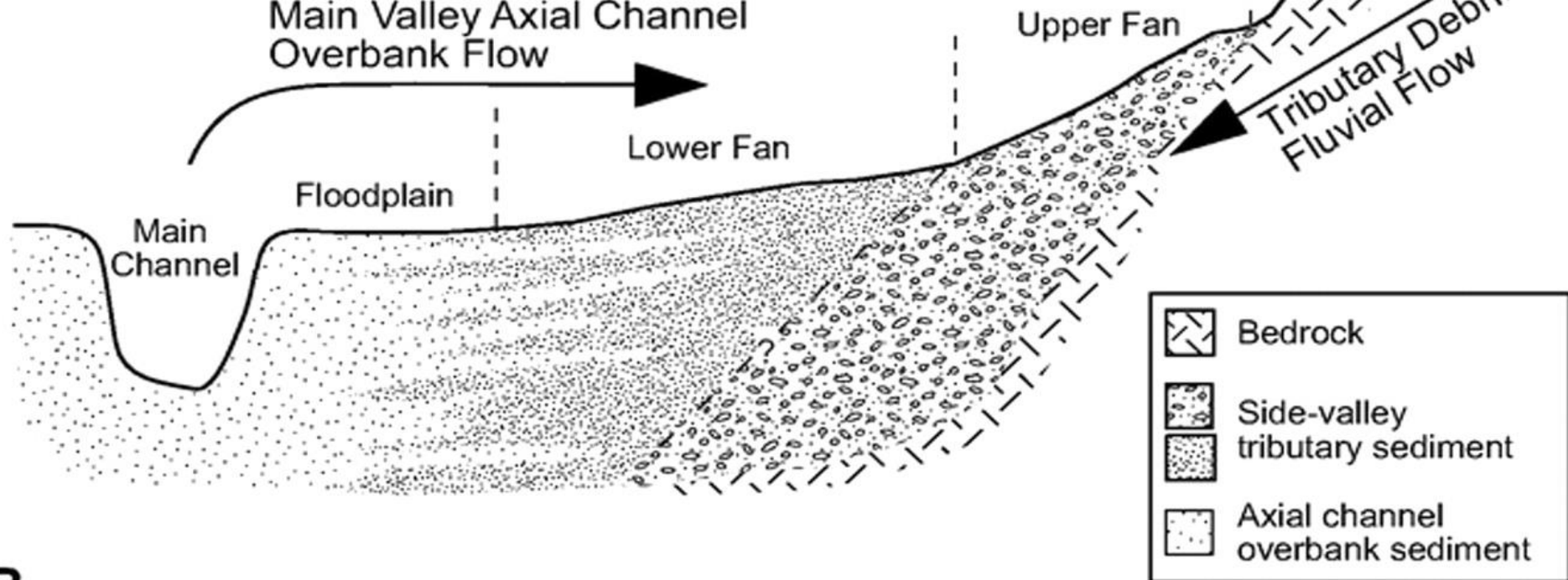
Old channel

Sand deposition in  
active braided channels

Mud deposition  
in abandoned  
channel







**B**

